

Earnings Quality

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Abstract

This monograph provides a thorough review of earnings quality issues and analysis. Its primary objectives are to help gain a deep understanding of earnings quality and facilitate the development of comprehensive, granular, and contextual earnings quality indicators and analyses. While there are several alternative definitions of earnings quality, the monograph focuses on the earnings sustainability or persistence view, which emphasizes valuation implications. With a working definition of earnings quality, the study then analyzes comprehensive and line-item financial statement indicators of earnings quality, and it relates the indicators to specific earnings quality issues. The monograph also describes nonfinancial indicators of earnings quality, including proxies for incentives and ability to manipulate earnings as well as transactions, events and circumstances that inform on earnings sustainability. The final two chapters discuss the role of earnings quality in valuation and review stock return anomalies related to earnings quality.

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Preface

Evaluating earnings quality has always been an important part of financial analysis and valuation. However, three trends have made such analysis even more consequential. First, due to the ***declining trend in long-term real interest rates*** since the mid-80s, the present value of long-term profits now accounts for a much larger proportion of total intrinsic value for most firms.² Accordingly, the long-term sustainability, or quality, of earnings has become the primary determinant of intrinsic value.³ The second trend, which has been at work for an even longer period but accelerated substantially due to COVID-19, is the ***increase in intangible intensity*** and, relatedly, in economic volatility, adjustment speed, and scalability (e.g., McKinsey & Company 2021). These changes have made reported earnings and book value poor proxies for future earnings (e.g., Srivastava 2014), in part due to accounting distortions (e.g., expensing of organic investments in intangibles). Using a forward-looking, holistic, and detailed approach to evaluating earnings power, which considers both financial and non-financial information, may mitigate these negative effects.⁴ The third trend is the ***increasing use of quality factors*** in risk models (e.g., Lambert et al. 2007, Fama and French 2015) and factor investing (e.g., Beck et al. 2016, Asness et al. 2019, Feng et al. 2020). In many cases, the measurement of these quality indicators appears rather arbitrary, and their selection is subject to potential data mining biases. There is also little consideration of economic and accounting relations among the factors. For example, Hsu et al. (2019) note: “Unlike standard factors, such as value, momentum, and size, ‘quality’ lacks a commonly accepted definition. Practitioners, however, are increasingly gravitating to this style factor. They define quality to be various signals or combinations of signals—some that have been thoroughly explored in the academic literature and others that have received limited attention.”

This monograph provides a thorough review of earnings quality issues and analysis. Its primary objectives are to help gain a deep understanding of earnings quality and facilitate the development of comprehensive, granular, and contextual earnings quality indicators and analyses. Identifying a wide-ranging set of potential earnings quality indicators is especially

² Equity duration is primarily related to real, not nominal interest rates because changes in interest rates due to changes in expected inflation are generally offset by changes in long-term nominal earnings.

³ A nice example of the impact of equity duration on the relationship between equity value and earnings sustainability is provided by Dechow et al. (2021). They hypothesize that pandemic shutdowns primarily impact short-term cash flows and should therefore have a greater impact on low-duration equities. Consistent with their hypothesis, they find that implied equity duration has a strong positive relation to U.S. equity returns during the onset of the 2020 COVID-19 shutdown. They also demonstrate that the underperformance of “value” stocks during this period is a rational response to their lower durations.

⁴ Reflecting the decline in the informativeness of reported earnings, many studies document a decrease in the explanatory power of earnings for stock returns (e.g., Dichev and Tang 2008). However, fundamental information has not necessarily become less important. Shao et al. (2021) replace earnings with earnings announcement returns as a measure of firm fundamental news and find that firm fundamentals have come to explain more, not less, price movement over time. Smith and So (2021) use the difference between the change in implied volatility of short-term options around earnings announcements and the expected change (measured using the difference between implied volatilities of short- and long-term options prior to the earnings announcement) to measure the risk information in earnings announcements. They show that risk information conveyed in earnings announcements has increased over time, consistent with the findings of Shao et al. (2021).

useful these days due to recent *developments in machine learning methods*, which allow one to extract information from a large set of variables. For example, Cecchini et al. (2010) and Bao et al. (2020) use machine learning methods to predict accounting fraud—an extreme cause of poor earnings quality—based on many raw financial data items. Other studies have used large sets of fundamental signals to predict earnings or stock returns (e.g., Chen et al. 2022, Yan and Zheng 2017). With a large set of theoretically motivated indicators of earnings quality, it may be possible to use machine learning models to derive more accurate forecasts compared to predictions based on a small set of theoretically motivated variables or a large set of variables with no underlying theory.⁵ Improvements may also result from partitioning variables into subsets based on the type of fraud or earnings quality issue they are likely to predict (e.g., Perols et al. 2017).⁶

The ability to conduct granular earnings quality analysis across large sets of companies has increased in recent years also due to *improvements in data availability* (in addition to modelling advancements). In particular, SEC-mandated structured disclosures in eXtensible Business Reporting Language (XBRL) format now provide comprehensive, machine-readable “as-filed” financial statement data for essentially all U.S. public companies. These data enable greater flexibility in analysis and may therefore yield more informative insights. For example, Du et al. (2021) find that discrepancies between XBRL and Compustat data, apparently a result of Compustat’s standardizations, affect inferences about the existence and magnitude of

⁵ Bao et al. (2020) describe the trade-off between using a small set of theoretically motivated ratios and a larger set of unstructured variables. “Ex ante, it is unclear whether fraud prediction models based on raw financial data can outperform fraud prediction models based on human expert-identified financial ratios. On the one hand, fraud prediction models based on financial ratios could be more powerful because the ratios identified by human experts are often grounded in theories that offer sharp prediction on when corporate managers have incentives to engage in fraud. Because fraud prediction models based on raw financial data are not directly linked to theory, they may be less powerful. On the other hand, existing theories about the drivers of accounting fraud may well be incomplete, as accounting fraud is, by definition, conducted in secrecy and designed to be difficult to detect. Accordingly, converting raw accounting data into a limited number of financial ratios based on potentially incomplete behavioral theories could mean the loss of useful predictive information. In contrast, fraud prediction models that make use of raw financial data could be more powerful because they do not impose any ex-ante structure on the raw data, instead letting them ‘speak for themselves.’ In addition, with the rapid advance of machine learning methods in computer science, fraud prediction models based on raw data can take on more flexible and complex functional forms. As a result, such fraud prediction models may be able to extract more useful information from raw data.”

⁶ Machine learning methods may be especially effective in detecting fraud when used with internal bookkeeping data. Liang et al. (2021) apply unsupervised machine learning methods to journal entry data from four different companies. They show that the techniques are effective in recognizing patterns in the data and thus in spotting anomalies, as evidenced by successful case studies and recalling injected anomalies including those created by audit practitioners. In motivating their approach, Liang et al. (2021) cite AICPA AU 316.61, which states that “inappropriate journal entries and other adjustments often have certain unique identifying characteristics. Such characteristics may include entries (a) made to unrelated, unusual, or seldom-used accounts, (b) made by individuals who typically do not make journal entries, (c) recorded at the end of the period or as post-closing entries that have little or no explanation or description, (d) made either before or during the preparation of the financial statements that do not have account numbers, or (e) containing round numbers or a consistent ending number. ... Inappropriate journal entries or adjustments may be applied to accounts that (a) contain transactions that are complex or unusual in nature, (b) contain significant estimates and period-end adjustments, (c) have been prone to errors in the past, (d) have not been reconciled on a timely basis or contain unreconciled differences, (e) contain intercompany transactions, or (f) are otherwise associated with an identified risk of material misstatement due to fraud.”

accounting-based anomalies, with factors calculated using XBRL data exhibiting greater stock return predictability.

While developments in machine learning and “big data” facilitate granular earnings quality analysis, they may imply less need for structure—“let the data speak for themselves.” In fact, the opposite is true. These developments suggest an increasing role for structure—accounting, financial, economic, and statistical. Without structure and transparency (as is the case with most machine learning methods), the out-of-sample validity of pure data mining is questionable and the ability to adjust the model and estimates for changing circumstances is limited.⁷ The increasing trends in intangible intensity, economic volatility, adjustment speed, and scalability mentioned above suggest that flexibility to account for changing circumstances is particularly important these days. The first wave of artificial intelligence models used expert systems, while the second shifted to machine learning. Combining the two may yield superior results.⁸ A primary objective of this monograph is to help facilitate such modelling in the context of earnings quality.

Developing a *large set of comprehensive and detailed earnings quality indicators*, and conducting *contextual analysis*, is important for two additional reasons. First, the ability of any single ratio to identify earnings quality issues is rather limited; essentially any “red flag” has an alternative, legitimate explanation. Second, while many of the indicators described in this monograph capture similar or related issues, they do so in ways that offer different advantages and disadvantages and often add incremental dimensions. For example, both accruals (net income minus cash flow from operations) and the cash conversion ratio (free cash flow divided by operating profit) reflect accruals management, but the cash conversion ratio also captures excess capitalization and it excludes financial accruals (e.g., noncash interest), which—compared to operating accruals—are less likely to be manipulated. On the other hand, the informativeness

⁷ For example, if the training period does not include events or circumstances similar to those underlying out-of-sample predictions—or more generally when past co-movements or patterns are not a good guide for the future—the estimates are likely to be highly imprecise. In such cases, incorporating accounting, financial and economic considerations (in addition to statistics) is particularly important. This can be done through: (1) careful selection, definition, and measurement of the variables (features); (2) imposing structure on the specifications (e.g., incorporating no-arbitrage conditions, allowing for select interactions, grouping variables into clusters, etc.); (3) adjusting the variables and specifications to the context; and (4) modelling causal or quasi-causal effects when such identification is feasible. I elaborate on these issues throughout the monograph. Recent research increasingly recognizes the importance of incorporating expert knowledge. For instance, Chen et al. (2021) implement deep neural networks to estimate an asset pricing model for individual stock returns using the no arbitrage condition as a criterion function. They conclude: “a successful use of machine learning methods in finance requires both subject specific domain knowledge and a state-of-the-art technical implementation.”

⁸ Quant funds often pay relatively little attention to accounting, financial and economic considerations, or they incorporate them separately. For example, a hedge fund may have two separate teams, one working on constructing the indicators/features and the other focusing on training models using the pool of indicators/features to predict stock returns. However, the contextual nature of the features and the interactions among them suggest that greater integration and a more robust process with respect to non-statistical considerations may yield better results. Dyer et al. (2021) examine quantitative investors’ ability to navigate the impact of new accounting standards on financial data. They find that relative to funds that rely heavily on human discretion to make investment decisions, the returns of quantitative mutual funds temporarily decrease following the implementation of standards that change the definition of key accounting variables. This effect is particularly strong for funds that rely heavily on accounting data and invest in many stocks.

of the cash conversion ratio with respect to earnings quality is reduced by growth capex and by the lumpiness of capex.

Considering multiple ratios not only *strengthens the inference* but also helps *identify the dominant earnings quality issue*. Continuing the previous example, if the cash conversion ratio suggests low earnings quality but reported accruals appear normal, then the earnings quality issue is more likely to be related to excess capitalization. Similarly, evaluating line-item indicators in a contextual way may help identify specific earnings quality issues. For example, an abnormal increase in days sales outstanding (i.e., receivables / revenue per day) concurrent with a decline in the gross margin suggest higher likelihood of channel stuffing or other sales pull-in activities,⁹ especially if the company has a lenient product-return policy, engages in factoring activities (possibly to reduce the buildup of receivables), or experiences excessive product returns or write-downs of receivables or returned products.

Contextualization may also help in evaluating whether accounting factors are likely to predict stock returns out of sample. Academics and practitioners study the *stock return predictability* of various accounting factors and document many significant relationships. However, at least some of these results are likely due to data mining (e.g., Harvey et al. 2016). One approach to differentiate real predictive ability from data mining is to evaluate the economic “story” associated with the factor or set of factors. A contextual analysis may help establish (or refute) an explanation. For example, if one hypothesizes that accruals predict stock returns because investors fail to fully identify accruals that reverse in the near term (triggering the stock returns), then the effect should be stronger for industries or firms with the following characteristics: (1) substantial working capital accruals (as opposed to long-term accruals such as depreciation and pension), (2) highly subjective assumptions and estimates (e.g., revenue transactions involving multiple performance obligations), and (3) little explicit or implicit transparency related to the assumptions, estimates or their impact (for example, limited disclosure related to performance obligations or an unstable relationships between total revenue and related metrics such as deferred revenue or “soft revenue,” which make it difficult to identify abnormal deviations).¹⁰

Contextualizing the analysis can be done not just by evaluating accounting disclosure and ratios (e.g., patterns across ratios or volatility over time) but also by considering the company’s ecosystem, business model, management incentives and ability to manipulate earnings, and other *nonfinancial indicators of earnings sustainability*. For instance, the inference related to

⁹ For example, according to Accounting and Auditing Enforcement Release (AAER) No. 4220, “Under Armour’s increasing reliance on pull forwards often resulted in it making multiple requests each quarter to its largest wholesale customers, and periodically offering sales incentives such as price discounts and extended payment terms. For example, in September 2016, Under Armour requested additional pull forwards from a key customer, after already having asked to move more than \$30 million in sales from the fourth quarter of 2016 to the third quarter of 2016. The customer responded by saying: ‘We just brought a bunch of your goods in early to help out your quarter... Now you want more... More..More..more..30% [price discount] please.’ Under Armour ultimately agreed to a 25% price discount and an extra 30 days to pay to secure an additional \$6.7 million of pull forwards.”

¹⁰ As discussed throughout the monograph, “red flags” for earnings manipulation are often triggered when ratios deviate significantly from their normal levels. For example, an abnormal decrease in [deferred revenue / revenue] or an abnormal increase in [“soft revenue” / revenue] suggests revenue overstatement. (“Soft revenue” includes sources of revenue that involve significant discretion such as construction and some services.) But for a ratio to be identified as abnormal, the relationship has to be relatively stable over time (until the deviation).

channel stuffing discussed earlier would be strengthened if there is evidence of inventory buildups at the company's customers, the company's earnings are just above an important benchmark (e.g., analysts' consensus forecast), or the firm's governance structure is weak.¹¹ Relatedly, recent research provides evidence that considering firm-level heterogeneity yields better estimates and more correct inference in earnings quality-related tests.¹²

Earnings sustainability is also related to the *economic environment* and to *industry-specific conditions and characteristics*. For example, earnings of cyclical firms are less sustainable when the economy is at the peak of the cycle, inflation often leads to an increase in near-term real earnings of capital-intensive firms (due to the protracted adjustment of depreciation to inflation), and tax law changes and foreign currency fluctuations add volatility to reported earnings. Accordingly, the monograph covers all these aspects and related indicators—comprehensive and granular, financial and nonfinancial, and firm-specific and economy-wide. Its overarching goal is to help facilitate the development of a holistic, detailed approach to earnings quality analysis.

Extracting information from earnings quality indicators requires *careful measurement*. For example, when using days sales outstanding (DSO) to evaluate the quality of quarterly revenue, it is important to use trailing-four-quarters revenue in measuring daily revenue (the denominator of DSO) to mitigate the effect of any overstatement of quarterly revenue on estimated daily revenue (which is effectively assumed non-discretionary when using DSO to evaluate earnings quality). In addition, to mitigate the effects of seasonality and to identify manipulation in the most recent quarter (as opposed to in the trailing four quarters), one should examine the difference between (DSO[end of quarter] - DSO[beginning of quarter]) and the value of this difference a year ago. A significantly positive value for this difference-in-difference implies that quarterly revenue is overstated. To control for economy- and industry-wide effects, one may subtract the median value of this variable across peer companies (effectively difference-in-difference-in-difference). Still, the DSO indicator may contain error due to changes in business mix, M&A, or F/X translation effects. Thus, adjusting the ratio to mitigate these effects, or at least evaluating their likely significance, should help yield more correct inference. The monograph dives deep into such measurement issues.

While the potential of a detailed and contextual earnings quality analysis to provide relevant insight has long been recognized in the academic literature (e.g., Bernard and Stober 1989, Lev and Thiagarajan 1993), there has been relatively little research that employs such analysis (Melumad and Nissim 2009, Beneish et al. 2013). In contrast, granular fundamental analysis has been conducted by some research firms, institutional investors, and other practitioners (e.g., Bellovwy and Don 2005, Estridge et al. 2009, Khan et al. 2020). The discussion and analysis provided by this monograph are intended to help *facilitate informed earnings quality evaluations by practitioners and academics*.

¹¹ Bertomeu et al. (2020a) use machine learning methods to detect accounting misstatements. They find that while accounting variables do not detect misstatements well on their own, they become important when audit and market variables are accounted for.

¹² For example, Breuer and Schutt (2021) document that accounting for firm-level heterogeneity in earnings/accruals processes results in more precise estimates of normal accruals, and Ball and Nikolaev (2021) show that earnings outperform operating cash flow in predicting future operating cash flow especially when allowance is made for cross-sectional differences in the relation between firms' earnings and future cash flows.

Another objective of this study is to ***review related findings of recent research***. In reviewing academic studies, the monograph focuses on implications for financial analysis—particularly for forecasting—rather than on methodological contributions, theoretical insights, or causal effects. The monograph also describes many analyses on which there is relatively little (if any) empirical evidence, thereby identifying research opportunities. For example, revenue growth decompositions (discussed in Section 3.1.4) are commonly used in practice in the context of forecasting revenue, but they are also likely to provide relevant insight about earnings sustainability. Yet, to my knowledge this issue has not yet been academically explored.

The study starts with an overview of earnings quality (Chapter 1). While there are several alternative definitions of earnings quality, the monograph focuses on the earnings sustainability or persistence view, which is consistent with practice and most academic research. This interpretation emphasizes valuation implications: high earnings sustainability implies that value estimates derived using price multiples are relatively accurate, because current earnings are a good proxy for future earnings. High earnings sustainability also implies that the current margin is a reasonably accurate estimate of future margins, which are key inputs in fundamental valuation models. With a working definition of earnings quality, the study then analyzes comprehensive (Chapter 2) and line-item (Chapter 3) financial statement indicators of earnings quality. Chapter 4 discusses nonfinancial indicators of earnings quality, including proxies for incentives and ability to manipulate earnings as well as transactions, events and circumstances that inform on earnings sustainability. Chapter 5 describes potential earnings quality issues for each key line item from the financial statements, related red flags, and how to address the issues in financial analysis and valuation. To enhance the reader's understanding of the earnings quality issues, each section of Chapter 5 starts with a review of the related accounting principles. Chapter 6 discusses the role of earnings quality in valuation, while Chapter 7 reviews stock return anomalies that are directly or indirectly related to earnings quality. Chapter 8 concludes.

Most of the sections of this monograph can be read on a standalone basis, which is important given its length, although it necessitates some repetition. To further facilitate targeted reading, the monograph contains many tables and exhibits that summarize key insights.

1. Overview of Earnings Quality

1.1 Defining earnings quality

The academic and professional literatures suggest alternative definitions, attributes, and proxies for earnings quality. High quality earnings are (1) sustainable, (2) free of error and manipulation, (3) informative, (4) accurate measure of value creation, or (5) conservative. This section explains the five definitions and related attributes and proxies, and then elaborates on their importance and the relationships among them.

1.1.1 Sustainable

Earnings are of high quality if they are *expected to recur* and thus reflect the “earnings power” of the company. Sustainability or persistence is apparently practitioners’ most common definition of earnings quality (e.g., Brown et al. 2015b, Dichev et al. 2013), and it is the one emphasized in this monograph. Related definitions of high-quality earnings include:

- Are from *normal core operations*
- Are free of or reflect limited effect of special, one-time, or volatile charges (e.g., restructuring, impairment), transactions (e.g., realized gains or losses), or adjustments (e.g., fair value, F/X)
- Follow the *matching* principle
- Reflect *consistent reporting* choices over time¹³
- Are *predictable* (e.g., Brown et al. 2015b, Dichev et al. 2013)
- Exhibit *smoothness* or *low volatility*. If on average earnings are expected to grow, low earnings variability implies low likelihood of earnings declines and therefore high earnings sustainability. However, earnings that are too smooth relative to cash flow volatility may indicate earnings manipulation (e.g., Leuz et al. 2003).

1.1.2 Free of error and manipulation

Earnings are of high quality if they:

- Accurately reflect *economic reality*
- Accurately reflect *application of GAAP*
- Include a relatively small non-cash, *accruals* component (e.g., Sloan 1996) or have accruals that are strongly related to past or future cash flows (e.g., Dechow and Dichev 2002)
- Include few long-term or “soft” *estimates*
- Were subject to *high quality audit* (e.g., big 4 auditor)
- Are reported by companies with *strong governance structure* (e.g., Brown et al. 2015b)
- Are reported by *credible management*. Given the substantial judgment that management has in measuring and reporting financial information, management creditability is a key determinant of the quality of financial reports (e.g., Brown et al. 2015b, Wells 2020). This

¹³ For example, Peterson et al. (2015) find that accounting consistency over time (textual similarity of accounting policy footnotes disclosed in 10-K filings) is positively associated with earnings persistence, predictability, accrual quality, and absolute discretionary accruals.

dimension of earnings quality is important also because management provides many additional disclosures besides the financial statements (e.g., MD&A, press releases, investor conference calls, investor presentations), and the reliability of these disclosures is likely correlated with that of the financial statements.

1.1.3 Informative

High-quality earnings are likely to change investors' expectations of cash flows or risk. Informativeness can be measured in several ways:

- *Market reaction*, including the direction, magnitude of stock returns in relation to earnings (e.g., earnings response coefficient), the magnitudes of earnings announcement returns and abnormal trading volume (e.g., Binz and Graham 2020), and the speed with which stock prices reflect earnings news (e.g., Berkovitch et al. 2021). However, abnormal volume may alternatively indicate investor disagreement regarding the valuation consequences of earnings announcements, which can be construed as low earnings quality (Abdel-Mguid et al. 2019).
- *Disclosure quality and quantity*. Financial reports (including periodic reports, current 8-K reports, prospectuses, and other reports or filings) contain substantial information besides bottom-line earnings. This concept of earnings quality focuses on the comprehensiveness, accuracy, and transparency of the firm's disclosures (e.g., Francis et al. 2008).¹⁴ Chen et al. (2021a) extend this concept to non-GAAP earnings metrics. Specifically, using qualitative characteristics of non-GAAP earnings disclosures,¹⁵ they find that more transparent qualitative information in non-GAAP disclosures is associated with more transitory non-GAAP exclusions and a lower likelihood that managers will aggressively exclude expenses in calculating non-GAAP earnings to meet or beat analysts' forecasts. Using a broad definition of reporting quality is important because disclosures may substitute for low-quality financial statements. For example, Brown et al. (2021) find that firms with lower value relevance of financial statements (1) are more likely to provide non-GAAP disclosure in the MD&A, (2) include more forward-looking statements in the MD&A, and (3) use larger proportions of the MD&A to discuss intangibles and discuss them more prominently.
- *Comparability*. To obtain insights from financial ratios (e.g., profit margin), one needs to compare them to relevant benchmarks (e.g., the average profit margin across peers). Therefore, companies that use accounting methods that are consistent with those used by their peers (for example, use the FIFO inventory assumption if most peers also use FIFO), or that have characteristics (e.g., business model) similar to their peers, are generally easier to

¹⁴ For example, Bird and Karolyi (2016) hypothesize that inclusion of similar-size companies in the Russell 2000 instead of Russell 1000 (i.e., being among the smallest Russell 1000 companies versus being among the largest Russell 2000 companies) should be associated with higher demand for information from institutional investors. If included in the large companies Russell 1000 index, these companies have a negligible effect; in contrast, if included in the Russell 2000, they have a much larger effect on the index. Consistent with their hypothesis, Bird and Karolyi (2016) document 1.7% more 8-K filings, 2.0% more items per 8-K filing, 4.7% longer length, 21.3% more embedded graphics, and 1.4% more exhibits for the Russell 2000 companies.

¹⁵ The qualitative characteristics of non-GAAP reporting examined are: (1) discussion of reasons justifying non-GAAP measures, (2) clear labeling of non-GAAP versus GAAP measures, (3) equal prominence in presenting non-GAAP versus GAAP measures, (4) clear reconciliation between non-GAAP and GAAP measures, (5) consistency of non-GAAP measures between periods, and (6) clear presentation of tax effects.

analyze. In other words, comparability increases the informativeness of earnings.¹⁶ Comparability may also be negatively associated with the likelihood of earnings manipulation. For example, firms that use reporting choices different from industry norms are perceived more likely to be misstating firms (e.g., Dichev et al. 2013).

- *Cash flow predictability.* High quality earnings facilitate precise predictions of future cash flows (e.g., Brown et al. 2015b, Ball and Nikolaev 2021).

1.1.4 Accurate measure of value creation

This interpretation of earnings quality is related not just to the *accuracy of earnings in measuring changes in value* but also to payout, profitability, and share buybacks.

- *Payout and profitability.* The value creation associated with earnings—and therefore their quality—depends on whether generating them required reinvestment of previously earned profits or issuance of additional capital. In general, for the same level of earnings, earnings quality increases with (prior) net payout, because high payout implies that the earnings are due to persistent rates of return rather than to return on additional investments (Estridge et al. 2009). High dividend payout also implies high earnings stability (e.g., Nissim and Ziv 2001, Skinner and Soltes 2011) and lower probability of accounting fraud (Caskey and Hanlon 2013).
- *Share buybacks.* If the earnings construct whose quality is being evaluated is a per share measure, to the extent that its growth or sustainability are due to share buybacks (which reduce the denominator), earnings quality is low because share buybacks increase leverage and risk (e.g., Hribar et al. 2006).

1.1.5 Conservative

The accounting literature suggests two versions of conservatism:

- *Unconditional conservatism.* Earnings are of high quality if they are measured using conservative accounting principles, which result in understated assets and equity (e.g., Beaver and Ryan 2005).
- *Conditional conservatism.* Earnings are of high quality if they reflect losses in a timelier manner than gains (Basu 1997).

1.1.6 Discussion and comparison of the different definitions

While some of the above earnings quality definitions are related, they are generally distinct from one another and often have contradictory implications. For example, fair value accounting—that is, measuring assets and liabilities at fair value with unrecognized gains and losses included in income—may improve the accuracy of earnings as a measure of change in value, but it is likely

¹⁶ Academic research often measures financial reporting comparability based on the similarity of the earnings-return relation across firms. The following are two examples of studies that examine the effects of financial reporting comparability. DeFranco et al. (2011) provide evidence that financial statement comparability lowers the cost of acquiring information and increases the overall quantity and quality of information available to analysts about the firm. Nam (2020) finds that when peer selection takes financial reporting comparability into account, the earnings of peer firms with high financial reporting comparability serve as a performance benchmark for determining CEOs' cash compensation.

to reduce their sustainability, predictability, and usefulness (e.g., Nissim and Penman 2008, DeFond et al. 2020). As another example, when managers smooth earnings over time—a widespread form of earnings management—they increase the persistence, stability and predictability of earnings but weaken the relationship between earnings and cash flows, because earnings management is often conducted through the management of accruals.

Accounting *conservatism* is viewed by many as an important determinant of earnings quality. This is due in part to the perception that earnings are less likely to be proven overstated if they are measured using conservative accounting principles. In fact, conservative accounting principles—such as the immediate expensing of R&D outlays—often result in overstated earnings. For example, a firm that made substantial investments in R&D in past years and currently focuses on producing and marketing the products that resulted from those efforts will report overstated earnings, because the R&D investments were expensed in prior years instead of being matched against current revenue. Moreover, the immediate expensing of R&D costs allows companies to manipulate earnings by changing these expenditures (e.g., Chan et al. 2015). In contrast, with “unbiased” accounting, under which R&D costs are capitalized and subsequently amortized, such manipulation is not feasible. The effects of accounting conservatism are pervasive; they apply to most organic investments in intangibles (e.g., human capital, information technology, advertising, R&D) as well as to other items.

Another example of the potential negative effects of conservatism on earnings quality is the recognition of impairment losses. Such losses introduce volatility into reported earnings, reducing their sustainability. Moreover, overstated impairment losses (e.g., due to “big bath” charges) increase subsequent earnings because of the reduction in the depreciation of impaired assets. When the impaired assets are replaced, however, earnings decline.

As noted earlier, the most common interpretation of earnings quality is that of earnings persistence or *sustainability*. This is due to several reasons. First, because price reflects expectations about earnings over many future years, earnings sustainability is a key factor in valuation (see Chapter 6). In price multiple valuation, equity value is typically estimated by applying a multiple to an earnings construct (e.g., EPS, EBITDA); high earnings sustainability implies that price-multiple valuation is likely to yield precise value estimates because current earnings are a good proxy for future earnings (e.g., Liu et al. 2002, 2007; Nissim 2019a). In fundamental valuation, one predicts long-term margins to convert sales forecasts into profit estimates; high earnings sustainability makes the current margin a good proxy for future margins. More generally, earnings sustainability implies earnings predictability, which is an important aspect for many users of financial information. Relatedly, high earnings sustainability implies low levels of information risk and value uncertainty.¹⁷

Earnings sustainability is also important to non-equity stakeholders, such as lenders, suppliers, and employees, who care about the ability of the company to continue to meet its obligations and prosper over time. Even short-term creditors are interested in the sustainability of earnings

¹⁷ In the auditing literature, information risk is defined as the probability that the information circulated by a company is false or misleading. In other literatures, information risk refers to the risk of significant information asymmetry (also referred to as information asymmetry risk), especially when the decision maker has the information disadvantage. High earnings sustainability is likely to mitigate both dimensions of information risk.

because perceptions of earnings sustainability affect the ability of the company to refinance its short-term obligations. Regulators are another group of stakeholders that care about assessing earnings sustainability as it often reflects monopolistic power. This monograph accordingly emphasizes the sustainability view of earnings quality and uses it as the primary benchmark when evaluating earnings quality.

Sustainability may be the prevalent interpretation of earnings quality for practitioners, academics and, originally, the FASB. However, over the last three decades the FASB and IASB have been increasingly setting standards that emphasize the measurement of assets and liabilities (e.g., fair valuing some investments, asset-liability approach for measuring deferred taxes, impairment tests) over that of sustainable profits (e.g., historical cost measurement, the matching principle).¹⁸ These new standards tend to reduce the persistence of reported earnings (e.g., Nissim and Penman 2008). For example, fair value income reflects changes in the fair values of assets and liabilities, which tend to be uncorrelated over time. At the extreme, under perfect fair value accounting, the mark-to-market adjustment anticipates and recognizes in current earnings all the value implications of current operations, so future earnings only reflect future shocks to profitability and are therefore unrelated to current earnings. In contrast, historical cost measures of income focus on realized earnings from operating activities, which tend to be relatively persistent over time, especially if they reflect proper matching of expenses with revenue.

The income statement reports several performance measures, including revenue, gross profit, operating income, pretax income, and net income. In addition, companies and users of the financial statements often define additional performance metrics, including EBITDA, EBITA, and alternative measures of “recurring” or “core” earnings (e.g., non-GAAP EPS, “Street earnings”). Therefore, when discussing earnings quality, it is important to describe the construct whose quality or sustainability is being evaluated. In addition, if one uses an earnings measure that excludes some items (e.g., EBITDA), the *(in)completeness* of the measure is also relevant for evaluating its quality (in addition to its sustainability). For example, executives, analysts and other market participants increasingly measure operating profitability using earnings before interest, taxes and amortization (EBITA; e.g., Ciesielski and Henry 2017, Nissim 2019a, Laurion

¹⁸ The differences in views regarding the desirability of balance sheet focused standards between the FASB and constituents (preparers, users, audit firms, etc.) were often reflected in the standard setting process. In several cases the FASB proposed standards that required extensive fair value measurement, and then feedback from constituents resulted in final standards with less fair value measurement. For example, the initial exposure draft on accounting for financial instruments, released in May 2010, proposed fair value measurement of all financial instruments on the balance sheet, including loans and deposit liabilities. The final standard, ASU 2016-01, retained a mixed-attribute measurement model. In discussing the basis for conclusions, the standard states:

“BC28. Few stakeholders, including users, on the 2010 proposed Update supported measurement of virtually all financial instruments at fair value. For example, many stakeholders commented on the difficulty and inherent subjectivity of determining fair value for financial instruments that do not trade in active markets. In addition, many preparers as well as users of financial information were concerned that the resulting volatility in reported comprehensive income would not appropriately reflect the way in which an entity manages its financial instruments and, thus, would not be an improvement to financial reporting.

BC29. Most stakeholders who provided input favored a mixed measurement attribute model and supported retaining more extensive use of amortized cost measurement for most loans, core deposits, and most financial liabilities. The Board redeliberated the guidance in the 2010 proposed Update in light of the feedback received and developed a measurement model that would result in amortized cost measurement for some financial assets and most financial liabilities for which the 2010 proposed Update would have required fair value measurement.”

2020). However, a relatively high and sustainable EBITA does not necessarily imply strong performance or value creation. For example, if a company develops a new technology, its EBITA will be reduced by R&D expenses during the development years. In contrast, if the company acquires a business that already developed that technology, EBITA will not reflect the cost of developing the technology. In both cases, though, EBITA will reflect the benefits from the new technology. Thus, focusing on EBITA may create the impression that acquisitive companies are able to indefinitely generate high margins, when in reality EBITA margins are not sustainable without periodically engaging in acquisitions (and paying for the acquired intangibles).

In fact, the concern about the incompleteness of earnings measures that exclude some items also applies to bottom line earnings, for two reasons. First, net income excludes other comprehensive income items, which may be systematically negative (e.g., Mahmood et al. 2020) due, for example, to the manipulation of pension assumptions (see Section 5.10) or to “gains trading” (Section 5.13). Second, while net income reflects the cost of debt capital (interest expense), it excludes the cost of equity capital.¹⁹ This suggests that another dimension of earnings quality that should be considered is the extent to which the sustainability of reported earnings is due to persistent profitability (ROE) versus earnings reinvestment or stock issuance. For example, if two companies generate the same constant earnings stream but one has a full *payout* while the other reinvests all earnings, the quality of the latter’s earnings is lower in the sense that generating them required that shareholders forfeit their dividends. One may differentiate between the two companies by examining the sustainability of profitability in addition to that of earnings—the profitability of the full payout company remains unchanged, while that of the other company declines over time (same earnings but equity is growing due to the reinvestment of earnings). I elaborate on the implications of profitability for earnings quality in Section 2.8.

The use of non-bottom-line earnings suggests another dimension that should be examined when evaluating earnings quality: the ease with which users of the financial statements can calculate alternative earnings metrics from the company’s disclosures. For example, investors and other market participants pay more attention to recurring revenue and expenses than to “one-time” items. *Transparent disclosures* that allow users to easily identify and exclude (or smooth) transitory (volatile) items facilitate the calculation of potentially informative pro-forma earnings metrics. Relatedly, firms may intentionally *classify* one-time gains as recurring revenues, net gains against expenses, or classify recurring expenses as one-time losses, to manipulate external users’ perception of recurring performance.²⁰ For the same reason, companies may also

¹⁹ Some academics and practitioners define earnings measures that account for the cost of equity capital; these measures are referred to as residual income, abnormal earnings, EVA, or economic profit (see, e.g., Ohlson 1995).

²⁰ The Securities and Exchange Commission (SEC) issues Accounting and Auditing Enforcement Releases (AAER) pertaining to financial reporting enforcement actions against companies, auditors, and officers. The following are examples of SEC enforcement actions regarding classification manipulation. According to AAER No. 1405, in 1995 Waste Management netted one-time gains against operating expenses. According to AAER No. 2127, in 2000 and 2001 Qwest sold indefeasible rights of use of portions of its domestic fiber-optic network (part of PP&E) and reported the gross amount as revenue. According to AAER No. 1721, in 1997 Smar Talk inflated earnings before one-time charges by reporting a one-time restructuring charge that included recurring operating expenses. More recent examples are discussed in Chapter 5. Academic research provides large-sample evidence on this form of earnings management. For instance, McVay (2006) finds that managers opportunistically shift expenses from recurring items (cost of goods sold and SG&A expenses) to “special items”, in order to overstate “core” earnings.

manipulate footnote disclosure. For example, examining segment disclosures, Lail et al. (2014) find that in some cases managers shift expenses from core segments to the corporate/other segment, to increase the reported performance of those segments. Obviously, such activities lower earnings quality, broadly defined.

Firms have substantial **discretion** in measuring earnings. Accordingly, an important determinant of earnings quality is the extent to which earnings have been “managed” (i.e., manipulated), which is discussed in the next section. In fact, earnings management activities are discussed throughout this monograph, and are often the focus of the analysis (e.g., in the discussion of evaluating earnings quality issues in Chapter 5).

Earnings sustainability is affected not just by accounting-related discretion, but also by the firm’s **business model** (e.g., capital intensive versus labor intensive, the length of the operating cycle),²¹ and management’s **economic decisions** (e.g., overinvestment). In addition, earnings sustainability is affected by **innate factors** (i.e., out of the firm’s hands) such as the *industry* that the firm belongs to (e.g., cyclical versus defensive, opaque versus transparent financial statement line items²²), the *specific economic conditions* under which the firm operates (for example, earnings are less sustainable if the demand for the firm’s products declines), *GAAP* (e.g., deviation from matching, inconsistent reporting of similar transactions such as operating versus finance leases or acquired versus internally-developed intangibles), *regulation and supervision* (e.g., SEC enforcement activities),²³ *economy- and industry-wide conditions* (e.g., earnings are less sustainable when the economy is at the peak of the cycle), and other factors. In a survey of financial executives (Dichev et al. 2013), respondents argued that innate factors’ influence on earnings quality is as high as that of management choices. Accordingly, an analysis of earnings quality should cover all aspects of earnings sustainability, not just those related to the firm’s accounting choices. Many of the red flags and analyses discussed in this monograph evaluate the impact of innate and economic factors on earnings sustainability.

1.2 Earnings management

Healy and Whalen (1999) define earnings management as follows: “Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported

²¹ Capital intensity and long operating cycle imply a more significant role of estimates (and thus potential error and manipulation) and larger impact of historical cost distortions. In addition, the operating cycle is correlated with operating volatility, which in turn affects earnings sustainability (e.g., Kiriukhin 2018).

²² For example, banks are considered difficult to evaluate, in part due to the opaqueness of their primary asset—the loan portfolio. Similarly, derivatives transactions, which vary in prevalence across industries, are considered especially opaque.

²³ For example, Bonsall et al. (2021) find that higher case backlog at SEC Division of Enforcement offices decreases the likelihood of investigation initiation. In addition, busy SEC offices are less likely to pursue cases with the largest shareholder losses, presumably because large-loss cases take longer to close. Backlog also appears to impact pursued investigations, leading to longer investigations, a lower AAER likelihood, and smaller SEC or DOJ penalties. Importantly, the authors provide evidence that uninvestigated firms exhibit lower earnings quality and returns in future periods.

accounting numbers.” I next expand on this definition and provide an overview of related findings from the literature.

People often refer to earnings management as synonymous with earnings overstatement. However, earnings management also includes situations where firms make accounting choices that result in *understated earnings*.²⁴ For example, the financial executives surveyed by Dichev et al. (2013) estimated that when earnings are misstated, the direction of the misrepresentation is negative in about one third of cases.²⁵ Moreover, firms may manage line items from the financial statements or other financial disclosures in ways that do not affect bottom line earnings (e.g., classifying recurring expenses as “unusual items” or manipulating fair value disclosures). Such activities are often conducted for the same reasons that firms manage bottom line earnings (e.g., to influence investors’ perception of performance or risk). References to “earnings management” typically include such activities as well.

Earnings are the total of *cash flow from operations* and *accruals*. Thus, firms may manage earnings by manipulating either the accruals or cash flow components of earnings. This distinction is related to—but not the same as—the distinction between manipulating *accruals estimates* versus engaging in *real earnings management* activities. Traditionally, earnings management has been conducted by manipulating accruals estimates (e.g., depreciation assumptions, bad debt and warranty estimates, impairment), but increasingly firms appear to manage earnings by engaging in real activities such as cutting R&D or advertising,²⁶ stuffing distribution channels, overproducing, or delaying the start of a new project. Unlike the management of accrual estimates, real earnings management generally affects both the accruals and cash flow components of earnings, and not necessarily in the same direction. For example, overproducing increases the accrual component of earnings, but this effect is partially offset by a negative effect on cash from operations (see Sections 3.3.1 and 5.3). In contrast, cutting R&D expenditures increases both the accruals and cash flow components of current earnings.

The circumstances, timing, extent, and consequences of accruals manipulation and real earnings management activities are generally different. Research suggests that firms first overstate accruals estimates and resort to real transactions management when accruals become excessive (e.g., Roychowdhury 2006, Badertscher 2011). In addition, because they involve transactions, real earnings management activities may have more negative effects on firm performance and stock returns than accruals management (e.g., Cohen and Zarowin 2010, Kothari et al. 2015). For instance, overproduction increases the costs of carrying inventory, and selling appreciated assets imposes a tax cost. Compared to accruals management, the timing of the market reaction to real

²⁴ For example, according to AAER 2676, Nortel Networks Corporation lowered its consolidated earnings to bring it in line with internal and market expectations and establish excess reserves that can be used to increase reported earnings in subsequent periods.

²⁵ These estimates are similar to those provided by Nelson et al. (2003), who conducted a survey of 253 auditors regarding the approaches managers use to attempt earnings management. Of the 515 attempts described by the auditors, 272 (53 percent) increased current-year income, 159 (31 percent) decreased current-year income, and 84 (16 percent) had no clear current-year income effect.

²⁶ Decreasing discretionary spending is one of the most common earnings management choices to meet an earnings target (Graham et al. 2005). Discretionary expenses include R&D, advertising, maintenance, training expenses, and other items (e.g., Dechow and Sloan 1991, Bushee 1998, Roychowdhury 2006).

earnings management activities may be especially delayed, because it is often hard to discern whether the motivation for real actions, such as cutting R&D or advertising, is a business decision or earnings management (Gunny 2010, Dichev et al. 2013, Huang et al. 2020). Relatedly, a reduction in SG&A expenses may reflect efficiency improvements rather than decreases in expensed investments (e.g., hiring costs, training, IT). The tendency of firms to engage in real earnings management activities increased significantly after the passage of SOX in 2002 (Cohen et al. 2008).

Arguably, many earnings management activities reduce earnings quality. However, some forms of earnings management, particularly *earnings smoothing*, may in fact improve the informativeness of reported earnings (e.g., Tucker and Zarowin 2006, Baik et al. 2020). Therefore, when evaluating earnings management for valuation purposes, it is important to examine not only whether earnings have been managed, but also the potential implications for earnings sustainability and equity value. Doing so requires an understanding of the objectives of earnings management. [Chapter 4](#) provides a detailed discussion of nonfinancial indicators of earnings quality, many of which are related to incentives and ability to manage earnings. I next describe the underlying forces that create or counterbalance such incentives.

1.2.1 Incentives to manipulate earnings

The use of accounting information in valuation generates *capital-market incentives* to manage earnings.²⁷ Managers may manipulate earnings to improve market participants' perception of the firm's performance or risk. For example,

- Investors' use of benchmarks such as previous year earnings or analysts' forecasts in evaluating performance may motivate firms to overstate earnings to *meet or beat these targets* (e.g., Burgstahler and Dichev 1997).²⁸
- Anecdotal and empirical evidence suggests that investors prefer smooth earnings and persistent patterns of increasing earnings over volatile ones. This may induce firms to *smooth earnings* over time (e.g., Subramanyam 1996, Barth et al. 1999).
- Firms may take a "big bath" charge (e.g., write down assets or overstate estimated liabilities such as accrued restructuring costs), hoping that investors will treat it as a one-time item, and

²⁷ Dechow et al. (1996) investigated 92 AAERs on earnings manipulation between 1978 and 1990. They find that among 39 AAERs that provided at least one explanation for earnings management, the main motivations included issuing securities at higher prices (22 cases), reporting upwardly trending EPS (11 cases), increasing the size of earnings-based bonuses (7 cases), and profiting from insider trading (6 cases).

²⁸ "Charlie and I have never focused on current-quarter results. Berkshire, in fact, may be the only company in the Fortune 500 that does not prepare monthly earnings reports or balance sheets. ... Furthermore, Berkshire has no company-wide budget (though many of our subsidiaries find one useful). Our lack of such an instrument means that the parent company has never had a quarterly "number" to hit. Shunning the use of this bogey sends an important message to our many managers, reinforcing the culture we prize. Over the years, Charlie and I have seen all sorts of bad corporate behavior, both accounting and operational, induced by the desire of management to meet Wall Street expectations. What starts as an "innocent" fudge in order to not disappoint "the Street" – say, trade-loading at quarter-end, turning a blind eye to rising insurance losses, or drawing down a "cookie-jar" reserve – can become the first step toward full-fledged fraud. Playing with the numbers "just this once" may well be the CEO's intent; it's seldom the end result. And if it's okay for the boss to cheat a little, it's easy for subordinates to rationalize similar behavior." *Warren Buffett's 2018 Letter to Berkshire Hathaway Shareholders*

subsequently report lower recurring expenses (e.g., lower depreciation, Riedl 2004; reversal of estimated liabilities, Moehrle 2002).

- Firms may shift expenses from recurring items (cost of goods sold, SG&A) to “special” or “unusual” items (e.g., impairment losses, restructuring charges) to change investors’ perception of “core” profitability (e.g., McVay 2006).

Financial information is also used for *contracting* purposes as well as in *negotiations*, *regulation*, and *litigation* matters. These uses may motivate managers to manipulate financial disclosures for reasons such as avoiding the violation of debt covenants (e.g., DeAngelo et al. 1994, Sweeney 1994, Franz et al. 2014); increasing management’s compensation or job security (e.g., Healy 1985, Cohen et al. 2008); setting a low target for future compensation (e.g., Holthausen et al. 1995); increasing regulatory capital of financial service firms (e.g., Collins et al., 1995); reducing perceived profitability when negotiating with customers, unions (DeAngelo and DeAngelo 1991) or suppliers, or when being subject to regulatory actions such as antitrust (e.g., Cahan 1992), import relief (e.g., Jones 1991), or rate determination (e.g., Chakravarthy et al. 2020); and understating litigation or other loss contingencies to avoid implicit admission of guilt (e.g., Hennes 2014) or loss of key customers (e.g., Cen et al. 2018). In extreme cases of earnings management, firms may conduct fraudulent financial reporting to conceal criminal charges such as bribery or other illegal conduct.²⁹

1.2.2 Costs of earnings management

Earnings management is not cost-free. There are two types of *costs associated with manipulating financial disclosures*: those incurred when earnings management activities are detected by market participants, and costs incurred independently of whether the manipulation is detected.

Costs associated with detected or inferred earnings management include:

- Negative *stock return* when the manipulation is detected, which is due primarily to multiple contraction (the earnings reduction due to restatement typically accounts for a small portion of the negative stock return; Karpoff et al. 2008)³⁰
- The negative effect on *management’s reputation*
- The decline in management’s *ability to convey information* to financial markets due to past abuses

²⁹ For example, according to AAER No. 4165, from 2006 to 2016, “Herbalife’s Chinese subsidiaries (“Herbalife China”) engaged in a scheme to offer corrupt payments and other improper benefits to Chinese government officials. Between 2012 and 2016, Herbalife China employees, including Herbalife China’s then-Managing Director (“Managing Director”) and Herbalife China’s then-Director of External Affairs (“EA Director”), provided improper benefits of cash, gifts, travel, alcohol, meals, and entertainment to Chinese government officials. Certain Herbalife executives received reports of high travel and entertainment spending in China and violations of Herbalife’s internal FCPA policies, but they failed to detect and prevent improper payments and benefits and falsifications of expense reports. By 2016, Herbalife China was responsible for approximately twenty percent of Herbalife’s worldwide net sales. The improper benefits provided by Herbalife China were not accurately reflected in Herbalife’s books and records, and Herbalife failed to devise and maintain a sufficient system of internal accounting controls.”

³⁰ The reduction in the multiple is due in part to reduction in institutional demand, increase in bid-ask spread, decrease in analysts’ forecast accuracy and other negative effects on the cost of capital (e.g., Donelson et al. 2021).

- The increase in *fees required to compensate auditors* for additional audit work and increased audit risk
- In extreme cases, auditors may issue *qualified audit reports*, the firm may be required to *restate its earnings*,³¹ or it may be subject to *SEC enforcement actions* or *shareholder litigation* (e.g., Hennes et al. 2008).

Undetected earnings management is also costly. When a firm overstates current earnings, *subsequent earnings growth* will be lower because:

- (1) Overstating current earnings increases the base from which future earnings grow, thereby decreasing future growth; and
- (2) Since over the long run earnings approach net cash flow, an overstatement of current earnings will generally be followed by an understatement of future earnings.

The timing of earnings reversal, and therefore the near-term consequences of earnings management, differ across items and transactions. For example, when a firm understates the amount of bad debt (thereby increasing net receivables and overstating current earnings), it is likely to report a larger bad debt expense and lower earnings in the next period when uncollectible receivables are written-down.³² In contrast, when a firm overstates the useful lives or salvage values of fixed assets, thereby understating the depreciation expense, the reversal generally occurs when the assets are sold at a loss, which can be many years ahead. Similarly, when a firm repurchases its own debt to recognize a gain, funding the transaction by issuing new debt, interest expense will increase for the maturity of the old debt.

Another cost of undetected earnings management is the *impact on taxable income* and the *likelihood of a tax audit*. While financial reporting choices and estimates generally do not affect tax returns, firms with total assets of \$10 million or more are required to file with the Internal Revenue Service (IRS) a reconciliation of financial accounting net income to taxable income, which the IRS uses to assess compliance risk.³³ Erickson et al. (2004) provide evidence that some managers are willing to significantly increase their taxable income (and hence tax liability) to be able to inflate their accounting earnings.

Whether detected or not, to the extent that earnings management increases information asymmetry, it may increase the firm's *cost of capital* (Easley and O'hara 2004) or reduce *capital investment efficiency* (e.g., Biddle et al. 2009). Francis et al. (2004, 2005), Armstrong et al. (2011) and Bhattacharya et al. (2013) provide evidence that poor earnings quality (generally measured using estimates of the extent to which accruals fail to map into realized cash flows from operations) increases information asymmetry, reduces stock liquidity, and increases the

³¹ Restatements are costly, especially if they involve fraud or if they decrease earnings (e.g., Palmrose et al. 2004). Restatements may call into question the accounting quality of the company, raise doubts about the company's management and control structure, or expose the company to shareholder litigation, regulatory action, and higher costs of capital.

³² Most working capital items share this near-term reversal property, including inventories, prepaid expenses, accrued expenses, and restructuring costs (changes in assets are positive accruals; changes in liabilities are negative accruals).

³³ This disclosure, referred to as Schedule M-3, "enables the IRS to more readily distinguish returns with potentially higher compliance risk from those with lower compliance risk" (Deborah M. Nolan, IRS Large and Mid-Size Business Division Commissioner).

cost of capital. Biddle et al. (2009) provide evidence that higher-quality financial reporting is associated with lower investment distortions (i.e., lower under- or over-investment). They suggest that this result is due to a reduction in information asymmetry between firms and external suppliers of capital: “For example, higher financial reporting quality could allow constrained firms to attract capital by making their positive net present value (NPV) projects more visible to investors and by reducing adverse selection in the issuance of securities. Alternatively, higher financial reporting quality could curb managerial incentives to engage in value destroying activities such as empire building in firms with ample capital. This could be achieved, for example, if higher financial reporting facilitates writing better contracts that prevent inefficient investment and/or increases investors’ ability to monitor managerial investment decisions.” Relatedly, McNichols and Stubben (2008) find that misstating firms (those investigated by the SEC for accounting irregularities, sued by their shareholders for improper accounting, or restated financial statements) overinvest substantially during the misreporting period.

Finally, there may be significant costs associated with an environment that lacks characteristics that reduce the potential for financial misstatements. For example, Ashbaugh-Skaife et al. (2009) provide evidence that firms with internal control deficiencies have higher idiosyncratic risk, systematic risk, and cost of equity. Feng et al. (2015) find that firms with inventory-related material weaknesses have systematically lower inventory turnover ratios and are more likely to report inventory impairments relative to firms with effective internal control over financial reporting. They also examine all material weaknesses in internal control over financial reporting, regardless of type, and provide evidence that firms’ returns on assets are associated with both their existence (-) and remediation (+).

2. Comprehensive Indicators of Earnings Quality and Related Analyses

This chapter describes comprehensive indicators of earnings quality, including accruals (Section 2.1), the cash conversion ratio (Section 2.2), the intensities of net operating assets (Section 2.3) and discretionary expenditures (Section 2.4), unusual expense intensity (Section 2.5), two proxies for earnings quality derived from tax-related disclosures—the effective tax rate (Section 2.6) and the relationship between net income and its tax counterpart (Section 2.7), profitability (Section 2.8), solvency and liquidity ratios (Section 2.9), earnings volatility (Section 2.10), earnings growth (Section 2.11), and price-earnings ratios (Section 2.12). In most cases, the discussion dives deeper into analysis of the drivers of these indicators.

Many of the indicators capture similar or related issues. For example, both accruals and the cash conversion ratio reflect accruals management, and net operating assets intensity and the cash conversion ratio also capture excess capitalization. Still, most ratios add incremental dimensions, and even when reflecting the same issue, they do so in ways that offer different advantages and disadvantages. For instance, unlike accruals and the cash conversion ratio, net operating assets intensity captures *cumulative* accruals.³⁴ In addition, while the cash conversion ratio captures excess capitalization in addition to accruals, its informativeness is reduced by growth capex and by the lumpiness of capex. Therefore, when evaluating earnings quality, it is important to consider multiple ratios. Doing so not only strengthens the inference but also helps identify the dominant earnings quality issue. For example, if the cash conversion ratio suggests low earnings quality but reported accruals appear “normal,” then the earnings quality issue is more likely to be related to excess capitalization.

Tables 2A summarizes the quality issues captured by each of the comprehensive indicators described in this chapter.

Table 2A: Comprehensive indicators of earnings quality

Indicator	Captures
1. Accruals (= net income - cash from operations; -)	Manipulation of accruals estimates (e.g., sales returns, bad debt, depreciation)
	Real accruals management (e.g., channel stuffing, overproduction)
	Overinvestment in working capital items, especially inventory
	Negative demand shocks or other operating challenges (e.g., inventory buildup, difficulties in collecting receivables)
2. Cash conversion ratio (= free cash flow / earnings; +)	The accruals effects described above
	Excess capitalization of costs into PP&E
	Overinvestment in fixed assets

³⁴ As explained below, current and cumulative accruals add information relative to each other. Current accruals are relevant because they (1) affect current earnings, and (2) may reverse in the future. Past accruals (as captured by cumulative accruals) are relevant because of the reversal effect.

Indicator	Captures
3. Net operating assets intensity (-)	Cumulative effects of accruals
	Cumulative effects of excess capitalization into any operating asset
	Cumulative effects of overinvestment in any operating asset
	Deteriorating performance related to net asset utilization
	Conservative accounting biases
4. Discretionary expense intensity (+)	Diminishing marginal returns
	Real earnings management by changing discretionary spending
5. Unusual expense intensity (-)	Economic investments that affect the sustainability of earnings
	Understated recurring expenses (e.g., understating depreciation leads to impairment or disposal losses)
	Overstatement of “core” profitability due to the exclusion of quasi-recurring items (e.g., restructuring charges do recur and generally reduce earnings)
	Overstatement of “core” profitability due to classification shifting (e.g., including recurring operating expenses in restructuring charges)
	Aggressive executives
6. Effective tax rate (+)	Transitory earnings components (e.g., goodwill impairment, change in the tax valuation allowance, cumulative impact of change in tax rates)
	Manipulation of the income tax expense in quarterly reports
7. Reported net income versus tax code net income (-)	Discretionary accruals (less discretion in measuring taxable income; e.g., bad debt, depreciation)
	Earnings deviation from a proxy for long-term profitability (firms often smooth taxable income over time, making it a proxy for future taxable income and hence future earnings)
8. Profitability (+)	Incentives to overstate earnings
	Average profitability and future earnings (smoothing of transitory shocks)
	Source of earnings sustainability (persistent profitability versus additional investments)
	Mean reversion in profitability (negative effect on earnings sustainability)
	Differences in persistence across profitability drivers (e.g., asset turnover versus profit margin)
9. Solvency and liquidity ratios (+)	Impact on borrowing costs
	Impact on operating profitability (operating stakeholders consider the firm’s risk)
	Impact on financial flexibility
	Incentives to overstate earnings
10. Earnings volatility (-)	Probability of an earnings decline
	Underinvestment
	Impact on income taxes
	Cost stickiness
	Cost of financial distress
	Managerial compensation
	Real options (potential positive effect on earnings sustainability)
	Correlation with past growth (potential positive effect on earnings sustainability)
11. Earnings growth (+)	Probability of an earnings decline
	The firm reporting quality (reporting quality affects investments, which in turn lead to earnings growth)
12. Price-earnings ratios (-)	Perceived quality of earnings
	Proxy for expected earnings growth

2.1 Accruals

Accruals are the noncash component of earnings (i.e., $\text{accruals} = \text{net income} - \text{cash from operations}$). They include

- *Gains (+) and losses (-)* from selling investments or extinguishing debt (the related cash flow is classified outside operations, either as an investing or financing activity)
- *Depreciation and amortization (-)*; the related cash outflow is classified as investing)
- *Stock-based compensation (-)*; non-cash expense)
- *Deferred portion of the income tax expense (-/+)*, depending on whether the deferred portion is positive (-) or negative (+))
- *Provisions* for bad debt, warranty costs, litigation, restructuring and other estimated expenses (-)
- *Write-downs or impairments* of inventories, fixed assets, and intangibles (-)
- *Net investment in working capital (+)*

For mature companies, net income is typically smaller than cash from operations (i.e., accruals are negative), because (1) the net investment in working capital (a positive accrual) is likely to be small or even negative; (2) earnings are reduced by depreciation, while cash from operations is before deducting the cost of fixed assets (payments to acquire fixed assets are included in investing activities); and (3) stock-based compensation reduces earnings but it is not a cash outflow. For growth companies, accruals may be positive if net working capital is significant.

2.1.1 Accruals and earnings sustainability

In contrast to cash flows, accruals reflect managers' estimates concerning future events (e.g., the realizability or recoverability of assets such as receivables or fixed assets, warranty costs, expected returns, the likelihood of a contingent loss), and are calculated using procedures that involve choices and assumptions (e.g., cost flow and cost allocation assumptions for inventory, depreciation method for fixed assets, lease accounting, etc.). Thus, accruals are prone to **measurement error** and, more importantly, to **manipulation** by managers.

Accruals may also reflect some forms of “**real**” (i.e., transaction based) **earnings management** activities. For example, firms may engage in “channel stuffing” to increase reported revenue (increasing the accounts receivable accrual), or overproduction to reduce reported cost of goods sold (increasing the inventory accrual). As another example, firms may sell fixed assets or investments with book value lower than fair value to recognize gains (positive accruals).³⁵ Accordingly, when a firm overstates (understates) its earnings, it is likely that the accrual component of earnings will be relatively large (small).

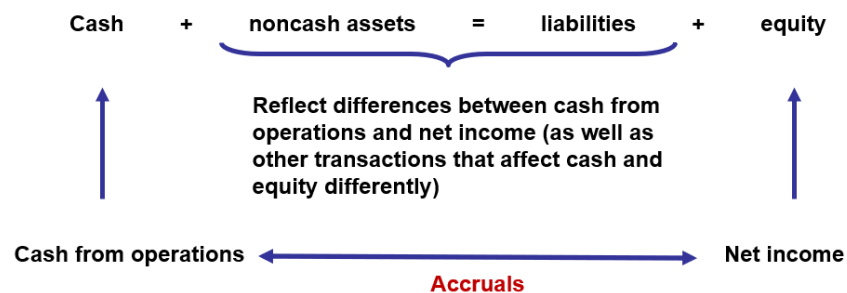
Substantial research provides evidence that high accruals **predict earnings decreases** (e.g., Sloan 1996). Moreover, investors do not fully price this information in a timely manner, leading to

³⁵ Another common form of real earnings management is to cut discretionary spending such as repairs and maintenance or investments in intangibles that are expense as incur (e.g., R&D, advertising, hiring). However, such activities mainly affect the cash flow component of earnings.

stock return predictability (i.e., high accruals predict negative stock returns; e.g., Lev and Nissim 2006).

The negative relationship between accruals and subsequent earnings changes is due to two related reasons. First, while companies may manipulate the amount of income recognized in any given year, they cannot manipulate cumulative earnings over the life of the company, which are generally determined by cumulative net cash flow (all cash flows, including operating, investing, and financing).³⁶ That is, given cumulative net cash flow, companies cannot manipulate cumulative accruals. Thus, overstatement of current accruals implies understatement of future accruals and therefore lower future earnings. Second, because accruals increase net assets (i.e., assets minus liabilities; see Exhibit 2.1a), and firms are restricted in their ability to inflate net assets (e.g., due to scrutiny by the auditor, regulators, or other market participants), earnings due to accruals overstatement are less likely to recur (Barton and Simko 2002, Hirshleifer et al. 2004).

Exhibit 2.1a Balance sheet as a constraint on accruals overstatement



Accruals may be negatively related to future earnings also for *economic reasons*. For example,

- *Negative demand shocks* often cause a buildup of inventories (thus increasing accruals) and induce firms to improve the credit terms that they offer their customers, with the resulting increase in accounts receivable further inflating accruals.
- *Difficulties in collecting receivables* result in an increase in accounts receivable (a positive accrual).
- *Firm prospects* – Suppliers are often among the most informed parties regarding the prospects of their customers, so a decrease in accounts payable (an increase in net working capital, a positive accrual) may be associated with future earnings declines.
- *Overinvesting in inventory* may lead to price concessions or inventory write-downs.
- Offering *lenient credit terms* may lead to a receivables' buildup and subsequent credit losses.
- *Transitory changes in input costs* – An increase in input prices raises the firm's production and inventory costs today but lowers future profits when the inventory is sold (Lewellen and Resutsek 2019)
- *Transitory changes in demand* – An increase in demand leads to a temporary rise in profits and working capital, followed by mean reversion in the variables as competition drives prices and profitability back to their long-term equilibrium levels (Lewellen and Resutsek 2019).

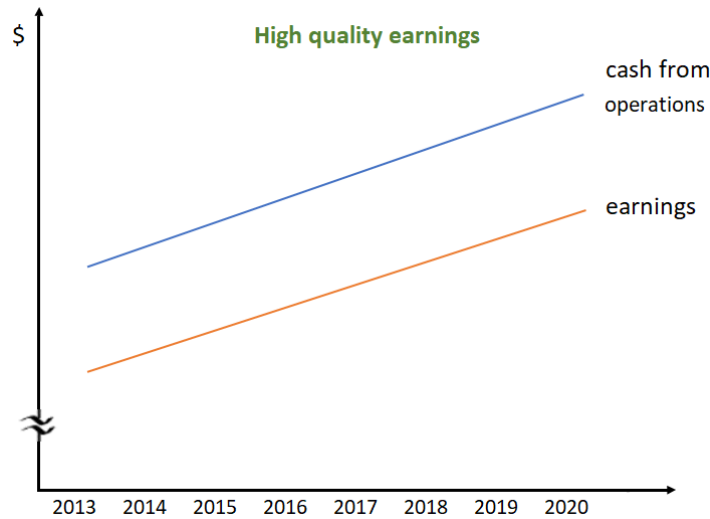
³⁶ One exception is stock-based compensation, which affects earnings but not cash flow.

Relatedly, several studies argue that accruals are negatively related to earnings persistence because they reflect or are correlated with investments or ***growth in net operating assets***, which in turn is negatively related to earnings sustainability due to *conservative accounting principles* and *diminishing marginal returns on investments* (e.g., Fairfield et al. 2003). Conservative accounting biases accelerate expensing of investments (e.g., organic investments in intangibles are expensed immediately) and delay the recognition of revenue, leading to a negative correlation between investments and short-term profitability. Diminishing marginal returns to capital, or the tendency of incremental investments to earn lower profitability than exiting investments, imply a negative relationship between growth in net operating assets and subsequent profitability because such growth increases the weight of the lower profitability new investments in measuring overall profitability. However, Richardson et al. (2006) provide evidence that conservative accounting principles and diminishing marginal returns on investments do not provide a complete explanation for the lower persistence of accruals, suggesting that accounting distortions play a significant role. Lewellen and Resutek (2016) split total accruals into investment-related and “nontransaction” accruals, items such as depreciation and asset write-downs that do not represent new investment expenditures. They show that nontransaction accruals have the strongest negative predictive slopes for earnings and stock returns, contrary to the predictions of the investment hypothesis and consistent with nontransaction accruals being the least reliable component of accruals.

2.1.2 Indicators and contextual analysis

To evaluate earnings quality using accruals-related information, practitioners often examine the behavior of ***earnings and cash from operations over time*** (e.g., Dichev et al. 2013). Given that cash from operations excludes the cost of fixed assets and share-based compensation, it is generally expected to exceed net income (i.e., accruals are expected to be negative). A pattern that suggests strong performance is one in which cash from operations and net income are both trending up, cash from operations consistently exceeds net income, and the extent to which cash from operations exceeds net income increases or at least does not decline over time (see Exhibit 2.1b). In contrast, if cash from operations is increasing at a slower pace than earnings, or even declines while earnings increase, a red flag is triggered.

Exhibit 2.1b Earnings versus cash flow analysis



When comparing earnings quality across peers, or when conducting large sample or quant-type analysis, practitioners and academics typically *deflate accruals by either average total assets or revenue*, and they classify firms with high (low) deflated accruals as having low (high) earnings quality. The primary problem with this approach is that deflated accruals metrics do not necessarily indicate the relative magnitude of the accruals component of earnings. Firms with high earnings relative to average assets often have both large accruals and large cash flow and may not necessarily have low earning quality. This suggests that the ratios of accruals to net income may be a better indicator of earnings quality. However, this approach has two shortcomings. First, the ratio is not meaningful when net income is negative, and it is “noisy” when net income is small. Second, it does not reflect the absolute magnitude of accruals, which may also be relevant. Alternative approaches include (1) conditioning deflated accruals on the firm’s overall return on asset (this approach is used mainly by academics³⁷), and (2) considering both deflated accruals and deflated cash from operations. When using the second approach, cash from operations is deflated by either revenue or the market value of equity.

Accruals vary in their *susceptibility to manipulation*. Expenses such as bad debt, warranty, depreciation, impairment, and restructuring involve substantial measurement discretion and are therefore easy to manipulate. Accruals related to investing or financing activities, such as gains and losses from sales of long-lived assets or early retirement of debt, involve little measurement discretion but their timing can be changed to affect reported income. On the other hand, transaction-related operating accruals, such as changes in accounts payable, involve little if any estimation, and their timing, while often discretionary, does not affect reported income (e.g., payment of accounts payable reduces cash from operations but increases the accruals component of earnings, leaving earnings unchanged). Thus, by constructing a refined accruals indicator that focuses on those accruals that are particularly vulnerable to manipulation, one may construct a better earnings predictor (e.g., Nissim and Penman 2003a, Richardson et al. 2005). Research suggests that inventory changes are a particularly useful accruals for predicting earnings changes

³⁷ For example, using performance-matched discretionary accruals (Kothari et al. 2005).

(e.g., Thomas and Zhang 2002), possibly due to earnings management activities such as excess capitalization of costs into inventory, overproduction to reduce reported cost per unit sold, or management of inventory write-downs (see Section 5.3 for a detailed discussion of earnings quality issues related to inventory).

While earnings management may explain some changes in accruals, the primary drivers of accruals are in most cases legitimate economic activities. For example, to grow, companies invest in working capital (a positive accrual) and fixed assets (leading to larger depreciation, a negative accrual). Such changes in accruals may have different implications for future earnings compared to “managed” accruals. Thus, a better indicator of earnings quality may be constructed by subtracting from total accruals an estimate of *non-discretionary accruals*, which in turn is based on the level of sales, fixed assets, and other drivers of “legitimate” accruals. Academics typically measure discretionary accruals as the residual from a regression of [accruals/average assets] on [sales/average assets] and [PP&E/average assets] (Jones 1991). Some researchers subtract the change in accounts receivable from sales, to mitigate potential bias due to revenue manipulation (Dechow et al. 1995). Practitioners typically use simpler approaches; for example, they often measure non-discretionary accruals as the product of the change in sales and the average ratio over recent years of balance sheet accruals (net working capital and possibly some long-lived assets) to sales. This approach often yields more precise estimates than the regression approach, possibly due to specification and estimation errors in regression analysis. Research suggests that focusing on discretionary accruals improves the ability of accruals to predict stock returns (Xie 2001, Chan et al. 2006).

The ability of “managed” accruals to predict earnings is related to the expected *timing of their reversal*. For example, when a firm understates the amount of bad debt (and so increases net receivables and overstates current earnings), it is likely to report a large bad debt expense and low earnings in the subsequent period as the receivables are written down. In contrast, when a firm recognizes impairment of fixed assets or finite-life intangibles (a negative accrual which reduces the book value of the asset), annual earnings over many subsequent periods will be slightly larger due to the decrease in depreciation and amortization. This suggests that one may construct a better predictor of near-term earnings changes by focusing on those accruals that are likely to reverse in the near term. Indeed, the finding that inventory changes are particularly important for predicting earnings changes is consistent with the fast reversal of this accrual.

Summarizing, accruals-based earnings quality indicators may be particularly relevant if they consist of accruals that are (1) highly sensitive to earnings management, and (2) are expected to reverse in the near term. Removing the portion of accruals that is likely to be “legitimate” (based, for example, on sales growth) and considering cash from operations in addition to accruals may further improve the indicator.

2.1.3 Limitations

The accruals analysis is based on the premise that it is easier or less costly to manage earnings by manipulating accruals than it is by changing cash from operations. *Managing cash from operations* generally (but not always, see below) involves real transactions, which may be costly. For example, firms may cut R&D or advertising, or they may delay starting a new project, to

increase reported earnings. The costs associated with such activities (e.g., forgoing positive NPV investments) suggest that they are less likely to be used compared to accruals management. However, from the perspective of management, manipulating cash flows is less risky than manipulating accruals estimates. This is especially true in the post-SOX environment, in which CEOs and CFOs are required to certify the accuracy of financial reports. In addition, overstating cash from operations provides the added benefit of implying high earnings quality, given the common perception that high cash flow relative to earnings indicates high earnings quality. Indeed, based on survey results, Graham et al. (2005) report that CFOs are more likely to manage earnings by manipulating cash flows than by managing accruals estimates. Of course, managers are more likely to admit cash flow management (compared to accruals management), and the effects of SOX may have declined since the immediate post-SOX period, but at the minimum the survey evidence suggests that accruals may not capture all forms of earnings management.

While managing cash from operations typically involves real transactions, there is an important exception. Companies often have substantial discretion in deciding whether to expense or capitalize an expenditure (e.g., replacing a component of a machine). If the cost is capitalized, it is reported as capex (an investing cash outflow), leaving both earnings and cash from operations unchanged. In contrast, if the cost is expensed, both earnings and cash from operations are reduced. Thus, ***excess capitalization*** inflates earnings by increasing cash from operations without changing accruals. As discussed below, this limitation can be addressed by comparing net income to free cash flow instead of to cash from operations.

Another limitation of using accruals to evaluate earnings quality is that managers are aware of investors' use of accruals as an indicator of earnings quality. Some managers ***overstate cash from operations in ways that do not increase earnings*** but rather improve their perceived quality. For example, managers may defer payments to suppliers at quarter end or securitize some receivables. To identify this form of manipulation, one has to examine line items from the financial statements, as described in [Chapter 5](#) below.

2.2 Cash conversion ratio

The cash conversion ratio compares earnings (in the denominator) to their cash counterpart ("free cash flow," in the numerator):

$$\text{Cash conversion ratio} = \frac{\text{Free cash flow}}{\text{Earnings}}$$

Earnings are compared to free cash flow rather than to cash from operations because they reflect the cost of fixed assets (through depreciation) while cash from operations is before deducting investments in fixed assets.

The cash conversion ratio can be calculated using either net income or net operating profit after tax (NOPAT), with free cash flow defined as either free cash flow to equity or free cash flow to the firm, respectively. For U.S. firms, free cash flow to equity is measured as reported operating cash flow minus capex because, under U.S. GAAP, reported cash from operations includes

interest and dividend income and is net of interest payments.³⁸ NOPAT, in contrast, excludes interest and dividend income as well as interest expense, and accordingly free cash flow to the firm is calculated by “undoing” these items from free cash flow to equity.

2.2.1 Cash conversion and earnings quality

A relatively low cash conversion ratio implies low earnings quality. The rationale is similar to that of the accruals analysis discussed above, except that—unlike accruals—the cash conversion ratio also captures *excess capitalization* and *overinvestment in fixed assets*. In addition, when measured using free cash flow and NOPAT, the cash conversion ratio may in some cases perform better than overall accruals in identifying accruals management because, compared to financial accruals (e.g., noncash interest), operating accruals are easier to manipulate.

Excess capitalization increases current earnings by reducing reported expenses, but the capitalized cost is subsequently depreciated, amortized or otherwise expensed, thus reducing future earnings. Firms often increase reported earnings by designating period costs as directly related to the acquisition of an asset or its preparation for use. For example, management may classify general training expenditures as part of the cost of a new machine. Excess capitalization may also occur after the initial acquisition of an asset. Firms have substantial discretion in classifying expenditures as improvements, additions or replacements—which improve the asset or extend its life and are therefore considered capital expenditures—versus repairs, maintenance or other operating expenditures—which enable the asset to perform according to original expectations and are therefore considered period costs. In many cases the abuse is related to the amount capitalized rather than to the decision to capitalize.

Because free cash flow is defined as operating cash flow minus capex, excess capitalization does not increase free cash flow (both operating cash flow and capex are increased by excess capitalization). Therefore, a comparison of free cash flow to earnings may capture earnings management in the form of excess capitalization in addition to accruals overstatement. This comes with important limitations though. Capex is often lumpy and includes growth investments in addition to maintenance capex. Thus, changes in the gap between earnings and free cash flow may be due to the lumpiness of capex or to changes in growth capex rather than to earnings management. Still, an increasing gap between free cash flow and earnings over time may suggest accruals overstatement or excess capitalization.

Overinvestment, or investments in negative NPV projects, reduces free cash flow and therefore reduces the cash conversion ratio. Substantial research documents pervasive overinvestment by many firms (e.g., Titman et al. 2004, Richardson 2006), especially cash-rich firms with poor corporate governance and overconfident CEO (e.g., Malmendier and Tate 2005). Overinvestment implies lower earnings sustainability because, for companies that engage in overinvestment, over time the mix of earning assets increasingly shifts toward the low profitability assets that the company (over-)invested in.

³⁸ IFRS companies, in contrast, may elect to report interest and dividend income as investing cash flows and interest payments as a financing cash flow.

2.3 Net operating assets intensity

This ratio is defined as follows:

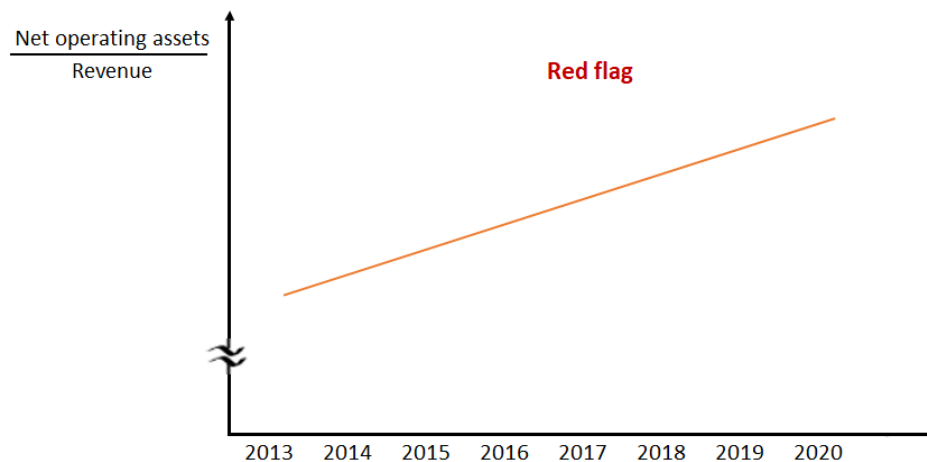
$$\text{Net operating assets (NOA) intensity} = \frac{\text{Net operating assets}}{\text{Revenue}}$$

Where net operating assets (NOA) equals operating assets (i.e., total assets minus excess cash and other nonoperating assets) minus operating liabilities (total liabilities minus debt and other nonoperating liabilities).

2.3.1 Information content

A positive trend or an increase in NOA intensity suggests low earnings quality (see exhibit 2.3a). Such changes indicate that net operating assets grows at a faster rate than sales, which in turn implies that future earnings or earnings growth rates are likely to decline.

Exhibit 2.3a Net operating assets intensity



Specifically, an increase in NOA intensity may reflect or be correlated with:

- (1) Earnings management activities, including **accruals overstatement** and **excess capitalization** of expenditures, which increase net operating assets.
- (2) **Deteriorating performance** related to net asset utilization (NOA intensity is the inverse of net operating asset turnover).
- (3) **Conservative accounting biases** that accelerate the expensing of some investments (e.g., organic investments in intangibles), leading to a negative correlation between investments and current and near-term profitability. Growth in net operating assets captures these conservative accounting distortions because investments in tangible assets are typically correlated with contemporaneous and subsequent investments in intangibles assets.³⁹

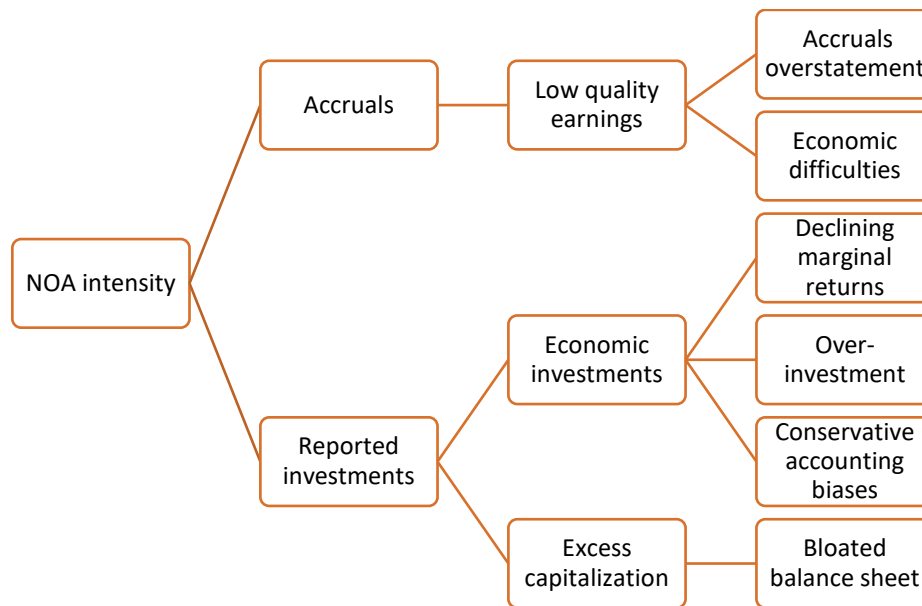
³⁹ In the early years following major investments (e.g., developing a new line of business), reported income is low or even negative, both because some investments are expensed (e.g., start-up costs, assembling work force, developing

(4) **Diminishing marginal returns** on capital, or the tendency of incremental investments to earn lower profitability than exiting investments. High growth in net operating assets implies a relatively large weight on the lower profitability new investments in measuring subsequent overall profitability, leading to a decline in profitability.

(5) **Overinvestment**, or investments in negative present value projects.

Exhibit 2.3b summarizes these effects, and the remainder of the section elaborates on them.

Exhibit 2.3b Net operating assets intensity and earnings sustainability



Growth in net operating assets reflects **accruals** (noncash earnings), which are generally lower quality than cash earnings due to both accounting and economic effects. As explained in Section 2.1, accruals are based on assumptions and estimates and may therefore contain measurement error and bias. In addition, because accruals increase net assets, and firms are restricted in their ability to inflate net asset, earnings due to accruals overstatement are less likely to recur (Barton and Simko 2002, Hirshleifer et al. 2004). Moreover, overstatement of current accruals implies understatement of future accruals, because over the long-run earnings equal net cash flow, and total accruals (properly defined) equal zero. Abnormal accruals may also reflect some forms of real earnings management. For example, firms may engage in “channel stuffing” to increase reported revenue, or they may overproduce to reduce reported costs.

Unlike accruals and the cash conversion ratio, net operating assets intensity captures *cumulative* accruals. When evaluating earnings quality, current and cumulative accruals add information relative to each other. Current accruals are relevant because they (1) affect current earnings and (2) may reverse in the future, while past accruals (as captured by cumulative accruals) are relevant because of the reversal effect.

processes, investing in technology, advertising, etc.), and revenue is low compared to fixed costs (it takes time to reach scale).

Excess capitalization increases current earnings by reducing reported expenses, but the capitalized cost is subsequently depreciated, amortized or otherwise expensed, thus reducing future earnings. **Overinvestment** reduces earnings sustainability because over time the mix of earning assets gradually tilts toward the low profitability assets that the company overinvested in. For further discussion of excess capitalization and overinvestment, see Section 2.2 above.

While using NOA intensity to evaluate earnings quality generally involves examining the trend or changes in the ratio over time, the level of the ratio may also be informative. Unlike the accruals and cash conversion ratios (Sections 2.1 and 2.2, respectively), a high level of NOA intensity suggests aggressive accounting policies (e.g., understated depreciation, excess capitalization) and overinvestment *over time*, not just in the most recent year examined. Moreover, for growing companies, aggressive accounting policies imply overstated earnings even if NOA intensity does not change. For example, if a mature company depreciates assets over ten years instead of over five years, its depreciation per asset will be 50% lower but it will depreciate twice as many assets (all assets that were acquired over the last ten years). In contrast, for a growth company, the effect of lower depreciation per asset will dominate, because the number of assets acquired in the early period is smaller than in the later period.

Another advantage of NOA intensity relative to the accruals and cash conversion ratios is that it captures several additional effects, which are not captured or not fully captured by the accruals and cash conversion ratios. These include deteriorating performance, accounting conservatism, and declining marginal returns; see the beginning of the section.

2.3.2 Limitations and alternative measures

While net operating assets intensity offers several important advantages compared to accruals and the cash conversion ratio, it does have several shortcomings, including the effects of business combinations, F/X translation, the potential manipulation of sales, and the protracted reversal of and earnings overstatement captured by net operating assets. I next elaborate on these issues.

An increase in NOA intensity that is associated with an increase in intangibles intensity may be due to **business combinations** rather than to earnings overstatement. Business combinations increase NOA intensity both because the net operating assets of the acquired company are recognized at fair value (including goodwill and other intangibles), and because the acquired business' revenue is included only from the date of acquisition. Therefore, when using NOA intensity to evaluate earnings quality, it is important to also examine the intangibles intensity ratio. Excluding intangible assets from net operating assets may mitigate this effect, but M&A activities may still distort the information provided by the ratio, so the ratio should be interpreted cautiously when there are significant M&A activities.

Another source of error is **foreign exchange translation**, both because (1) the exchange rates used to translate the income statement and balance sheet are not identical (generally average and end-of-year, respectively), and (2) the NOA intensities of the parent and its foreign subsidiaries may be substantially different from each other, and changes in the exchange rate effectively

change the relative weights of the ratios of the company and its foreign subsidiaries in measuring the overall ratio.

A third source of error is the *potential manipulation of sales* (the denominator of NOA intensity), which is quite common (e.g., Dechow and Schrand 2004, Stubben 2010). Some forms of earnings management activities increase sales, so NOA intensity may not necessarily increase when earnings are overstated. To address this concern, one may instead divide net operating assets by a nonfinancial measure of operating capacity or activity such as # of customers, # of employees, # of production or outlet facilities, square feet of operations, manufacturing space, floor space, warehousing space, # of distributors, gas reserves, electricity consumption, or output capacity (e.g., energy production). An increasing trend in the ratio of net operating assets to a nonfinancial measure of operating capacity (e.g., # of employees) or activities (e.g., # of customers or electricity consumption) may suggest low earnings quality, for the reasons discussed above. In fact, the same approach can be used to evaluate the quality of reported revenue as well as that of other financial metrics—inconsistent trends in financial and nonfinancial metrics may suggest manipulation or low quality of the financial measures (Brazel et al. 2009, Dechow et al. 2011).⁴⁰ Comparing net operating assets to nonfinancial stock measures (e.g., # of employees) instead of to sales (a flow measure) may also mitigate the impact of distortions related to the misalignment of assets and sales (e.g., due to M&A activities during the year). Still, there are two issues with measuring NOA intensity relative to nonfinancial measures. First, companies may not disclose relevant nonfinancial metrics, or they may disclose them at a lower frequency than they disclose financial metrics (e.g., disclose the number of employees annually rather than quarterly). Second, nonfinancial measures may also be manipulated or contain substantial measurement error (e.g., Pinnuck et al. 2020).⁴¹

Another shortcoming of NOA intensity is that, unlike the overstatement of working capital accruals, which typically reverses within a year (e.g., the impact of early recognition of revenue reverses in the following year), the subsequent earnings effect of overstatement of NOA is often gradual and spread over many years. For example, excess capitalization of expenditures into fixed assets increases current year earnings by the amount capitalized, but the *reversal* occurs over the period during which the asset is depreciated, which may last many years.

⁴⁰ A recent example is provided by Allee et al. (2021a). They show that the difference between revenue growth and electricity consumption growth (i.e., growth wedge) is a useful signal of financial misreporting. Using electricity consumption data for Korean firms from 2006 to 2014, they find that the growth wedge is positively associated with discretionary revenues and accruals and the likelihood of financial misreporting as proxied by accounting restatements, qualified audit opinions, and regulatory enforcement actions.

⁴¹ For example, according to SEC AAER No. 4091, “Comscore made false or misleading disclosures regarding two important performance metrics. In 2014 and 2015, Comscore disclosed inflated customer totals that falsely conveyed a consistent increase in the number of net new customers added. In fact, the number of net new customers was declining. Comscore disclosed these overstated numbers in its periodic filings with the Commission and Matta [Comscore’s CEO] highlighted them during earnings calls with investors. Also, in the third and fourth quarters of 2015, Comscore disclosed misstated revenue growth percentages concerning one of its flagship data analytic products. Matta described this purported revenue growth in earnings calls. In fact, the product’s revenue had been declining. In both instances, Matta directed or approved incremental changes within Comscore to the methodology by which the disclosed figures were calculated without disclosing those changes to investors.”

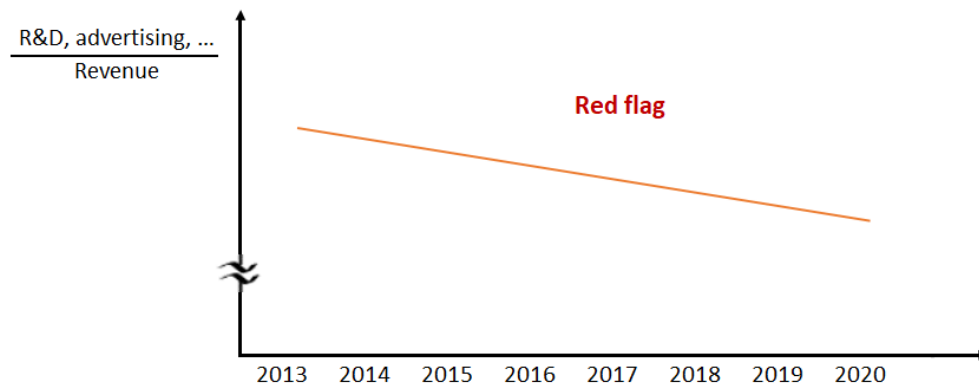
2.4 Discretionary expense intensity

This ratio is defined as follows:

$$\text{Discretionary expense intensity} = \frac{\text{Discretionary expenses}}{\text{Revenue}}$$

Where discretionary expenses are expenditures that are expensed as incurred, their timing and/or magnitude involve significant discretion, and they are generally expected to provide future benefits. Discretionary expenses include some maintenance costs, R&D, advertising, other marketing efforts with lasting benefits, and expensed investments in human capital, information technology, and other intangibles (these items are typically included in SG&A expenses). Because these expenditures provide benefits over extended periods, when they are cut, current earnings increase but future earnings will suffer.⁴² Accordingly, the level of and change in R&D/revenue, advertising/revenue, SG&A/revenue, and ratios of other measures of discretionary expenses to sales inform on earnings quality (e.g., Roychowdhury 2006) and help predict future earnings (e.g., Lev et al. 2005, Banker et al. 2019). Accordingly, examining trends in the ratios help in evaluating earnings quality (Exhibit 2.4a).

Exhibit 2.4a Discretionary expenditures intensity



Earnings in any given year reflect two offsetting distortions: (1) investments in internally developed intangibles (e.g., R&D) are expensed as incurred, biasing reported earnings downward; and (2) the cost of unrecognized intangibles that contribute to current earnings is omitted from the income statement, biasing reported earnings upward (that cost was expensed in prior years, when the related expenditures were made). For mature companies with relatively stable investments in intangibles, the two sources of bias generally offset each other, and so earnings are approximately correct. However, when companies decrease their internal investments in intangibles, current earnings are overstated, and future earnings are likely to be lower because of the reduced investment. In other words, decreases in discretionary expenditures predict earnings declines both because current earnings are overstated, and future earnings are likely to be lower due to the decrease in current investments. Substantial research demonstrates

⁴² For example, advertising helps build brands in addition to growing same-period sales (e.g., Bruce et al. 2012).

the prevalence and significance of earnings management in the form of cutting discretionary expenditures. Based on CFO survey results, Graham et al. (2005) report that decreasing discretionary spending is one of the most common earnings management choices, and empirical research provides supporting evidence (e.g., Roychowdhury 2006).

2.4.1 Adjustments and contextual analysis

Many studies attempt to “correct” earnings and/or book value with respect to the expensing of organic investments in intangibles (e.g., Lev et al. 2005, Banker et al. 2019, Arnott et al. 2021, Dugar and Pozharny 2021; see “Investment intensity” in Section 2.11). Most commonly, adjustments are made with respect to R&D (innovation capital), advertising (brand equity), and SG&A expenses (organization capital). These studies examine whether the adjustments improve the ability of earnings and/or book value to explain market valuations or contemporaneous stock returns, or to predict future earnings or stock returns. Most studies document improvements but also recognize the shortcomings of this alternative accounting treatment, including

- (1) The high uncertainty associated with future benefits from intangibles;
- (2) Differences in the level, pattern, and duration of future benefits across expenditures (e.g., R&D versus advertising), industries (e.g., pharmaceutical versus technology), and firms (e.g., depending on the business model);
- (3) Discretion in classifying expenses (e.g., including non-R&D expenses in R&D); and
- (4) The same-period benefits of some discretionary expenses, which are particularly difficult to estimate due to endogeneity (for example, abnormal sales may lead to increased spending on SG&A).

While a decline in discretionary expense intensity typically suggests low earnings sustainability, in some cases it may not be the case, or it may even imply the opposite. Therefore, it is important to rule out alternative explanations (to earnings management) and to conduct contextual analysis:

- In addition to earnings management, declines in SG&A expense intensity may be due to efficiency gains or to sales growth that lowers the ratio of fixed costs to sales. Estimating the proportion of *fixed costs* may help in distinguishing among the three explanations.
- When sales decline, SG&A expense intensity may increase not just due to fixed costs but also due to *cost stickiness*, especially if the decline in sales is expected to be temporary and costs are related to specialized assets and/or inflexible labor (Anderson et al. 2003).
- A decrease in SG&A expense intensity concurrent with a decrease in the gross margin and an increase in days inventory held may be an indication of capitalization of operating expenditures into inventory.
- A decrease in SG&A expense intensity concurrent with an increase in asset intensity ratios (e.g., PP&E or “other assets”) may be an indication of capitalization of operating expenditures into those assets.

The next subsection elaborates on the nature and estimation of fixed and sticky costs.

2.4.2 Fixed and sticky costs

As noted above, to rule out alternative explanations (to earnings management) of changes in SG&A expense intensity one needs to estimate the significance of the fixed and sticky costs

components of SG&A expenses. This can be done by analyzing the time-series behavior of sales and costs or by examining cost composition.

Time-series analysis involves regressing changes in SG&A expenses on changes in sales, allowing for an incremental coefficient on the sales change variable for sales declines (i.e., add another explanatory variable that is equal to the product of the sales change variable and an indicator variable for sales declines).⁴³ The negative of the product of that incremental coefficient and sales gives an estimate of sticky costs, and the product of the sum of the two coefficients and sales give an estimate of variable costs. The excess of total costs over the sum of variable and sticky costs is the estimate of fixed costs.

The *cost composition approach* recognizes that some SG&A costs are mostly variable (e.g., temporary employees, outside services such as consulting), some are mostly fixed (e.g., depreciation, amortization, rent, property taxes, insurance), and yet others are mixed in the sense that they change with sales but are not proportional to sales (e.g., employees that earn a base salary plus overtime or bonus). In addition, whether a cost is fixed or variable depends on the time horizon. Essentially all costs are variable in the long run. Therefore, when one refers to “fixed costs,” the time dimension has to be identified. In the context of evaluating the extent to which changes in SG&A expense intensity are due to earnings management versus the effect of fixed costs, costs that cannot reasonably be changed during the period over which SG&A expense intensity is measured should be considered fixed.

Cost stickiness relates to costs that adjust faster to increases in revenue than to revenue declines. Examples of sticky labor costs include salary and benefits of unionized employees (companies can hire additional employees but cutting costs related to unionized employees is difficult). Asymmetric labor cost sensitivity to sales shocks is also related to full- versus part-time employees. The utilization of part-time employees can be quickly adjusted to upside shocks (e.g., change the status of employees to full) but less so to downside shocks. For many assets—especially specialized ones—the difference between entry cost and exit value are large, effectively making much of the costs associated with the assets (e.g., depreciation, property taxes) a sunk cost that cannot be cut until the end of the asset’s useful life. In such cases, companies may increase capacity (and costs) in response to an increase in demand, but they cannot cut costs to the same extent when faced with negative shocks.

Costs that cause cost stickiness (referred to as “adjustment costs” in the literature), include:

- Costs of terminating employees – severance pay when employees are dismissed as well as organizational costs such as loss of morale among remaining employees when associates are terminated or erosion of human capital when work teams are disrupted.
- Costs of search, hiring and training employees when new employees are hired (upon recovery) – like termination costs, these costs can be avoided by maintaining excess capacity until the recovery of demand.
- Costs of selling assets and buying new ones when demand recovers – these include not just commissions and other direct costs of selling or buying assets but, more importantly, the difference between the entry cost and exit value of assets (essentially a bid-ask spread).

⁴³ The modelling equation is: $\Delta SG\&A_t = c_1 + c_2 \Delta Sales_t + c_3 \Delta Sales_t \times Indicator(\Delta Sales_t < 0) + e_t$.

Relatedly, some assets require installation, customization or similar costs, which are lost when assets are sold and incurred again when assets are repurchased.

Cost stickiness may also be due to investment in human capital. For example, in the MD&A of its 2020 annual report Costco notes: “With respect to the compensation of our employees, our philosophy is not to seek to minimize their wages and benefits. Rather, we believe that achieving our longer-term objectives of reducing employee turnover and enhancing employee satisfaction requires maintaining compensation levels that are better than the industry average for much of our workforce. This may cause us, for example, to absorb costs that other employers might seek to pass through to their workforces.”

Additional factors that affect cost stickiness and its implications include:

- Persistence of revenue shocks – if managers assess a sales decline as temporary, they may decide to bear the costs of excess resources in order to avoid adjustment costs of cutting resources and building them up again when demand is restored.
- Revenue volatility – the probability of incurring the adjustment costs is increasing with revenue volatility.
- Capacity utilization – to the extent that there is significant slack, the likelihood of having to reverse cost cuts (and therefore overall adjustment costs) is lower.
- Agency costs – managers may be willing to maintain unutilized resources for reasons such as status, prestige and power, or if they face social pressure.

The above discussion points to the importance of evaluating fixed and sticky costs.

Unfortunately, the information required to generate precise estimates is generally unavailable to outsiders. While IFRS firms provide some information about the composition of costs and expenses by nature (e.g., labor, raw materials), U.S. firms are not required to disclose this information. Still, U.S. firms do disclose two fixed cost items: depreciation and amortization (D&A) and rent, so some analysis is feasible. For manufacturing firms, though, this information is of limited value when evaluating SG&A expenses, because companies generally do not disclose the breakdown of D&A or rent between SG&A and COGS.

[Section 5.6](#) provides further discussion of discretionary expenses.

2.5 Unusual expense intensity

Unusual expense intensity is calculated as follows:

$$\text{Unusual expense intensity (UEI)} = \frac{\text{Unusual expenses}}{\text{Revenue}}$$

Where unusual expenses (also referred to as special, one-time or exceptional items) include restructuring charges, asset impairments, losses (gains) from asset sales, unusual litigation/settlement costs, accrual of other loss contingencies related to unusual events, recognized M&A costs and adjustments, and other items that are either non-recurring, do not regularly recur, or are highly volatile over time.

A high level of unusual expense intensity (UEI) in recent years—especially relative to peers—suggests that earnings excluding unusual expenses (“core” or “recurring” earnings, a construct on which most users focus) are overstated. This is due to several reasons, as explained next.

First, unusual expenses are often due to *understated recurring expenses*. For example, understated depreciation or amortization leads to impairment or disposal losses.

Second, expenses that are classified by companies as unusual or non-recurring often *do recur* over time (Elliott and Hanna 1996, Cready et al. 2010, Johnson et al. 2011, Laurion 2020). For example, many companies recognize restructuring charges quite frequently (e.g., Atiase et al. 2004, Nissim 2021d). As another example, litigation costs classified as unusual are often recurring over time. Thus, excluding these items from measures of “core” profitability would result in an overstated estimate of sustainable profitability (e.g., Fairfield et al. 2009).

Third, managers may opportunistically *shift expenses* from core expenses (cost of goods sold and SG&A expenses) to special items (McVay 2006, Fan et al. 2010, Fan et al. 2017). For example, they may include recurring operating expenses in restructuring charges.

Fourth, a tendency to report unusual expenses suggests *aggressive management* team. For example, research shows that reporting special items is correlated with aggressive non-GAAP reporting (Laurion 2020), and that it enables management to increase their compensation (Gaver and Gaver 1998).⁴⁴

On the other hand, several studies provide evidence that negative special items—especially restructuring charges—are associated with subsequent earnings increases (e.g., Burgstahler et al. 2002, Dechow and Ge 2006). They attribute this result to inter-period expense transfer (e.g., impairment losses reduce subsequent depreciation, Riedl 2004; overstated restructuring charges are subsequently reversed, Moehrl 2002, Bens and Johnson 2009) and performance improvement (e.g., due to a restructuring, Cready et al. 2012).

2.5.1 Contextual analysis

The correlation between special items and subsequent earnings changes varies across the type of special items and the motivation for their recognition. For example, earnings increases following restructuring charges are larger than those following asset write-downs or goodwill impairment charges (e.g., Cready et al. 2012). In addition, special items that are recognized as part of a “big bath” are likely to be strongly associated with subsequent earnings increases (e.g., Atiase et al. 2004, Bens and Johnson 2009). Thus, when evaluating the future earnings implications of unusual expenses, it is important to conduct contextual analysis. Cain et al. (2020) propose a methodology to estimating economically driven special items and suggest using the difference between actual and predicted special items as a proxy for opportunistically misclassified recurring expenses. A less structured analysis is to consider the behavior of other

⁴⁴ Potepa (2020) finds that executives now benefit less from positive nonrecurring items and are penalized more for negative special items, compared to earlier periods.

relevant ratios. For example, an increase in UEI concurrent with an increase in EBIT margin is often a strong indication that recurring expenses were classified as unusual.

Examining the intensity of unusual expenses is important because (1) companies have substantial flexibility in recognizing, measuring and disclosing special items (e.g., Rouen et al. 2020),⁴⁵ and (2) there is substantial variation across firms in the tendencies to recognize and identify unusual expenses (Cready et al. 2010, Riedl and Srinivasan 2010, Johnson et al. 2011). In addition, the reporting of special items has increased substantially over time due to both economic and accounting changes (Elliott and Hanna 1996, Donelson et al. 2011, Johnson et al. 2011). An important factor that contributed to the increase in the magnitude and cross-sectional variation in the reporting of special items in recent years is non-GAAP reporting (Laurion 2020).

2.6 Effective tax rate

This ratio is defined as follows:

$$\text{Effective Tax Rate (ETR)} = \frac{\text{Income Tax Expense}}{\text{Pretax Income}}$$

A significant decrease in the effective tax rate (ETR) suggests that earnings are not sustainable, especially if

- Most peers did not experience a similar decrease
- ETR is significantly lower than its average level in prior years
- ETR is low relative to the statutory tax rate (STR)
- The firm's ETR is lower than those of most peers
- The difference between ETR and STR is smaller than the corresponding differences for peers (relevant when comparing companies that operate in different tax jurisdictions, with different statutory tax rates)

The remainder of this section explains the rationale for the above ETR-related inferences. Accounting for income taxes is described in [Section 5.8](#).

The change in the ETR and the difference between ETR and STR inform about the magnitude of **transitory earnings** and therefore on earnings quality. This follows because abnormal levels of

⁴⁵ Impairment losses provide a nice example of the discretionary nature of “unusual” expenses. In recognizing and measuring impairment losses, firms have substantial discretion regarding each of the following elements:

- Timing of the test (“whenever events or changes in circumstances indicate that [the asset’s] carrying amount may not be recoverable”);
- Level of grouping (“long-lived asset or assets shall be grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities”; when assets are grouped together, losses on impaired assets are offset by gains on other assets, reducing the likelihood and amounts of impairment);
- Estimating future cash flows (the amount and timing of all cash flows associated with the asset or asset group, including disposition cash flows and future capital expenditures required to obtain the benefits from the asset or asset group); and
- Estimating the discount rate or fair value (if fair value is measured using an approach other than DCF).

the ETR (relative to its prior period level or relative to the STR) tend to reverse over time. Abnormal levels of the ETR are often due to the inclusion in pretax income of non-taxable transitory items (e.g., goodwill impairment, non-deductible fines, some insurance proceeds), or to the inclusion in the income tax expense of transitory tax adjustments (e.g., the impact of changes in tax rates, tax reserves, or valuation allowances). Thus, a low ETR suggests that pretax income includes positive transitory earnings items or that the income tax expense includes negative transitory items, either way implying that net income is likely to decrease next period. And conversely for high ETR.

The effective tax rate can be expressed as follows:

$$\text{ETR} = \frac{\begin{array}{c} \text{Taxable} \\ \text{income} \\ \times \text{STR} \end{array} + \begin{array}{c} \text{Adjustments} \\ \text{to current} \\ \text{taxes} \end{array} + \begin{array}{c} \text{State \&} \\ \text{local taxes} \end{array} + \begin{array}{c} \text{Impact of differences} \\ \text{between foreign and} \\ \text{federal tax rates} \end{array} + \begin{array}{c} \text{Deferred} \\ \text{income tax} \\ \text{expense} \end{array}}{\text{Taxable income} + \text{permanent differences} + \text{timing differences}}$$

This expression indicates that differences between the ETR and the federal STR are due to:

- *Adjustments to current income taxes*, including tax credits (e.g., for R&D or investments), changes in tax reserves (called “unrecognized tax benefits” in the U.S.), unreserved prior periods tax payments, stock-based compensation (SBC) excess tax benefits,⁴⁶ and possibly other items
- *State and local taxes* (the reported income tax expense includes state and local taxes in addition to federal taxes)
- The effect of *foreign earnings taxed at rates different than the federal STR*
- *Permanent differences* between book and taxable income (e.g., non-deductible compensation,⁴⁷ interest on state and municipal bonds, goodwill impairment, dividend received deduction), which effect either pretax income or the income tax expense but not the other
- *Adjustments to the deferred portion* of the income tax expense, including changes in the valuation allowance (U.S. GAAP) or in unrecognized deferred tax assets (IFRS) and the cumulative impact of changes in tax rates or tax laws on deferred tax assets and liabilities.

Timing differences between book and taxable income generally do not impact the ETR because they change the numerator (deferred portion of the income tax expense) by an amount equal to

⁴⁶ SBC excess tax benefits represent the tax benefit (tax cost) of deducting a greater (smaller) amount in the tax return than the amount expensed in the income statement. For example, ESO expense is based on grant date fair value, but the deduction is generally based on the stock price at the time of exercise. Since 2017 (ASU 2016-09), any excess tax benefit or shortfall is recognized in the income tax expense (previously most of the amount was recognized directly in equity). The tax benefit (cost) from excess (shortfall) deductions depends on the statutory tax rate—the higher the tax rate, the greater the effect on the ETR.

⁴⁷ Provisions of TCJA significantly increased the amount of non-deductible compensation. Section 162(m) prohibits publicly held companies from deducting more than \$1 million per year in compensation paid to senior executive officers. The tax act removed an exemption for commissions and performance-based pay. The legislation also expanded the scope of covered individuals to include the CFO, along with an organization’s CEO and three highest-paid employees, beginning in 2018. The tax cost of not being able to deduct the full SBC expense depends on the statutory tax rate—the higher the tax rate, the greater the effect on the ETR.

their magnitude times the statutory tax rate. However, changes in the tax valuation allowance or in enacted tax rates (or in other tax provisions) require adjusting the deferred portion of income tax expense for the same level of pretax income and therefore impact the ETR.

In the income tax note, companies disclose a reconciliation of the effective tax rate, which explains how the above items changed the ETR relative to the STR. Examining these effects may help gain insight about earnings quality, primarily because the tendency to mean revert varies across the components. For example, the effects of state taxes and foreign operations tend to persist, while those of goodwill impairment or changes in the valuation allowance are typically transitory.⁴⁸

Companies have particularly high discretion in measuring income taxes in *interim reports*. The year-to-date income tax expense is generally measured as the product of year-to-date pretax income and the projected annual effective tax rate. Thus, firms may manage the interim income tax expense by adjusting the estimated annual effective tax rate, which could have large effects on quarterly earnings. In addition, companies do not disclose the ETR reconciliation in interim reports, which increases their ability to manipulate quarterly income taxes. Thus, considering the quarterly ETR may be especially helpful when evaluating the quality of interim earnings (e.g., Schmidt 2006).

2.7 Reported net income versus tax-code net income

When reported net income is significantly larger than tax-code net income, it is potentially overstated or it may indicate lower likelihood of earnings sustainability for other reasons (discussed below). Thus, a relatively low ratio of tax-code net income to reported net income is a red flag that earnings may not be sustainable (Lev and Nissim 2004).⁴⁹ Tax-code net income is not disclosed by companies, but it can be estimated by subtracting current income taxes from taxable income, which in turn is estimated by grossing up current income taxes.⁵⁰ [Section 5.8](#) describes the accounting for income taxes.

Tax-code net income is an informative benchmark for net income due to at least three reasons: (1) tax-code net income excludes some *discretionary accruals* which are often used to manage reported earnings; (2) many firms *smooth taxable income* over time, making it a proxy for future taxable income and hence future earnings; and (3) low taxable income (or low current income

⁴⁸ In some countries—including the U.S.—the statutory tax rate includes more than one layer of taxation (e.g., federal and state). In addition, companies' income is often subject to taxation in different jurisdictions. In the U.S., the effective tax reconciliation starts with the statutory federal tax rate, with state and local taxes and the impact of differences between the foreign and federal tax rates accounted for as reconciling adjustments. In contrast, some IFRS firms use a weighted-average statutory tax rate across the different jurisdictions as the starting point for the reconciliation, so their reconciliation does not include an adjustment for foreign tax rates. In addition, in measuring the weighted-average tax rates, some IFRS companies use the combined statutory tax rate (including state and local taxes), thus omitting this adjustment as well.

⁴⁹ An alternative approach for estimating book-tax differences is to examine the relative magnitude of deferred taxes (e.g., Hanlon 2005).

⁵⁰ See Hanlon (2003) for a discussion of the conditions under which taxable income may most accurately be estimated from financial statements as well as those conditions which make this task difficult, if not impossible.

taxes, from which the taxable income estimate is derived) relative to book income implies **high risk** and thus lower likelihood of earnings sustainability. I next elaborate on these effects.

Accruals such as provisions, amortization, and impairment charges, which are often used to manage earnings, are either not tax deductible (e.g., impairment charges, most cases of amortization);⁵¹ tax deductible according to a uniform, IRS-dictated formulas (e.g., depreciation); or tax deductible only when the underlying event occurs (e.g., a debt write-off). Thus, firms' ability to use these items to manipulate taxable income is rather limited. In addition, deferred taxes—which affect net income but not tax-code net income—may be manipulated, for example through adjustments to the valuation allowance. Accordingly, a low ratio of taxable-to-book income suggests that accruals—and therefore net income—are overstated (Lev and Nissim 2004). Relatedly, the ratio of taxable-to-book income may inform on accruals quality. For example, Ayers et al. (2009) find that the relative and incremental information content of this ratio in explaining stock returns is significantly larger for firms with large abnormal accruals.

Firms often smooth taxable income over time because some elements of the tax code cause income taxes to increase with income volatility (tax convexity).⁵² These include progressive tax schedules, provisions of the alternative minimum tax, and asymmetry in the tax treatment of income and loss (delays in obtaining the tax benefits associated with losses due to carryforwards and the expiration of unexploited tax losses). Companies may smooth taxable income primarily by timing and “cherry picking” transactions. For example, to increase (reduce) taxable income, they may sell assets with unrealized gains (losses). To the extent that taxable income is smoothed over time, it may serve as a proxy for “permanent income.” Accordingly, a low ratio of taxable-to-book income implies that book income is likely to decline as it is expected to converge to its “permanent” level.

Ratios such as *current ETR* (i.e., ETR measured using only the current portion of income taxes), *tax-code net income to net income* (which captures information similar to current ETR), or *cash ETR* (income taxes paid divided by book income) are often used as proxies for tax aggressiveness (inverse relationship). High tax aggressiveness, in turn, implies high direct and indirect risks, and therefore low likelihood of earnings sustainability. For example, Graham et al. (2014) survey about 600 corporate tax executives to investigate firms' incentives and disincentives for tax planning. They report the following responses to the question: “What factors were important in your company's decision not to implement the tax planning strategy that was proposed?”: (1) the transaction lacked business purpose and/or economic substance (important to 86.0%), (2) potential harm to the company's reputation (69.5%), (3) risk of detection and challenge by the IRS (62.1%), (4) risk of adverse media attention (57.6%), (5)

⁵¹ While impairments are generally not tax deductible, there is a difference between impairments of PP&E and intangible assets. Impairments of PP&E are not deductible at the time of expense recognition, but the expense is eventually deducted through subsequent depreciation. In contrast, most intangibles have no tax basis, so their amortization and impairment are never deducted.

⁵² Tax convexity can be very costly. For example, Gaertner et al. (2021) provide evidence that large firms pay substantially less taxes over the long run primarily by avoiding losses, potentially mitigating the negative consequences of tax convexity. They find that, over a ten-year period, firms in the largest decile pay 10.8 p.p. (26 percent) lower taxes than those in the smallest decile, and about 80 percent of the association between size and taxes can be explained by the magnitude of losses.

possibility of having to later restate financial statements (54.2%), (6) negative impact on pretax book income (43.8%), (7) the tax benefit could not be recorded for GAAP (39.2%), and (8) “other” (19.0%). Thus, of the eight possible answers, the four risk-related responses were ranked second to fifth in importance, with the direct risk of detection considered less important than reputational risks. The increase in the importance of ESG considerations to various stakeholders, including employees, customers, and society at large, have likely made the importance of reputational effects significantly higher than it was at the time of the survey.

Comparing net income to tax-code net income is similar to comparing net income to cash from operations (i.e., the accruals analysis discussed in Section 2.1). Similar to the accruals analysis, the relationship between net income and tax-code net income can be evaluated using the ratio of the difference between the two income metrics to sales (or to another scale measure), or based on time-series trends; in particular, opposite trends in net income and tax-code net income, where tax-code net income is relatively low or declining, suggests low earnings quality. The ratio version is typically used when simultaneously evaluating or comparing many companies (e.g., when applying screens or in factor models).

2.8 Profitability

Profitability ratios are calculated by comparing earnings metrics (e.g., operating income, net income) to the investment that generated them (e.g., net operating assets, equity). Profitability ratios inform on earnings quality for several reasons:

- Executives of firms that perform poorly have stronger than average incentives to overstate earnings.
- The time-series of profitability ratios—especially their mean reversion tendency—helps in (1) predicting future earnings, and (2) identifying the source of earnings sustainability—persistent profitability versus additional investments—which in turn indicates whether they represent value creation, a dimension of earnings quality.
- Component ratios (e.g., profit margin, asset turnover) have differential persistence and thus help predict earnings. In addition, some patterns of and relationships among component ratios are indicative of earnings management (e.g., Jansen et al., 2012).

I next elaborate on these effects.

2.8.1 Incentives to overstate earnings

When the company’s performance or prospects are perceived weak, managers are likely to have stronger than average incentives to overstate earnings. For example, Johnson et al. (2009) and Dechow et al. (2011) find that companies that experience deterioration in performance (EPS growth and ROA, respectively) are more likely than other firms to commit financial misconduct. Extending these results, Donelson et al. (2021) find that the change in ROA predicts both settled accounting 10b-5 (fraud) SEC enforcement cases and settled accounting 10b-5 securities class actions.

Poor firm performance can hurt managers’ reputation or even lead to their dismissal. Dichev et al. (2013) report that 80% of 500 surveyed financial executives agree that management’s fear of adverse career consequences of reporting poor results is an important motivation for

misrepresenting economic performance. In addition, if the firm's financial position or prospects are perceived weak, operating counterparts—including employees, suppliers, and customers—may be deterred from transacting with the firm, or they may demand better terms to the detriment of the firm. For example, Cen et al. (2018) find that dependence on key customers lead suppliers to delay bad news and accelerate good news related to litigation outcomes. Dou et al. (2016) provide evidence of firms overstating earnings to manage rank and file employees' perceptions of employment security. Noh et al. (2021) find that foot traffic to the commerce locations of firms that sell durable goods decreases after reporting financial results that suggest an increase in solvency risk (as measured using Altman Z-score), consistent with consumers responding to information about firms' longevity conveyed by their earnings.

Incentives to manage earnings are related not just to the level of profitability but also to its value relative to peers. When using financial ratios to evaluate a company's performance, investors and other capital market participants compare the company to peers with similar operations. Investors react strongly when the firm's performance is materially lower than that of its peers or industry norms. This is due to two reasons: (1) peers' performance reflects industry conditions, so performance below peers implies idiosyncratic poor performance rather than market- or industry-driven poor performance; and (2) investors typically adjust the company's expected performance based on information released by peers, so if the company reports lower profitability than early reporters, the market will be negatively surprised. Thus, firms whose performance is significantly below that of peers have strong incentives to overstate earnings. Fung (2015) finds that the incidence of fraudulent financial reporting (restatements) is positively related to the probability of reporting ROA below peers.

2.8.2 Average profitability and future earnings

Earnings in any given year may contain a large transitory component, either due to firm-specific effects (see Section 2.5) or to industry or macro conditions (see Section 4.9 and 4.10). Therefore, compared to most recent earnings, average earnings in recent years may serve as a better proxy for future earnings. Indeed, this is the rationale underlying Shiller's cyclically adjusted P/E (e.g., Campbell and Shiller 1998) as well as for using retained earnings a proxy for average profitability (e.g., Ball et al. 2020). Still, if the equity base on which profits are earned has changed significantly in recent years, the average level of past earnings may be a biased estimate of future earnings. For example, if equity has been increasing over time, future earnings should generally be larger than past earnings. Therefore, a potentially more accurate estimate of sustainable earnings is the product of average profitability (ROE) in recent years and the most recent level of equity.

The time-series of profitability may inform on earnings quality for several additional reasons, including its implications for value creation and the mean-reversion property of profitability. I next explain these effects.

2.8.3 Value creation

While earnings sustainability is the primary aspect of earnings quality, the *source of earnings sustainability*—persistent profitability versus earnings reinvestment or capital issuance—is

another relevant dimension (Estridge et al. 2009). For example, if two companies generate the same constant earnings stream but one has a full *payout policy* while the other reinvests all earnings, the quality of the latter's earnings is lower in the sense that generating them requires that shareholders forfeit their dividends. One may differentiate between the two companies by examining the sustainability of profitability in addition to that of earnings (Harris and Nissim 2006). In the above example, the profitability of the full payout company remains unchanged, while that of the other company declines over time (same earnings but equity is growing due to the reinvestment of earnings).⁵³

When evaluating the value implications of past or forecasted revenue growth, analysts and other market participants often focus on the profitability associated with that growth. For instance, revenue growth that requires significant investment in fixed assets results in lower free cash flow and smaller value effect than growth due to improvement in efficiency (e.g., same store or comp growth). As another example, due to operating leverage (fixed costs), revenue growth is often associated with margin improvement; when this is not the case, market participants may discount the value of the growth.⁵⁴

2.8.4 Mean reversion

To the extent that profitability is mean reverting, considering it may help in predicting earnings and evaluating their sustainability. Mean reversion implies that earnings are likely to decline (increase) if profitability is relatively high (low). Indeed, numerous studies (e.g., Freeman et al. 1982, Fama and French 2000, Nissim and Penman 2001) provide evidence on the mean-reversion tendency of profitability ratios, and some also document its asymmetric nature (stronger from below the mean). These studies attribute the mean reversion tendency to both economic forces (competition, investments, sales volatility, transitory items, operating and financing leverage, cost stickiness, and real options) and accounting effects (fair value accounting, conservatism, and “big bath” charges).

The remainder of this section describes the primary factors that cause mean reversion in profitability as well as analyses that help evaluate and predict the extent of mean-reversion. Because the effects of these factors on profitability vary across companies, considering them when conducting earnings quality analysis may yield relevant insight. Some of these factors are expanded on in other sections of this monograph.

Classic economic theory posits that *competition* among firms, entry and exit of firms, and diffusion of new ideas or practices drive abnormal levels of profitability toward the mean.

⁵³ Earnings growth due to equity growth is costly. Stock issuance dilutes the share of existing stockholders by creating new claims on the firm's assets and cash flows, and equity growth due to earnings reinvestment implies that stockholders forgo the opportunity to use the reinvested funds. This suggests that the following decomposition of earnings growth informs about the extent to which earnings growth affects value (Harris and Nissim 2006):

$$\Delta \text{Earnings}_1 = (\text{ROE}_1 - \text{ROE}_0) \times \text{Equity}_{-1} + \text{ROE}_1 \times (\text{Equity}_0 - \text{Equity}_{-1})$$

Earnings growth due to the first component (ROE improvement) represents value creation, while earnings growth due to the second component (equity growth) is at least partially due to normal return on investment.

⁵⁴ The following article provides a nice example: “Cisco's analyst day fell flat but Credit Suisse thinks it's worth a second look,” by Tiernan Ray.

Therefore, if a company is currently enjoying a competitive advantage that is not protected by economic moats, earnings are not likely to persist. Whether and the extent to which a company is likely to sustain its competitive advantage depend on the advantage's type (cost leadership, innovating differentiation, marketing differentiation, niche strategies, network effect, customers' switching costs), the company's efforts to maintain the advantage (e.g., advertising [brand], R&D [innovation], training [human resources], investments [scale]), the significance of abnormal profitability (high profitability increases competition), and the company's ability to maintain its advantage (e.g., power over suppliers or customers, credibility of its threat to retaliate against actions by competitors, nature of the product and industry, market dynamics).⁵⁵

Porter (2008, an updated version of the 1979 article) describes the five forces that affect competitiveness:

- Threat of new competition – relevant determinants include supply-side economies of scale (e.g., fixed costs, scalable intangibles versus tangible assets); demand-side economies of scale (network effect); the time and costs it takes to reach economies of scale (e.g., longer with consumers compared to business customers); the difficulty and cost of acquiring customers (e.g., customer switching costs); capital intensity; availability and cost of capital; regulation (e.g., the financial services sector); patents
- Threat of substitutes – the availability, similarity (in terms of function to the customer), and relative prices of direct or indirect substitutes
- Bargaining power of customers – customer's significance to the company (for example, retail customers usually do not have much control over pricing); product importance and economic significance to the customer; switching costs (reduce customers' bargaining power); access to information and customers' savviness (may be able to negotiate better terms or play rivals against one another)
- Bargaining power of suppliers, employees, and other input providers – company's significance to the supplier; competition in suppliers' markets; substitutability of inputs; supply and skills of employees; union status
- Intensity of competitive rivalry – number of firms; distribution of market share; barriers to exit (e.g., specialized assets); product differentiation (e.g., commodity-like products imply more competition); industry growth (low growth increases incentives to gain market share); capacity utilization; high fixed costs and/or low marginal costs; price-based competition (as opposed to competing based on service, features, or other dimensions)

Investments cause mean reversion in profitability because, when the profitability of existing projects is very high or very low, new projects are likely to earn less extreme levels of profitability and so “push” overall profitability ratios—which reflect the profitability of both new and existing projects—towards the mean. Note, however, that if one's focus is on the

⁵⁵ For example, Dickinson and Sommers (2012) find that power over suppliers (positively related to operating liabilities and inventory turnover) and the ability to credibly signal expected retaliation (positively related to financial flexibility) are especially important factors in maintaining competitive advantage. In contrast, effective bargaining power over customers (positively related to receivable turnover and market share) results in modest long-term gains over competitors. Feng et al. (2021a) find that industry level transparency (measured using variables such as industry-specific R-squared from return-earnings regressions, number of analysts' forecasts for the industry, press coverage of the industry, etc.) is associated with faster reductions in within-industry profitability differences (presumably greater information transparency leads to more speedy actions by competitors).

sustainability of the level of earnings, mean reversion in profitability due to investments does not imply that earnings are less sustainable. In fact, it may imply the opposite, as new investments are expected to add earnings. But, as noted above, the quality of these earnings is low in the sense that generating them requires additional, costly investments.

Sales volatility affects the volatility of profitability ratios, which in turn increases the potential for large abnormal levels of profitability that are less likely to persist. Sales volatility, and therefore the sustainability of profitability, vary substantially across industries (e.g., cyclical versus defensive industries) and companies (e.g., mature versus growth companies).

Transitory items—including unusual transactions, realized gains and losses, unrealized gains and losses (e.g., fair value accounting, F/X effects on receivables or payables) and other non-core items—which often cause an abnormal level of profitability in a given year, have smaller effects on subsequent profitability due to their transitory nature, and thus contribute to the mean reversion tendency of profitability ratios. Negative special items may also lead to improvement in subsequent profitability (e.g., restructuring charges), further increasing the subsequent earnings change (see [Section 2.5](#)).

Operating leverage (fixed cost), **cost stickiness** (e.g., to avoid termination and subsequent hiring costs) and **financial leverage** magnify the effects of sales volatility and transitory items on the volatility—and therefore mean-reversion tendency—of profitability ratios (e.g., Nissim and Penman 2003a, Banker and Chen 2006, Chen et al. 2019).⁵⁶ In addition, mean reversion in the leverage ratios themselves further contributes to this effect (e.g., Flannery and Rangan 2006). Thus, earnings associated with high profitability due to large leverage effects are likely to be particularly unsustainable. And for low profitability shocks, the size of the transitory effect—and therefore the extent of subsequent mean reversion—is likely to be especially large due to cost stickiness (see Section 2.4).

Mean reversion is particularly strong when profitability is low not just due to cost stickiness. **Options** to adapt or abandon existing projects allow firms to reduce the duration of negative profitability shocks (e.g., Hayn 1995, Lawrence et al. 2017). In addition, due to **accounting conservatism**, losses are often recognized when anticipated, while profits are recognized only when earned, which is typically over time. “**Big bath**” charges exacerbate this effect; they are occasionally recognized by managers in periods of particularly low performance, or following management change, to facilitate the reporting of higher profitability in subsequent periods (e.g., Burgstahler et al. 2002). Conservatism-induced reported losses and “big bath” charges cause mean reversion in profitability not only because of their transitory nature but also because of their effects on the numerator and denominator of future profitability (e.g., impairment reduces both future depreciation and future reported assets).

While economic and accounting forces cause mean reversion in profitability, they do not eliminate differences in “steady-state” profitability. Persistent differences in profitability across

⁵⁶ Financial leverage increases the volatility of ROE because equity holders absorb the variability of the return generated on borrowed funds (lenders generally receive a constant return independent of the profitability of the operations). In other words, leverage reduces the amount of equity (the denominator of ROE) but does not reduce the variability of net income (the numerator) because debtholders’ claims are fixed.

industries and firms are due primarily to differences in risk (as reflected in the cost of capital) and in the effects of accounting distortions. Absent accounting distortions, steady-state profitability should be close to the cost of capital. As described above, economic forces—including competition among firms, entry and exit of firms, and diffusion of new ideas or practices—erode abnormal levels of profitability over time, limiting the extent to which steady-state profitability can exceed the cost of capital. In addition, in the long-run companies are not expected to destroy value, which implies that steady-state profitability should not be lower than the cost of capital. Therefore, expected long-term *economic* profitability should be approximately equal to the cost of capital. However, as explained below, measures of steady-state *accounting* profitability are likely to overstate steady-state economic profitability.

The primary accounting distortions that cause an upward bias in steady-state (accounting) profitability are:

- Omission of internally developed intangibles from the balance sheet (e.g., brands, R&D capital, human capital), which biases reported assets and equity downward
- Historical cost accounting, which biases assets and depreciation downward
- Undiscounted deferred taxes, which generally bias net assets downward (most firms have a net deferred tax liability)
- Conservative accounting principles that mandate immediate recognition of expected losses (e.g., impairment charges) but delayed recognition of expected profits, which bias net assets downward.

While the above accounting distortions cause reported net assets to understate economic net assets, they generally do not cause an offsetting downward bias in steady-state earnings (unlike the common misconception). In fact, in steady-state earnings may be overstated:

- The immediate expensing of some economic investments (e.g., R&D, advertising) biases earnings downward, but in steady state (with little or no growth) this bias is offset by the omission of amortization expense that would have been recognized if the investments were booked.
- Historical cost accounting implies that expenses such as depreciation and amortization are understated (due to inflation), causing an overstatement of earnings.
- The lack of discounting of deferred taxes overstates the tax expense, but this is offset by the omission of accretion expense that would have been recognized if the deferred tax liability was discounted.
- “One-time” losses such as impairment and restructuring charges, which effectively substitute for depreciation and other recurring operating expenses, are often excluded from measures or forecasts of recurring operating profit, causing an upward bias in earnings.

Nissim (2021f) describes several approaches for estimating steady-state profitability, which can in turn be used to derive forecasts of sustainable long-term earnings. These methods include (1) using estimates of the profitability of mature peer companies (which are presumably close to steady state), (2) deriving price-implied profitability estimates from market-to-book ratios of

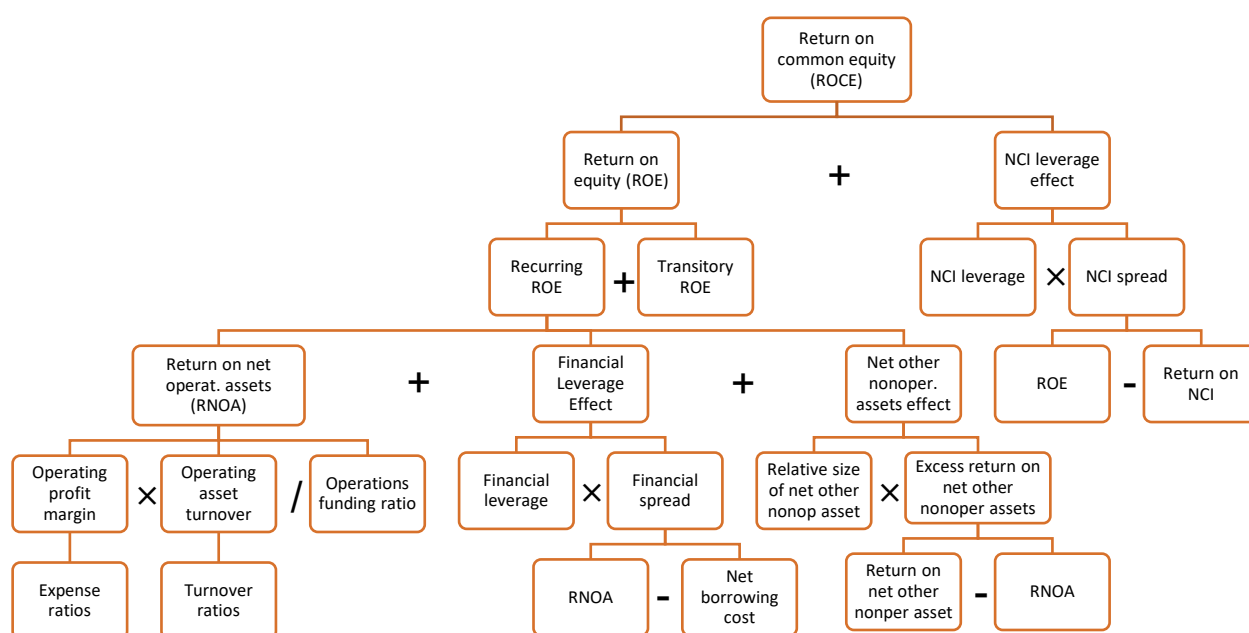
mature peers, and (3) estimating the magnitude of downward (upward) bias in the denominator (numerator) of steady-state profitability.⁵⁷

2.8.5 *Decompositions*

Additional insights on earnings sustainability may be obtained by *decomposing operating profitability* into its primary drivers—operating profit margin and net asset turnover—as research suggests that net asset turnover is more persistent than profit margin (e.g., Nissim and Penman 2001, Soliman 2008). Similarly, disaggregating the net profit margin into components, including gross margin, SG&A expense, nonoperating income, taxes, special items, and discontinued operations may further inform on the sustainability of profitability (e.g., Fairfield et al. 1996). Binz et al. (2020) apply a machine learning algorithm to estimate Nissim and Penman’s (2001) structural decomposition framework of profitability. They find that trading on profitability forecasts and intrinsic value estimates derived using the Nissim and Penman’s framework generates substantial risk-adjusted returns. Choices that improve performance include increasingly granular ratio disaggregation, a focus on core earnings, and long-horizon forecasts of operating performance.

Nissim (2021b) develops a finer decomposition of profitability, which provides further insight on the mean-reversion tendency of profitability. Exhibit 2.8a depicts the decomposition.

Exhibit 2.8a Profitability analysis



⁵⁷ For example, how significant is brand equity (which is generally omitted from the balance sheet) in the firm’s industry? How significant is the depreciation-related inflation bias?

While most elements of the analysis are consistent with prior decompositions, there are a few innovations, including the analysis of noncontrolling interest (NCI), the separation and analysis of activities other than operating and financing,⁵⁸ and, especially, the decomposition of operating profitability. Specifically, turnover is measured relative to operating assets (as opposed to relative to net operating assets), and a new driver of operating profitability is introduced: the ratio of net operating assets to operating assets. This ratio—referred to as the *Operations Funding Ratio*—measures the proportion of the investment in operating assets that is funded with debt and equity capital (as opposed to credit from suppliers, customers, employees, and other operating counterparts), and it provides insight on the impact of operating credit on profitability. Because it involves only balance sheet information, the *Operations Funding Ratio* is typically highly stable over time and therefore easy to forecast. The introduction of this ratio also allows turnover to be measured relative to operating assets, which is an advantage because revenue is generated by all operating assets, not just by the portion funded by capital (which is equal to net operating assets).⁵⁹

Another advantage of Nissim's (2021b) framework is that the three drivers of operating profitability—*Operating Profit Margin*, *Operating Asset turnover*, and *Operations Funding Ratio* ($RNOA = \text{Operating Profit Margin} \times \text{Operating Asset turnover} / \text{Operations Funding Ratio}$)—are always meaningful and have robust statistical properties (as opposed to *RNOA* and *Net Operating Assets Turnover*, which are “noisy” when net operating assets is small and meaningless when net operating assets is negative). Thus, these drivers facilitate the analysis and forecasting of operating profitability in essentially all cases.

Finally, some patterns of and relationships among component ratios are indicative of earnings management (e.g., Jansen et al., 2012). For example, accruals management related to operating expenses affects operating income and net operating assets in the same direction, and thus causes turnover and margin to move in opposite directions. For example, for a given level of sales, if a firm manages earnings upward by understating the bad debt expense, both operating income relative to sales and the net realizable value of accounts receivable relative to sales will be overstated. The increase in operating income relative to sales will lead to an increase in margin, while the increase in net accounts receivable relative to sales will lead to a decrease in turnover.

2.9 Solvency and liquidity ratios

The level of or change in the firm's solvency or liquidity risks may inform on the sustainability of economic profitability as well as on management incentives to overstate earnings. The relationship between earnings quality and solvency and liquidity is reciprocal—earnings quality is both affected by and affect solvency and liquidity.

⁵⁸ Net other nonoperating assets represents assets and liabilities other than financial that are not part of core operating activities (e.g., equity method investments, assets and liabilities of discontinued operations).

⁵⁹ Nissim and Penman (2001) suggest an alternative decomposition of operating profitability, which distinguishes between the profitability of operating assets and the effect of operating liability leverage (the ratio of operating liabilities to net operating assets). One difficulty with implementing their decomposition is the need to estimate the implicit cost of operating credit. Still, Nissim and Penman (2003a) show that the decomposition helps improve the accuracy of forecasts of operating profitability.

2.9.1 Implications for earnings quality

An increase in solvency risk may lead to higher ***borrowing costs*** (when debt is refinanced or due to performance pricing) and therefore to lower earnings. A deterioration in perceived solvency or liquidity may also affect ***operating profitability***, as it may lead operating stakeholders—including employees, customers, and suppliers—to require improved terms or even refuse to transact with the firm if they perceive the company as being excessively risky (e.g., Opler and Titman 1994, Cen et al. 2018).

A high or increasing solvency or liquidity risks also imply low or declining ***financial flexibility***, which affects earnings sustainability both because it limits the firm's ability to grow, and it makes it more difficult for the company to recover from negative shocks. This follows primarily because debt capacity is restricted, so high-debt firms have limited ability to borrow additional funds if the need for such borrowing arises.

A deterioration in solvency or liquidity measures (e.g., an increase in leverage or a decline in cash from operations) is often associated with stronger ***incentives to overstate earnings*** because it suggests:

- Low *debt covenant slack* and therefore strong incentives to overstate earnings to avoid violating covenants (e.g., Burns and Kedia 2006).
- Recent *borrowing*, which likely increased management incentives to overstate earnings (to lower the interest rate or improve other terms).
- Poor *performance* (e.g., Fama and French 2002), which could strengthen management's incentives to overstate earnings so that they maintain their jobs or improve stakeholders' perceptions of the company's financial position or prospects.
- Dependency on capital markets for refinancing (unlike equity, debt is a temporary source of capital), which could strengthen management's incentives to overstate earnings.
- Restrictions on the firm's ability to grow or pay dividends (especially relevant for financial institutions).

The above effects are likely to be particularly strong at times of market dislocation such as the financial crisis or COVID-19. Indeed, companies with strong balance sheets (i.e., high solvency and liquidity) tend to perform better than other firms in such times.

The next two subsections discuss common measures of solvency and liquidity as well as the role of earnings quality analysis in evaluating these dimensions.

2.9.2 Solvency

Solvency is evaluated using various leverage and coverage measures, including balance sheet ratios (e.g., debt-to-book equity), market or fair value ratios (e.g., fair value of debt divided by the market value of equity),⁶⁰ coverage ratios (e.g., EBITDA-to-interest), and debt-to-

⁶⁰ Using market or fair values instead of book values gives a more correct measure of economic leverage. However, book value leverage still adds information, both because (1) in case of bankruptcy the cash realization values of

performance ratios (e.g., debt-to-EBITDA). Solvency is also affected by off-balance sheet exposures and the composition of assets and liabilities.

Debt/EBITDA

Of the above mentioned ratios, debt-to-EBITDA—which is inversely related to the firm’s ability to service its debt (i.e., pay interest and principal)—is the most common measure.⁶¹ For example, *The Interagency [OCC, Fed, and FDIC] Guidance on Leveraged Lending*, which was issued on March 21, 2013, notes: “Generally, a leverage level after planned asset sales (that is, the amount of debt that must be serviced from operating cash flow) in excess of 6X Total Debt/EBITDA raises concerns for most industries.” Less common variants of this ratio use EBIT instead of EBITDA or net debt instead of debt.⁶²

The rationale for using the Debt/EBITDA ratio to evaluate solvency is as follows. EBITDA measures the funds that are generated in operations and are available to service debt. Thus, EBITDA should be at least as large as the interest expense. Mathematically, this is equivalent to requiring that the Debt/EBITDA ratio be less than one divided by the interest rate. For example, if the interest rate (r) is 5%, Debt/EBITDA should be less than 20 ($=1/.005$). But having EBITDA that is exactly equal to the interest rate is not enough, because (1) EBITDA is not free cash flow, (2) future EBITDA may be lower than current EBITDA, (3) future interest rates may be higher than current rates (e.g., for floating rate debt or when the debt is refinanced), and (4) debt principal will also have to be paid eventually. So, in practice, maximum acceptable Debt/EBITDA is set well below $1/r$. As noted above, a rule-of-thumb that is often used is Debt/EBITDA ratio of no more than 6. Prior to the financial crisis, the upper bound was 8. Yet, when using the Debt/EBITDA ratio to evaluate solvency, relevant characteristics should be considered. In general, maximum acceptable Debt/EBITDA should decrease with current and expected interest rates and increase with the stability, sustainability, and quality of EBITDA. It should also be lower for capital intensive firms, which must reinvest a relatively large portion of their EBITDA in fixed assets to maintain operating capacity, and for firms with adjustable-rate debt or relatively short weighted average debt maturity (short maturity implies large principal

recognized assets are typically larger than those of omitted assets (unrecognized internally developed intangibles), and (2) debt covenants and other contractual provisions typically use book rather than market values.

⁶¹ Li (2016) examines the definitions of performance measures in debt covenants using a large sample of loan contracts and finds that the typical performance measure is close to EBITDA. Specifically, contractual definitions typically begin with GAAP net income but exclude transitory earnings and interest, tax, depreciation, and amortization expenses. There are many other adjustments, but their frequencies are typically low. Cash flows are rarely used as a performance measure in covenants. Performance measures are most commonly compared to the level of debt (e.g., debt-to-EBITDA) rather than to interest or fixed charges (e.g., interest, principal, capex, rent, or dividend payments), although coverage ratios are also common.

⁶² Using net debt-to-EBITDA as the primary solvency measure, which is often done in management disclosures, is problematic. At least some cash is needed to operate – if all cash is netted against debt (effectively assuming that it is used to pay back debt and only the remaining balance of debt has to be serviced), the company will not be able to continue to generate EBITDA to service the remaining balance of debt. Even if only excess cash is netted against debt, net debt-to-EBITDA may not indicate the long-term solvency of the company as excess cash may be used for purposes other than paying down debt (e.g., for dividends, share repurchases, or empire building) before the debt is due. Still, cash balances do mitigate solvency risk, so considering net debt-to-EBITDA in addition to debt-to-EBITDA may provide relevant insight.

payments in the near term and greater refinancing risk). Finally, if the company has high quality collateral or guarantees, it may maintain financial flexibility even with a relatively high debt-to-EBITDA ratio.

If the cost of fixed assets reduces the funds that are available to service debt, why not incorporate that cost in the earnings construct, that is, use Debt/EBIT instead of Debt/EBITDA? There are several reasons for this. EBITDA avoids the distortions of depreciation, including historical cost accounting, manipulation of cost estimates or asset designations (especially in M&A), arbitrary depreciation and amortization (D&A) assumptions, differential effects of organic versus acquired (M&A) growth on D&A, the effects of impairment on subsequent D&A, and the impact of interest capitalization on D&A (see Sections 5.4 and 5.5).

Still using EBITDA involves several issues:

- Companies with similar economic profitability may report substantially different EBITDA depending on characteristics such as capital intensity (versus labor and intangible intensities), the cash cycle (reflecting working capital intensity), whether they invest organically or through M&A,⁶³ the extent of leasing (versus borrowing and purchasing assets), lease accounting (operating versus finance), and the effective tax rate.
- For manufacturing companies, EBITDA estimates often contain significant error because the depreciation addback from the cash flow statement—which is used in measuring EBITDA—is different from depreciation expensed due to the capitalization of depreciation into inventory.⁶⁴
- While EBITDA may be less sensitive to some D&A-related accounting distortions, it is still subject to other distortions (e.g., expensing of organic investments in intangibles and earnings management activities such as channel stuffing). In particular, EBITDA is more sensitive than EBIT to a common form of earnings management: excess capitalization of expenditures into PP&E and other assets that are subject to D&A. Excess capitalization shifts EBIT from future periods to the current period, but it does not change the total amount of EBIT recognized over the company's life, as any amount capitalized would have to be subsequently depreciated or otherwise expensed. In contrast, because it excludes D&A, EBITDA is permanently increased by excess capitalization.

The above issues with using EBITDA can be mitigated. For example, EBITDA can be adjusted by excluding lease costs, subtracting the estimated change in depreciation capitalized into inventory, and subtracting the estimated amount of excess capitalization. In addition, one may use multivariate analysis to control for capital intensity, investments in intangibles, cash cycle, leasing, and other relevant characteristics (for example, by running a regression of Debt/EBITDA on these characteristics and using the residual instead of Debt/EBITDA). Of course, the impact of these issues varies across industries, and adjustments and models should

⁶³ For example, if a company develops a new technology, its EBITDA will be reduced by R&D expense during the development years. In contrast, if the company acquires a business that already developed that technology, EBITDA will not reflect the cost of developing the technology. In both cases, though, EBITDA will reflect the benefits from the new technology.

⁶⁴ See Nissim (2019c) and earnings quality issue “Depreciation expensed and EBITDA are measured with error” in Section 5.4.

vary accordingly. For example, in some industries the most important investments are expensed as incurred (R&D, advertising, investments in human capital, IP, IT etc.) and so reduce EBITDA, making it especially important to consider expensed investments when evaluating solvency. Good earnings quality modeling can help achieve this.

Off-balance sheet exposures

Off-balance sheet exposures are particularly difficult to evaluate, yet footnote disclosure and other information can provide important insights. For example, pension-related exposures can be evaluated by examining the gross amounts of pension assets and obligations (which are generally netted against each other on the balance sheet, thereby hiding risk) as well as the plan assets allocation. Leverage may be similarly adjusted by consolidating equity method investments or at least recognizing potential exposures to these affiliates. Other analyses may include evaluating notional amounts and composition of derivatives, geographic segment disclosures, disclosures related to VIEs, commitments, securitization, etc. (see Chapter 5). Of course, many of these exposures vary substantially across industries and should be modeled accordingly. Another approach to capture risk due to off-balance sheet exposures is by evaluating earnings volatility (including some components of other comprehensive income), which capture risk from both on- and off-balance sheet activities. Further refinements may involve decomposing volatility into its drivers or determinants, including systematic and idiosyncratic sales volatility, operating leverage, and profit margin (see Section 2.10), as well as evaluating earnings correlations with macro variables such as exchange rates, inflation, and interest rates.

Asset and liability composition and measurement

Reported assets vary in the relationship between their current (going concern) value and the cash realization value in case of bankruptcy (e.g., land has a high collateral value, but goodwill has none). They also vary in the extent to which the reported amount reflects current value. Earnings quality analysis may help shed light on these dimensions as well. For example, the ratio of accumulated depreciation to the depreciation expense (Section 3.4.6) informs on average asset age, which in turn informs on the extent to which the reported amount likely understates current value due to inflation. Relatedly, the timing and extent to which reported expenses adjust to inflation (and therefore the inflation effect on earnings) depend on the nature of the assets that are being expensed. Similar issues are relevant for liabilities, especially in some industries (e.g., reserve liabilities of P&C insurers).

2.9.3 Liquidity

While liquidity concerns are typically not an important motivating factor for companies to manage earnings, in some cases—especially at times of market dislocation or when the near-term viability of the company is in question—they may be important. Liquidity is evaluated using balance sheet ratios, working capital turnover ratios, and cash flow ratios.

Balance sheet liquidity ratios include the current ratio (= current assets / current liabilities), the quick ratio (= quick assets / current liabilities), and the cash ratio (= cash, cash equivalents and short-term investments / current liabilities), where quick assets exclude illiquid current assets

(e.g., inventory, prepaid expenses). These ratios indicate the ability of existing current (or quick or cash) assets to settle existing current liabilities, with values greater than one arguably indicating liquidity.⁶⁵ While commonly done in practice, considering ratios in excess of one as suggesting high liquidity is problematic because (1) most obligations to be paid and cash to be received in the coming year are not reported on the balance sheet (they will be generated during the year), and (2) the duration of current assets and current liabilities may not be comparable (i.e., the proportion of next 12-month cash inflows reported on the balance sheet as current assets may be substantially different from the proportion of next 12-month cash outflows reported on the balance sheet as current liabilities). For example, a restaurant business may have little receivables (cash business) and inventory (perishable goods) but still obtain significant credit from suppliers. Therefore, it is more informative to compare balance sheet liquidity ratios to cross-sectional and time-series benchmarks rather than to use the value one as a benchmark. For example, a red flag for liquidity concerns is a pattern of declining liquidity ratios that are below those of peers and that cannot be explained away by an increase in lines of credit or other liquidity support mechanisms.

Working capital liquidity ratios include days inventory held ($= \text{inventory} / [\text{cost of goods sold} / 365]$), which measures the average number of days from the purchase of inventory to its sale; days sales outstanding ($= \text{receivables} / [\text{sales} / 365]$), which measures the average number of days from the sale of inventory to the collection of receivables; operating cycle ($= \text{days inventory held} + \text{days receivables outstanding}$), which measures the average number of days from the purchase of inventory to the collection of receivables generated by the sale; days payables outstanding ($= \text{payables} / [\text{purchases} / 365]$), which measures the average number of days from the purchase of inventory to the payment to the supplier; and the cash conversion cycle ($= \text{operating cycle} - \text{days payables outstanding}$), which measures the portion of the operating cycle that is funded by capital. Short operating and cash conversion cycles indicate low liquidity risk. Chapter 3 elaborates on working capital ratios.

Finally, the **cash flow liquidity ratio** ($= \text{operating cash flow} / \text{current liabilities}$) measures ability to generate cash (liquidity) from operating activities. A relatively high (significantly positive) and stable ratio suggests high liquidity or ability to pay operating obligations and interest as they come due (reported cash from operation is net of payments of operating obligations and interest).⁶⁶ This ratio has at least two shortcomings: (1) unlike the current, quick and cash ratios,

⁶⁵ Dyreng et al. (2017) find that the distribution of reported current ratios exhibits a discontinuity at 1.0, especially when the cost of credit in the economy is relatively high, suggesting that managers adjust working capital to avoid deficits. U.S. firms that avoid working capital deficits report lower proportions of inventory and higher proportions of accounts receivable in current assets and, when credit is tight, higher proportions of cash, consistent with managers increasing sales volume to capitalize profit margins and thereby increase current assets.

⁶⁶ There are several distortions with reported cash from operations, and “undoing” them may improve the informativeness of ratios that use this metric. In general, cash from operations includes the cash counterparts of all revenues and expenses reported in the income statement. Thus, reported cash from operations is reduced by all income taxes, including those related to investing and financing activities. For example, if a company sells an investment for a gain and pays income taxes, its reported cash from operation will decrease (the inflow from selling the investment is included in the investing section). In addition, interest that the company received or paid, and dividends that the company received (but not dividend paid) are classified as operating cash flows. (IFRS companies, unlike U.S. firms, may elect to report interest and dividend income as investing cash flows and interest payments as a financing cash flow.) Companies are required to disclose the amounts of interest and income taxes paid during the year, and they typically disclose this information in the notes; some provide it at the bottom of the

there is no theoretical basis for scaling cash from operations by current liabilities, and (2) past cash flow may not necessarily indicate ability to generate future cash flow. The second issue is especially important at times of distress or when black swan events occur, either economy-wide (e.g., the financial crisis, COVID-19) or firm-specific (e.g., chipotle e coli outbreak). In such cases, past cash flows may be a poor indicator of current and future cash flows, and balance sheet resources (e.g., high quick or cash ratios) and/or availability of committed credit lines are crucial. Still, the cash flow liquidity ratio—and more generally the level of, trend in and stability of cash from operations—are among the most informative indicators of liquidity in “normal” times.⁶⁷ Thus, for example, when executives manage earnings due to liquidity concerns, they are likely to overstate the cash component of earnings.

2.10 Earnings volatility

2.10.1 The likelihood of earnings declines

All else equal, higher volatility of the earnings growth rate implies lower confidence in the sustainability of the earnings. If, on average, earnings are expected to grow, ***the probability of an earnings decline*** increases with the volatility of the earnings growth rate. For example, if the growth rate is distributed normally with a 10% mean and 10% standard deviation, the probability of an earnings decline is 16%. But if the standard deviation is 5%, the probability of an earnings decline is just 2%. Therefore, forecasts of the volatility of the earnings growth rate should inform on earnings quality.

Earnings volatility may also affect or be correlated with the level of future earnings. I next discuss potential negative and positive effects of earnings volatility as well as methods for evaluating and forecasting earnings volatility.

2.10.2 Negative effects on future earnings

The volatility of earnings or cash flows may be negatively related to the sustainability or quality of earnings also for the following reasons (see, e.g., Nissim 2002).

Underinvestment

In making investments decisions, firms with sufficient internal funds use a discount rate commensurate with the riskiness of the cash flows from the project, independent of the financing. But with insufficient internal funds, firms use higher hurdle rates that reflect the additional cost of accessing external capital due to market frictions (e.g., asymmetric information, issuance costs, taxes). Cash flow volatility increases the likelihood of having insufficient funds and thus may lead to underinvestment and lower future profits (e.g., Minton and Schrand 1999).

cash flow statement. See earnings quality issue “Distorted cash from operations” in Section 5.11 for further discussion.

⁶⁷ For example, in the MD&A section of its 2020 annual report, Costco notes “our primary sources of liquidity are cash flows generated from our operations, cash and cash equivalents, and short-term investments.”

Income taxes

For most firms, the present value of income taxes increases in the volatility of taxable income (“tax convexity”) due to (1) progressive tax schedules, (2) delay in obtaining the benefits from tax losses due to carry forwards, and (3) expiration of unexploited tax losses (e.g., Graham and Smith 1999, Gaertner et al. 2021). Thus, all else equal, higher volatility implies lower future after-tax earnings.

Cost stickiness

Income taxes are not the only cost with a convex function. One factor that causes cost convexity—especially of SG&A expenses—is cost stickiness (see Section 2.4). Cost stickiness relates to costs that adjust faster to increases in revenue than to revenue declines (e.g., sticky labor costs of unionized employees). In many cases, cost stickiness is due to adjustment costs rather than to external restrictions. For example, if there is a reasonable possibility of subsequent increase in demand after a negative shock, management may not terminate employees or close facilities to avoid the costs of termination and exit and subsequent hiring and investment.

Costs of financial distress

If customers, suppliers, employees, or lenders perceive earnings volatility or factors that are correlated with earnings volatility to be indicators of financial distress, they may not be willing to transact with high volatility companies, or they may agree to do it only under less favorable terms (e.g., Smith and Stulz 1985). As a result, revenue could be lower for such firms, and expenses (e.g., cost of goods sold, wages, interest) could be higher.

Managerial compensation

To align incentives, provisions of managerial compensation contracts frequently make the manager’s total compensation an increasing function of the firm’s earnings. Therefore, earnings variability reduces the expected utility of risk-averse managers, which in turn require additional compensation for bearing this risk (e.g., Smith and Stulz 1985).

2.10.3 Positive effects on future earnings

Earnings or cash flow volatility may be positively related to earnings growth, which may offset the negative effects of earnings volatility on earnings sustainability discussed above. There are two possible reasons for a positive relation between volatility and earnings growth:

Real options

Higher volatility implies a greater potential to benefit from exercising real options to expend successful operations or abandon or revise unsuccessful ones.

Correlation with past growth

In measuring unconditional volatility, one subtracts the same (unconditional) mean value from each observation. Since growth increases the deviations of cash flows from their unconditional mean, measures of unconditional volatility proxy for growth in addition to conditional volatility.

2.10.4 Forecasting the volatility of earnings growth rates

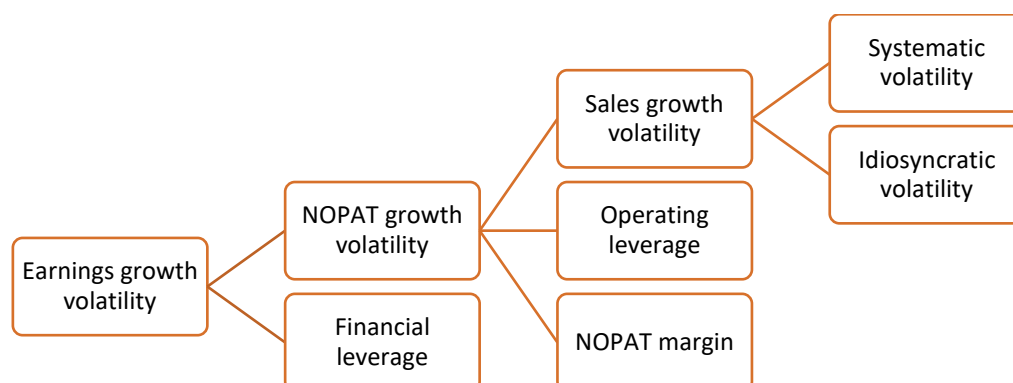
So, if earnings volatility is likely to inform on earnings quality, how should one forecast it? This subsection discusses the forecasting of the volatility of earnings growth rates.

The simplest approach to forecasting volatility is to use its past levels. However, this approach often yields poor estimates, both because (1) the drivers of volatility—and therefore its level—change over time, and (2) earnings growth is not a “well-behaved” ratio—base earnings (from which growth is measured) can be close to zero or even negative, rendering growth rates noisy or meaningless, respectively. Indeed, the square of the earnings growth rate (which is used to estimate volatility) is highly volatile over time. Moreover, earnings data are low frequency (so relatively few historical observations are available), further reducing the precision of historical volatility estimates as proxies for future volatility.

There are at least two alternative approaches to forecasting the volatility (or higher moments) of the earnings growth rate besides using its historical level. One approach is to use quantile regressions to forecast quantiles of the distribution of future earnings, derive the implied earnings growth rate associated with each quantile, and use the quantile growth rates to measure the volatility. Chang et al. (2021) use this approach to forecast the standard deviation, skewness, and kurtosis of next year ROE. They show that their estimates of the three moments are reliable and help explain stock prices and credit spreads.

Another alternative approach to forecasting earnings volatility is to examine and forecast trends in its key drivers (see Exhibit 2.10a) and use insights from this analysis to help predict the level of or change in future volatility.

Exhibit 2.10a Drivers of the volatility of the earnings growth rate



Earnings reflect the results of both operating and financing activities. Thus, the volatility of the earnings growth rate can be decomposed into the *volatility of the NOPAT growth rate* and the magnifying effect of *financial leverage*. NOPAT growth volatility, in turn, can be forecasted based on its historical value or based on estimates of its three drivers: sales growth volatility, operating leverage, and NOPAT margin. For the reasons discussed above (which apply to NOPAT growth volatility as they do to earnings growth volatility), the components approach is likely to yield more precise estimates.

Operating leverage measures the proportion of fixed costs relative to total costs. When revenue declines, so do variable costs, offsetting the negative effects on earnings. Fixed costs, in contrast, do not offset revenue shocks. Therefore, the higher the proportion of fixed costs (i.e., operating leverage), the greater the volatility of earnings. With fixed costs, the magnitude of the percentage change in total costs (which offsets the change in revenue) is smaller than that of the percentage change in sales. Thus, a given percentage change in sales results in a larger percentage change in earnings. Algebraically,

$$\begin{aligned}\% \Delta \text{ total costs} &= \% \Delta \text{ variable costs} \times (1 - \text{operating leverage}) \\ &= \% \Delta \text{ sales} \times (1 - \text{operating leverage})\end{aligned}$$

The following quote from the MD&A section of Costco's 2020 annual report illustrates this effect "The higher our ... sales ..., the more we can leverage certain of our selling, general and administrative (SG&A) expenses, reducing them as a percentage of sales and enhancing profitability."

The following example demonstrates the effect of operating leverage on earnings volatility.

Example: The impact of operating leverage on earnings volatility

Case		Sales	Fixed costs	Variable costs	Profit
A	Base level ($OL = 0/80$)	200	0	80	120
	After a 50% sales decline	100	0	40	60
	Percentage change	-50%	NA	-50%	-50%
B	Base level ($OL = 40/80$)	200	40	40	120
	After a 50% sales decline	100	40	20	40
	Percentage change	-50%	0%	-50%	-67%

For a given sales shock (50% decline), the percentage change in operating profit increases in the OL.

The academic literature emphasizes operating leverage as a measure of operating risk (e.g., Novy-Marx 2011). However, of the three factors (operating leverage, sales growth volatility, and NOPAT margin), operating leverage is the most difficult to estimate. This is especially true for U.S. firms because, unlike IFRS firms, U.S. firms do not report expenses by nature (e.g., the

costs of labor and raw material).⁶⁸ Still, there is some information that helps indicate the significance of operating leverage. For example,

- Merchandising firms have lower operating leverage than manufacturing firms because their COGS is generally variable cost.
- For most firms, COGS has lower proportion of fixed cost compared to SG&A (e.g., Chen et al. 2019). Still, classifying costs as fixed versus variable based on their function (i.e., COGS, SG&A, or R&D) is unlikely to consistently yield precise estimates.⁶⁹
- Operating leverage increases with the intensity of fixed and intangible assets and decreases with the intensity of raw materials and energy (e.g., Li et al. 2014a).
- An indirect estimate of operating leverage can be derived based on the historical relationship between operating profit and sales (e.g., using regression analysis).

Additional limitations of the operating leverage concept include:

- In the long-run, essentially all costs are variable, so operating leverage is horizon-specific.
- Cost behavior is often asymmetric, typically with a greater percentage of cost fixed with respect to downside sales shocks compared to upside shocks. This phenomenon is referred to as cost stickiness; see above and in Section 2.4.
- Variable costs may not be proportional to sales. For example, the declining marginal productivity of labor (for a fixed level of capital) implies that a given percentage increase in sales requires a larger percentage increase in (variable) labor costs.

NOPAT margin affects the volatility of the NOPAT growth rate because a high NOPAT margin implies a large “buffer” or ability to absorb negative NOPAT shocks (e.g., Li et al. 2014a). In other words, a relatively high base level of NOPAT (high NOPAT margin) implies that a given NOPAT shock has a relatively small effect (percentagewise) on NOPAT. To see this, consider two companies with the same fixed and variable costs, say \$40 each (so same operating leverage, $40/80 = .5$), but company A has \$200 sales while company B has \$300 sales. A negative sales shock of -50% would reduce company A’s operating income by 67%, from \$120 ($=200-40-40$) to \$40 ($=100-40-20$), but the decline for company B would be 59%, from \$220 ($=300-40-40$) to \$90 ($=150-40-20$). Note that company A’s initial NOPAT margin was 60% ($=120/200$) while that of company B was 73% ($=220/300$).

⁶⁸ While U.S. companies do not disclose overall labor costs, since 2017 (Pay Ratio Disclosure, amendment to Item 402 of Regulation S-K), U.S. public companies (excluding emerging growth companies, smaller reporting companies, and foreign private issuers) are required to disclose the median of the annual total compensation of all employees. This number, together with information about the number of employees, can be used to estimate total labor cost. However, this estimate may contain substantial error for at least two reasons. First, the median may be substantially different from the mean. Second, firms may not include all employees in calculating the ratio. For example, they may not include contracted labor, overseas employees, or employees of a recently acquired business.

⁶⁹ For example, in Item 1A. Risk Factors in its 2019 Form 10-K, Edwards Lifesciences notes: “A high proportion of our costs are fixed, due in part to significant selling, research and development, and manufacturing costs. Thus, small declines in revenue could disproportionately affect our operating results in a quarter, and the price of our common stock could fall.”

Example: The impact of operating profit margin on earnings volatility

Case		Sales	Fixed costs	Variable costs	Profit
A	Base level ($OPM=120/200=60\%$, $OL = 40/80$)	200	40	40	120
	After a 50% sales decline	100	40	20	40
	Percentage change	-50%	0%	-50%	-67%
B	Base level ($OPM=220/300=73\%$, $OL = 40/80$)	300	40	40	220
	After a 50% sales decline	150	40	20	90
	Percentage change	-50%	0%	-50%	-59%

For a given sales shock (50% decline), the percentage change in operating profit decreases in the OPM.

The following quote from the MD&A section of Costco's 2020 annual report illustrates the operating margin effect "Because our business operates on very low margins, modest changes in various items in the consolidated statements of income, particularly merchandise costs and selling, general and administrative expenses, can have substantial impacts on net income."

The *volatility of the sales growth rate* can be forecasted based on its historical value. Unlike earnings growth rates, sales growth rates are relatively well-behaved (in a statistical sense), so historical volatility provides a reasonable starting point for forecasting future volatility. Additional insight may be obtained by decomposing sales volatility into systematic and idiosyncratic components and forecasting each component separately. For example, the systematic component can be estimated based on industry membership (e.g., cyclical versus defensive industry) and information about business and geographic segments (diversification, differences in GDP volatility across countries, foreign exchange exposure). Similarly, to the extent that past volatility reflects idiosyncratic effects of M&A, that effect on the sales growth rate can be excluded when measuring historical volatility for the purpose of predicting future volatility (see Section 3.1.4).

2.11 Earnings growth

As explained in the previous section, for a given level of expected earnings growth, the probability of an earnings decline increases with earnings volatility. Similarly, all else equal, the ***probability of an earnings decline*** decreases with expected earnings growth. Thus, earnings growth forecasts should inform on the sustainability, or quality, of earnings.

Earnings growth informs on earnings quality also because investments (which lead to earnings growth) may be ***affected by the firm's reporting quality***. For example, Biddle and Hilary (2006) find that higher quality accounting enhances investment efficiency by reducing information asymmetry between managers and outside suppliers of capital. Consistent with this result, Balakrishnan et al. (2014) find that financing and investment by firms with higher reporting quality is less affected by changes in real estate values (which serve as collateral for borrowing) than are financing and investment by firms with lower reporting quality. Lara et al. (2016) argue that conservatism mitigates debt-equity conflicts and thus facilitate access to debt financing and reduce underinvestment. Consistent with their hypothesis, they find that more conservative firms

invest more and issue more debt in settings prone to underinvestment and that these effects are more pronounced in firms characterized by greater information asymmetries. In addition, several studies provide evidence on the relationship between reporting quality and the cost of capital (e.g., Francis et al. 2008, Armstrong et al. 2011), which in turn affects investments and growth (higher reporting quality implies lower cost of capital and thus more investments).

Earnings growth can be forecasted by extrapolating from historical growth rates, using time series models, or based on various decompositions. In addition, many financial and nonfinancial metrics inform on earnings growth prospects. In some cases, predicting variables that have a relatively stable relationship with earnings (especially revenue), and then mapping those forecasts into earnings estimates, yields more accurate forecasts compared to predicting earnings directly. Indeed, when conducting DCF valuation, analysts often focus on forecasting revenue and effectively assume that earnings growth will converge to revenue growth over time.

The remainder of this section describes different approaches for forecasting earnings growth. The discussion covers insights from practice as well as from academic research in different business fields.⁷⁰ Given that earnings quality and earnings growth are closely related, much of the discussion throughout the monograph is also relevant for forecasting earnings growth. Table 2.11A summarizes the approaches and related analyses discussed in this section.

⁷⁰ Monahan (2018) synthesizes and discusses academic research on financial statement analysis and earnings forecasting.

Table 2.11A: Forecasting earnings growth

Approach	Subsections / analyses
1. Historical growth rates	Earnings growth
	Revenue growth
	Asset growth
	Equity growth
	Dividend growth
2. Time-series models	No subsections
3. Revenue growth decomposition	Referenced in this section; described in Section 3.1.4
4. Asset growth decomposition	Decomposition of asset growth into the effects of intangible and tangible assets
	Growth in tangible assets versus growth in total assets
	Changes in working capital
5. Investment intensity	No subsections
6. Firm characteristics	Size and age
	Leverage and cash holdings
	Profitability and sustainable growth rate
	Asset tangibility
	Regression-based forecasts
7. Nonfinancial drivers	Customer-related indicators
	Human capital
	Other nonfinancial drivers
8. Industry-specific predictors	No subsections
9. Analysts' forecasts	No subsections
10. Value ratios	No subsections

2.11.1 Historical growth rates

This subsection discusses the use of historical growth rates in earnings and related variables (revenue, assets, equity, and dividends) to predict future earnings growth.

Earnings growth

Economic growth rates are often autocorrelated, suggesting that historical earnings growth rates may help predict future earnings growth. However, earnings growth rates are very volatile and show little persistence (e.g., Nissim and Penman 2001, Chan et al. 2003). In some cases, base earnings—from which growth is measured—are relatively small, resulting in highly volatile growth rates. In other cases, base earnings are negative, rendering earnings growth rates meaningless. Another reason for the overall low persistence of earnings growth rates is the mean reversion tendency of extreme earnings (e.g., Fama and French 2000), which in some cases offsets or even reverses any earnings momentum effect.

While the high volatility of earnings growth rates makes it difficult to extrapolate from past earnings growth rates, it does not imply that earnings growth rates are not predictable. Informative earnings growth forecasts can be derived by forecasting growth rates in related

variables—especially revenue—and then rely on the relationship between earnings and those variables to help forecast earnings growth.

Revenue growth

Revenue growth rates are less volatile and more persistent than earnings growth rates (e.g., Chan et al. 2003). The reason is that the following two effects—which increase the volatility of earnings—do not apply to revenue: (1) fixed costs reduce earnings without offsetting their variability (operating leverage, see Section 2.10), and (2) earnings often include transitory items (e.g., impairments, gains, losses).

To understand the operating leverage effect, note that if all costs are fixed, earnings have the same variability as sales but are smaller in magnitude, so their relative variability (percentagewise) is higher than that of sales. In contrast, if all costs are variable, a given percentage change in sales results in the same percentage change in earnings. For essentially all firms, at least some costs are fixed, so the relative variability of earnings is greater than that of sales. The inclusion of transitory items in earnings (e.g., restructuring charges, impairments, gains, losses) further increases their variability. The relatively low variability and recurring nature of revenue (compared to earnings) make past revenue growth a better predictor of future earnings growth than past earnings growth itself.

While revenue growth rates are more persistent than earnings growth rates, they still exhibit strong mean reversion (e.g., Nissim and Penman 2001). Incorporating the following considerations may help improve the accuracy of extrapolated growth forecasts:

- Extrapolate from the time-series of growth rates, not just from the most recent growth rate (for example, use the median growth rate in recent years). Using a historical period that covers a full business cycle is important especially when forecasting the revenue and earnings of cyclical companies.
- If there are outliers (e.g., due to M&A, F/X effects, or unusual shocks like COVID-19 or the financial crisis), use the median revenue growth rate rather than the arithmetic or geometric means. Using the arithmetic mean is problematic not just due to outliers but also because it biases the revenue forecasts upward.⁷¹ The geometric mean is not subject to this bias but,

⁷¹ Let G_t denote one plus the growth rate in year t . Over the previous two periods (0 and -1), the arithmetic mean is equal to $(G_{-1}+G_0)/2$ while the geometric mean is equal to $(G_{-1} \times G_0)^{.5}$. How do the two measures compare to each other?

$$(G_{-1}+G_0)/2 \text{ vs. } (G_{-1} \times G_0)^{.5}$$

or

$$.25 \times (G_{-1}+G_0)^2 \text{ vs. } G_{-1} \times G_0$$

or

$$G_{-1}^2 + G_0^2 + 2 \times G_{-1} \times G_0 \text{ vs. } 4 \times G_{-1} \times G_0$$

or

$$G_{-1}^2 + G_0^2 - 2 \times G_{-1} \times G_0 \text{ vs. } 0$$

or

$$(G_{-1}-G_0)^2 \text{ vs. } 0$$

Thus, if there is volatility in growth rates, the arithmetic mean will be greater than the geometric mean. But which mean is the “correct” one? When we forecast future amounts, we use the expected growth over the horizon to generate an estimate of the future value (FV). For example, if the horizon is two years and the current (known) amount in CV, $E[FV] = CV \times E[G_1 \times G_2]$, and so we are interested in estimating $E[G_1 \times G_2]$. An unbiased estimate of

unlike the median, it may be sensitive to outliers. If there are no outliers, the geometric mean may yield a more precise estimate than the median.

- If the company changed significantly over the historical period from which growth rates are extrapolated, giving more weight to recent observations may improve forecast accuracy.
- If there were significant changes since the last fiscal year end, it may be beneficial to recreate and analyze the time-series of annual revenue assuming fiscal year end as of the end of the most recently reported quarter (this can be done using reported year-to-date and quarterly information).⁷² The potential improvement from working with such proforma data is especially high if the most recently reported quarter is Q3.
- If forecasted inflation is different from historical inflation, or expected GDP growth is different from historical GDP growth, one may obtain more accurate forecasts by adding expected nominal GDP growth to the firm's median excess real revenue growth in recent years, where excess real revenue growth is revenue growth in excess of nominal GDP growth.⁷³ This approach may perform especially well if the firm's revenue is sensitive to aggregate economic activity.
- Forecasted revenue growth rates should generally converge toward expected GDP growth rates over the forecasting horizon. A simple approach to incorporate this insight is to calculate the revenue growth forecast for future year t as a weighted average of the extrapolated forecast and expected GDP growth in future year t , with the weight on the former (latter) decreasing (increasing) in t .
- More accurate forecasts, especially for the near-term, can be generated using time-series models and/or by applying the extrapolation methods separately to components of the revenue growth rate (see discussion of "Time-series models" and "Revenue growth decomposition" below).

Asset growth

Asset growth rates may be useful for predicting revenue growth rates (and by extension earnings growth rates) because they reflect investments that increase the capacity to generate revenue. In addition, to the extent that asset growth rates persist over time, high historical asset growth predicts high future asset growth and by extension high revenue growth. These arguments suggest that past asset growth rates may perform better than past revenue growth rates in

this quantity is the square of the geometric mean, i.e., $G_{-1} \times G_0$, which—as shown above—is less than the square of the arithmetic mean.

The expected value of $(G_{-1} - G_0)^2$, which determines the upward bias in the arithmetic mean estimate of expected growth, is increasing in the variance of the growth rate (σ^2) and decreases in its autocorrelation (ρ). To see this, note that

$$E[(G_{-1} - G_0)^2] = E[G_{-1}^2] + E[G_0^2] - 2 \times E[G_{-1} \times G_0] = 2 \times \sigma^2 \times (1 - \rho)$$

This bias is quite large because the volatility of growth rates is typically high, and their autocorrelation is low.

⁷² Trailing four quarters data are typically measured as the year-to-date value, plus the previous year annual value, minus the previous year's year-to-date value. This approach is preferred to aggregating four quarters of data due to reporting changes (e.g., reclassifications, changes in accounting policies, restatements).

⁷³ Many companies sell or operate in more than one country, so the relevant real GDP is the weighted average real GDP across those countries. In contrast, expected inflation should relate to the home country because, under the relative purchasing power parity, differences in expected inflation across the countries should be offset by differences in expected F/X changes. See Sections 3.1.4 and 4.9.3 for further discussion of foreign exchange effects.

predicting future revenue growth. This is typically not the case, however, for reasons explained below. Still, past asset growth rates often provide incremental information about future growth in revenue and earnings.

Revenue growth rates are generally less volatile and more persistent than asset growth rates, primarily because business combinations and other investing activities have a more gradual effect on revenue growth than on asset growth. Assets and liabilities of acquired businesses are fully added to the balance sheet on the acquisition date, but revenue is recognized only from the date of acquisition. The income statement for the year after a business combination reports the full year revenue of the acquired firm, while the income statement in the year of the combination reports revenue only from the acquisition date. Thus, the revenue growth rate is likely to be significant both in the acquisition year and in the following year. In contrast, the asset growth rate in the acquisition year generally reflects the full effect of the M&A.

The revenue growth effect is even more gradual for capital expenditures. Unlike business combinations, capital expenditures typically lead to a gradual and protracted revenue growth following the investment, as it often takes significant time for the assets to become fully productive. Thus, shocks to revenue growth rates are more moderate and persistent than shocks to balance sheet numbers, which in turn implies that historical revenue growth rates are likely to perform better than asset growth rates in predicting future growth rates in revenue and earnings.

Equity growth

Equity growth means that additional equity will be available to generate earnings next year; in other words, next year's ROE will be earned on a larger investment base. In addition, to the extent that equity growth rates persist over time, high historical equity growth implies high future equity growth and therefore high future earnings growth. However, like asset growth rates, equity growth rates have low persistence, especially extreme ones.

Focusing on equity growth rates instead of asset growth rates when forecasting earnings has the advantage that they are more directly related to earnings growth. If asset growth is funded with debt, it may not yield earnings growth if the increase in operating income is fully offset by the increase in interest expense.

For financial services companies, the relationship between equity growth and subsequent earnings growth is also due to regulatory capital requirements, which restrict the investments and operations of weakly-capitalized institutions (e.g., Nissim and Penman 2007).

Dividend growth

Dividend growth performs quite well in predicting earnings growth (Nissim and Ziv 2001). Managers are reluctant to cut dividends, and so they increase dividends only when they perceive an increase in sustainable earnings (Skinner and Soltes 2011). However, when dividends are small relative to earnings, or when no dividends are paid (as is often the case), this growth predictor is less informative or unavailable, respectively.

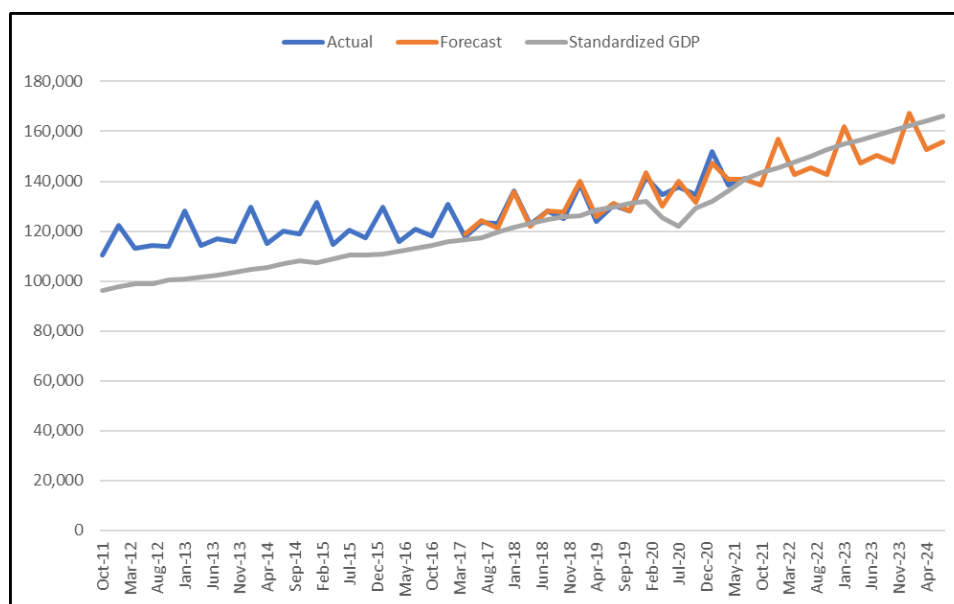
2.11.2 Time-series models

A more sophisticated approach for extrapolating from past growth rates is to use statistical time-series models. These models may consider not just the past level of growth rates but also trends, patterns, persistence, cyclicality, seasonality, or other features of the time series, and they may apply different weights to the observations (for example, larger weights to recent observations).⁷⁴ Time-series models may also incorporate predictor variables, including macroeconomic information (e.g., GDP growth, inflation, interest rates, exchange rates) or firm-specific information (e.g., advertising intensity). In many cases, these models perform well in generating near-term forecasts but less so in generating long-term forecasts; simple extrapolation models often dominate time-series models for longer horizons. Because they involve the estimation of several parameters, time-series models require a reasonable number of observations and therefore relatively high frequency data (quarterly or even monthly information, when available). Exhibit 2.11a provides an example of estimates generated using a time-series model.

The following are relevant considerations when using time-series models to *forecast revenue*:

- Use the revenue growth rate rather than the level of revenue, because changes in revenue are proportional to the base level of revenue; this adjustment mitigates specification errors and heteroscedasticity.
- Apply the log transformation to [one plus] the growth rate to yield a more symmetric distribution and mitigate the effects of M&A outliers.
- Model periodic growth rather than cumulative growth, because the time-series of cumulative growth has problematic statistical properties (non-stationary process).
- When using quarterly or monthly data, seasonally-adjust the data or incorporate seasonality in the specification.

Exhibit 2.11a Forecasting Walmart's revenue using a time-series model



⁷⁴ For example, ARIMA, exponential smoothing, LES (see, e.g., <http://people.duke.edu/~rnau/411outbd.htm>).

Notes to Exhibit 2.11a: The growth rate in revenue relative to the same fiscal quarter in the prior year is modeled based on the previous quarter value of this variable and the growth rate in seasonally adjusted nominal GDP in the current quarter relative to the previous one. To mitigate outlier effects, all variables are measured using the natural logarithm of one plus the growth rate. Out-of-sample revenue forecasts require nominal GDP forecasts, which are generated using several data series obtained from the federal reserve (<https://fred.stlouisfed.org/>). The model captures seasonality, growth momentum, and changes in economic activity. The figure uses data obtained as of October 15, 2021.

The following are relevant considerations when using time-series models to forecast earnings:

- Model the level of earnings instead of the growth rate, because earnings are often close to zero (generating extreme growth rates) or negative (growth rates are meaningless when the base level is negative).
- When modelling *annual EPS*, the simple random walk model (i.e., earnings are predicted to equal their previous year value) often provides a reasonable starting point (e.g., Bradshaw et al. 2012). In some cases, significant improvement may be obtained by allowing for a drift or by accounting for mean-reversion following extreme changes or abnormal profitability (e.g., Freeman et al. 1982).
- When modelling *quarterly EPS*, use the same quarter in the prior year as the starting point (seasonal random walk) and consider the seasonal earnings change in the adjacent prior quarter (autoregressive adjustment). For example, if EPS_{t-1} is \$1 larger than EPS_{t-5} , and EPS_{t-4} is \$4, then the forecast for EPS_t is $\$4 + \$1 \times \rho$, where ρ is a persistence parameter—generally positive and less than one—to be estimated from the time-series of EPS. Further improvement may be obtained by considering the earnings shock in the same quarter of the previous year (seasonal moving average adjustment), that is, the extent to which EPS_{t-4} is different from the value implied by the seasonal random walk with autoregressive adjustment model. Continuing the above example, if EPS_{t-4} is \$.1 above its fitted value from the seasonal random walk with autoregressive adjustment model, then the forecast for EPS_t is $\$4 + \$1 \times \rho + \$.1 \times \mu$, where μ is the moving average parameter to be estimated from the time-series of EPS (typically negative, because earnings shocks are not fully persistent). To gain efficiency, this model should be estimated in one stage (e.g., Pagach and Warr 2020).⁷⁵
- When modelling quarterly earnings, consider the fiscal quarter (see discussion of “Fiscal quarter” in Section 4.5.3).

Instead of using time-series analysis to extrapolate from past earnings, one may (1) use the company’s time-series of past earnings to identify firms that in the past had a similar earnings sequence, and (2) forecast the company’s earnings using the realized subsequent earnings of those firms. The rationale for this approach is that earnings reflect economic performance and firms with similar past performance are more likely to perform similarly in the future. Easton et al. (2021) evaluate the accuracy of this approach (referred to as k-nearest neighbors or k-NN model) in forecasting annual earnings, setting the forecast equal to median subsequent earnings of the matched k-neighbors. To implement the analysis, they first “tune” two key parameters: (1)

⁷⁵ The modelling equation is: $EPS_t - EPS_{t-4} = c_1 + c_2 (EPS_{t-1} - EPS_{t-5}) + c_3 e_{t-4} + e_t$. As noted, this model incorporates the following characteristics of the time-series behavior of quarterly EPS: (1) the preferred benchmark for quarterly earnings is earnings in the same quarter of the previous year; (2) there is a positive correlation between seasonal differences that is strongest for adjacent quarters and gradually declines over the first three lags; and (3) there is a negative correlation between seasonal differences that are four quarters apart.

the length of the earnings history, M , used to find matches, and (2) the number of nearest neighbors, k , that are matched to each subject firm-year. They find that the optimal value of M is two and that the optimal value of k is 90. They further show that their approach performs better than other commonly used models (e.g., random walk, regression-based forecasts) in forecasting out-of-sample, and that adding more features to the matching (e.g., accruals, total assets, dividends) does not lead to better forecasts.

2.11.3 Revenue growth decomposition

In various disclosures (e.g., MD&A, investor presentations, press releases), many companies provide a decomposition of revenue growth rates into price, volume, structural changes, exchange rate, and product/geographic-mix effects. These revenue growth components vary in persistence, with the structural changes (M&A, divestitures) and foreign exchange effects being especially volatile. Thus, by extrapolating from the persistent components of revenue growth instead of their total, one may obtain more accurate forecasts of revenue and, by extension, earnings. Section 3.1.4 elaborates on revenue growth decompositions.

2.11.4 Asset growth decomposition

As noted above (in “Asset growth”), past asset growth rates may help predict growth rates in revenue and earnings because asset growth reflects investments that increase the capacity to generate revenue and earnings. Considering the composition of assets may further help in predicting revenue and earnings, for the reasons discussed below.

While most assets help generate future revenue and earnings, an important exception is *accounts receivable*, which result from past sales. Investments in other working capital assets—primarily inventory—predict revenue growth in the near term (e.g., Hwang et al. 2020), while investments in fixed assets lead to revenue growth in a protracted way, with the resulting revenue recognized over multiple years.

The source of asset growth also has implications for future revenue and earnings. Unlike organic investments, *business combinations* lead to immediate revenue growth as most acquired businesses are already generating sales. However, compared to organic investments, business combinations result in lower revenue growth per dollar of recognized assets, because all assets acquired in a business combination are recognized while some internal investments are expensed (hiring & training costs, most R&D and IP, advertising, some IT, ...). Moreover, acquired growth is often fully paid for, while organic growth is more likely to represent value creation. Kubic (2020) provides evidence that information about the impact of M&A transactions on the financial statements help improve the accuracy of analysts’ earnings forecasts.⁷⁶

⁷⁶ Article 11 of Regulation S-X requires SEC registrants to provide pro forma financial information for acquisitions that exceed one of three 20% materiality thresholds based on the relative sizes of the bidder and target (the asset test, income test, and investment test). For acquisitions with required pro forma disclosure, the acquirer must provide an as-if consolidated balance sheet and income statement, with separate columns presenting historical acquirer financial statements, historical target financial statements, pro forma adjustments, and pro forma results. Kubic (2020) finds that this disclosure reduces post-acquisition analysts’ forecast errors and improves target selection. While

The following analyses and ratios can be used to evaluate the significance of asset growth due to M&A (as opposed to internal investments) and to construct more informative asset-based predictors of revenue and earnings.

Decomposition of asset growth into the effects of tangible and intangible assets

The following equations describe the decomposition:

$$\begin{aligned}\text{Growth in assets} &= \Delta \text{ assets} / \text{assets}_{-1} \\ &= \text{Growth in assets due to tangible assets} + \text{Growth in assets due to intangible assets}\end{aligned}$$

Where

$$\text{Assets} = \text{tangible assets} + \text{intangible assets}$$

$$\text{Growth in assets due to tangible assets} = \Delta \text{ tangible assets} / \text{assets}_{-1}$$

$$\text{Growth in assets due to intangible assets} = \Delta \text{ intangible assets} / \text{assets}_{-1}$$

Intangible assets are recognized primarily in business combinations (see Sections 5.5 and 5.17). Thus, if the change in intangible assets is significant compared to the total change in assets (e.g., assets increased by 20% and intangibles accounted for 8 percentage points of this increase), then M&A likely accounted for most if not all of the asset growth (M&A result in an increase in tangible assets in addition to intangibles).

Growth in tangible assets

As noted, internal investments in intangibles are expensed while acquired intangibles are recognized, making total asset growth a distorted measure of economic growth. In contrast, the growth rate in tangible assets measures economic growth in a way that is less sensitive to the composition of growth between internal investments and M&A.

$$\text{Growth in tangible assets} = \Delta \text{ tangible assets} / \text{tangible assets}_{-1}$$

Growth in tangible assets is still not free of M&A effects because tangible assets acquired in business combinations are marked to fair value while existing assets are generally reported at historical cost. Thus, for example, if a business combination results in growth in total assets of 60% and growth in tangible assets is 40%, economic growth—and thus the overall growth in revenue due to the M&A—is likely to be less than 40%.

informative, Article 11 pro formas are only required for material transactions and are disclosed in an 8-K or form S-4, formats that are not amenable to large scale data analysis.

Growth in tangible operating assets

Asset-based forecasts of revenue may be further improved if one excludes from the calculations assets that don't contribute to reported revenue (e.g., excess cash, long-term investments in marketable securities, assets of discontinued operations, and other nonoperating assets). Thus, *growth in tangible operating assets* is likely to reflect growth in the capacity to generate revenue better than the other previously discussed asset-based measures.

Changes in working capital

The magnitude of economic growth due to M&A activities can also be estimated by comparing changes in working capital (WC) items as reported in the cash flow statement with changes in these items between consecutive balance sheets. Typically, there is information on inventory, accounts receivable, accounts payable, and accrued expenses (the last two items are often reported combined). In some cases, additional WC items (e.g., prepaid expenses, deferred revenue) are also explicitly reported both on the balance sheet and in the statement of cash flows. The change in WC in the cash flow statement is due to operating activities, while the change in WC between consecutive balance sheets is due to operating activities, M&A, and translation effects.⁷⁷ Ignoring translation effects (discussed below), the change in WC items in the balance sheet (i.e., current year minus prior year) is equal to the change in the cash flow statement plus the amount acquired in M&A during the year. For example, if the statement of cash flows (SCF) reports an increase in inventory of \$50 while the balance sheet reports a beginning balance of \$500 and an ending balance of \$700, inventory of businesses acquired during the year on the day of the M&A was \$150 ($= 700 - 500 - 50$). The economic significance of M&A activities can be estimated by dividing the change in each WC item due to M&A by the beginning balance of the WC item. In the example above, growth due to M&A is $150/500 = 30\%$, growth due to organic activities is $50/500 = 10\%$, and overall growth is $200/500 = 40\%$. Typically there is information on more than one WC items (e.g., accounts receivable, inventory, accounts payable), so the above analysis can be repeated with each WC item, with the final estimate measured using the mean or median value across the alternative estimates.

As noted, asset growth due to investments is likely to lead to revenue and earnings growth. But some changes in reported assets—in particular, the effects of *F/X translation adjustments*—are not related to investments and may therefore have different implications for future revenue and earnings. Assets and liabilities of most foreign subsidiaries are reported on the consolidated balance sheet based on current exchange rates (see Section 5.18). Thus, fluctuations in exchange rates cause revaluation of assets and liabilities, which bypass the income statement and are reported in OCI (“F/X OCI”). Assuming that the leverage ratios of foreign subsidiaries are similar to those of the parent and its domestic subsidiaries, the impact of translation adjustments

⁷⁷ To demonstrate the M&A effect, consider a company that had no activities during the year other than to acquire another company that has inventory of \$100, which also did not engage in any activity during the year. The balance sheet will reflect an increase in inventory of \$100. In contrast, the cash flow statement will have no adjustment for inventory, because net income and cash from operations are both zero. Similarly, the cash flow statement excludes changes in inventory due to fluctuations in exchange rates used to translate the financial statements of foreign subsidiaries, because these changes do not affect net income or cash from operations.

on asset growth can be estimated using the ratio of F/X OCI to beginning-of-period equity (“F/X Effect”).

To demonstrate these calculations, consider a company that directly owns \$1,000 of assets and has \$500 liabilities. In addition, the company owns 100% of the stock of a European subsidiary that has assets of 100 Euro and liabilities of 50 Euros. Further assume that the exchange rate at the beginning of the year is 1:1, while by the end of the year it changes to 1 Euro = 2 USD. If the companies had no activity during the year, the parent will report other comprehensive income of \$50 ($= [100-50] \times [2-1]$), its assets will increase by 9.1% ($= 100/1,100$), and the ratio of F/X OCI to beginning equity will be 9.1% ($= 50/550$; beginning equity is $\$550 = [1,000 + 100 - 500 - 50]$).

Estimating the translation effect on asset growth is important not just to be able to discern investment-related growth from other sources of asset growth, but also to generate a more accurate estimate of the magnitude of M&A activities. Specifically, the refined estimate is:

$$\text{M\&A growth} = [\% \text{ change in BS WC}] - [\text{SCF } \Delta \text{WC} / \text{WC}_{-1}] - [\text{F/X Effect}]$$

2.11.5 Investment intensity

As noted above, investments lead to growth in revenue and earnings. Therefore, investment intensity ratios should help predict revenue and earnings growth. Indeed, this is one of the motivations for using asset and equity growth rates—which can be interpreted as investment intensity ratios—in forecasting revenue and earnings growth. There are also more direct measures of investment intensity, including *capex intensity* (capex divided by revenue; discussed in Section 3.4.2) and *discretionary expense intensity* (Section 2.4). A positive (negative) trend in these ratios implies that growth rates in revenue and earnings are likely to increase (decline) (e.g., Chan et al. 2003).

However, periodic investments—while informative—often perform poorly in predicting revenue growth, for two reasons: (1) the lead-lag gap between investments and growth can be quite long, and it varies substantially across firms and investments; and (2) fluctuations in investment intensity over time (either due to fluctuations in investments or in revenue) make it difficult to predict the change in revenue due to past investments. For tangible assets, these sources of estimation error can be mitigated by examining trends in *fixed asset intensity* in addition to capex intensity, because fixed assets accumulate past investments. But for discretionary expense intensity ratios—such as R&D, and advertising—there is no recognized asset on the balance sheet that can be compared to revenue. The following approach can be used to estimate the implications of *omitted economic assets* for future revenue and earnings.

Let X denote R&D, advertising, startup costs, IT-related expenses, hiring costs, or any other expensed economic investment.⁷⁸ For several alternative useful life assumptions (e.g., T = 1, 2, ..., 7), estimate X capital (e.g., R&D capital) assuming:

⁷⁸ Organic investments in intangibles that are expensed as incurred are mostly included in SG&A. SG&A expenses include IT investment, consulting, employee training costs, advertising and marketing expenses, R&D expenses, and information systems and distribution channel investment. Because detailed disclosure on these investments is typically unavailable, they can be estimated as a percentage of SG&A.

- X expenditures are made at the middle of the year and provide straight-line benefits over T years.
- X capital has zero salvage value.

Then, for each of the alternative values of T, calculate the value of X capital in the current year and for each of the last N years (e.g., N = 5). For example, for T = 3,

$$X \text{ capital}_i = (1/6) \times X_{i-2} + (3/6) \times X_{i-1} + (5/6) \times X_i, \text{ for } i = 0, -1, -2, -N$$

Where $i = 0$ is the most recent year. Then, plot the ratio of X capital to operating assets over the last N years. Repeat this for each value of T (e.g., T=1, 2, ..., 7). Next examine the trends in the T plots. Trends in the ratios may inform on future revenue growth and profitability. For example, a decreasing trend in R&D capital, observed under alternative assumptions of T, implies that (1) revenue growth rates are likely to decline; (2) near-term profitability may increase due to lower R&D expense; and (3) in the long-run, asset turnover and profitability are likely to decline as the contribution of R&D capital to revenue and earnings decreases.

Exhibit 2.11b Analysis of trends in Intel's R&D capital

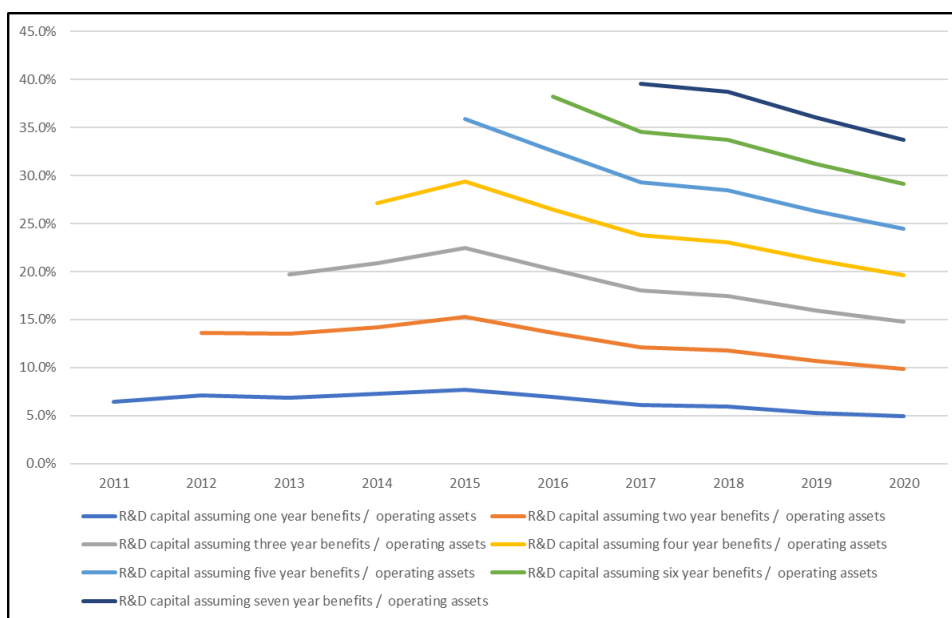
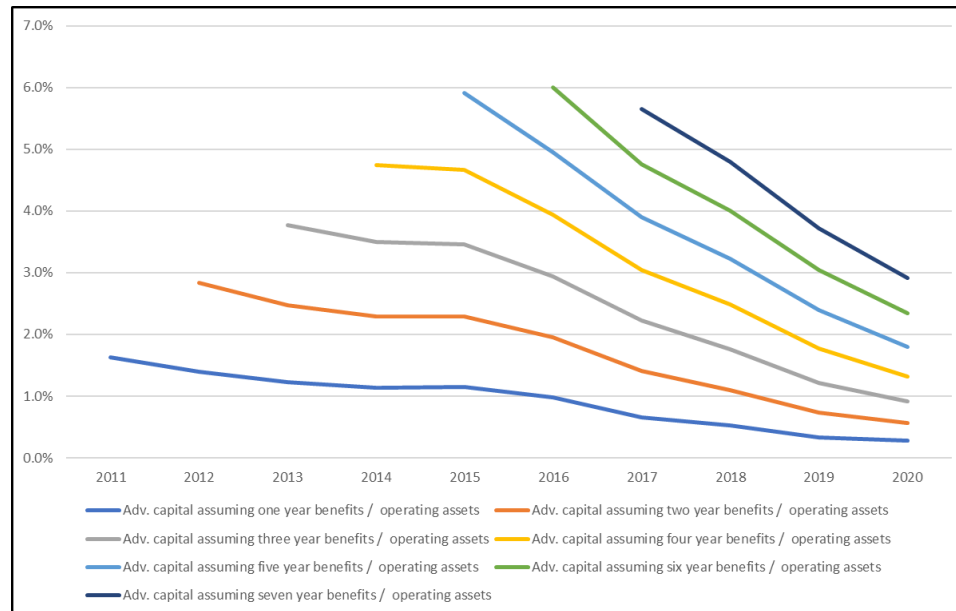


Exhibit 2.11c Analysis of trends in Intel's advertising capital (brand equity)



Exhibits 2.11b and 2.11c illustrate how this analysis can be used to obtain insight regarding trends in Intel's unrecognized intangibles. The figures indicate negative trends in both R&D capital and brand equity.

An alternative approach is to use only one value of T (e.g., $T = 5$) and replace reported numbers with pro-forma numbers that assume capitalization and subsequent amortization of X capital (e.g., Lev et al. 2005; Koller et al. 2020). The problem with this approach is that the reliability of the measured X capital as a proxy for its value is likely to be low because (1) it involves strong assumptions (useful life, magnitude and pattern of the benefits), and (2) the cash flows associated with investments in intangibles are less certain than those from fixed assets (e.g., Kothari et al. 2002, Penman and Yehuda 2019). The latter issue is due to several factors, including (a) greater uncertainty (compared to investments in fixed assets) regarding whether the investment will be successful; (b) if the investment is successful, the benefits may be much higher than those from successful investments in fixed assets due to scalability, network effects, optionality (e.g., an invention in one context can lead to other applications), and low variable costs; and (3) unlike most fixed assets, intangible assets have little or no exit value if the project is unsuccessful. Therefore, instead of adjusting historical data, the preferred approach is to evaluate trends in the ratio of X capital (e.g., R&D capital, advertising-based brand capital) to operating assets, with X capital calculated under alternative useful life (T) assumptions, as explained above.

Examining changes in the ratio of unrecognized assets to reported operating assets is important also because such changes weaken the relationship between growth in operating assets and revenue growth. For example, analysts often focus on capex intensity as a primary predictor of revenue growth. However, if a company changes its input or cost structure to substitute intangible assets for fixed assets, a decline in capex intensity may not predict a decline in revenue or earnings growth. For the same reason, it is also important to examine changes in human capital (discussed below) and leased assets. As discussed in Section 5.9, since 2019 (ASC

842) right-of-use lease assets are reported on the balance sheet, but pre-2019 numbers exclude these assets. In addition, investments in right-of-use assets are excluded from capex even under the new standard. Thus, to forecast growth in revenue based on trends in PP&E and capex, one should adjust these metrics to respectively include the estimated level of and investment in right-of-use assets. Alternatively, one may examine trends in the lease cost expense and estimated right-of-use assets in addition to trends in capex and PP&E (in which case, right-of-use assets should be excluded from post ASC-842 PP&E numbers). Section 5.9 elaborates on these issues.

2.11.6 Firm characteristics

For reasons discussed below, the following firm characteristics are correlated with subsequent growth.

Size and age

Research has documented a negative correlation between firm size and subsequent growth (e.g., Chan et al. 2003). Studies have attributed this correlation to diminishing returns to scale and to finite demand (small firms start from a small scale of operations, so they have more room for potential growth). Size is negatively related to growth also due to life cycle effects (large firms are more likely to have products at the maturity or decline stages) and diminishing returns to learning (large, old firms have less opportunity for further efficiency gains from learning). Conversely, small, young firms tend to undertake riskier investments in innovation, which on average lead to higher growth (e.g., Coad et al. 2016). In addition, business combinations by large companies are typically less value creative than acquisitions by small companies (Moeller et al. 2004).

While growth is generally negatively related to size and age, there are important exceptions. Some large market players with innovative products and strong market position may gain further market share and grow above the industry rate (e.g., Apple's iPhone). In addition, due to the "first mover's advantage," industry leaders are often the oldest firms.⁷⁹ Such effects have likely increased in importance over time because for digital technologies factors such as scale economies and network effects tend to produce "winner-take-all" outcomes. Finally, large firms are less likely to be financially constrained and so are less likely to underinvest (Beck et al. 2005).

Leverage and cash holdings

Leverage is negatively related to investments and growth, especially for firms whose growth opportunities are either not recognized by the capital markets or are not sufficiently valuable to overcome the effects of their debt overhang (Lang et al. 1996). Cash holdings effectively reduce leverage, and they allow financially constrained firms to undertake value-increasing projects that may otherwise be bypassed (Denis and Sibilkov 2009).

⁷⁹ Mueller (1997) describes this phenomenon as follows: "One of the empirical regularities of a product or industry's life cycle is that the one or two firms that eventually emerge as the industry leaders tend to be among the first to enter the industry. This phenomenon is so frequent that it has been dubbed 'the first-mover's advantage.' Just what the first-mover's advantage is, is often not clear. What is clear is that such advantages seem to exist and to persist."

Profitability and sustainable growth rate

Another firm characteristic that is likely to be correlated with growth prospects is profitability. Profitable firms often have (1) better investment opportunities, (2) internal funds (which are cheaper than external funds), (3) ability to obtain operating credit, and (4) access to capital markets. In addition, profitable firms may have greater ability and willingness to incur the negative short-term reporting effects that are often associated with investments (e.g., the immediate expensing of startup, R&D, advertising or hiring costs).⁸⁰

If profitable firms indeed invest more than other firms, they should have higher revenue growth. However, profitable firms often have high payout ratios, or they invest their profits in financial assets. The sustainable growth rate, which is defined as the product of forecasted long-term profitability and the *plowback ratio* (one minus the payout ratio), incorporates this caveat. With clean surplus accounting, the sustainable growth rate is equal to the growth rate in equity, which over time should approximate the revenue growth rate. The problem with this approach to forecasting growth is that it is difficult to predict long-term plowback or payout, and current payout is often a poor proxy for future payout. (In contrast, there are several useful approaches for predicting long-term ROE.)

Asset tangibility

In the presence of financing frictions, firms use pledgeable assets as collateral to finance new projects. Using the tangibility of firms' assets as a proxy for pledgeability, Almeida and Campello (2007) show that investment-cash flow sensitivities of financially constrained firms are increasing in assets' pledgeability. This effect is economically significant; Chaney et al. (2012) find that over the 1993-2007 period, the representative U.S. corporation invests \$0.06 out of each \$1 of collateral.

Regression-based forecasts

The academic literature on earnings forecasting in recent years has focused primarily on generating forecasts using linear combinations of firm characteristics, with coefficients obtained from panel data regressions of future earnings on current and past firm characteristics. The earnings predictors used by these studies include current earnings as well as other characteristics such as size, dividends, accruals, etc. Essentially all studies allow the intercept and the coefficient on current earnings to depend on whether the company reported a profit or loss. See Monahan (2018, chapter 6) for a review and discussion of this approach.

2.11.7 Nonfinancial drivers

Revenue and earnings are generated by or related to various nonfinancial or non-GAAP input or output metrics (e.g., # of employees, patents, products, transactions, etc.; customer and employee

⁸⁰ Asker et al. (2014) find that firms whose stock prices are most sensitive to earnings news invest substantially less and are less responsive to changes in investment opportunities due to the negative effects of investments on current and near-term reported earnings.

satisfaction and retention data), which are often considered KPIs. Thus, analyzing or forecasting these measures may help in forecasting revenue and earnings. Moreover, these metrics often inform on the risk or performance of companies, which in turn are correlated with earnings sustainability (see Sections 2.8 through 2.10). Some companies provide detailed disclosure and analysis of these factors in so-called “integrated reports” (e.g., Krzus 2020, Barth et al. 2021) or in corporate social responsibility reports. In proxy statements, companies disclose information on the composition and compensation of the management team and board of directors, and increasingly discuss other ESG aspects and related metrics. I next discuss—in separate subsections—indicators related to customers, human capital, and other nonfinancial measures of resources, utilization, and productivity. Chapter 4, which focuses on proxies for incentives and ability to manipulate earnings, contains additional discussion of nonfinancial indicators.

Customer-related indicators

Customers-related nonfinancial or non-GAAP metrics can serve as proxies for unrecognized brand-related intangibles, which help generate revenue and earnings (Mizik and Nissim 2011). These predictors of revenue and earnings include

- *Order backlog* (e.g., Rajgopal et al. 2003, Feldman et al. 2020, Banker et al. 2021a; see Section 3.1.3)⁸¹
- *Gross bookings*
- Shipment data (units)
- # of customers/subscribers/transactions/visits/members (total and new)
- Customer retention (or churn/attrition)
- *Net dollar retention* (i.e., current revenue from last year’s customers divided by last year’s revenue)
- *Annual recurring revenue* (ARR, the value of the contracted recurring revenue components normalized to a one-year period). For example, Cisco Systems defines ARR as the “annualized revenue run-rate of active subscriptions, term licenses, and maintenance contracts at the end of a reporting period. It includes both revenue recognized ratably as well as upfront on an annualized basis” (Cisco System Investor Day 2021). Some companies provide ARR decompositions—for example, ARR related to products (e.g., term licenses), maintenance, and SaaS—as well as related statistics (e.g., duration of contracts in place and retention rates)
- Customer shopping patterns. For example, using GPS location data from customers’ mobile devices, Jin et al. (2020) find that revenues and earnings are more persistent when customers (a) have more regular shopping patterns, (b) are repeat rather than one-time customers, (c) shop during the week rather than on weekends, and (d) spend more time in the store.
- Average transaction/ticket price
- Disaggregation of revenue, gross margin and # of customers by product/business, geography, channel, or customer type (e.g., retail vs. wholesale, government vs. private, corporate vs. consumer, recurring vs. repeat vs. one-time, small versus large volume, regular vs. premium)
- Information about distribution channels (e.g., # of retail and wholesale outlets)

⁸¹ A related metric is deferred revenue. Like order backlog, deferred revenue is a leading indicator of future revenue (see Section 3.1.2). However, unlike order backlog, deferred revenue is recognized in the financial statements and is reported by companies from many industries.

- Geographical reach of the company overall or specific products (e.g., # of markets that products are sold in; e.g., Krzus 2020)
- Components of the sales growth decomposition described in Section 3.1.4 (for example, positive price *and* volume effects suggest an increase in demand)
- # of products (total and new) and customer adoption data; for example, several studies find that the introduction of a new product increases the long-term financial performance of companies (e.g., Petrin 2002)
- Data on investment in, development, and sale of/switching to safe/r products (e.g., smoke-free cigarettes; Krzus 2020)
- Customer credit quality data (e.g., FICO scores)
- Customer loyalty/satisfaction/experience (e.g., net promoter score), awareness and preference data (e.g., Gupta and Zeithaml 2006, Ittner et al. 2009)
- Investments made to increase customer satisfaction (e.g., opening new call centers)
- *Take/conversion rate* (i.e., % of potential customers that react to offers/actions by the company)
- *Customer acquisition cost*
- *Customer lifetime value* and its drivers, including average revenue per user (ARPU), average operating cost per user, and customer average duration (=1/churn rate)
- Customer-related intangibles (e.g., tradenames, trademarks, customer lists, franchises; organic and acquired, financial and nonfinancial measures)

In some cases, examining or forecasting industry or market level data (e.g., total addressable market, penetration rates, market size—in amounts, volume or # of customers) and related firm-specific measures (e.g., market share) provides further insight.

Customer-related nonfinancial indicators of revenue growth or revenue sustainability include qualitative assessments of the stickiness of the product, which is due in part to customer switching costs (i.e., the level of customer lock-in). For example, switching costs for customers of companies like SAP or Oracle are high because their data, processes and architecture run on those applications. Changing vendor would cause deep upheaval, and the end result would be being locked in with a new vendor who has the same power over them. Non-core and non-critical applications don't have the same lock-in. For instance, there's far less upheaval involved in switching away from a video conferencing app like Zoom. Thus, for example, when analyzing software companies, it is important to evaluate if the application sits at the core of a software environment, has an ecosystem of third-party applications built on it, or is mission-critical to the company.

Human capital

Human capital is an important economic resource for essentially all companies, especially service ones. Yet this resource is generally not reported on the balance sheet.⁸² The number of employees can help investors assess the size of the firm's operations. The growth rate in the number of employees may serve as a proxy for growth in human capital, which should in turn

⁸² The value of human capital of an acquired business at the time of combination is included in recognized goodwill. However, subsequent increases in this economic resource, and the value of human capital developed organically, are omitted from the balance sheet.

lead to growth in revenue and earnings. Considering the following metrics may yield further insight on human capital and help in forecasting revenue:

- Employee demographic data (age, gender, race, ethnicity, nationality, education, experience, etc.)
- Investments in employees (e.g., hiring costs, education and training cost, % of employees trained, training and development programs, compensation and benefits data⁸³)
- Employee productivity (e.g., operating income or revenue per employee; e.g., Kotsantonis and Serafeim 2020)
- Employment status (e.g., rank, full vs. part time, unionized vs. non-unionized, permanent vs. temporary/contingent, employees vs. independent contractors)
- Employment by function, division or geography (e.g., number of R&D or quality-related positions; e.g., Krzus 2020)
- Employee retention, tenure, and turnover data (e.g., Huselid 1995)
- Employee satisfaction data (e.g., Edmans 2011) such as employee net promoter score and outside recognition (e.g., Fortune's list of "100 Best Companies to Work For")
- Health, safety and well-being at work data (e.g., incidents/injury/illness frequency and severity data, excess work hours; e.g., Caskey and Ozel 2017)
- Employee engagement and culture data (e.g., participation in surveys, employees' evaluation of inclusion, equity, ethics, integrity, and other culture-related dimension)
- Focus on human capital (e.g., senior human resources official is a named executive officer (NEO),⁸⁴ human capital-related metrics are used in determining the CEO's compensation; e.g., Batish et al. 2021)

For firms reporting under IFRS, measures of human capital can be constructed using publicly disclosed personnel expenses. For example, Regier and Rouen (2020) measure the opportunity to create human capital using the ratio of personnel expense to total assets, and the efficacy of human capital creation based on the relationship between past personnel expenses and operating income. They show that these measures are associated with stock prices and subsequent stock returns.

A recent regulatory change (adopted by the SEC on August 26, 2020) may increase the availability and usefulness of information on the human capital of U.S. companies. The amended Regulation S-K Item 101(c) requires, to the extent such disclosure is material to an understanding of the firm's business as a whole, to include "a description of the registrant's human capital resources, including the number of persons employed by the registrant, and any human capital measures or objectives that the registrant focuses on in managing the business (such as, depending on the nature of the registrant's business and workforce, measures or objectives that address the development, attraction and retention of personnel)." Batish et al.

⁸³ For example, in its 2019 Form 10-K, Costco note: "With respect to the compensation of our employees, our philosophy is not to seek to minimize their wages and benefits. Rather, we believe that achieving our longer-term objectives of reducing employee turnover and enhancing employee satisfaction requires maintaining compensation levels that are better than the industry average for much of our workforce. This may cause us, for example, to absorb costs that other employers might seek to pass through to their workforces."

⁸⁴ The named executive officers (NEOs) are the Chief Executive Officer, the Chief Financial Officer and the next three most highly paid executive officers of the firm.

(2021) examine early disclosure choices that companies have made under the new guidance. They find that while some companies are transparent in explaining the philosophy, design, and focus of their human capital management (HCM), most disclosure is boilerplate. Companies infrequently provide quantitative metrics. One major focus of early HCM disclosure is to describe diversity efforts. Another is to highlight safety records. Few provide data to shed light on the strategic aspects of HCM: talent recruitment, development, retention, and incentive systems. The authors conclude that “new HCM disclosure appears to contribute to the length but not the informativeness of 10-K disclosures.”

Other nonfinancial drivers

Additional drivers of revenue and earnings include measures of *technology capital* (e.g., patent counts, assessment studies, scientific publications; e.g., Bloom and Reenen 2002, Krzus 2020) and *capacity* (e.g., # of production or outlet facilities, production capacity, square feet of operations, manufacturing space, floor space, warehousing space, # of distributors). Also informative are measures of *capacity utilization* (e.g., the ratio of actual production to production capacity) and *product quality* (e.g., Nagar and Rajan 2001).

The availability of resources does not guarantee success. Therefore, information on corporate purpose, strategy, business model, and plans for employing the resources, may help in forecasting revenue and earnings (e.g., Teece 2010). Evaluating the business model is also relevant because it informs on the sustainability of earnings (Dichev et al. 2013), in part because it affects the susceptibility of earnings to manipulation or error (e.g., long operating cycle, high asset intensity).

2.11.8 Industry-specific predictors

When forecasting the sales and earnings of retail firms, analysts often distinguish between sales growth that arises from growth in the asset base (opening new stores) and sales growth that arises from increasing the efficiency of existing assets (comparable/same/existing store sales growth). All else equal, growth that results from improving asset utilization is more valuable than growth from additional investments as the latter require incremental funds (see Section 2.8). On the other hand, growth from improved efficiency is likely to be bounded. In addition, sales growth rates for new and existing stores may be different, either because stores are slow to mature or they enjoy a “fad” status in their initial year (see Curtis et al. 2013). The two components of sales growth also differ in terms of their drivers. For example, sales growth from existing stores is likely to be strongly correlated with contemporaneous economy- or industry-wide activity. In contrast, sales growth from new stores is related to anticipated long-term economic activity at the time the decisions to invest in the stores were made as well as to other considerations (e.g., increasing market share). Accordingly, forecasts of sales growth from existing stores are often based on forecasts of overall economic activity, while forecasts of growth from new stores emphasize recent and planned capex and store opening (companies often provide significant disclosure on such plans).

Similar growth decompositions may be used in other industries. For example, forecasting sales growth at a pharmaceutical company involves forecasting sales growth from existing drugs and

sales growth from introducing new drugs to the market. Forecasting sales growth for a cruise line company involves separately forecasting revenues from existing and newly launched ships. The discussion below provides additional examples.

The following is a list of industry-specific drivers of revenue and earnings that are either nonfinancial or that provide information that is not contained in the financial statements. Some of these metrics are used together with financial statement data to calculate additional drivers. For example, floor space is used together with sales to calculate sales per square foot, and available seat miles is used together with operating expenses to calculate cost per available seat mile. These measures are related to operations, and many of them are considered KPI.

- Retail: (growth in) same store sales; # of stores (total and periodic changes—opened, closed, relocated); selling/floor space; number of cars in the parking lots (e.g., Kang et al. 2021); GPS foot-traffic data (e.g., Jin et al. 2020, Noh et al. 2021)
- Hotel: # of rooms; occupancy (%), average daily room rate and their product (revenue per available room); # of properties owned/operated/franchised
- Casinos: gaming tables; slot machines
- Pharma and biotech: # drugs and medical devices, product pipeline (products under development by phase and therapeutic; e.g., Lev 2017), patents and trademarks, sales force, market shares of main drugs, years-to-patent expiration of main drugs
- Hospitals: # of facilities/hospitals; # of beds; # of visits/admissions (total, inpatient, outpatient, and equivalent [= inpatient admissions times the ratio of total inpatient and outpatient revenue to inpatient revenue]); (growth in) same facility admissions (total, inpatient, outpatient, and equivalent); average length of stay; occupancies; procedures/surgeries
- Airlines: (# of) revenue passengers; revenue passenger miles/kilometers, available seat miles/kilometers and their ratio (passenger load factor)
- REITS: Net asset value (with underlying assets often valued by applying asset-specific capitalization rates to the related net operating income); (growth in) same property/store net operating income; various measures of funds from operations
- Home builders: Information on backlog, periodic orders, and periodic deliveries—units, average price, and value; cancelation rates
- Social media/games: daily/monthly active users; monthly unique users
- Telecommunication: access lines; minutes of use; service area population and population penetration (e.g., Amir and Lev 1996)
- Technology: gross bookings; book-to-bill ratio (order received divided by units shipped and billed); traffic acquisition cost
- Cloud, SaaS and other subscription companies: Annual Recurring Revenue (ARR); net dollar retention
- Auto: shipment data (units); average selling price
- Mining: production (quantity) by metal; average price per unit by metal; cash cost (average cost per unit of metal produced); all-in sustaining costs (operating and sustaining capital costs per unit produced)
- Oil and Gas: oil production per day (total, oil, gas & natural gas liquids); total production; realized price (average price received per unit); proved/probable/possible reserves, which are reserve quantities estimated with 90%/50%/10 confidence; exploration success rate; refinery utilization; refinery capacity; reserve replacement costs

- Utilities: The main driver of demand at electric and gas utilities is ambient air temperature, with cold (warm) weather driving heating (cooling) demand in the winter (summer) (e.g., Grieser et al. 2021).
- Finance (banks, insurance companies, and other financial institutions): volume-rate analysis of net interest income (primarily for banks);⁸⁵ assets under management; assets under custody; net flows; capital ratios (e.g., Tier 1 common capital ratio); non-performing loans/assets; risk-weighted assets; premiums written; embedded value; reserve development data (Nissim 2010)

As non-GAAP measures, many of the metrics described in this section involve substantial measurement discretion, and their comparability across companies and often for the same company over time is relatively low. For example, when measuring “net dollar retention,” companies vary in the way they identify customers – should subsidiaries of the same parent be viewed as the same customer? Should all customers be included in the calculation or should some (e.g., small customers) be excluded? As another example, the churn rate (i.e., the rate at which customers fail to renew contracts when they expire) is in some cases measured relative to end-of-year instead of beginning-of-year volume.⁸⁶ Same store sales is another calculation that requires assumptions that vary substantially across companies; for example, should stores be included in the calculation after 12 months or after a longer period (to exclude the effect of positive or negative abnormal level of activity in the first few months).

2.11.9 Analysts’ forecasts and other outputs

Sell-side and independent analysts regularly issue forecasts of earnings and revenue (as well as of other financial statement line items).⁸⁷ A large body of research demonstrates the informativeness—but also inefficiencies—of these forecasts. To the extent that analysts’ forecasts are informative, they can be used to measure or adjust expected earnings growth rates. Forecasts relating to peers or to the industry overall may also provide relevant information, especially when analyzing firms with little or no analyst coverage. In addition, analysts’ reports—especially initiating coverage reports—often contain substantial quantitative and qualitative information, which can also be used in forming growth forecasts. Finally, investors that hold private discussions with analysts may obtain more detailed or specific information. For example, Brown et al. (2016) survey 344 buy-side U.S. analysts and report that these analysts—which are among the primary consumers of sell-side research—find sell-side analysts useful primarily because of their industry knowledge (average rating of 5.05 out of 6), management access (4.7), and the calls and visits that they have with them (3.91). All three ranked above the “public” output (written reports (3.76), earnings forecasts (2.67), and stock recommendations

⁸⁵ In 10-K filings, banks disaggregate annual changes in net interest income into changes in the balances (“volume variance”) and changes in the rates (“rate variance”) of assets and liabilities. Burke et al. (2020) find that the volume and rate variances are predictive of future net interest income and are positively associated with stock returns and prices, suggesting the disaggregated information is value relevant.

⁸⁶ See, e.g., “Foggy metrics obscure value of cloud companies,” Financial Times, December 6, 2020.

⁸⁷ Analysts generally fall into one of three categories: sell-side (work for full-service broker-dealers, including firms with investment banking operations), buy-side (work for institutional money managers, including mutual funds, hedge funds, pension funds, etc.), or independent (sell their research reports on a subscription or other basis; not associated with firms that underwrite the securities they cover).

(1.76); the survey did not ask about target prices, which are another output). I next describe evidence on the informativeness of analysts' earnings forecasts and then review the documented inefficiencies.

Findings related to the informativeness of analysts' earnings forecasts include:

- *Analysts' earnings forecasts*—especially near-term forecasts—are generally *more accurate than forecasts derived from time-series models*, although the difference is relatively small (e.g., Bradshaw et al. 2012).
- *Analysts' earnings forecasts provide new information*, as is evident from the market reaction to analysts' revisions (e.g., Kothari et al. 2016).
- *Analysts may obtain private information from management*. While Reg FD attempts to prevent selective disclosure of material information by public companies to analysts and other market participants, analysts may still benefit from their access to management.⁸⁸ An issuer is not prohibited from disclosing a non-material piece of information to an analyst, even if, unbeknownst to the issuer, that piece helps the analyst complete a “mosaic” of information that, taken together, is material. Similarly, since materiality is an objective test keyed to the reasonable investor, Reg FD will not be implicated where an issuer discloses immaterial information whose significance is discerned by the analyst. Finally, while under Reg FD non-intentional disclosure must be disclosed promptly (including by filing Form 8-K under Item 7.01), there may still be some timing benefit to the analyst.
- *Analysts are better than management in understanding the impact of macroeconomic factors*. Hutton et al. (2012) find that analysts provide more accurate earnings forecasts than management when a firm's fortunes move in concert with macroeconomic factors such as GDP and energy costs. In contrast, management's forecasts are more accurate than analysts' when management's actions, which affect reported earnings, are difficult to anticipate by outsiders, such as when the firm's inventories are abnormally high or the firm has excess capacity or is experiencing a loss.
- *Analysts' earnings forecasts are particularly informative in bad times*. Loh and Stulz (2018) find that in bad times analyst revisions have a larger stock-price impact, earnings forecast errors per unit of uncertainty fall, and analyst reports are more frequent and longer. The increased impact of analysts is also more pronounced for harder-to-value firms.

Inefficiencies that have been demonstrated in the literature include:

- *Analysts' forecasts of earnings are generally overoptimistic*. Many studies demonstrate that analysts bias their earnings forecasts upward to curry favor with firm management to obtain better access to management or investment banking (IB) business, from which they can benefit if their compensation or status is affected by their firm's IB activities (see Kothari et

⁸⁸ Regulation Fair Disclosure (Reg FD)—effective since 2000—provides that when an issuer, or person acting on its behalf, discloses material nonpublic information to certain enumerated persons (in general, securities market professionals and holders of the issuer's securities who may well trade based on the information), it must make public disclosure of that information. The timing of the required public disclosure depends on whether the selective disclosure was intentional or non-intentional; for an intentional selective disclosure (e.g., conference calls), the issuer must make public disclosure simultaneously (press releases, making the presentations and recording of the call available on the web, filing Form 8-K); for a non-intentional disclosure, the issuer must make public disclosure promptly (including by Form 8-K under Item 7.01). Reg FD provides no “bright line” standard for what should be considered material.

al. 2016 for a review of this literature). Favorable coverage may also increase the analyst's likelihood of being hired by the company or nominated to its board (e.g., Lourie 2018). Incentives to issue positive reports may be especially strong when the analyst's firm is underwriting an offering by the company, in which case the analyst's firm has financial and reputational incentives to assure that the offering is successful and to support the new stock. In some cases, the analyst or her firm owns securities of the covered company. In addition, issuing optimistic forecasts supports buy recommendations, which are more likely to generate trading and increase brokerage commissions compared to hold recommendations (Cowen et al. 2006).⁸⁹ Other studies attribute the observed bias to selection bias, arguing that the distribution of analysts' earnings forecasts is biased upward because it reflects primarily forecasts by analysts with favorable view (analysts with less favorable view have weaker incentives to follow the firm or issue forecast; McNichols and O'Brien 1997). Another explanation for the upward bias is that it is at least partially due to earnings skewness, as analysts effectively forecast median rather than mean earnings (Gu and Wu 2003).

- *Analysts “walk down” their earnings forecast during the year.* To curry favor with management, analysts first issue optimistic earnings forecasts and then “walk down” their estimates to a level that firms can beat at the official earnings announcement (Matsumoto 2002). In contrast, revenue walkdowns are relatively diminutive, except when analysts forecast losses (in such cases revenue forecasts are more critical and exhibit steeper walkdowns; Bradshaw et al. 2016).
- *Analysts' earnings forecasts do not fully reflect earnings quality information.* For example, Bradshaw et al. (2001) show that analysts' earnings forecasts do not incorporate the predictable future earnings declines associated with high accruals. Asness et al. (2019) find that analysts issue especially overoptimistic earnings forecasts for low quality stocks. Based

⁸⁹ Extensive regulation in the U.S. attempts to mitigate these effects, including rules by FINRA and the NYSE, and the Global Analyst Research Settlement. NYSE and FINRA (previously NASD) Rules, which were significantly strengthened in 2002, address conflicts of interest that arise when research analysts recommend securities in public communications. The rules are aimed at increasing analysts' independence and managing conflicts of interest. They also require increased disclosure of conflicts in research reports and public appearances. Key provisions of the rules include the following: prohibiting analysts from offering favorable coverage to induce investment banking (IB) business; imposing “quiet periods” that bar the analyst's firm from issuing a report on the company within 40 days after an IPO that they help manage; prohibiting supervision of analysts by the IB department and limiting their communications with the IB department and with IB client companies; prohibiting analyst's compensation from being tied to specific IB transactions; disclosure in research reports of underwriting relationship with company; restrictions on personal trading by analysts; disclosures of financial interests in covered companies by the analysts and by their firm; disclosure of the percentages of all buy/hold/sell rating and the percentage of IB clients in each category (these disclosures may be particularly useful in evaluating the bias); a graph of historical prices with the points of rating issuance and price targets; disclosures during public appearances by analysts (e.g., television or radio interviews) of position in the stock, IB relationship, or other material conflicts. In addition to these rules, in April 2003 the SEC announced settled enforcement actions against ten (generally the largest) Wall Street firms arising from an investigation of research analyst conflicts of interest. The terms of the settlement (called the Global Analyst Research Settlement) included the following: separations of research from investment banking (physical, reporting lines, legal and compliance staffs, budgeting, analysts' compensation, analysts' supervision, analysts' coverage, prohibitions on participation in IB activities, limit on communications with IB), disclosures of potential conflicts of interest, reason of terminating coverage, rating data and system, requirement to make independent research available to the firm's customers, and agreement to restrict allocations of securities in “hot” IPOs to certain company executive officers and directors.

on a survey of sell-side analysts, Brown et al. (2015b) report that analysts generally do not focus on detecting fraud or intentional misreporting.

- *Analysts' earnings forecasts do not fully reflect the information in firm characteristics.* For example, So (2013) shows that analysts' earnings forecast do not fully reflect the information in characteristic-based earnings forecasts that map current firm characteristics (e.g., past values of EPS, percentage change in total assets, dividends per share, book-to-market) into EPS forecasts.
- *Analysts' long-term earnings growth forecasts are of little value.* Chan et al. (2003) show that these forecasts exhibit a large upwards bias, display excessive cross-sectional variation, and have little ability to forecast realized long-term earnings growth. Bradshaw et al. (2012) show that simple random walk EPS forecasts are more accurate than analysts' forecasts over longer horizons, for smaller or younger firms, and when analysts forecast negative or large changes in EPS.
- *Analysts' overweight their private information,* especially when it is more favorable than public information (Chen and Jiang 2005).
- *Analyst forecasts are inefficient due to decision fatigue.* Hirshleifer et al. (2019) find that forecast accuracy declines over the course of a day as the number of forecasts the analyst has already issued increases. Also consistent with decision fatigue, the more forecasts an analyst issues, the higher the likelihood the analyst resorts to more heuristic decisions by herding more closely with the consensus forecast.
- *Analysts' forecasts are often stale or "sticky."* O'Brien et al. (2005) show that analysts with investment banking ties to the firm are slow to downgrade buy recommendations. Conrad et al. (2006) provide evidence that analysts are reluctant to downgrade stocks in response to negative information.

The above findings relate to research produced by human analysts. In recent years investment recommendations generated by "Robo-Analysts," which are human-analyst-assisted computer programs conducting automated research analysis, have become increasingly common. Coleman et al. (2021) provide evidence that the information content, timelines, and other properties of Robo-Analyst recommendations differ from those produced by traditional human research analysts.⁹⁰

For additional discussion of analyst coverage, see "Analysts' following" (Section 4.6.2).

2.11.10 Value ratios

When it comes to forecasting earnings growth, two types of value ratios are generally used in the literature, with somewhat different motivations. The macroeconomic and corporate finance literatures focus on variants of the market-to-book ratio (e.g., Tobin's q) and use them as proxies for investment opportunities, which in turn lead to growth in revenue and earnings. Valuation-

⁹⁰ Specifically, Coleman et al. (2021) report the following findings. First, Robo-Analysts produce a more balanced distribution of buy, hold, and sell recommendations than do human analysts and are less likely to recommend "glamour" stocks and firms with prospective investment banking business. Second, automation allows Robo-Analysts to revise their recommendations more frequently than human analysts and incorporate information from complex periodic filings. Third, while Robo-Analysts' recommendations exhibit weak short-window return reactions, they have long-term investment value and significantly outperform those of human analysts.

related research, in contrast, generally focuses on P/E-type ratios and uses them as market-based proxies for expected earnings growth. I next discuss the two streams of research.

If book value reflects the value of existing assets, and market value reflects both the value of existing assets and expected value creation through future investments, then the market-to-book ratio can be viewed as a proxy for investment opportunities.⁹¹ Of course, book value does not reflect the value of existing assets, and market value may not reflect the true value of investment opportunities due to various market inefficiencies and frictions (see “Firm characteristics” above). Still substantial research demonstrates (or assumes) that variants of the market-to-book ratio inform on the firm’s investment opportunities (see Bartlett and Partnoy 2018 for a review and critique of this literature). Adam and Goyal (2008) evaluate the performance of several value ratios as proxies for the firm’s investment opportunity set. They find that the market-to-book assets ratio has the highest information content, and it subsumes the information in the market-to-book value of equity and the earnings-price ratio.

Stock prices reflect investors’ expectations of future earnings. Thus, the price-earnings ratio can serve as a proxy for the ratio of expected future earnings to current earnings, that is, expected earnings growth. Empirically, price-earnings ratios predict subsequent earnings changes in the near term but much less so in the long term (e.g., Chan et al. 2003). Current earnings often reflect transitory items which are expected to reverse in the near term. The relationship between P/E and future earnings growth is noisy also because price is affected by the discount rate and expected payout ratio in addition to earnings growth. These issues can be mitigated by using recurring income or earnings forecasts in measuring the P/E ratio and by controlling for other determinants of P/E, including risk, payout, and earnings quality (e.g., Kemsley and Nissim 2002). The next section, which discusses the use of P/E ratios as proxies for earnings sustainability, elaborates on this point.

2.12 Price-earnings ratios

Profitability ratios compare earnings metrics to the book value of the investment that generated them (e.g., ROE, ROIC). Price-earnings ratios (e.g., P/E, EV/EBITDA) compare earnings (in the denominator) to the market value of the investment.

Although earnings quality analysis is typically conducted to inform about valuations, in some cases the motivation is different (e.g., forecasting earnings for risk analysis). In such cases, one

⁹¹ Tobin’s q theory (the finance version; see Bartlett and Partnoy 2018) describes the same idea somewhat differently. Under the theory, Tobin’s q reflects perceptions about expected profitability (+) and cost of capital (-), which in turn determine the value created by the firm’s investments. Thus, all else equal, investment should increase in Tobin’s q. Hou et al. (2015) provide a recent example of the implications of this theory. They use it to explain the significance of the profitability and investment factors in predicting stock returns. Firms invest when investments create value, which in turn requires high expected profitability or low discount rate. Thus, holding constant the level of investment, higher profitability must be offset by a higher discount rate (otherwise the company would invest more), explaining the coefficient on the profitability factor (the return on high ROE portfolios minus the return on low ROE portfolios). Similarly, given profitability, high investments imply a low discount rate, explaining the coefficient on the investment factor (the return on low asset growth portfolios minus the return on high asset growth portfolios).

may obtain information about the *perceived quality of earnings* from market prices. Because stock prices reflect investors' expectations of future earnings, the price-earnings ratio can serve as a proxy for the ratio of expected future earnings to current earnings. More generally, the P/E ratio reflects expectations about earnings growth, risk, and payout (e.g., Nissim 2013b). All else equal, the P/E ratio increases with expected earnings growth and payout and decreases with risk. Earnings growth and risk are important determinants of earnings quality because, all else equal, higher expected growth (risk) implies smaller (larger) probability of earnings declines (see Sections 2.10 and 2.11). For example, a low P/E ratio implies that investors expect an earnings decline, namely, earnings are not sustainable. Payout is relevant because, as discussed in Section 2.8, earnings derived from reinvested earnings are less valuable—and thus are of lower quality—than those derived from persistent profitability. Other determinants of earnings quality (e.g., the likelihood of earnings manipulation, management credibility) are also likely to be at least partially priced by investors and therefore affect (and are reflected by) the P/E ratio.

While the above discussion concerns the information conveyed by P/E ratios about earnings quality, the focus is often on the opposite direction—namely, the implications of earnings quality for the P/E ratio. To the extent the prices are viewed as inefficient, using value ratios to identify mispriced stocks requires controlling for earnings quality in addition to other determinants of the P/E ratio. Indeed, practitioners and academics that identify mispriced stocks using value ratios increasingly incorporate earnings quality factors. For example, Piotroski and So (2012) find that the returns to value/glamour investment strategies are strongest among those firms where expectations implied by current prices are incongruent with the strength of their fundamentals. Asness et al. (2018) define quality as characteristics that investors should be willing to pay a higher price for, including profitability (various measures of earnings and cash flow scaled by book value), growth (prior five-year growth in profitability), payout, and safety (beta, leverage, volatility of profitability, credit risk). Asness et al. (2019) show that high-quality stocks have higher prices on average but not by a large margin, and that these stocks have high risk-adjusted returns.

Although recent research recognizes the importance of conditioning value ratios on proxies for earnings quality when predicting stock returns, the approach used by extant research to define quality factors is typically statistical in nature; it often involves arbitrary selection, measurement, or aggregation of variables; and it is subject to potential data mining biases. There is also little consideration of economic and accounting relations among the factors. A primary objective of this monograph is to help facilitate the development of comprehensive, granular, and contextual earnings quality analysis.

3. Line-item Indicators of Earnings Quality

This chapter describes key line-item indicators of earnings quality, starting with revenue-related ratios (e.g., days sales outstanding) and then ratios related to different expense categories (e.g., bad debt, days inventory held, D&A rate). Table 3A below lists the different indicators by category. Chapter 5, which details line-item earnings quality issues, describes on how these indicators may provide a red flag or otherwise inform on the quality issues. Chapter 5 also discusses additional line-item ratios that are useful for evaluating specific earnings quality issues, especially in the context of more complicated accounting topics (e.g., income taxes, leases, pension, financial instruments, M&A, and share-based payments).

Table 3A: Line-item indicators of earnings quality

Category	Indicator
Revenue	1. Days sales outstanding (DSO)
	2. Deferred revenue intensity
	3. Order backlog intensity
	4. Revenue growth decomposition
	5. Revenue mix ratios
	6. Portfolio decomposition and fair value designation
	7. Revenue margin
Bad debt	8. Allowance ratio
	9. Bad debt intensity
	10. Net write-off intensity
	11. Problem receivables ratio
	12. Provision/WO
	13. Allowance/problem receivables
Inventory	14. Days inventory held (DIH)
	15. Days payable outstanding
	16. LIFO effect on the gross margin
	17. Gross margin
Long-lived operating assets	18. D&A rate
	19. Capex intensity
	20. Asset replacement ratio
	21. PP&E intensity
	22. Average useful life of depreciable PP&E
	23. Average age of depreciable PP&E
	24. Life cycle index
	25. Goodwill and indefinite life intangible intensity
	26. Other asset intensity

3.1 Revenue

Subsections 3.1.1 through 3.1.7 discuss revenue-related ratios. Table 3.1A below summarizes the quality issues captured by each of these indicators. Section 5.1 covers revenue-related earnings quality issues and analysis.

Table 3.1A: Revenue-related indicators of earnings quality

Indicator	Captures
1. Days sales outstanding (DSO)	Channel-stuffing, sales pull-in, and many other forms of revenue overstatement
	Changes in demand for the firm's products that affect credit policies
	Difficulties in collecting receivables
	Understatement of the bad debt expense (if measured using net receivables)
	Efficiency of cash and credit management
2. Deferred revenue intensity	Revenue manipulation
	Changes in demand for the firm's products
	Manipulation of the allocation of the transaction price to increase the portion considered recurring
3. Order backlog intensity	Revenue manipulation
	Changes in demand for the firm's products
4. Revenue growth decomposition	Persistence of revenue
	Value creation
	Revenue manipulation
5. Revenue mix ratios	Revenue manipulation
	Persistence of revenue
	Value creation
6. Portfolio decomposition and fair value designation	Manipulation of trading revenue
	Significance of transitory revenue
7. Revenue margin	Revenue manipulation related to reporting gross versus net (no effect on earnings)
	Revenue manipulation from sources other than gross bookings

3.1.1 Days sales outstanding (DSO)

This ratio—which is also called days receivables outstanding—can be used to evaluate **revenue recognition**. It is calculated as follows:

$$DSO = \frac{\text{Accounts receivable}}{\text{Revenue per day}}$$

As measured here, DSO is an estimate of the number of days it will take the company to collect existing receivables. Another interpretation of DSO—especially when measured using the average balance of receivables during the period—is the average credit period extended to customers. When measured using the average balance of receivables, $DSO = 365 / \text{accounts receivable turnover}$.

A significant *increase in DSO* may indicate that revenue is overstated (e.g., Beneish 1997). For example, Stubben (2010) finds that abnormal receivables turnover predicts SEC enforcement actions.⁹² When a firm recognizes credit sales before they are earned, revenue and accounts

⁹² Stubben (2010) measures abnormal receivables as the residual from cross-sectional regressions within each industry of the annual change in accounts receivable on the change in revenue for the first three quarters of the year (relative to prior year's first three quarters) and the change in revenue for the fourth quarter. He decomposes the change in revenues because revenues in the early part of the year are more likely to be collected in cash by the end

receivable (A/R) increase by the same amount. Since the balance of A/R is typically smaller than sales, the ratio of A/R to sales increases. For example, if without manipulation revenue would have been \$365 (\$1 revenue per day) and A/R \$100 (i.e., DSO of 100), overstating revenue by shipping \$20 of additional merchandise to dealers and booking it as revenue would increase DSO to 113.8 ($= [100+20] / [(365+20)/365]$).

When DSO is used to evaluate earnings quality, it should be measured using end of period A/R (rather than average A/R).⁹³ The reason is that any overstatement of revenue during the period will be reflected in the end-of-period, not beginning-of-period balance. In addition, if A/R is relatively large, DSO should be measured using annual or trailing-four quarter revenue rather than using quarterly revenue. The reason is that the impact of revenue overstatement during the quarter on full year revenue is much smaller (percentagewise) than the impact on quarterly revenue. In fact, if A/R is relatively large, measuring DSO using quarterly revenue may reverse the direction of the change in DSO. Using the above example, DSO measured using quarterly sales would *decrease* from 100 ($= 100 / [91/91]$) to 98.4 ($= [100+20] / [(91+20)/91]$) instead of increasing to 113.8.

The *level of DSO* may also be relevant. A high ratio implies aggressive revenue recognition practices—sales are potentially recognized before they are earned. For mature firms, a stable DSO implies that current period sales are not materially overstated even if the ratio is high. This follows because any revenue overstatement implied by a high DSO at period end is offset by the reporting of current revenue in the previous period, as implied by a high DSO in the previous period. However, for growing firms the first effect dominates, so a high DSO implies that revenue is overstated even if DSO remains constant.

DSO may change during the fiscal year due to *seasonality*. In addition, changes in economy-wide or industry wide conditions may change DSO in ways that are not necessarily related to earnings quality. Therefore, when evaluating earnings quality, it is important to benchmark the level of and change in DSO relative to the same quarter a year ago as well as relative to peers.⁹⁴ In fact, combining the two benchmarks is likely to be most informative—the change in DSO relative to the same quarter a year ago minus the median DSO change across peer companies.

Note, however, that when DSO is benchmarked relative to the same quarter a year ago, the analysis informs on the quality of trailing-four-quarters revenue, not necessarily on that of quarterly revenue. For example, if DSO at the end of the quarter is 10 days larger than its value a year ago, but DSO at the beginning of the quarter is 20 days larger than its value a year ago, then quarterly revenue is probably understated, not overstated.

of the year, and they therefore have different implications for year-end receivables than a change in fourth-quarter revenues.

⁹³ DSO is also used in evaluating liquidity, credit terms, and efficiency in collecting receivables. When used for evaluating credit terms and efficiency, measuring DSO using the average balance of A/R often results in a more informative ratio.

⁹⁴ Indeed, due to seasonality, the most common benchmark to which quarterly earnings are compared to are their value in the same quarter a year ago, not in the prior quarter (e.g., Graham et al. 2005).

To evaluate the quality of *quarterly* revenue, one should examine the difference between (DSO[end of quarter] – DSO[beginning of quarter]) and the value of this difference a year ago. A significantly positive value for this difference-in-difference implies that revenue is overstated. Incorporating control for economy and industry-wide effects, suggests the following procedure for developing a DSO-related indicator of quarterly earnings quality (I_{AbnDSO} , effectively difference-in-difference-in-difference):

1. Measure DSO at the beginning and end of the current quarter and at the beginning and end of the same quarter a year ago (i.e., DSO_t , DSO_{t-1} , DSO_{t-4} , DSO_{t-5}) for the company and each of its peers using the following formula:

$$DSO_j = \frac{\text{Accounts receivable}_j}{\text{TTM Revenue}_j / 365}$$

2. Measure the following change indicator for the company and each of its peers:

$$I_{DSO} = (DSO_t - DSO_{t-1}) - (DSO_{t-4} - DSO_{t-5})$$

3. Measure the industry-adjusted change indicator:

$$I_{AbnDSO} = \text{Company } I_{DSO} - \text{median across peers of } I_{DSO}$$

While the primary time benchmark for DSO is its value a year ago, it may also be informative to consider *longer-term trends in DSO*. For example, if the company's DSO is substantially higher than its median level over the prior five years, and this is not the case for the median peer, then such evidence would suggest a trend of deteriorating earnings quality over time.

DSO may inform on earnings quality also because it may capture ***changes in the demand for the firm's products***, which may lead companies to change their credit policies. For example, competitive pressures may induce companies to offer extended credit periods.

Changes in DSO may also be due to changes in ***businesses mix***. Therefore, when using DSO to evaluate earnings quality, it is important to examine revenue-related disclosures and segment information. Under the new revenue recognition standard (effective 2018 for public companies; see Section 5.1), firms provide substantially more disclosure about revenue. DSO may vary substantially across performance obligations (e.g., goods versus services), distribution channels (e.g., retail versus wholesale), geographies, or other decompositions. A change in DSO associated with a change in business mix may have weaker implications for earnings quality compared to a change in DSO for the same business mix.

Reported A/R may include non-trade related receivables (e.g., expected refunds from the IRS or from sale of regulatory credits), or may not include all trade-related receivables (e.g., notes receivable from trade may be reported separately or be included in "other assets"). Also, factoring and securitization of receivables distort the relationship between receivables and sales, thus reducing the information in DSO regarding revenue management. Therefore, when possible, DSO should be calculated using all trade receivables, including sold and securitized receivables

as well as trade note receivables. Non-trade receivables and non-trade revenue should be excluded from the receivables and sales balances, respectively.

Two additional sources of measurement error in DSO are M&A and foreign exchange translation effects. In the period of *business combination*, the acquired business' sales are included in current sales only from the date of acquisition, while the balance sheet reflects the full amount of the acquired business' receivables. Thus, a material business combination in the current period would increase the calculated DSO relative to the prior period, incorrectly suggesting deterioration in earnings quality. Perhaps more concerning, a material business combination in the prior period would incorrectly imply an improvement in earnings quality in the current period or hide a deterioration in earnings quality.

Foreign exchange translation may introduce error into DSO both because (1) the exchange rates used to translate the income statement and balance sheet are not identical (generally average and end-of-year, respectively); and (2) the DSO of the parent and its foreign subsidiaries may be substantially different from each other, and changes in the exchange rate effectively change the relative weights of the DSO ratios of the parent and its foreign subsidiaries in measuring overall DSO.

DSO may also inform on other aspects of earnings quality besides revenue manipulation. If DSO is estimated using net receivables, an increase in DSO may indicate an understatement of the bad debt expense. (The bad debt expense increases the allowance for doubtful accounts, which is netted against receivables.) Relatedly, an increase in DSO may indicate that the company experiences difficulties or is inefficient in collecting receivables. More generally, DSO is useful in evaluating the efficiency of the company's cash and credit management.

3.1.2 Deferred revenue intensity

Deferred revenue intensity is calculated as follows:

$$\text{Deferred revenue intensity} = \frac{\text{Deferred revenue}}{\text{Revenue}}$$

(Deferred revenue is also called unearned revenue, contract liabilities, or advances from customers.)

Deferred revenue is reduced when the firm recognizes revenue from the related transactions. Because the timing and amount of revenue recognition often involves substantial discretion, an unexpected decrease in deferred revenue may indicate revenue overstatement. Specifically, an understated ending balance implies recognition of future revenue, and an overstated beginning balance implies recognition of revenue that should have been recognized in prior periods. A decrease in the ratio may also inform on earnings sustainability for economic reasons, as deferred revenue is essentially a leading indicator of future revenue.

Companies' ability to manipulate earnings related to deferred revenue has probably increased since the implementation of the new revenue recognition standard (ASC 606, effective 2018; see

[Section 5.1](#)). Many transactions that were previously considered to involve only one element, are now viewed as including multiple performance obligations. For example, compared to the previous standard, the new standard is more likely to require deferred recognition of a portion of the revenue related to warranty, installation, or custodial services (in bill-and-hold sales). To the extent that the transaction price is paid before the recognition of the deferred portion, a liability for deferred revenue is recognized. Importantly, the measurement of the portion of the revenue that has to be deferred often involves substantial discretion, increasing firms' ability to manipulate revenue and earnings.

Some forms of earnings management activities may actually increase deferred revenue. When contracts consist of multiple performance obligations, with some elements less recurring in nature than others (e.g., installation, implementation and staff training versus subscription and service), companies may overstate the value of the recurring elements and understate the value of the other items. Because the less recurring performance obligations are typically satisfied earlier than the recurring ones, such manipulation may lead to relatively high or increasing deferred revenue.⁹⁵

A concept related to deferred revenue, which many companies report since 2018 (ASC 606) is ***remaining performance obligations*** (RPO). PRO represents revenue for non-cancellable contracts that will be recognized in future periods. It is generally comprised of total deferred revenue plus unbilled contract revenue. The level of and changes in the RPO/revenue ratio provides information similar to deferred revenue intensity.

3.1.3 Order backlog intensity

Order backlog intensity is calculated as follows:

$$\text{Order backlog intensity} = \frac{\text{Order backlog}}{\text{Revenue}}$$

Order backlog is reduced when the firm recognizes revenue from the related transactions. Because the timing and amount of revenue recognition often involves substantial discretion, an unexpected decrease in order backlog intensity may indicate revenue overstatement. A decrease in this ratio may also inform on earnings sustainability for economic reasons, as order backlog is a leading indicator of future revenue. However, this indicator has several shortcomings. First, order backlog is an unaudited non-GAAP measure. Second, companies have discretion related to (1) which orders are considered “firm” and should therefore be included in the disclosed order backlog;⁹⁶ and (2) whether to disclose the measure (disclosure is required if the item is material

⁹⁵ See, e.g., “Foggy metrics obscure value of cloud companies,” Financial Times, December 6, 2020.

⁹⁶ Item 101(c)(1)(viii) of Regulation S-K requires companies to disclose “The dollar amount of backlog orders believed to be firm, as of a recent date and as of a comparable date in the preceding fiscal year, together with an indication of the portion thereof not reasonably expected to be filled within the current fiscal year, and seasonal or other material aspects of the backlog. (There may be included as firm orders government orders that are firm but not yet funded and contracts awarded but not yet signed, provided an appropriate statement is added to explain the nature of such orders and the amount thereof. The portion of orders already included in sales or operating revenues on the basis of percentage of completion or program accounting shall be excluded.)” The following is an example of overstatement of order backlog (SEC AAER No. 3946): “In the second quarter of 2012, KBR included \$459 million

and potentially informative). Third, order backlog disclosures are concentrated in a few industries such as durable manufacturing and computers. Fourth, as discussed below, in some cases increases (decreases) in order backlog may have negative (positive) implications for earnings sustainability. For example, an increase due to supply chain difficulties or other production issues may predict lower profitability while a decrease in order backlog due to improved efficiency implies higher profitability.

Like other metrics discussed in this monograph, the information provided by order backlog is contextual. Banker et al. (2021a) find that an additional unit of production (order) backlog predicts a more significant increase in return on assets when the firm also reports a sales decrease (a sales decline concurrent with an increase in production backlog is likely to be temporary), the cash conversion cycle is longer, or asset growth is higher. Conversely, an additional unit of production backlog predicts a less significant increase in return on assets when the firm has a higher ratio of production backlog to sales.

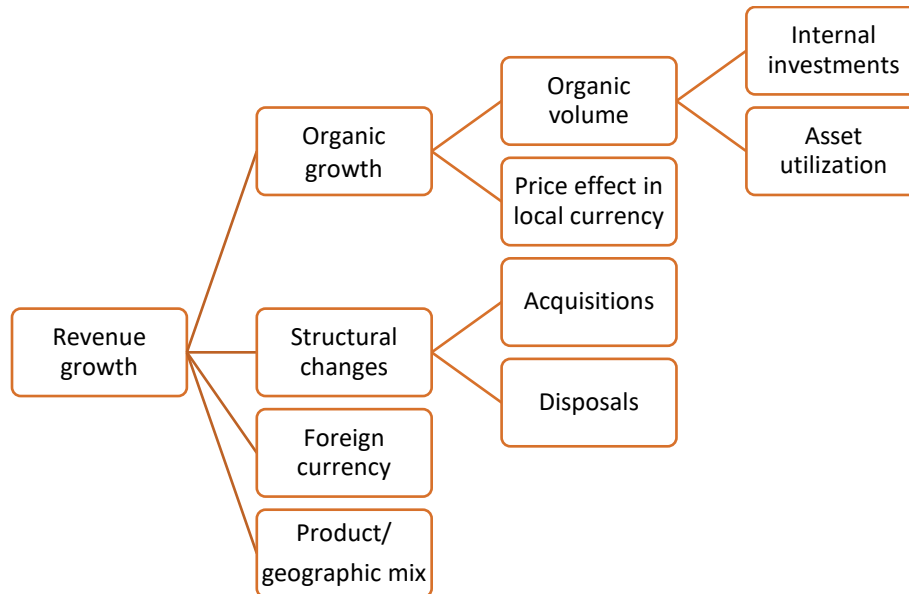
3.1.4 Revenue growth decomposition

In the MD&A section of financial reports as well as in investor presentations and other disclosures, many companies provide a decomposition of revenue growth rates into price, volume, structural changes, exchange rate, and product/geographic-mix effects. These revenue growth components *vary in persistence* (e.g., price versus exchange rate effects) and have *different implications for value creation* (e.g., organic growth versus M&A effects). In addition, the reported growth components can be compared to their drivers or other benchmarks to inform on the *likelihood that revenue has been manipulated*. For example, an organic volume component that is much larger than expected (given internal investments, GDP growth, or other relevant drivers), concurrent with a price effect that is smaller than expected (given inflation or other relevant drivers), may indicate sales pull-in activities. Thus, evaluating the contribution of the different sources to the revenue growth rate may inform on the quality of revenue and earnings.

Typical revenue growth decompositions involve some or all the components depicts in Exhibit 3.1a.

in its disclosed backlog for the MUA contract, despite the fact that KBR had yet to receive, and the Canadian energy company was not obligated to provide, KBR any orders under the contract. The backlog recording remained in place during the next six quarters, including after it became clear that KBR was receiving far fewer work authorizations under the contract than anticipated. KBR's disclosed backlog for the MUA contract was not consistent with its disclosures, which attributed all of KBR's backlog to 'firm orders.' As a result, KBR overstated the amount of its backlog in reports filed with the Commission."

Exhibit 3.1a Revenue growth decomposition



Organic volume effect – the weighted average (by sales, across products) percentage change in the number of units sold by businesses controlled by the company in both the prior and current period.

Price effect in local currency – the weighted average percentage change in price per unit measured in the currencies of the sale transactions (“local currency,” domestic currency for domestic sales and foreign currency for foreign sales).

The total of the volume and price effects is often termed **organic growth**. For example, if the average price per unit sold during the year was 5% higher than in the prior year (i.e., the price effect is 5%), and the company sold 10% more units than in the prior year (i.e., a volume effect of 10%), overall revenue growth is 15.5% ($=1.1 \times 1.05 - 1$). The 0.5% compounding effect can be attributed to the volume or price effects or be divided between them.

Structural change effect – the impact of acquisitions and dispositions of businesses. For example, if a business was acquired in the current year, and that business’ revenue between the acquisition date and the end of the year was \$100 while the company’s total revenue in the prior year was \$1,000, then the structural change effect is 10%.

Foreign currency effect – the impact of fluctuations in exchange rates. For example, for a U.S. company with international sales, a strengthening of the dollar would result in a negative foreign currency effect as the same sales in local (foreign) currencies are translated into fewer U.S. dollars.

Product/geographic mix effect – the impact of changes in the composition of units sold or location (currency) of sales. This effect is often included in one or more of the other components (e.g., in the price effect).

The organic volume effect can be used to evaluate the quality of revenue and earnings in several ways:

- For many companies (cyclical firms, firms with diversified end customers), the volume effect is correlated with measures of economic activity such as GDP growth, and its reasonableness can therefore be evaluated by comparing it to the weighted average (by sales) real GDP growth rate in the domestic and foreign markets. A reported organic volume effect that is substantially larger than the benchmark suggests greater than average likelihood of revenue overstatement or transitory revenue growth.
- Organic volume growth is due to *internal investments* (e.g., capex, opening new stores) and/or improvement in *asset utilization* (e.g., growth in same-store sales). Therefore, the reasonableness of the reported organic volume effect can also be evaluated by comparing it to the average across peers. Is the difference (if any) consistent with differences in internal investments, capacity utilization, advertising intensity (which leads to improved asset utilization) or other relevant factors?
- To what extent is organic volume growth due to growth in *market size* versus growth in *market share*? The effect of growth in market size is less likely to be due to revenue overstatement.
- Organic volume growth is typically associated with greater value creation than growth due to M&A, especially if it is due to improvement in asset utilization. However, the potential for continued growth from improved asset utilization is limited.

Similarly, analyzing the price effect can provide relevant insight:

- Price effect in local currencies should generally be consistent with the weighted average (by sales) inflation rate in the domestic and foreign markets. A large difference may imply higher than average likelihood of revenue manipulation.
- In a competitive environment firms have little ability to change price but may have substantial control over quantity. Therefore, a price effect that is substantially different from that reported by peers may constitute a red flag.

The relationship between the price and volume effects may also inform on the quality of reported revenue and earnings. In general, the two effects should be positively (negatively) correlated when the company experiences demand (supply) shocks. Are changes in the two effects consistent with those reported by peers? Are they consistent with the changes in demand (e.g., due to GDP growth) or supply (e.g., due to technological improvements)? The relationship between the two effects may also inform on the likelihood that the company engaged in sales “pull-in” activities (see Section 5.1), as these activities often lead to an increase in volume and a reduction in price.

The structural changes and foreign currency effects are typically highly volatile, so revenue growth due to these effects is much less likely to persist compared to growth in the other components. Still, while often forecasted to equal zero, the structural changes (M&A) and foreign currency (F/X) effects are in some cases predicted to partially persist. For M&A, the persistence is related to the timing of business combination during the fiscal year. For example, if the current year M&A effect was 9% and the business combination was at the end of the first

quarter of the current year, next year's effect should be predicted to equal 3%.⁹⁷ For subsequent years, most analysts would generally predict zero M&A effect due to the high uncertainty associated with future M&A and the fact that value creation in M&A activities is typically small. For foreign currency, the persistence of the effect is related to the cause of the F/X change. See Section 4.9.3.

Similar to other revenue growth components, comparing the reported M&A and F/X effects to relevant benchmarks may help identify misreporting. For example, the reasonableness of the reported foreign currency effect can be evaluated by comparing it to the weighted average (by sales) percentage change in average foreign exchange rates during the year.

3.1.5 Revenue mix ratios

Revenue from some transactions involves higher than average *discretion* in recognition or measurement. Examples include bill and hold sales, revenue from related party transactions, contingent/unbilled revenue (contract assets), revenue from sales to distributors (as opposed to sales to end customers), revenue from marking-to-market illiquid financial instruments, and progress revenue. Thus, high levels of or increases in the proportion of such “soft” revenue (i.e., revenue that may be manipulated or measured with error) may indicate revenue overstatement.

Revenue mix ratios may inform on earnings sustainability and value creation also for reasons unrelated to earnings management. Many companies generate revenue from different sources, which generally differ in their *persistence* and other *value-relevant attributes*. A change in revenue mix toward sources with lower persistence or margin, or an increase in the revenue share of high investment intensity or high-risk sources, implies a reduction in earnings quality (broadly defines, see Chapter 1). For example, an increase in mark-to-market revenue (e.g., trading activities), even if measured accurately, implies lower likelihood of earnings recurrence compared to an increase in revenue from selling products. In contrast, if a decrease the share of product sales is due to an increase in subscription revenue, the implications is higher earnings sustainability.⁹⁸ As another example, insurance companies include in their reported revenue realized gains and losses from selling investments, but most analysts remove this item from their measure of operating income (e.g., Nissim 2013b). The availability of information on revenue mix has increased with the implementation of ASC 606 and IFRS 15 (both effective 2018), which significantly extended disclosure requirements (see [Section 5.1](#) for details).

Considering revenue mix ratios is important also in the context of examining other ratios. For example, the primary ratio used in evaluating revenue quality is DSO (discussed above), with increases in DSO implying that revenue is potentially overstated. However, changes in DSO may also be due to legitimate reasons, including a change in revenue mix toward transactions that

⁹⁷ To see this, consider two companies A, and B. Company A generates revenue of \$100 each year and company B generates revenue of \$12 each year. If company A acquires company B at the end of the first quarter, it will report revenue of \$109 for the current year ($=100 + 9/12 \times 12$), that is, growth of 9% ($=109/100 - 1$). Next year, company A will report a revenue of \$112 ($=100 + 12$), that is a growth of approximately 3% ($=112/109 - 1$).

⁹⁸ See, for example, <https://www.wsj.com/articles/cisco-introduces-new-metrics-to-showcase-shift-toward-software-11631734200>.

involve extending longer customer credit. Therefore, examining revenue mix may improve the accuracy of inference based on changes in DSO.

3.1.6 Portfolio composition and fair value designation

Some firms—primarily large financial institutions—recognize revenue from marking financial instruments to fair value (a component of trading revenue). This requires measuring the fair values of financial instruments at the end of each accounting period, which often involves significant discretion.⁹⁹ For example, in its 2019 annual report, Goldman Sachs notes: “Trading assets and liabilities, certain investments and loans, and certain other financial assets and liabilities, are included in our consolidated balance sheets at fair value (i.e., marked-to-market), with related gains or losses generally recognized in our consolidated statements of earnings. The use of fair value to measure financial instruments is fundamental to our risk management practices and is our most critical accounting policy.”

Examining the compositions of the portfolios and fair value designations may help in evaluating the quality of the fair value estimates and the resultant revenue. In general, the quality of fair values is high for level 1 estimates (unadjusted price from active market), government-issued securities, and short-term instruments (estimating the fair value of liquid low risk instruments is relatively easy). Level 2 estimates (based on observable inputs) and especially level 3 estimates (based on inputs that cannot be observed in market activity) involve discretion and thus potential error and manipulation. In addition, some level 2 and level 3 financial assets and liabilities may require valuation adjustments that a market participant would require to arrive at fair value for factors such as counterparty and own credit quality, funding risk, transfer restrictions, liquidity, and bid/offer spreads.

3.1.7 Revenue margin

The revenue margin is calculated as follows:

$$\text{Revenue margin} = \frac{\text{Revenue}}{\text{Gross bookings}}$$

What percentage of gross bookings is recognized as revenue? If the company serves as an agent rather than a principal for at least some transactions, the ratio should be less than one. Companies often have significant discretion in deciding which transactions to account for on a gross versus net basis, and in most cases prefer gross reporting (see Section 5.1).

An increase in the revenue margin concurrent with a decrease in the gross margin could be a red flag for ***revenue overstatement related to reporting gross versus net*** (no effect on earnings).

A decrease in the revenue margin may also imply that revenue is overstated in ways other than reporting gross instead of net. Companies that report revenue from gross bookings typically have

⁹⁹ The fair value of a financial instrument is the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

additional sources of revenue that are related to or correlated with gross bookings. For example, they may have ad or referral revenue, which, like gross bookings, increases with visits to their website. If a company **overstates revenue from such other sources**, the revenue margin will likely increase. In essence, gross bookings can be viewed as a proxy for (unmanipulated) economic activity, so an increase in the ratio of revenue to gross bookings suggest that revenue is potentially overstated. To the extent that an increase in the revenue margin is due to such manipulation, earnings are likely overstated.

3.2 Bad debt

Subsections 3.2.1 through 3.2.6 discuss bad debt-related ratios. Table 3.2A below summarizes the quality issues captured by each of these indicators, and Exhibit 3.2a depicts the relationships among key bad debt-related accounts.

Table 3.2A: Bad debt-related indicators of earnings quality

Indicator	Captures
1. Allowance ratio	Credit quality of customers and receivables
	Manipulation of the bad debt expense
2. Bad debt intensity	Credit quality of customers and receivables
	Manipulation of the bad debt expense
	Transitory earnings effect
3. Net write-off intensity	Credit quality of customers and receivables
4. Problem receivables ratio	Credit quality of customers and receivables
5. Provision/WO	Manipulation of the bad debt expense
6. Allowance/problem receivables	Manipulation of the bad debt expense

Exhibit 3.2a Relationships among bad debt-related accounts

Accounts receivables		Allowance	
Beginning balance	Collection	Write-offs	Beg. balance
Credit sales	Write-offs		Recoveries
Recoveries			Bad debt expense
Ending balance			Ending balance

3.2.1 Allowance ratio

The allowance ratio is calculated as follows:

$$\text{Allowance ratio} = \frac{\text{Allowance for uncollectible accounts}}{\text{Gross accounts receivables}}$$

The allowance for uncollectible accounts measures expected write-offs of accounts receivable. Therefore, a low or decreasing allowance ratio may indicate a high or improving **credit quality of receivables**. Alternatively, it may indicate an **understatement of the bad debt expense** and therefore overstated earnings. This follows because the allowance for uncollectible accounts is

highly discretionary, and companies increase the allowance by recognizing a bad debt expense. (In fact, most companies calculate the bad debt expense as the required change in the allowance to bring its balance to reflect expected write-offs.)

To distinguish between the two alternative interpretations of changes in the allowance ratio (changes in credit quality versus earnings management), it is important to evaluate:

- The level of and change in days sales outstanding (DSO, discussed in [Section 3.1](#));
- The levels of and changes in relatively non-discretionary measures of credit quality (for example, the net write-off intensity ratio discussed below); and
- Estimates of the adequacy of reserves (the provision/WO and allowance/problem receivables ratios discussed below).

For example, a low or decreasing allowance ratio, concurrent with a high or increasing DSO, implies a high likelihood of earnings overstatement. Such inference would be further strengthened if the ratios of peer companies do not exhibit similar trends (so the improvement in the company's allowance ratio is not likely due to improvement in economic conditions), or if the decrease in the allowance ratio is associated with declines in the provision/WO or allowance/problem receivables ratios, or with an increase in the net write-off intensity ratio. (These ratios are discussed in the next sections.)

Evaluating the allowance ratio in the context of DSO is important because DSO is positively correlated with expected write-offs. DSO indicates the average age of receivables, and old receivables are more likely to be written off.¹⁰⁰ Indeed, aging of accounts receivable—the most common approach for determining bad debt provisions—is based on this observation. Thus, in the absence of earnings management, the allowance ratio should increase with DSO.

An increase in the allowance ratio that is due to deteriorating customers' quality could also be a red flag for unsustainable or low-quality revenue. For example, an increase in the allowance ratio may suggest that any growth in revenue in the current period was at least partially due to the lowering of credit standards rather than to an increase in demand, and thus the ability to generate additional growth is limited.

The allowance ratio discussed in this section focuses on accounts receivable. A similar ratio is calculated for loans receivable—the ratio of the allowance for loan losses to the gross balance of loans. This ratio is used in evaluating banks' earnings quality, and it is typically assessed considering loan composition, the proportion of non-performing or otherwise problematic loans, the rate of net charge-offs, and other relevant information (see Section 5.12).

¹⁰⁰ If DSO is measured using total sales instead of credit sales (which is the typical calculation given that most companies don't disclose the amount of credit sales), the average age of receivables depends on the proportion of credit sales in addition to DSO.

3.2.2 Bad debt intensity

Bad debt intensity is calculated as follows:

$$\text{Bad debt intensity} = \frac{\text{Bad debt expense}}{\text{Revenue}}$$

A low or decreasing ratio suggests high or improving **credit quality of customers**. Alternatively, similar to the allowance ratio, a low or decreasing bad debt intensity may indicate **understatement of the bad debt expense**. To differentiate between the two interpretations, one has to evaluate other, related ratios (DSO, net write-off intensity, provision/WO, and allowance/problem receivables), as explained in the previous section.

The bad debt intensity ratio may inform on earnings quality even in the absence of earnings management. Given that estimates of future write-offs involve significant uncertainty, current year write-offs of accounts that existed at the beginning of the year may differ substantially from the beginning-of-year balance of the allowance. Such differences are absorbed by the current year bad debt expense. In other words, the current year bad debt expense may include volatile adjustments unrelated to current year revenue, thus lowering the sustainability of earnings. A large decrease (increase) in the bad debt intensity ratio suggests positive (negative) **transitory earnings effect**.

3.2.3 Net write-off intensity

Net write-off intensity is calculated as follows:

$$\text{Net write off intensity} = \frac{\text{Net write off}}{\text{Revenue}}$$

A high or increasing ratio suggests low or deteriorating **credit quality of customers**. Compared to the bad debt intensity ratio, this ratio is less likely to be significantly manipulated because companies follow relatively non-discretionary write-off policies (e.g., accounts are written off when they are 120 days past due).¹⁰¹ On the other hand, net write-off intensity is an untimely measure of customers' credit quality, and changes in revenue over time (due to growth or fluctuations) distort its information content. Unlike the bad debt expense that purports to measure credit losses associated with same period revenue, net write-offs reflect credit losses with a delay, as accounts are generally written off only after a period of collection efforts. The delayed nature of write-offs implies that changes in revenue cause variation in the ratio that is not necessarily related to changes in customers' credit quality. For example, a large increase in revenue is likely to reduce net write-offs intensity, as current net write-offs partially relate to prior sales.

¹⁰¹ While less discretionary than the provision, write-offs are still not free of discretion and they have an indirect effect on the provision. Delaying a write-off allows firms to avoid a decline in the allowance, which might necessitate increased provisioning to restore the allowance (e.g., Calomiris and Nissim 2014). Higher write-offs may also suggest that a higher allowance-to-receivables ratio—and therefore additional bad debt expense—is warranted (see, e.g., SEC LR No. 19477).

Further contributing to the time-related distortion in net write-off intensity is the effect of recoveries, which relate to even older accounts than those written-off during the period. This issue can be avoided by using gross write-offs instead. However, doing so would distort comparability across firms and possibly over time. Gross write-offs are affected by management discretion regarding the events that trigger write-off. Net write-offs are less sensitive to variation in write-off policies since firms that use conservative write-off policies have large recoveries, which offset the inflated write-offs.

3.2.4 Problem receivables ratio

The problem receivables ratio is calculated as follows:

$$\text{Problem receivables ratio} = \frac{\text{Problem receivables}}{\text{Gross receivables}}$$

where problem receivables are measured using delinquent or otherwise problematic receivables. Because there are alternative classifications of problem receivables (e.g., 30+ days past due, 90+ days past due), there may be more than one ratio.

A high or increasing ratio suggests low or deteriorating ***credit quality of receivables***. Compared to the allowance ratio, this ratio is less likely to be significantly manipulated because measures of problem receivables are relatively non-discretionary (e.g., accounts that are 30+ days past due).

Variants of this ratio are especially relevant when evaluating the credit quality of loan portfolios of banks and other lending organizations, as they typically provide detailed information regarding delinquent and non-performing loans.

3.2.5 Provision/WO

The provision/WO ratio is calculated as follows:

$$\text{Provision/WO} = \frac{\text{Bad debt expense}}{\text{Net write offs}}$$

A low value of this ratio may indicate ***insufficient bad debt provisioning*** (i.e., understatement of expected write-offs) since the denominator of the ratio is a relatively objective measure of credit losses. For mature companies this ratio should normally be close to one, while for growing companies it should be greater than one because—unlike the bad debt expense—write-offs are a lagging indicator of incurred losses.

When evaluating the adequacy of loan loss provisioning, the ratio is measured using the provision for loan losses (the equivalent of the bad debt expense) in the numerator and net charge-offs (the term used when referring to loan write-offs) in the denominator.

3.2.6 Allowance/problem receivables

The allowance/problem receivable ratio is calculated as follows:

$$\text{Allowance/problem receivables} = \frac{\text{Allowance for uncollectible accounts}}{\text{Problem receivables}}$$

where problem receivables are measured using delinquent or otherwise problematic receivables.

A low level of or a decrease in this ratio may indicate ***understatement of expected write-offs and the bad debt expense***.

Variants of this ratio are especially relevant when evaluating the adequacy of the loan loss allowance of banks and other lending organizations, as they typically provide detailed information regarding delinquent and non-performing loans.

Example: Evaluating revenue and expense quality

Evaluate the quality of reported revenue and bad debt of Company A in year t. Use both time-series and cross-sectional benchmarks. Company B is a peer company.

	t-5	t-4	t-3	t-2	t-1	t
Company A						
Receivables / Sales	0.407	0.392	0.357	0.321	0.300	0.422
Deferred Revenue / Sales	0.036	0.025	0.029	0.027	0.034	0.012
Allowance for Uncollectible Accounts / Gross Accounts Receivable	0.087	0.079	0.069	0.058	0.057	0.053
Company B						
Receivables / Sales	0.166	0.140	0.160	0.126	0.101	0.112
Deferred Revenue / Sales	0.050	0.054	0.059	0.066	0.072	0.080
Allowance for Uncollectible Accounts / Gross Accounts Receivable	0.028	0.022	0.016	0.014	0.012	0.025

In year t, Company A had a large increase in the receivables/sales ratio and a large decline in the deferred revenue/sales ratio, both suggesting that the company overstated its reported sales and earnings. In some cases, such changes are due to industry-wide conditions rather than to earnings management, but this alternative explanation is unlikely to hold here because Company B did not experience similar changes in the ratios. Company A also had a decline in the allowance ratio, which is consistent with an understatement of the bad debt expense. The decline in the allowance ratio is relatively small, but the increase in the receivables/sales ratio suggests that outstanding receivables at the end of year t are on average older than at the end of year t-1, which in turn implies that the allowance ratio should have increased, not declined (old balances are more likely to be written-off).

3.3 Inventory

Subsections 3.4.1 through 3.4.4 discuss inventory-related ratios. Table 3.3A below summarizes the quality issues captured by each of these indicators, and Exhibit 3.3a depicts the relationships among key inventory-related accounts.

Table 3.3A: Inventory-related indicators of earnings quality

Indicator	Captures
1. Days inventory held (DIH)	Excess capitalization of costs into inventory
	Overproduction (manufacturing firms)
	Failure to recognize inventory write-downs
	Overstated quantity or quality of inventory items
	Inventory holding gains
	Demand shocks
	Overinvestment in inventory
	Round-tripping transactions
2. Days payable outstanding (DPO)	Cash and credit management
	Market power over suppliers
	Suppliers' private information about the company
	Difficulties paying suppliers
	Reverse factoring
3. LIFO effect on the gross margin	Core profitability
	Transitory earnings due to LIFO liquidation
4. Gross margin	Sales pull-in
	Persistence or sustainability of earnings
	Incentives to overstate earnings
	Inflation of revenue and costs (no effect on earnings)
	Difficulties in selling products

Exhibit 3.3a Relationships among inventory-related accounts (manufacturing firms)

Raw Material		Work in Process		Finished Goods		Cost of Goods Sold	
b.b. (1)	(2)	b.b. (2)	(5)	b.b. (5)	(6)	(6)	(6)
e.b.		(3) (4)		e.b.		=	=
		e.b.					

- (1) = Net purchases of raw materials
(2) = Transfers of raw materials to production departments
(3) = Direct labor
(4) = Production overhead (depreciation, indirect labor, energy costs, repairs and maintenance, ...)
(5) = Cost of finished good
(6) = Cost of goods sold
(2)+(3)+(4) = total production costs

3.3.1 Days inventory held (DIH)

Days inventory held (DIH) is calculated as follows:

$$DIH = \frac{\text{Inventory}}{\text{COGS per day}}$$

DIH is an estimate of the number of days it will take to sell existing inventories. Another interpretation of DIH—especially when measured using the average balance of inventories during the period—is the average number of days from the beginning of the operating cycle (i.e.,

the purchase of raw materials) to the sale of finished goods. When DIH is measured using the average balance of inventory, $DIH = 365 / \text{inventory turnover}$.

Low DIH implies high efficiency in production and sale. For example, firms that implement “just in time inventory” are attempting to reduce DIH. Low DIH also implies that reported inventory is relatively liquid—it turns into receivables or cash in a relatively short period of time. More importantly (for the purpose of this monograph), the level of and change in DIH inform about earnings quality.

A significant increase in DIH may indicate that:

- Cost of goods sold is understated due to either
 - Excess capitalization of costs into inventory
 - Overproduction (manufacturing firms)
 - Failure to recognize inventory write-downs
 - Overstated quantity or quality of inventory items
 - Inventory holding gains
- SG&A expenses are understated due to capitalization of operating expenses into inventory
- The company experienced a negative demand shock
- The company anticipates an increase in the demand for its products
- Old and potentially obsolete inventory items are included in inventories (especially if the increase in DIH is due to finished goods inventory), which may be written down in future periods
- The company overinvested in inventory
- The company engaged in round-tripping transactions, which inflated inventories

I expand on some of these effects below. Most of the effects imply a negative correlation between DIH and earnings quality, and academic research provides supporting evidence. For example, Lennox and Pittman (2010) and Donelson et al. (2021) document a positive correlation between abnormal inventory turnover and the probability of fraud, proxied for using SEC enforcement actions and settled securities class actions.¹⁰²

Excess capitalization

Many firms, especially manufacturing ones, have substantial discretion in deciding which costs to include in inventory (i.e., capitalize) and which ones to expense immediately (in COGS, SG&A, or other operating expenses). In many cases the discretion relates to the amount capitalized (for example, allocating compensation of employees that work both in production and administration between the two functions). These decisions impact both the balance sheet and the income statement. Excess capitalization results in larger reported inventory and smaller expenses in the capitalization year. Like most earnings management activities, however, this comes at a cost—the income effect reverses in subsequent periods when the inflated inventory units are sold. Excess capitalization increases reported inventory, but the effect on COGS depends on

¹⁰² Donelson et al. (2021) measure abnormal inventory as the residual from cross-sectional regressions within each industry of the annual change in inventory on the change in cost of goods sold for the first three quarters of the year (relative to prior year’s first three quarters) and the change in cost of goods sold for the fourth quarter.

whether the capitalized costs would have otherwise been reported in COGS or in SG&A.¹⁰³ In any case, because COGS is typically much larger than inventory, excess capitalization increases DIH.

Overproduction

For manufacturing firms, inventory costs include variable production costs (e.g., raw material, energy, some labor) and allocated fixed production costs (e.g., depreciation, rent, property taxes, some labor). Because fixed costs are spread over the units produced, fixed cost per unit—and therefore overall cost per unit and COGS ($= \text{cost per unit} \times \# \text{ units sold}$)—decline with the level of production. Some firms take advantage of this accounting treatment to manage reported earnings by changing production levels (e.g., Roychowdhury 2006). In particular, when firms overproduce, the same fixed costs are spread over a larger number of units, thereby reducing reported COGS and overstating the gross profit and earnings. Overproduction increases DIH both because of the decline in COGS and the increase in the quantity (and hence book value) of inventory. Independent of whether the overproduction is deliberate or not, empirically it predicts earnings decline, and market prices do not fully reflect this information (Nissim 2019c). The subsequent earnings decline is due not just to the shifting of future earnings to the current period, but also to increases in the cost of carrying inventory, in obsolescence rates, and in the likelihood of price discounts (to reduce inventory levels). Another cost, which is relevant since 2006 (SFAS 151), is the reduction in the ability to capitalize fixed costs into inventory in subsequent periods of low production.¹⁰⁴

Inventory write-down

Inventory should generally be reported at the lower of cost or net realizable value, an estimate that often involves substantial discretion (see Section 5.3). Failure to recognize inventory write-

¹⁰³ Under SFAS 151 (effective 2005), abnormal amounts of idle facility expense, freight, handling costs, and wasted material should be expensed immediately (typically in COGS) rather than capitalized into inventory. In addition, SFAS 151 requires that in periods of low production fixed overheads be allocated to the costs of conversion based on the normal capacity of the production facilities, which increases the amount that is included in COGS. To the extent that a company capitalizes rather than expenses these items, COGS is reduced. In contrast, if a company capitalizes operating expenditures (e.g., by overstating the production-related portion of the costs incurred in operating a building that is used for both production and administrative purposes, such as depreciation, rent, utilities, property taxes and insurance), SG&A expenses are reduced.

¹⁰⁴ SFAS 151 requires that in periods of low production fixed overheads be allocated to the costs of conversion based on the normal capacity of the production facilities. Until 2005, all fixed overhead costs were allocated to inventory produced during the period independent of the level of production. Thus, in periods of low production, inventory reported on the balance sheet had relatively high production overhead costs per unit. To prevent excess capitalization of fixed costs into the inventory, SFAS 151 requires that in periods of low production fixed overheads be applied to inventory based on rates for “normal” production levels (i.e., average level of production over several typical years for the company). By increasing the negative earnings effect of low production (limit on the amount of fixed costs per unit that can be capitalized), and by specifying past levels of production as input for estimating the “normal” level of production, SFAS 151 strengthened the negative effect of overproduction on subsequent earnings (Nissim 2019c). For example, if a company that normally produces 100 units each year increases current production to 120 and reduces next year production to 80, next year’s capitalized fixed costs would be reduced from 100% to a factor of $80/(100+20/N)$, where N is the number of years over which the “normal” or average level of production is measured.

downs results in an overstatement of inventory and an increase in DIH. This form of manipulation is particularly feasible in quarterly reports. In the U.S., a reduction in the net realizable value of inventory below cost does not trigger a write-down if it is expected to be recovered in subsequent quarters of the same fiscal year, giving manager another layer of flexibility in understating write-downs (by arguing that a permanent decline in the value of inventory is expected to be recovered).

Quantity or nature of items owned by the company

Firms may include in inventory items that do not belong to the company (e.g., inventory in consignment, inventory sold under “bill and hold” sales), or they may misrepresent the quantities or types of items owned by the firm. Because COGS is generally measured by subtracting the change in inventory from the cost of goods acquired or produced during the period, overstating inventory lowers COGS. Such manipulations are particularly feasible in interim (unaudited) reports. For example, when preparing interim reports merchandising firms are permitted to estimate cost of goods sold and ending inventory based on the level of sales during the quarter and the “normal” gross margin. In contrast, when preparing the financial statements for the year, they generally use the actual level of inventory, as measured based on a physical count.

Inventory holding gains or losses

The cost of acquiring or producing inventory units varies over time. In measuring COGS, firms use a cost flow assumption: FIFO, weighted average, or LIFO (in the US). Under FIFO (first in, first out), and to some extent under weighted average, COGS is measured using old costs. Therefore, if costs (e.g., oil prices) increase, and the cost increase is at least partially charged to the customers, in the short-term sales and inventory will increase but not COGS. The resulting increase in the gross margin is likely to subsequently reverse when the higher cost units are recognized in COGS. In other words, holding gains on inventory increase DIH and predict a decline in the gross margin (a similar effect occurs with LIFO liquidation; see Section 3.3.3).

Example: Inventory holding gains and losses

Company A buys 10 units each year and sells them the following year. The cost per unit is \$10 in the first year, and it increases by \$1 in each subsequent year. Each year the company sets the selling price at current cost plus \$1 markup. The company uses the FIFO assumption. Due to supply chain disruptions, in year 3 the cost per unit jumped to \$16, but it returned to the long-term trend in year 4.

	Inventory	COGS	Sales	Gross profit	Core profit ¹	Holding gain/loss ²
Year 1	10×10	0	0	0	0	0
Year 2	10×11	10×10	10×12	20	10	10
Year 3	10×16	10×11	10×17	60	10	50
Year 4	10×13	10×16	10×14	-20	10	-30
Year 5	10×14	10×13	10×15	20	10	10

¹ “Core profit” is the value added by the company, as measured by the difference between current selling price and current cost.

² Holding gains/losses are due to changes in the cost of inventory between the acquisition date and the selling date.

Core profit is typically quite stable but holding gains/losses may fluctuate significantly over time.

Demand shocks

Changes in the relation between inventory and COGS may indicate actual or expected demand shocks. For example, an increase in DIH may indicate that the firm is experiencing difficulties selling products, especially if the increase in DIH is due to finished goods inventory. Alternatively, an increase in DIH may indicate that the firm expects an increase in the demand for its products, especially if the increase in DIH is due to raw material inventory (the company is accumulating raw materials to satisfy anticipated demand). Hwang et al. (2020) find that inventory decreases less during periods with sales declines than it rises during periods with sales increases. They attribute this result to the costs of adjusting resources or production levels and to stockout costs, which are only partially offset by the costs of carrying inventory (including funding and obsolescence).¹⁰⁵ Using a construct similar to the change in DIH, they provide evidence that suggests that DIH increases when sales decline, especially if managers expects demand rebound or if stockout costs are high.

Round-tripping transactions

Round-tripping transactions are effectuated through “circles” of entities, each of which includes the firm, a third-party “customer,” and a related “vendor.” Typically, the customer and the vendor in each circle share a common owner. The firm “sells” the product to the customer, the customer “sells” the product to the vendor, and the vendor sells the product back to the firm. This process allows firms to recognize fictitious revenues and inflate reported inventories, which in turn increases DIH.¹⁰⁶

The following are additional considerations when using DIH to evaluate earnings quality (the reasons are the same as those discussed in [Section 3.1](#) with respect to days sales outstanding):

- When using DIH to evaluate earnings quality, inventory should be measured using its balance at the end of the period (rather than average during the period), and COGS should be measured using its trailing-four-quarters value.
- Due to *seasonality*, the benchmark to evaluate DIH should be the same quarter a year ago rather than the previous quarter.
- To evaluate the quality of *quarterly* earnings, one should examine the difference between (DIH[end of quarter] – DIH[beginning of quarter]) and the value of this difference a year ago (i.e., difference-in-difference).

¹⁰⁵ Costs of adjusting resources or production levels and stockout costs are related to the following factors: (1) convex cost functions (i.e., rising marginal costs), which imply that smooth production over time reduces the cost per unit; (2) costs associated with cutting slack capacity and laying off employees when demand declines and then re-acquire capacity and hire employees when demand rebounds; (3) demand uncertainty; (4) procurement lead times; and (5) capacity utilization.

¹⁰⁶ For example, a company “sells” inventory costing \$40 to A for \$60. A sells the products to B, which in turn sells it back to the company for \$65. Revenue goes up by \$60, pretax income goes up by \$20, reported inventory increases by \$25, ... and the company lost \$5. Next year’s pretax income will be \$25 lower (higher COGS).

- To control for economy- or industry-wide effects, the change in DIH should be compared to the median change across peer companies (difference-in-difference-in-difference).
- Considering the *level* of and *long-term trend* in DIH may provide further insight regarding earnings sustainability.
- In making inferences from the DIH, it is important to consider the potential for changes in measured DIH due to *M&A* and *foreign exchange translation* effects, which introduce error into the estimate, as well as the effect of *changes in product mix*.

3.3.2 Days payable outstanding (DPO)

This ratio—which is also called *payable days*—is calculated as follows:

$$DPO = \frac{\text{Accounts payable}}{\text{Purchases per day}}$$

How quickly does the firm pay amounts owed to suppliers?

High DPO may indicate effective ***cash and credit management*** (“free” financing) or imply that the company has ***market power*** over its suppliers. In addition, ***suppliers often possess private information*** about the performance and prospects of their customers. Thus, a reduction in DPO, or low DPO relative to industry benchmarks, may be interpreted as a negative signal—informed parties do not consider the company a good credit risk.

On the other hand, taking advantage of cash discounts may be optimal if the company’s cost of capital is relatively low. Also, delaying payments to suppliers may affect future costs. Thus, in some cases an increase in DPO may be due to the company experiencing ***difficulties in paying suppliers***. In addition, high DPO may be associated with ***reverse factoring*** transactions, which are equivalent to borrowing to finance suppliers and yet are classified as accounts payable rather than debt (e.g., Chuk et al. 2021; Section 5.11).

Thus, making inferences based on the level of or change in DPO has to be done in a contextual way. In general, large changes in DPO—either decreases or increases—should be examined to identify the underlying cause.

Issues in measuring DPO include: (1) for manufacturing firms it is difficult for outsiders to estimate purchases from suppliers,¹⁰⁷ and (2) accounts payable may include payables to parties other than suppliers and are often reported combined with accrued expenses. Another, related limitation of DPO is that suppliers are only one of several sources of operating credit. Thus, even when it is measured accurately, DPO is an imperfect indicator of operating credit.

¹⁰⁷ For merchandising companies, purchases from suppliers can be estimated as the total of COGS and the change in inventory. In contrast, for manufacturing companies COGS and the change in inventory reflect many additional costs besides purchases from suppliers (e.g., factory labor, energy, depreciation, etc.). For service companies, the primary difficulty is that the distinction between cost of revenue and other operating expenses is often obscure.

To address the above limitations, a more complete measure of operating credit can be calculated as the ratio of the total of accounts payable and accrued expenses to an estimate of average daily operating outlays that generate these liabilities. A simple measure of such expenditures is the total of cost of revenue, the change in inventory, and SG&A, minus the total of depreciation, amortization, and stock-based compensation.

3.3.3 LIFO effect on the gross margin

The LIFO effect on the gross margin is calculated as follows:

$$\text{LIFO effect on the gross margin} = - \frac{\text{Change in LIFO reserve}}{\text{Revenue}}$$

A negative LIFO effect implies that, all else equal, the gross margin reflects the core profitability of the company—the difference between sales (reflecting prices during the year) and cost of goods sold measured using the cost to acquire or produce those goods during the year (“last in”). In contrast, for FIFO firms, the gross margin includes holding gains or losses on inventory in addition to core profits (see “inventory holding gains or losses” above). This LIFO advantage, however, reverses when there is a **LIFO liquidation** (i.e., a positive LIFO effect due to a decrease in the quantity of inventory; see the LIFO liquidation example below). In such cases, the gross margin includes a positive transitory component. I next explain and demonstrate these effects.

Public firms that use the LIFO assumption are required to provide information in the notes to the financial statements that quantifies the impact of using this assumption.¹⁰⁸ This information enables users to convert the financial statements from a LIFO to FIFO basis. The primary component of the disclosure is the so-called **LIFO reserve**—the difference between the FIFO cost (which approximates current replacement cost) and book value of inventory. That is, the LIFO reserve measures the difference between inventory that would have been reported had the firm used the FIFO assumption and inventory as reported by the company.

While the balance sheet effects of LIFO are related to the level of the LIFO reserve (e.g., inventory is reduced by the LIFO reserve and retained earnings are reduced by the product of the LIFO reserve and one minus the tax rate),¹⁰⁹ the income statement effects are related to the change in the LIFO reserve during the period. Specifically, cost of goods sold (gross profit) is increased (reduced) by the change in the LIFO reserve, as the following example demonstrates.

¹⁰⁸ Specifically, the SEC requires that the excess of current replacement cost over LIFO cost and the income effect of depleting LIFO layers (relative to replacement cost) be disclosed in 10-K filings. Many firms use the FIFO cost of inventory as a proxy for its current replacement cost.

¹⁰⁹ The LIFO effect on reported assets is equal to the negative of the LIFO reserve (the LIFO reserve is defined as the difference between the current replacement cost of inventory and LIFO inventory). The impact on retained earnings reflects the impact on assets (lower assets imply larger past expenses) as well as the tax savings from the larger past tax deductions under LIFO.

Example: Impact of changing costs on the LIFO reserve

Assume the following transactions:

Year 1: bought 2 units for \$10 each and 3 units for \$12 each; sold 3 units.

Year 2: bought 2 units for \$15 each; sold 2 units.

Year 3: bought 2 units for \$11 each; sold 2 units.

Assume further that the company uses LIFO and that the marginal tax rate is 40%.

Compare net income under LIFO and FIFO in each of the three years.

Year	EI _{book}	EI _{FIFO}	LIFO reserve	ΔLIFO reserve	COGS _{book} - COGS _{FIFO}	NI _{book} - NI _{FIFO}
1	2*10	2*12	4	4	4	-2.4
2	2*10	2*15	10	6	6	-3.6
3	2*10	2*11	2	-8	-8	4.8

- The LIFO reserve increased as costs rose and decreased as costs fell.
 - With no LIFO liquidation, each year COGS is measured using costs of units purchased during the year.
-

As shown, the LIFO assumption typically results in a COGS measure that reflects current costs. However, as the next example demonstrates, when there is a LIFO liquidation COGS includes old costs which inflate reported income.

Example: LIFO liquidation

Assume the following transactions:

Year 1: bought 4 units for \$10 each; sold 1 unit.

Year 2: bought 4 units for \$12 each; sold 3 units.

Year 3: bought 2 units for \$12 each; sold 5 units.

Assume further that the company uses LIFO and that the marginal tax rate is 40%.

Compare net income under LIFO and FIFO in each of the three years.

Year	EI _{book}	EI _{FIFO}	LIFO reserve	ΔLIFO reserve	COGS _{book} - COGS _{FIFO}	NI _{book} - NI _{FIFO}
1	3*10	3*10	0	0	0	0
2	3*10+1*12	4*12	6	6	6	-3.6
3	1*10	1*12	2	-4	-4	2.4

- The LIFO reserve increased as costs rose from period 1 to period 2.
- The first period LIFO layer was “dipped into” in the third period.
- The LIFO reserve decreased in the third period because lower cost layers in the LIFO inventory had been sold.
- The LIFO cost of goods sold was less than the FIFO cost of goods sold in the third period because costs in the older LIFO layer were included in the third period’s cost of goods sold. Net income was thus higher for the LIFO firm than the FIFO firm, and due to the LIFO conformity rule, this means taxes were higher for the LIFO firm as well (for the year, not cumulative).

The most likely explanation for an increase in the LIFO reserve over a period is an increase in average costs. Decreases in the LIFO reserve are typically due to falling costs or depletion (liquidation) of LIFO layers.

3.3.4 Gross margin

The gross margin is calculated as follows:

$$\text{Gross margin} = \frac{\text{Gross profit}}{\text{Revenue}}$$

Note that the gross margin can be expressed as follows:

$$\begin{aligned}\text{Gross margin} &= \frac{\text{Revenue} - \text{cost of revenue}}{\text{Revenue}} \\ &= \frac{(\text{price} - \text{cost per unit}) \times \# \text{ of units sold}}{\text{price} \times \# \text{ of units sold}} = \frac{\text{price} - \text{cost per unit}}{\text{price}}\end{aligned}$$

Thus, the gross margin effectively answers the following question: How big is the spread between the selling price and the cost per unit (as a percentage of the selling price)?

A significant decrease in the gross margin relative to the same period a year ago or relative to the prior period (adjusting for seasonality) suggests that earnings are overstated (e.g., Beneish 1999a), especially if

- Most peers did not experience a similar decline
- The gross margin is significantly lower than the median in prior years.

While one should focus on changes in the gross margin when evaluating earnings quality, the level of the gross margin is also relevant. The gross margin tends to be relatively persistent, so high profitability due to high gross margin implies high earnings quality. In addition, a relatively high and stable gross margin often implies pricing power, which allows firms to charge high markups (especially relative to marginal cost) and increase prices when input costs increase (thereby maintaining margin stability). Investors do not seem to fully appreciate these effects, as several studies demonstrate the gross profit predict stock returns (e.g., Novy-Marx 2013).

As explained in more details below, a decrease in the gross margin may indicate that

- Revenue and earnings were increased by “sales pull-in” activities and are therefore not sustainable
- The negative impact of the gross margin decline on earnings is relatively persistent
- Managers have strong incentives to overstate earnings, and may have done so
- Revenue and cost are inflated by the same amount (no effect on earnings)
- The company is experiencing difficulties selling its products.

The remainder of the section expands on these issues.

A common approach for companies to increase reported revenue and earnings is to offer excessive discounts to ***pull in sales*** from the next period. These activities, which reduce the gross margin, lower the sustainability or quality of earnings. A decrease in the gross margin accompanied by an increase in days sales outstanding (DSO; see Section 3.1.1) is a particularly strong red flag for such activities, because another way to pull in sales from the next period is to extend excessive credit. In some cases, sales pull-in activities may also be associated with increased marketing expenses. For example, Chapman and Steenburgh (2011) find that manufacturers of soup (a durable commodity consumer product that can be easily stockpiled by end consumers) roughly double the frequency and change the mix of marketing promotions (price discounts, feature advertisements, and aisle displays) at the fiscal quarter-end when they have greater incentive to boost earnings.

Earnings decreases due to gross margin declines are less likely to reverse compared to earnings decreases due to changes in SG&A, income taxes, or other income statement items. This is due to several reasons. First, the gross profit reflects core profitability and is therefore relatively stable. Relatedly, competitive advantages in the form of either *economies of scale* or *product differentiation* typically imply a relatively high and stable gross margin. In addition, compared to COGS, SG&A expenses contain a larger proportion of fixed costs (e.g., Chen et al. 2019) and are more likely to contain discretionary expenses (e.g., Banker et al. 2019), further contributing to the relative stability of the gross margin compared to the operating margin. Finally, companies typically exclude volatile “unusual” expenses” (e.g., restructuring, impairment) from COGS.

For the reason discussed above, investors and other market participants consider a deterioration in the gross margin a strong negative signal about a company’s prospects (e.g., Beneish 1999a). Given that managers of companies with poor prospects have ***strong incentives to overstate earnings***, a deterioration in the gross margin implies a higher-than-average likelihood that managers engaged in earnings manipulation to offset the negative gross margin effect.

A decrease in the gross margin may also indicate that ***revenue and cost are inflated by the same amount***, with no effect on earnings. While often manipulated, revenues are still considered more “real” and closer to cash flow than most expenses. Thus, when valuing firms, investors tend to apply larger multiples to revenue compared to other income statement items. This is especially true for firms in the early growth stage, where profit margin is expected to improve over time. Accordingly, some firms overstate revenue in ways that do not necessarily increase earnings, and which therefore lower the gross margin. One such method is to include in revenue product sales derived from acting as a broker or an agent on behalf of other firms. And some firms, particularly internet, media, and telecom, report revenues from two-way (“barter”) transactions, which often do not represent the same economic performance as regular sales.¹¹⁰

Notwithstanding the above, some changes in the gross margin may be transitory. For example, the gross margin may be temporarily depressed due to the inclusion in cost of goods sold of holding losses on inventory (under FIFO), abnormal inventory shortage, or impairment or restructuring charges (uncommon). Similarly, the gross margin may be temporarily high due to

¹¹⁰ In a barter transaction, each firm commits to purchase some assets or services from the other (e.g., ad space on web pages) and recognizes both revenue and expense when the transaction occurs.

holding gains on inventory (under FIFO), overproduction that temporarily reduces COGS, LIFO liquidation, or inclusion of one-time gains or rebates from suppliers in revenues. In addition, some manufacturing companies have relatively large fixed or sticky production costs, which make the gross margin sensitive to fluctuations in sales, especially negative ones. In general, labor and asset-related costs tend to be fixed and sticky (see Section 2.4), while raw materials, energy, and subcontract costs tend to be variable.

To help identify transitory ***holding gains or losses that distort the gross margin***, one may examine the days inventory held (DIH) ratio. For example, a combination of high gross margin and high DIH could be an indication of inventory holding gains reducing cost of goods sold. Comparing the company's change in gross margin and DIH to those of LIFO peers may also help identify holding gains and losses (for LIFO firms holding gains generally do not affect cost of goods sold).

Another issue with using the gross margin to evaluate earnings quality is that in some cases it may ***not be comparable across companies or even over time***. Companies have some discretion in deciding which costs and expenses to include in reported cost of sales (which in turn affects the gross margin) versus in SG&A expenses, and this discretion may hinder comparability. Perhaps the best example is shipping and handling costs—some companies include them in cost of sales while others classify them as SG&A.

3.4 Long-lived assets

Subsections 3.4.1 through 3.4.9 discuss ratios related to long-lived operating assets. Table 3.4A below summarizes the quality issues captured by each of these indicators.

Table 3.4A: Indicators of earnings quality related to long-lived operating assets

Indicator	Captures
1. D&A rate	Overstated useful lives or salvage values of fixed or intangible assets subject to depreciation or amortization
	Distorted purchase price allocation in business combinations or combined asset acquisitions
	Misclassification of assets that are used in operations as “construction in progress” or “held for sale” to reduce reported depreciation
2. Capex intensity	Investment intensity
	Overinvestment
	Excess capitalization
3. Asset replacement ratio	Overinvestment
	Excess capitalization
	Understated depreciation
4. PP&E intensity	Excess capitalization
	Understated depreciation
	Overinvestment
	Inefficient asset utilization
5. Average useful life of depreciable PP&E	Understated depreciation
	Aggressive accounting practices (in general)

Indicator	Captures
6. Average age of depreciable PP&E	Significance of understatement of PP&E and depreciation due to inflation Likely accuracy of maintenance capex estimates
7. Life cycle index	Expected earnings growth Earnings volatility Effects of conservative accounting principles (e.g., expensing of R&D) Effects of aggressive accounting assumptions or estimates
8. Goodwill and indefinite life intangible intensity	Distorted purchase price allocation in business combinations Understated expenses (even when there is no manipulation) because goodwill and indefinite life intangibles are effectively consumed over time
9. Other asset intensity	Expenditures that should have been expensed Low quality assets recognized in revenue or gain transactions

3.4.1 D&A rate

The depreciation and amortization (D&A) rate is calculated as follows:

$$D\&A\ rate = \frac{D\&A}{Average\ fixed\ and\ intangible\ assets}$$

Compared to other ratios, this ratio is much less sensitive to economic and accounting seasonality, and it can therefore be measured using quarterly information.

This ratio is used to evaluate whether the company expenses long-lived assets at an appropriate rate. For reasons explained below, a low or decreasing D&A rate suggests that earnings are overstated, especially if the firm's D&A rate is smaller than those of most peers. In addition, a low D&A rate suggests a greater risk of future impairments and lower long-term earnings sustainability.

A low or decreasing D&A rate may reflect

- ***Overstated useful lives or salvage values*** of fixed or intangible assets subject to depreciation or amortization
- ***Distorted purchase price allocation*** in business combinations or combined asset acquisitions (explained below)
- ***Misclassification of assets that are used in operations*** as “construction in progress” or “held for sale” to reduce reported depreciation. (Assets classified as construction in progress or held for sale are not subject to depreciation.)

In business acquisitions, firms have substantial discretion in identifying intangible assets, measuring their fair values, and classifying them as having finite or indefinite life. They also have substantial discretion in estimating the values of fixed assets. Firms may use this discretion to overstate future earnings. For example, a company may classify an acquired finite-life trademark as having indefinite life, thereby avoiding the periodic amortization which reduces reported income. In general, firms may increase near-future reported earnings by understating the value of finite-life fixed or intangible assets, especially those having short useful lives, because errors in the valuation of individual assets are absorbed in goodwill, which is not subject to periodic amortization. Firms may similarly understate the value of depreciable PP&E acquired in

a combined transaction; for example, they may overstate the value of land and understate the value of the building when acquiring a property.

3.4.2 Capex intensity

Capex intensity is calculated as follows:

$$\text{Capex intensity} = \frac{\text{Capex}}{\text{Revenue}}$$

Capex intensity is often used to measure **investment intensity**, which in turn predicts growth. However, capex intensity may also inform on earnings sustainability. Specifically, in some cases it may reflect **overinvestment** (i.e., investments in negative present value projects) or **excess capitalization** (i.e., capitalizing operating expenditures).

Capex intensity should be evaluated in relation to PP&E turnover and PP&E useful lives (discussed below). High PP&E turnover or long PP&E useful lives imply that a relatively low capex intensity is required to maintain operating capacity. Alternatively, capex intensity can be measured relative to fixed or total assets instead of relative to sales (e.g., Beneish et al. 2001).

A low capex intensity could be due to assets added in transactions other than cash capex (business combination, non-cash purchases) or to leasing. Therefore, when evaluating capex intensity, it is important to examine changes in fixed assets due to transactions other than cash capex as well as changes in right-of-use (lease) assets. For example, if the company is reducing its leasing intensity, the same level of capex intensity implies lower investment intensity.

3.4.3 Asset replacement ratio

The asset replacement ratio is calculated as follows:

$$\text{Asset replacement ratio} = \frac{\text{Capex}}{\text{Depreciation}}$$

Similar to capex intensity, the asset replacement ratio informs on investment intensity and may indicate overinvestment or excess capitalization. Unlike capex intensity, the asset replacement ratio is also useful for evaluating the depreciation charge. Specifically, a high asset replacement ratio may reflect

- **Overinvestment** – i.e., investments in negative present value projects
- **Excess capitalization** of expenditures – i.e., reporting operating expenditures as asset acquisition (capex) instead of expenses
- **Understated depreciation**

Similar to the D&A rate, the asset replacement ratio may indicate understated depreciation due to overstated useful lives or salvage values, distorted purchase price allocation in combined capex transactions (e.g., of a building and the land on which it is situated), or misclassification of construction in progress or assets held for sale.

Unlike the D&A rate, the asset replacement ratio also reflects understated depreciation due to the recognition of *impairment losses*, which reduce subsequent depreciation. (The impact of impairment losses on the D&A rate is ambiguous, because impairment losses reduce both the numerator and denominator of the ratio.) Impairment losses imply lower earnings sustainability because depreciation will increase when the impaired assets are replaced.

The asset replacement ratio is often used to help ***predict growth***. A ratio in excess of one is interpreted as implying that the company is investing more than is needed to replace depreciating assets, with the increase in operating capacity expected to lead to an increase in sales. However, there are several difficulties with making such inference:

- Depreciation is based on the assets' historical cost, which typically understates their current cost. In contrast, capex reflects current costs.
- Depreciable assets are often acquired in business combinations or in non-cash transactions (e.g., buying an asset with vendor financing). Thus, compared to capex, depreciation effectively relates to a larger asset pool.
- Capex includes the cost of land, which is not subject to depreciation.
- The productivity of some assets increases and/or their cost declines over time (e.g., computers), leading to a reduction in the capex needed to maintain operating capacity.
- Changes in the capex-depreciation relationship may be due to changes in input or cost structure (e.g., owned fixed assets, leased fixed assets, intangible assets, labor), because depreciation relates to past input structures while capex relates to current and future input structures.

A high asset replacement ratio is more likely to indicate the earnings quality issues discussed above under the following circumstances:

- Low sales growth (so the high asset replacement ratio is not likely due to growth capex)
- The asset replacement ratio is high relative to both time-series (past values) and cross-sectional (relative to peers) benchmarks
- Lease intensity has not been trending down (in which case a high asset replacement ratio may reflect substituting from leasing to asset acquisition)
- Labor intensity has not been trending down (in which case a high asset replacement ratio may reflect substituting from labor to fixed assets)
- Intangible intensity has not been trending down (in which case a high asset replacement ratio may reflect substituting from intangible assets to fixed assets)

3.4.4 PP&E intensity

PP&E intensity is calculated as follows:

$$PP\&E\ intensity = \frac{Net\ PP\&E}{Revenue}$$

This ratio is the inverse of the PP&E turnover ratio (measuring ratios with sales in the denominator typically results in better statistical properties).

A high level of or an increase in PP&E intensity may indicate

- Excess capitalization
- Understated depreciation
- Overinvestment
- Inefficient asset utilization

(Please see previous sections—in particular Sections 2.2 and 2.3—for a discussion of these issues.) Thus, a high PP&E intensity ratio implies that earnings or profitability rates are not sustainable as well as a high risk of future impairment or disposal losses.

Changes in PP&E intensity may be due to changes in lease intensity, as leasing effectively substitutes for asset purchases. Therefore, when evaluating fixed asset intensity it is important to consider changes in lease intensity, measured using the ratio right-of-use (ROU) lease assets to revenue. Alternatively, one may simply evaluate the ratio of [Net PP&E + ROU assets] to revenue in the first place.

3.4.5 Average useful life of depreciable PP&E

This ratio is calculated as follows:

$$\text{Average useful life of depreciable PP\&E} = \frac{\text{Average gross depreciable PP\&E}}{\text{Depreciation}}$$

The calculation assumes that the firm uses straight-line depreciation, which is the case for most firms. *Depreciable PP&E* excludes land and construction in progress, which are not subject to depreciation. Average PP&E should be calculated over the period to which the depreciation relates, using either the average of beginning- and end-of-year balances or possibly incorporating information from quarterly or semiannual reports.

The average useful life of depreciable PP&E informs on earnings quality. Specifically, if the ratio is high compared to industry peers, or if it increases over time, it may indicate that the firm ***understates depreciation*** by overstating the assets' useful lives or their residual values. In addition, a high ratio suggests aggressive accounting principles in general.

Some firms justify using relatively long useful life assumptions based on low utilization or high maintenance activities. Thus, when evaluating the useful life assumption, it may be helpful to examine measures of asset utilization (e.g., fixed assets turnover) and the intensity of repairs and maintenance (if the company discloses this item).

3.4.6 Average age of depreciable PP&E

This ratio is calculated as follows:

$$\text{Average age of depreciable PP\&E} = \frac{\text{Accumulated depreciation}}{\text{Depreciation}}$$

The calculation assumes that the firm uses straight-line depreciation, which is typically the case.

The average age of depreciable PP&E informs on the ***significance of understatement of PP&E and depreciation*** (relative to their economic counterparts) due to inflation. A high level of this ratio indicates that old (and typically relatively small) historical costs are used to measure assets and depreciation, which in turn implies that earnings are overstated.

Evaluating the average age of assets is important also when estimating so-called “***maintenance capex***,” that is, the capex required to maintain operating capacity. One approach is to base the estimate on reported depreciation. This may be a sensible approach if the historical cost of the assets is a reasonable proxy for their current cost, but for old assets this is not likely to be the case due to inflation, technological improvements, demand shifts, and other factors. Thus, considering the average age of the assets is relevant when selecting an approach for estimating maintenance capex. Moreover, the average age can be used to estimate the inflation effect and adjust depreciation-based capex estimates. For example, if the assets are on average 6 years old, and annual inflation in recent years averaged 3%, then one may estimate maintenance capex by applying a factor of about 1.2 to depreciation.

3.4.7 Life stage index

The life stage index is calculated as follows:

$$\text{Life stage index} = \frac{\text{Average age of depreciable PP\&E}}{\text{Average useful life of depreciable PP\&E}}$$

The ratio informs on the company’s stage in its life cycle and therefore on ***expected earnings growth*** and ***earnings volatility***. For example, a ratio above 0.5 that is trending up over time suggests a mature or declining company, which is likely to generate relatively stable earnings but with little if any growth (e.g., Vorst and Yohn 2018). To improve the accuracy of the index in measuring the stage in the life cycle, one may also consider cash flow patterns (e.g., Dickinson 2011).

Examining the life stage index is important when evaluating the effects of ***conservative accounting principles***. The earnings distortion related to the immediate expensing of organic investments in intangibles (e.g., R&D, advertising, investments in human capital) depends on the firm’s stage in its life cycle. The expensing of current investments in intangibles is offset by the omission of amortization of past investments in intangibles that contribute to current revenue (those investments were expensed in the past so there is no book value to amortize). For growing firms (life stage index significantly below 0.5), the understatement of earnings due to the expensing of current expenditures is only partially offset by the omission of periodic amortization of unrecognized intangibles. In contrast, for declining firms (life stage index greater than 0.5), current year expenditures are smaller than the omitted amortization of unrecognized intangibles, resulting in overstated earnings.

The life stage index is also relevant when evaluating the effects of ***aggressive accounting assumptions or estimates***. For mature companies, using aggressive accounting choices has a relatively small earnings effect if those choices are consistently applied. For example, if a mature company depreciates assets over ten years instead of over five years, its depreciation per asset

will be 50% lower but it will depreciate twice as many assets (all assets that were acquired over the last ten years). In contrast, for a growth company, the effect of lower depreciation per asset will dominate, because the number of assets acquired in the early period is smaller than in the later period.

Exhibit 3.4a Evaluating Walmart's investments in fixed assets



Notes to Exhibit 3.4a: The plots in this exhibit depict the time-series behavior of key PP&E-related ratios for Walmart. The figures use data obtained as of October 15, 2021.

3.4.8 Goodwill and indefinite life intangible intensity

Goodwill and indefinite life intangible intensity is calculated as follows:

Goodwill and indefinite life intangible intensity =

$$\frac{\text{Goodwill and indefinite life intangible assets}}{\text{Revenue}}$$

A high level of or an increase in this ratio may indicate earnings overstatement. Companies have substantial discretion in measuring and classifying intangible assets as having finite or indefinite lives. Finite-life intangible assets are subject to amortization, but goodwill and indefinite-life intangibles are only expensed when considered impaired. In most acquisitions, goodwill and indefinite-life intangibles constitute the majority of intangible assets.¹¹¹ Yet, the classification of assets as having indefinite lives does not imply that they are not consumed in operations. The FASB notes:

“The term indefinite does not mean the same as infinite or indeterminate. The useful life of an intangible asset is indefinite if that life extends beyond the foreseeable horizon—that is, there is no foreseeable limit on the period of time over which it is expected to contribute to the cash flows of the reporting entity. Such intangible assets might be airport route authorities, certain trademarks, and taxicab medallions.” FASB ASC 350 Intangibles—Goodwill and Other.

Similarly, goodwill effectively measures the portion of the amount paid in a business combination for unidentifiable intangible assets and expected synergies, which also are often consumed over time.¹¹² In theory, a decline in the value of goodwill or indefinite-lived intangibles should be expensed through impairment, but in practice companies have substantial discretion in recognizing and measuring impairment charges. Moreover, when such charges are reported, analysts typically exclude them from measures of recurring or “core” profitability.

¹¹¹ This is due in part to earnings management. Managers have both (1) substantial discretion in estimating the fair values of assets acquired in business combinations, and (2) strong incentives to understate the fair values of assets that are subject to depreciation (e.g., PP&E), amortization (e.g., patents), or other expensing (e.g., inventory). Understating the fair value of these assets enables companies to subsequently report lower expenses and therefore higher earnings, but it also results in inflated goodwill. For example, according to SEC AAER No. 3912, Premier represented in public statements around the time it purchased TPC that it acquired certain customer contracts that purportedly had value. Therefore, it should have assigned a portion of the purchase price to a finite life intangible asset. Yet, the full amount was allocated to goodwill.

¹¹² Intangible assets are considered unidentifiable if they are neither separable from the business nor grounded in legal or contractual rights. Unidentifiable intangible assets include economic resources such as human capital, customer base, customer service capability, presence in geographic markets or locations, nonunion status or strong labor relations, ongoing training or recruiting programs, outstanding credit ratings, access to capital markets, and favorable government relations. As noted above, goodwill may also reflect any understatement of the fair values of acquired identifiable assets, or overstatement of the fair values of acquired liabilities, contingent consideration (i.e., “earnout”), previous holdings in the target, or non-controlling interests.

3.4.9 *Other assets intensity*

Other assets intensity is calculated as follows:

$$\text{Other assets intensity} = \frac{\text{Other assets}}{\text{Revenue}}$$

A high level of or an increase in this ratio may indicate earnings overstatement, especially if there is little or no information about the components of other assets or the underlying transactions. The reason is that some firms “hide” in other assets *expenditures that should have been expensed* but instead were capitalized, or *low-quality assets that were recognized in revenue or gain transactions*.

Example: Analysis of PP&E and Depreciation

Evaluate the quality of reported PP&E and depreciation of Company A in year t. Use both time-series and cross-sectional benchmarks. Company B is a peer company.

	t-5	t-4	t-3	t-2	t-1	t
Company A						
PP&E / Sales	0.220	0.218	0.203	0.189	0.181	0.173
Gross Depreciable PP&E / Depreciation	12.1	12.0	14.6	13.4	13.3	12.6
Accumulated Depreciation / Depreciation	7.3	7.5	9.2	8.5	8.5	8.1
Capital Expenditures (cash) / Sales	0.024	0.026	0.030	0.030	0.030	0.029
Capital Expenditures (cash) / Depreciation	0.631	0.718	1.097	1.099	1.158	1.119
Company B						
PP&E / Sales	0.154	0.151	0.135	0.128	0.141	0.121
Gross Depreciable PP&E / Depreciation	12.0	13.2	12.9	13.6	13.8	12.8
Accumulated Depreciation / Depreciation	7.7	7.8	8.0	8.4	8.1	7.6
Capital Expenditures (cash) / Sales	0.015	0.017	0.015	0.014	0.015	0.015
Capital Expenditures (cash) / Depreciation	0.657	0.895	0.860	0.900	0.932	0.999

The PP&E/sales ratio of Company A declined monotonically during the last five years, suggesting that material earnings overstatement related to PP&E is unlikely. The other ratios were relatively stable, at least in recent years, again suggesting that material earnings overstatement is unlikely. A similar conclusion emerges from the cross-sectional comparison. The two companies have very similar ratios and trends in the ratios, except that Company A is more capital intensive. Neither company appears to grow organically, as the capex/depreciation ratios are close to one. Alternatively, it may be that the companies make noncash acquisitions of PP&E, which are not reflected in the capex ratios (if noncash capex was included, the ratios would have been more informative). In addition, business combinations, which increase PP&E and depreciation, are not captured by capex. A comparison of the useful life and average age estimates suggest that most assets are in the latter parts of their useful lives, which in turn suggests that the companies are on average in the late maturity or declining stages of their product life cycles.

4. Nonfinancial Indicators of Earnings Quality

Some transactions, events, or circumstances are associated with strong incentives to manage earnings, create opportunities for manipulation, or otherwise indicate that earnings are not likely to persist. Incorporating such information when conducting earnings quality analysis is important because the financial statements indicators discussed in the previous two chapters are far from perfect. Essentially any red flag has an alternative, legitimate explanation. Considering the company's ecosystem, business model, management incentives and ability to manipulate earnings, and other nonfinancial indicators of earnings sustainability may strengthen any ratio-based inference. For example, as discussed in Section 3.3.4, an abnormal increase in days sales outstanding concurrent with a decline in the profit margin suggest higher likelihood of channel stuffing. Such inference would be strengthened if the company's earnings are just above an important benchmark (e.g., analysts' consensus forecasts) or if the company has weak governance structure. Earnings sustainability is also related to the economic environment and industry-specific conditions. For instance, earnings are less sustainable when the economy is at the peak of the cycle, and tax law changes and foreign currency fluctuations add volatility to reported earnings. Thus, considering such information provides further insight about the persistence of reported earnings.

This chapter discusses cases where managers have strong incentives to overstate (Section 4.1) or understate earnings (Section 4.2). It also describes earnings quality indicators related to governance (Section 4.3) and internal controls (Section 4.4), accounting and auditing (Section 4.5), and monitoring by outsiders (Section 4.6), as well as event-based (Section 4.7), "soft" (Section 4.8), and macroeconomic indicators (Section 4.9), industry and firm-specific characteristics (Section 4.10), additional ESG effects (Section 4.11), and uncertainty and information risk (Section 4.12). The indicators discussed in Sections 4.3 through 4.12 suggest higher than average tendency or ability to manipulate earnings (e.g., overconfident CEO, weak governance structure) or that earnings have likely been manipulated (e.g., a qualified audit opinion), involve high uncertainty (e.g., abnormal trading volume around earnings announcements), or are otherwise not sustainable (e.g., earnings at the peak of the business cycle). Many of these indicators relate to environmental, social and governance (ESG) factors. Additional nonfinancial indicators of earnings quality are discussed in the context of predicting earnings growth in Section 2.11.

Some of the indicators discussed in this chapter involve no financial data (e.g., the appointment of a new CEO), while others use financial data from sources other than the financial statements (e.g., short interest, macroeconomic data). Given that the focus of this monograph is on financial statements data, the latter indicators are also referred to here as "non-financial." Table 4A lists the indicators by category.

Table 4A: Nonfinancial indicators of earnings quality

Category	Indicator, motivation, or facilitator
1. Incentives to overstate earnings	1. Meet or beat benchmarks
	2. Smooth earnings (when unmanaged earnings are below the trend)
	3. Maintain a high valuation multiple
	4. Capital raising activities or M&A
	5. Compensation (equity incentives, meeting bonus targets)
	6. Unrealistic targets
	7. Avoid violating debt covenants
	8. Avoid violating other contractual provisions
	9. Restrictive regulatory capital
	10. Relatively new CEO
	11. CEO in the final years of service
	12. Poor or deteriorating absolute or relative performance
	13. Demand or supply shocks
	14. Credit ratings, CDS spreads, and bond yields
2. Incentives to understate earnings	1. Smooth earnings (when unmanaged earnings are above the trend)
	2. Facilitate earnings overstatement in future years
	3. Compensation (setting targets for bonus plans, creating reserves, SBC grants)
	4. Management buyout
	5. Negotiations (employees, unions, suppliers, customers)
	6. Investigations or regulatory actions (antitrust, import relief, rate determination)
	7. Extreme performance
	8. New CEO
3. Governance	1. Independent directors
	2. Compensation of independent directors
	3. CEO-appointed directors or executives
	4. Busy directors
	5. Non-staggered board
	6. Powerful CEO and/or weak subordinate directors
	7. CEO or CFO with strong outside network
	8. Retention of policy-making accounting functions by the CFO
	9. Audit committee with limited expertise, status, or activity
	10. Weak internal audit function
	11. Complex operations
	12. Complex or unusual organizational structure
	13. Policies regarding related-party transactions
	14. Distance from management
	15. Enforcement and listing
	16. Ownership listing
4. Internal control	
5. Accounting and auditing	1. Accounting policies
	2. Accounting changes and error correction
	3. Fiscal quarter
	4. Change in fiscal year
	5. Aggressive non-GAAP reporting
	6. Audit quality
	7. Reliance on third party services
	8. Mechanism of going public (IPO versus de-SPAC)

Category	Indicator, motivation, or facilitator
6. Monitoring by outsiders	1. Investor base
	2. Analysts' following
	3. Short selling and short interest
	4. Banks and other lenders
	5. Media
7. Event-based indicators	1. Resignation or change of auditors, lawyers, executives, or directors
	2. Non-standard audit opinion
	3. Restatements, revisions, and out-of-period adjustments
	4. SEC enforcement actions (e.g., AAER, comment letters)
	5. Accounting-related shareholder litigation
	6. Reports by analysts, short sellers, or the media claiming accounting irregularities
	7. Late Filings
	8. Material related-party transactions
	9. M&A
	10. Issuance of management forecasts
	11. Potentially problematic transactions
	12. Events at related firms
8. "Soft" indicators	1. Managerial ability
	2. Executives' traits
	3. Disclosure characteristics
9. Macroeconomic indicators	1. Inflation
	2. Interest rates
	3. Foreign currency exchange rates
	4. GDP
	5. Tax rates and other policies
	6. Oil prices and other commodities
	7. Macroeconomic uncertainty and investor sentiment
10. Additional ecosystem and firm-specific indicators	1. Customers' activities
	2. Peers' activities
	3. Industry
	4. Dividends
	5. Size
11. Additional environmental, social and governance effects	1. ESG effects on operating profit
	2. ESG risks
	3. ESG effects on the cost of capital
	4. ESG and earnings management
12. Uncertainty and information risk	1. Abnormal trading volume around earnings announcement
	2. A high or increasing dispersion in analysts' earnings forecasts or credit ratings
	3. A high or increasing bid-ask spread
	4. R&D intensity

4.1 Incentives to overstate earnings

4.1.1 Meet or beat benchmarks

When unmanaged earnings, revenue, or other key financial metrics are below important benchmarks (zero, prior period value, analysts' consensus forecast, or management forecast), managers have strong incentives to manipulate reported numbers to meet or beat the

benchmark.¹¹³ CFOs explain that meeting or beating benchmarks is important in order to build credibility with capital markets, maintain or increase the stock price, and support management reputation, as well as for other reasons (Graham et al. 2005). Managers are particularly concerned that failing to meet the benchmark would create uncertainty about the firm's prospects. Meeting or beating their own forecasts is important to managers also because of legal exposure and loss of reputation for accuracy if they fail to do so (Kasznik 1999). On the other hand, the impact of earnings falling below management forecast is probably less binary than it is for the other three benchmarks (zero, prior earnings, and analysts' consensus forecast), because expected legal costs likely increase with the magnitude of the forecast error—the larger the error, the higher the probability of being sued and the greater the costs of resolving the lawsuit if it occurs. In addition, managers often provide range rather than point forecasts.

Many studies (e.g., Burgstahler and Dichev 1997) document discontinuities in the distribution of reported earnings around the four benchmarks mentioned above, with higher (lower) than expected frequency above (below) the benchmark. This evidence suggests that the likelihood that earnings have been overstated is higher than average when reported earnings are equal to or slightly above a benchmark.¹¹⁴ Other studies (discussed below) suggest that this indicator of earnings management is especially informative when evaluating firms that consistently meet or beat analysts' expectations or that have “glamour” characteristics.

The importance of meeting or beating varies across benchmarks. In the context of quarterly reporting, the financial executives surveyed by Graham et al. (2005) identify “same quarter last year” as the most important earnings benchmark, followed by analysts' consensus EPS forecast, reporting a profit, and finally previous quarter EPS (management forecast was not included as an optional answer). More recent research documents a decline in the zero-earnings discontinuity, suggesting reduced frequency of earnings management activities to avoid reporting losses. These studies attribute the decline to SOX reducing accrual earnings management (e.g., Gilliam et al. 2015), although some of it is likely due to changing firm characteristics following the dot-com boom (Chardonens et al. 2021).

¹¹³ The following are several examples. **Meeting analysts' earnings forecasts:** According to AAER 4094, from December 2016 through April 2018, PPG Industries “maintained materially inaccurate books and records and insufficient internal accounting controls. ... senior accounting officer ... and employees within PPG's finance division ... manipulated accounting entries. The misstatements were designed to enable PPG to meet, or come closer to meeting, analysts' consensus earnings estimates.” **Meeting analysts' revenue and EBITDA forecasts:** According to AAER 4091, “Comscore's former management became increasingly focused on meeting analysts' consensus revenue targets, a factor that reasonable investors consider important to their investment decisions. In 2013, 2014, and 2015, Comscore implemented incentive compensation plans for certain executives ... that were tied, in large part, to hitting revenue and adjusted EBITDA targets. ... For seven consecutive quarters during the Relevant Period, the revenue derived from NMTs [non-monetary transactions] ... made the difference between Comscore missing or hitting its revenue targets. **Meeting management forecasts:** According to AAER 4076, “... Marvell was facing a revenue shortfall of approximately \$50 million against forecasted revenue guidance of \$880 to \$900 million. ... A primary motivation for the pull-in effort [a form of revenue overstatement; see Section 5.1] was concern that missing revenue guidance would adversely impact the company's stock price.”

¹¹⁴ Donelson et al. (2013) provide evidence linking earnings management to discontinuities in earnings distributions among a sample of firms that settled accounting-related securities class action lawsuits and restated earnings from the alleged violation period. Comparing the distribution of restated (“unmanaged”) earnings to originally reported (“managed”) earnings, they find that earnings management drives the discontinuities in the distribution of analyst forecast errors and earnings changes, and mixed evidence with respect to the earnings level distribution.

4.1.2 Smooth earnings

When unmanaged earnings are below their expected long-term trend, managers have incentives to manage earnings up to smooth the trend. A smooth earnings trend makes the company appear less risky, and it enables analysts to predict future earnings more accurately and easily. CFOs believe that these effects translate into higher valuations (Graham et al. 2005), and empirical evidence supports their beliefs—firms with smooth patterns of increasing earnings have higher price-earnings multiples than other firms with similar growth and risk characteristics (e.g., Barth et al. 1999).¹¹⁵ These findings suggest that a company that reports smooth earnings (i.e., low earnings volatility)—especially relative to the volatility of operating cash flows—has stronger than average inclination to manage earnings.¹¹⁶

4.1.3 Maintain a high valuation multiple

Two types of firms have relatively high valuation multiples:

- Firms that consistently meet or beat benchmarks such as prior year earnings (e.g., Barth et al. 1999) or analysts' consensus forecast (Kasznik and McNichols 2002), or that report smooth earnings over time
- Firms with glamor characteristics or other features that suggest strong market interest – high growth, high past stock returns, high value ratios, growing institutional ownership, optimistic analysts' long-term growth forecasts, high proportion of analysts recommending the stock as “buy” and “strong buy” (e.g., Chu et al. 2019)

The stock price of these companies is particularly sensitive to earnings disappointments (“earnings torpedoes;” see Barth et al. 1999, Skinner and Sloan 2002), creating strong incentives for management to overstate earnings when unmanaged earnings are below expectations (e.g., Beneish 1999a, Dechow et al. 2011). Lower than expected earnings for these firms reduce price not only because they imply lower future earnings, but also because they reduce the multiple applied to those earnings (“multiple contraction”).

¹¹⁵ Additional motivations to smooth earnings—especially by modifying real activities—include the effects on management compensation, investment, and income taxes (see Section 2.10). Higher earnings volatility reduces the expected utility of risk-averse managers. High cash flow volatility may lead to an increase in underinvest, and activities that smooth cash flow volatility—such as cutting discretionary expenditures—also smooth earnings. Similarly, smoothing taxable income reduces the present value of income taxes (“tax convexity”), and while earnings are different from taxable income, many activities that smooth taxable income—such as sales pull-in—also smooth reported earnings.

¹¹⁶ Incentives to report smooth performance often extend to additional metrics besides earnings. For example, according to AAER 4095, Fiat Chrysler Automobiles “New vehicle sales and the growth streak were key performance indicators that were important to [Fiat Chrysler Automobiles or FCA], investors, and analysts. FCA N.V. explained to investors in annual reports that new vehicle sales illustrated the company’s competitive position and demand for its vehicles. ... In an article posted on its website, FCA US described the sales streak as “a symbol of our continuing success in the marketplace.” ... FCA US failed to report all actual sales in the months in which they were made. Instead, FCA US maintained a database of actual but unreported sales. FCA employees often referred to the database as a “cookie jar.” In months when it wanted its vehicle sales results to appear better than they were, FCA US dipped into the “cookie jar” to inflate vehicle sales numbers. In particular, FCA US manipulated vehicle sales to avoid ending the growth streak.”

The studies discussed above suggest that firms that consistently meet or beat earnings benchmarks, or that report smooth earnings over time, have stronger than average incentives to manipulate earnings. Therefore, proxies for the consistency with which a company meets or beats benchmarks, or of its earnings smoothness, should inform on the likelihood of earnings management. Such measures may be positively related to earnings management also because a pattern of smooth earnings, or earnings that consistently meet or beat benchmarks, are not likely to occur without earnings manipulation given that business activities involve substantial risks and uncertainties. Consistent with this inference, Chu et al. (2019) find that firms subject to SEC enforcement actions consistently beat analysts' quarterly earnings forecasts in the three years prior to the manipulation period and continue to do so by smaller "beats" during the manipulation period. Manipulating firms beat expectations around 86 percent of the time in the 12 quarters prior to the manipulation period (versus 75 percent for control firms) and that manipulation often ends with a miss in expectations.

While the stock prices of high multiple companies are likely to be particularly sensitive to earnings disappointments, there may be additional characteristics that suggest high sensitivity to bad news and therefore greater executives' inclination to manage earnings. A catch-all measure of sensitivity to bad news is *stock return skewness*. Kim and Skinner (2012) show that shareholder litigation is strongly negatively related to stock return skewness (i.e., negative skewness—relatively high frequency of large price declines—is associated with greater likelihood of fraud). Donelson et al. (2021) show that stock return skewness also predicts settled accounting 10b-5 SEC enforcement cases.

4.1.4 Capital raising activities or M&A

Incentives to overstate earnings are likely to be particularly strong when firms engage in capital-raising activities or stock-funded M&A transactions. In such cases, earnings overstatement may cause an increase in issue price or allow firms to borrow at lower interest rates, permanently increasing earnings from the perspective of existing shareholders (in contrast, earnings management in other circumstances simply shifts earnings from one period to another). Several studies find that companies are more likely to overstate earnings when they raise capital (e.g., Dechow et al. 1996, Teoh et al. 1998, Marquardt and Wiedman 2004, Bertomeu et al. 2020a) or engage in M&A transactions (e.g., Erickson and Wang 1999).¹¹⁷ Thus, the likelihood that earnings have been inflated is higher in periods preceding such activities. Factors that may exacerbate or mitigate earnings management in such circumstances include the quality of underwriter, accelerated IPO, and failure to attract investment from industrial buyers or VCs.

In some cases, incentives to overstate earnings may be particularly strong *after* the acquisition. Bens et al. (2012) hypothesize that managers may feel increased pressure to retain their job following an M&A poorly received by the market, which may create incentives for misreporting. They find that acquirers with more negative M&A announcement returns are more likely to

¹¹⁷ In contrast, Ball and Shivakumar (2008) provide evidence that IPO firms report more conservatively and attribute this to the higher quality reporting demanded of public firms by financial statement users and consequentially higher monitoring by auditors, boards, analysts, rating agencies, press, and litigants, and to greater regulatory scrutiny. In addition, Armstrong et al. (2015) argue and provide supporting evidence that high accruals in IPO years are due to the investment of the IPO proceeds in working capital, not to increased earnings overstatement.

misstate financial statements in the post-investment period and the issuance of misstated financials mitigates this pressure, at least in the near term.

While prior studies examining earnings management in the context of capital raising activities have focused on stock issuance (IPO or SEO) or borrowing, a recent study provides suggestive evidence in the context of warrants' exercise or expiration. Barth et al. (2021) provide evidence that firms manage stock prices to prevent (induce) warrant exercise when exercise price is below (above) their estimate of intrinsic value.

4.1.5 Compensation

Managers with relatively large stock or option holdings, or with high compensation sensitivity to earnings or stock price, may have strong incentives to overstate earnings, especially when they intend to sell their holdings (Beneish 1999b) or when share-based compensation with market-based or performance-based conditions vest.¹¹⁸ The impact of equity incentives on earnings management may be more nuanced, however. For example, Cheng and Warfield (2005) find that managers' equity incentives lead them to overstate earnings when needed to meet or beat earnings benchmarks but to understate earnings (and create reserves) when unmanaged earnings are unexpectedly high. Cohen et al. (2008) provide evidence that option awards create incentives to understate (overstate) accruals in the period of (after) the grant. Armstrong et al. (2013) find that equity-based holdings and compensation provide managers with incentives to misreport when they make managers less averse to equity risk by increasing the compensation portfolio's vega (i.e., sensitivity to change in stock price volatility).¹¹⁹ In addition, some studies find no relationship or even negative association between equity compensation and financial misreporting. For example, Armstrong et al. (2010) find that equity incentives reduce rather than increase managers' likelihood of engaging in accounting irregularities (restatements, lawsuits, AAER).

While most of the studies that investigate the impact of equity incentives on reporting quality focus on the CEO, several studies examine other executives and even rank-and-file employees. Davidson (2021) conducts within-firm analysis of 1,805 executives—including CEOs, CFOs, and other top executives—and finds that executives implicated in financial reporting fraud cases have significantly stronger equity incentives than their within-firm peers who are not implicated in the fraud. Executives implicated in fraud cases also have significantly stronger equity incentives than executives at non-fraud firms in similar roles. These results suggest that firm-level measures that consider the equity incentives of all members of the top management team

¹¹⁸ A recent study links the earnings discontinuity literature to compensation. Using proxy statement data, Atanasov et al. (2021) find that the distribution of the difference between actual and target values of performance metrics used in calculating executive compensation is significantly discontinuous at zero, suggesting that some managers manipulate realized performance metrics to increase their performance-based compensation.

¹¹⁹ Recent research provides evidence on vega's effects on real activities. For example, Raghunandan (2021) finds that firms whose CEOs have higher vegas are more likely to engage in wage theft (e.g., not paying employees for working overtime), a form of real earnings management. Armstrong et al. (2021) find that bank executives' vega leads to systemic risk that manifests during subsequent economic contractions, and that vega encourages systemically risky policies, including maintaining lower common equity Tier 1 capital ratios, relying on more run-prone debt financing, and making more procyclical investments.

may better identify fraud firms than do measures focusing on one executive. Call et al. (2016) find that firms grant more rank-and-file stock options when involved in financial reporting violations, consistent with managements' incentives to discourage employee whistleblowing. They also provide evidence that misreporting firms that grant more rank-and-file options during violation years are more likely to avoid whistleblowing allegations.

The increasing use of non-GAAP earnings in recent years may have affected compensation-related incentives to manage earnings as well as the form of earnings management. For example, Curtis et al. (2021) document that 84% of S&P 1500 firms use adjusted earnings for bonus compensation. They find that the transactions removed from adjusted earnings vary widely and include both transitory and nontransitory items, and that boards are more likely to contract using adjusted earnings when firms have high levels of intangible assets, more volatile earnings, CEOs with shorter tenures, CEOs who also act as board chairperson, or larger compensation committees or are reporting losses.

4.1.6 Unrealistic targets

Unrealistic targets of revenue, earnings or other performance metrics may induce employees to engage in activities that lead to overstated financial results (e.g., backdating sales invoices). Moreover, to the extent that executives rely on internal targets when issuing guidance, unrealistic targets increase the likelihood of earnings overstatement to meet guidance.¹²⁰ In some cases the impetus for setting unrealistic internal targets is overoptimistic analysts' forecasts.¹²¹ In other cases the pressure is due to the company's prior disclosures or management forecasts.¹²² Based

¹²⁰ For example, according to SEC AAER 4076, "Senior management perceived that the sales teams were not aggressive enough in generating sales in the company's two main divisions of Datacom and Storage. Historically, revenue and sales targets had been set from the bottom-up, where sales teams influenced the process by providing forecasts of their sales projections based on their understanding of customers' needs. However, in an effort to exert more control over the sales force, senior management, in late 2014, imposed top-down revenue and sales targets, which were reflected in the company's Annual Operating Plan (AOP) for FY 2016. Sales staff protested the top-down targets set by senior management, believing they were not realistic and had been developed without proper consideration of customers' needs. The pressure to meet the targets set in the AOP became the impetus for Marvell's pull-in effort [a form of revenue overstatement; see Section 5.1]."

¹²¹ For example, according to SEC AAER No. 4169, "In 2014 and 2015, PSI management, including Winemaster and Davis, used quarterly analyst guidance as a benchmark for its internal quarterly revenue targets. On August 5, 2015, PSI provided the investing public with quarterly revenue guidance for the third and fourth quarters of 2015 along with reduced full year guidance for 2015. Subsequently, on November 9, 2015, PSI provided the investing public with revised, lower quarterly revenue guidance for the fourth quarter of 2015. During this period, PSI management, including Winemaster and Davis, also continued to look at quarterly analyst guidance as a benchmark for its internal quarterly revenue targets."

¹²² For example, according to SEC AAER 4248, "Following the Kraft-Heinz merger in July 2015, newly-formed KHC made concerted efforts to eliminate redundancies and reduce operational costs. As part of its merger strategy, KHC disclosed to investors that the company would deliver on certain cost savings results throughout the company ... from 2017 on, as market conditions deteriorated, Pelleissone [KHC's COO] should have known that continued incremental savings were unrealistic, but he failed to adjust expense reduction expectations for the procurement division, creating a high-pressure environment focused on obtaining same-year cost savings. Procurement division employees discussed internally that Pelleissone 'push[ed] like crazy' for them to meet cost savings goals, and increased cost savings targets to unreasonable levels. At least in part due to this pressure, in 2017 and 2018,

on a survey of 500 financial executives, Dichev et al. (2013) report that inside pressure to hit earnings targets is the third most important motivation to manipulate earnings, only slightly below the first two motivations (to influence stock price and outside pressure to hit earnings benchmarks).

4.1.7 Avoid violating debt covenants

Companies with restrictive earnings- or equity-based covenants may have stronger incentives to overstate earnings compared to other firms (e.g., DeAngelo et al. 1994, Sweeney 1994, Franz et al. 2014).

4.1.8 Avoid violating other contractual provisions

While less common than concerns about violating debt covenants, in some cases the motivation for earnings management is related to non-debt covenants. For example, According to AAER 4110, a primary motivation for Quantum’s misstatement of its revenue was a standstill agreement with an activist investor, which among other things set forth business objectives (including revenue targets) that Quantum needed to hit in its 2015 fiscal year. According to the agreement, if Quantum missed the targets the activist investor would gain two additional seats on Quantum’s board of directors.

4.1.9 Restrictive regulatory capital

The ability of regulated financial institutions to invest, engage in new activities, pay dividends, or repurchase shares is often restricted by their level of regulatory capital. This creates strong incentives for many financial service firms to overstate earnings, thereby increasing regulatory capital (e.g., Collins et al., 1995).

4.1.10 Relatively new CEO

CEOs may be more inclined to overstate earnings in their early years of service when the market is more uncertain about their ability (Ali and Zhang 2015). However, newly appointed outside CEOs may have lower ability to manipulate earnings (Cheng et al. 2016). In addition, new CEOs often recognize big bath charges soon after being appointed (see Section 4.2).

4.1.11 CEO in the final years of service

As discussed earlier, one of the costs of earnings overstatement is earnings reversal in subsequent periods. CEOs close to the end of their tenure may not suffer such consequences and may therefore have stronger incentives to overstate earnings compared to other CEOs. Such earnings overstatement can be achieved either by manipulating accruals estimates or by cutting discretionary expenditures such as R&D (e.g., Dechow and Sloan 1991).

members of the procurement division—across multiple geographic zones— manipulated 54 supplier transactions (out of approximately 59 during the Relevant Period) to improperly obtain premature recognition of cost savings.”

To deter financial misstatements, many companies adopted compensation recovery policies (*clawbacks*) that authorize the board to recoup compensation paid to executives based on misstated financial reports. Clawbacks have led to a decrease in accruals management, especially when they do not require the manager to be culpable in the misstatement (deHaan et al. 2013), but they have also led to an increase in real transactions management (Chan et al. 2015). Thus, the extent to which shareholders benefit from clawbacks is unclear, because real earnings management activities involve suboptimal decisions (e.g., forfeiting a positive NPV project due to its negative short-term earnings effect; e.g., Graham et al. 2005).

4.1.12 Poor or deteriorating absolute or relative performance

Executives are likely to have stronger than average incentives to overstate earnings when the company's performance or prospects are perceived weak. This argument was made in the context of profitability ratios in Section 2.8, but perceived performance and prospects are affected by additional measures of performance, including market-based indicators such as stock returns. For example, Donelson et al. (2021) find that cumulative abnormal stock returns are negatively associated with subsequently settled Accounting 10b-5 (fraud) SEC enforcement cases and securities class actions, even after controlling for the change in ROA.

As noted in Section 2.8, incentives to manage earnings are related not just to the levels of performance measures but also to their values considering economic conditions (e.g., as measured using abnormal stock returns) or relative to peers. Because peers' performance reflects industry conditions, performance below peers implies idiosyncratic poor performance rather than market- or industry-driven poor performance. Accordingly, some compensation plans use peer-adjusted performance measures, including market-based performance metrics. For example, using S&P 1500 firms' first proxy disclosures under the SEC's 2006 executive compensation disclosure rules, Gong et al. (2011) find that about 25 percent of the sample firms explicitly use relative performance evaluation in setting executive compensation. They also document a significantly negative association between CEO pay and stock performance for disclosed peers after controlling for the company's stock performance.

4.1.13 Demand or supply shocks

Related to the previous factor, indications of a reduction in demand for the firm's products or an increase in the costs of its inputs may suggest greater than average pressure on management to manipulate earnings. For example, according to SEC AAER No. 3527, "one of [Diamond Foods, Inc.]'s significant lines of business involves buying walnuts from its growers and selling the walnuts to retailers. With sharp increases in walnut prices in 2010, Diamond encountered a situation where it needed to pay more to its growers in order to maintain longstanding relationships with them. Yet Diamond could not increase the amounts paid to growers for walnuts, which was its largest commodity cost, without also decreasing the net income that Diamond reports to the investing public." According to the SEC, this pressure led to significant earnings management activities by Diamond's Executives.

4.1.14 Credit ratings, CDS spreads, and bond yields

Companies may overstate earnings around the issuance of *initial credit ratings* (Demirtas and Cornaggia 2013), either because credit rating initiation often occurs at times of capital raising activities or due to the stickiness of the ratings. In addition, firms whose credit rating is close to the *investment grade/high yield cutoff* (BBB-), either from below or above, and issuers that are placed on the *watch list* for downgrade review, may have strong incentives to overstate earnings to maintain or improve their credit rating (Brown et al. 2015a, Liu et al. 2018).

Credit ratings may be associated with earnings quality due to information effects in addition to causation. As discussed in Section 2.8, incentives to overstate earnings are likely to be stronger for poorly performing firms, especially those close to violating debt covenants (Franz et al. 2014). These firms often have *poor credit ratings*. In addition, in setting ratings, credit agencies consider information about the sustainability of earnings, which is an important determinant of solvency risk (see Section 2.9). Finally, *differences in ratings* across rating agencies indicate uncertainty about credit risk, which implies low reporting quality (Akins 2018).

While commonly used to evaluate credit worthiness, credit ratings are inefficient and untimely, and thus *CDS spreads* and *bond yields* often provide incremental information on the sustainability of earnings.¹²³ For example, deHaan et al. (2021) provide evidence that retail investors appear to select bonds by first screening on a credit rating level and then sorting by yield, buying the highest-yielding bonds within each rating level. Because yields reflect information about earnings sustainability that is not fully reflected in credit ratings, this practice leads retail investors to buy bonds of companies that subsequently experience deterioration in performance. Thus, when using credit-related information to evaluate earnings quality, it is important to consider not just credit ratings, but also CDS spreads and bond yields as well as whether the bonds were placed on a watch list (which often precedes rating changes). The levels of, changes in, and the relationships among these metrics may provide additional information about earnings sustainability.

4.2 Incentives to understate earnings

4.2.1 Smooth earnings

When unmanaged earnings are above their expected long-term trend, managers have incentives to manage earnings downward to smooth the trend. As noted earlier, a smooth earnings trend makes the company appear less risky, and makes it easier for analysts to predict future earnings.

4.2.2 Facilitate earnings overstatement in future years

¹²³ Substantial research provides evidence of and explanations for the inefficiencies of bond ratings (e.g., see Nissim 2017 for review and evidence). First, credit rating agencies (CRAs) may not pay the same attention to all firms; for example, they may pay less attention to small companies. Second, CRAs review and adjust credit ratings on a periodic rather than continuous basis, so ratings do not adjust immediately to changes in credit quality. Third, CRAs care about the stability of the ratings in addition to their informativeness, which could affect the timeliness of the ratings. Fourth, CRAs may deliberately bias the ratings or delay downgrading ratings fearing losing the issuer's business. Fifth, agency ratings may reflect selection bias resulting from issuers' engaging in rating shopping.

Understating earnings in a given period allows companies to overstate earnings in subsequent periods because over the long-run earnings equal net cash flow. Two common situations were firms may be inclined to understate earnings are (1) when “unmanaged” earnings are significantly above the trend (see “Smooth earnings” above) or when the company takes a “big bath.” Firms occasionally take a “big bath” charge (e.g., they write down assets or overstate estimated liabilities such as accrued restructuring costs), hoping that investors will treat it as a one-time item, and then benefit from reporting lower future depreciation (e.g., Riedl 2004) or other asset-based expenses (e.g., COGS) or from the reversal of estimated liabilities (e.g., Moehrl 2002).

4.2.3 Compensation

Bonus plans often set lower and upper limits, defining minimum (maximum) earnings under (above) which variation in earnings does not affect the bonus. Thus, when unmanaged earnings are below the minimum or above the maximum, managers have incentives to manage earnings downward, either to reduce the benchmark that will be set in the following year or to create reserves for future periods (e.g., Healy 1985). Compensation-related incentives to understate earnings may also exist when *share-based payments* are granted to employees (to reduce option exercise price or performance- or market-based triggers; e.g., Cohen et al. 2008).

4.2.4 Management buyout

In such cases management has strong incentives to lower the firm’s perceived value. One way of achieving this goal is to understate accounting measures of performance (e.g., Perry and Williams 1994, Marquardt and Wiedman 2004).

4.2.5 Negotiations

When negotiating with *employees* or their representatives (e.g., *unions*), firms often have incentives to appear less profitable (DeAngelo and DeAngelo 1991).¹²⁴ Although less common, such incentives may also arise when negotiating with some *suppliers* (to reduce cost) or *customers* (to increase price).¹²⁵

4.2.6 Investigations or regulatory actions

Firms subject to *antitrust* (e.g., Cahan 1992) or *import relief* investigations (e.g., Jones 1991), or firms subject to explicit or implicit *price regulation* (rate determination for utility companies,

¹²⁴ Aobdia and Cheng (2018) examine the disclosure policies of non-unionized firms operating in unionized industries. They test the hypothesis that non-unionized firms have an incentive to disclose more information when their unionized rivals are engaged in labor renegotiations; that is, to weaken them. They find that non-unionized firms disclose more information and more good news when renegotiations are ongoing. This behavior is stronger for larger firms, firms with fewer peers in the industry, and firms more similar to their renegotiating rivals.

¹²⁵ In some cases, companies may achieve bargaining benefits by misclassifying items instead of understating earnings. Hribar et al. (2020) provide evidence suggesting that firms with major customers (identified using customer concertation) strategically classify certain costs as cost of goods sold rather than as SG&A in order to deflate their gross margin and reduce the bargaining power of their major customers.

e.g., Chakravarthy et al. (2020), or premium restrictions in insurance operations) may understate their earnings.

4.2.7 Extreme performance

Very low or very high earnings (or other performance measures) could imply earnings understatement. Very low earnings could reflect a big bath, while unexpectedly high earnings could entice management to create reserves for future periods. In addition, extreme earnings may proxy for the bonus plan effect described above.

4.2.8 New CEO

A deterrent for managers in recognizing big bath charges is the implication that they performed poorly in past periods. For new CEOs, this cost is less relevant or even irrelevant. Therefore, the likelihood of big bath charges increases significantly following a change in management.

4.3 Governance

Management ability to manipulate earnings and the likelihood of reporting errors are affected by the strength of corporate governance. Based on a survey of 365 U.S. sell-side analysts, Brown et al. (2015b) report that the highest-rating answer to the question: “to what extent do you believe the following indicate management effort to intentionally misrepresent the financial statements?” was “company has weak corporate governance.” This section describes proxies for weak governance structure. Many additional governance-related factors are discussed throughout this monograph (e.g., executive compensation is discussed in Section 4.1 in the context of incentives to overstate earnings). Some of the factors are difficult to observe or quantify. Several financial services entities (e.g., MSCI, ISS) provide company-specific corporate governance scores based on many metrics related to the board, management compensation, shareholders’ rights, accounting, auditing, and other relevant aspects.

This section describes the following governance-related red flags:

- Relatively low proportion of independent directors on the board or on key board committees
- Compensation of independent directors includes a relatively low proportion of long-term incentives
- CEO-appointed directors or executives (especially the CFO)
- Busy directors
- Non-staggered board
- Powerful CEO and/or weak subordinate executives (especially the CFO)
- CEO or CFO with strong outside network
- Retention of policy-making accounting functions by the CFO
- Audit committee with limited expertise, status, or activity
- Weak internal audit function
- Complex operations
- Complex or unusual organizational structure (including tax haven incorporation)
- Policies regarding related-party transactions

- Distance from management
- Enforcement and listing
- Ownership structure

4.3.1 Independent directors

Independent directors, by definition, do not have a material relationship with the company and therefore are not subject to undue influence from the management team.¹²⁶ Accordingly, a high proportion of independent directors on the board and/or on principal board committees imply strong governance structure.¹²⁷ However, research finds mixed evidence regarding the value of independent directors (e.g., Masulis and Zhang 2019). For example, Faleye et al. (2011) find that monitoring quality improves when a majority of independent directors serve on at least two of the three principal monitoring committees (audit, compensation, and nominating). These firms exhibit greater sensitivity of CEO turnover to firm performance, lower excess executive compensation, and reduced earnings management. However, the improvement in monitoring quality comes at the significant cost of weaker strategic advising and greater managerial myopia. Firms with boards that monitor intensely exhibit worse acquisition performance and diminished corporate innovation. The negative advising effects on firm value outweigh the benefits of improved monitoring, especially when acquisitions or corporate innovation are significant value drivers or the firm's operations are complex.

4.3.2 Compensation of independent directors

Compensation plans with significant long-term incentives may better align the incentives of outside directors and shareholders. For example, Fich and Shivdasani (2005) find that the use of stock-option compensation for independent directors is associated with larger market-to-book ratios and higher profitability.

4.3.3 CEO-appointed directors or executives

Corporate fraud often requires coordination between, or acquiescence by, top executives and/or board members. Khanna et al. (2015) show that the fraction of top corporate leaders—top executives and directors—appointed during the current CEO's tenure is significantly associated with not only greater likelihood of fraud, but also lower expected costs of engaging in fraud: it decreases the likelihood of fraud detection, lengthens the time from fraud commission to detection, reduces the likelihood of forced CEO turnover upon discovery of fraud, and lowers the coordination costs needed to carry out illegal activity. This concern is especially important when the CFO is appointed by the CEO, given the key role that CFOs have in financial reporting.

4.3.4 Busy directors

¹²⁶ The SEC defines “independent director” as a person who is not a current or recent employee of the company and who does not, in the board's estimation, have relationships that would interfere with their objective judgment.

¹²⁷ The NYSE and NASDAQ now mandate majority-independent boards. In addition, since SOX (Section 301) the audit committee of listed companies must be composed entirely of independent directors, and the NYSE further requires that the compensation and nominating committees be fully independent.

Fich and Shivdasani (2006) find that firms in which most outside directors hold three or more directorships are associated with weak corporate governance. Hauser (2018) finds that reductions of board appointments of directors that serve in multiple boards due to mergers are associated with higher profitability, market-to-book, and the likelihood of those directors joining board committees. The performance gains are particularly stark when the directors are geographically far from firm headquarters. However, shared board membership—if not excessive—may have positive effects. Larcker et al. (2013) find that firms with central boards of directors (i.e., with connection to many firms, where companies are considered linked if they share at least one board member), earn superior risk-adjusted stock returns. They also experience higher future growth in ROA and more positive analyst forecast errors. These effects are concentrated among high growth opportunity firms or firms confronting adverse circumstances, consistent with boardroom connections mattering most for firms standing to benefit most from information and resources exchanged through boardroom networks.

4.3.5 Non-staggered board

Managers of firms with staggered boards may have weaker incentives to manage earnings.¹²⁸ For example, Zhao and Chen (2008) find that staggered boards are associated with lower likelihood of committing fraud (SEC accounting enforcements) and smaller magnitude of absolute unexpected accruals. However, they also show that staggered boards are negatively associated with firm value. They interpret these results as suggesting that staggered boards enable managers to enjoy the quiet life and lessen their motivation to increase firm value or manage earnings.

4.3.6 Powerful CEO and/or weak subordinate executives

Powerful CEOs are identified using the following characteristics: CEO serves as chairman of the board, CEO is the firm's founder or belongs to the founding family, or CEO earns a relatively high share of the total compensation of the top five executives (e.g., Dechow et al. 1996, Feng et al. 2011, Chu et al. 2019); conversely, CEOs' ability to manipulate earnings may be lower if they are newly appointed outsiders, or if key subordinate executives (especially the CFO) have high influence (measured using compensation relative to the CEO) or short horizon (measured using years to retirement age) (Cheng et al. 2016). Relatedly, Li and Srinivasan (2011) provide evidence of more effective board governance when a non-CEO founder is on the board. Other studies show that CFO with accounting experience or expertise, or who serves on the board of directors, is associated with a lower likelihood of restatement, better internal controls, and lower levels of discretionary accruals (e.g., Li et al. 2010, Bedard et al. 2014).

4.3.7 CEO or CFO with strong outside network

Well-connected executives may be more likely to engage in financial misreporting than less-connected ones. High-centrality executives may have greater ability to influence decisions within

¹²⁸ In a typical staggered board (a.k.a. a classified board) approximately one third of the members are elected each year. Staggered boards are often used to prevent hostile takeovers, as potential acquirers are forced to wait longer to take control of the board. An important advantage of staggered boards is that they provide continual leadership of the organization.

the firm due to their social status, and they may have more outside opportunities to fall back on and find alternative jobs should they lose the current positions when their wrongdoings are detected. He (2021) measures network position using the number of executives or directors with whom the CEO/CFO shares at least one of the following connections: (1) current common outside board directorship, (2) past common employment or board directorship, or (3) attending the same school and degree program at the same time. She finds that high-centrality CEOs and CFOs are more likely to engage in financial misreporting than low-centrality CEOs and CFOs. The influence of CFO network centrality is greater than that of CEOs in financial misreporting. He (2021) interprets her results as suggesting that corporate reporting can be influenced by executives' social network position, with high centrality CFOs using their social power to make adverse corporate reporting decisions to gain personal benefits.

4.3.8 Retention of policy-making accounting functions by the CFO

Given the expanding role of the CFO in today's organizational form (greater strategic and general management responsibilities), CFOs face increasing nonaccounting demands on their time and are increasingly valued for their ability to serve as a strategic partner to the CEO (e.g., McKinsey & Company 2008). Rhodes and Russomanno (2021) argue that delegating the responsibility to head the accounting function or perform accounting-related policy making functions to an "executive officer" other than the CFO promotes the reliability of financial reporting.¹²⁹ Consistent with their hypothesis, they find that executive accountants (executive officers with a title containing accounting, accountant, controller, comptroller, or CAO) are associated with a significant reduction in the likelihood of restatement, higher accrual quality, and faster remediation of material weaknesses in internal control.

4.3.9 Audit committee with limited expertise, status, or activity

Audit committees whose members have both *financial expertise*¹³⁰ and high *status* relative to management reduce earnings management (e.g., Badolato et al. 2014).¹³¹ Similarly, Ashraf et al. (2020) find a reduction in the likelihoods of material restatements and information technology-related material weaknesses in internal controls at firms whose audit committee includes members with *information technology expertise*. Krishnan et al. (2011) find that the presence and proportion of directors with *legal backgrounds* on the audit committee is associated with higher financial reporting quality, as measured using accruals quality and discretionary accruals.¹³²

¹²⁹ The SEC requires companies to disclose any individual that meets the definition of "executive officer," that is, any person in charge of a principal business unit, division, or function (such as sales, administration or finance) or who performs a policy making function.

¹³⁰ Section 407 of SOX mandates that public companies disclose whether their audit committee includes at least one member who is a financial expert. The definition of financial expert is somewhat broad, and it may include individuals whose primary financial experience involves supervising persons engaged in preparing, auditing, or evaluating financial statements (see <https://www.sec.gov/rules/final/33-8177.htm>).

¹³¹ Badolato et al. (2014) measure relative status by comparing audit committee status to management status, using the following status indicators: (1) the number of contemporaneous public board directorships, (2) the number of contemporaneous private board directorships, and (3) degrees from elite institutions.

¹³² In the academic literature, accruals quality is often measured using estimates of the extent to which accruals fail to map into realized cash flows from operations (Dechow and Dichev 2002), possibly after controlling for additional

Cohen et al. (2014) posit that audit committee *industry knowledge* is valuable because accounting guidance, estimates, and oversight of the external auditor are often linked to a company's operations within a particular industry. They find that audit committee members who are both accounting and industry experts perform better than those with only accounting expertise. Cziffra et al. (2021) find that more active audit committees (measured using meeting frequency) improve financial information quality.

4.3.10 Weak internal audit function

The role of internal audit is to provide assurance and advice on the adequacy and effectiveness of governance and risk management. Accordingly, high quality internal audit function (IAF) serves as a key resource to audit committees for monitoring senior management. Ege (2015) finds that a composite measure of IAF quality (IAs experience, certification, training, reporting level, relative size) is negatively associated with the likelihood of management misconduct even after controlling for board, audit committee, and external auditor quality. Other studies provide evidence on the importance of additional measures of independence (besides reporting to the audit committee), including the negative effects of rotating internal auditors out of the IAF, using the IAF as a management training ground, and the sizeable presence of an IAF outside service provider (e.g., Abbott et al. 2016).

4.3.11 Complex operations

Companies with complex operations may be more difficult to govern. Indicators of complex operations include high R&D intensity, large number of geographical segments, and high percentage of foreign sales (e.g., Cheng et al. 2016).

4.3.12 Complex or unusual organizational structure

Such structures may facilitate corporate opacity. For example, research suggests that tax haven firms (i.e., firms whose parent companies are incorporated in tax havens but whose headquarters or primary operations are in nonhaven countries) have low transparency, especially those subject to weak governance in the base country (e.g., Lewellen 2021).

4.3.13 Policies regarding related-party transactions

Weak policies around related-party transactions (RPTs) may enable companies to use RPTs to facilitate or conceal earnings management. Conversely, formal written policies with respect to RPTs, a designated committee to review and approve RPTs, and extensive disclosure on RPTs imply strong corporate governance (Hope and Lu 2020).

4.3.14 Distance from management

variables. Krishnan et al. (2011) use the Francis et al. (2005) version, which involves (1) regressing—within each industry/year—current accruals on operating cash flows in the current year, the preceding year, and the following year, changes in revenues, and gross PP&E, deflating all variables by total assets; and (2) measuring accruals quality as the inverse of the firm's standard deviation of the residuals from the annual cross-sectional regressions over the prior five year.

Companies with major assets or business units located far from management, or that use subcontractors for significant parts of their operations, may be more difficult to govern.

4.3.15 Enforcement and listing

Companies subject to weak legal or regulatory supervision or enforcement (e.g., Daske et al. 2008), or that are listed in a market with no obvious connection, may have weak governance structure.

4.3.16 Ownership structure

Compared to private firms, public firms have higher agency costs due to greater ownership dispersion, greater owner-manager separation, and less managerial ownership (Gao et al. 2013). Managers of public firms are also subject to capital market pressures to meet earnings expectations and often have equity-based compensation packages, resulting in a greater incentive to manipulate reported earnings. These elevated costs and incentives may result in greater earnings management (e.g., Givoly et al. 2010). On the other hand, the high agency costs of public companies may incentivize them to create strong corporate governance. In addition, due to their dispersed ownership and regulation, public companies have limited ability to communicate privately with stakeholders, and they may therefore use high quality reporting as a substitute for insider access (e.g., Hope et al. 2013). The literature provides mixed evidence regarding the net effect of ownership structure on earnings quality (e.g., Givoly et al. 2010, Hope et al. 2013).

4.4 Internal control

Section 404 of SOX requires public companies to review their *internal controls over financial reporting* (ICFR) and declare whether their ICFR are “effective” or “ineffective.” SOX 404 has two requirements: a management assessment and an auditor attestation. Large companies (accelerated filers) must have their independent auditor attest to the management’s assessment of ICFR. Smaller companies (non-accelerated filers) are not required to include an auditor attestation.

Indication by the company, auditor, or other parties of a *material weakness* in internal controls over financial reporting implies higher than average potential of earnings manipulation or unintentional reporting errors (e.g., Ashbaugh-Skaife et al. 2008). For example, Brown et al. (2015b) report that “company has a material internal control weakness” received the second highest rating by sell-side analysts responding to the question: “to what extent do you believe the following indicate management effort to intentionally misrepresent the financial statements?” (the first is weak corporate governance, with slightly higher rating). Brown et al. (2016) presented a similar question to buy-side analysts and report that “company has a material internal control weakness” is the highest rated answer. Bertomeu et al. (2020b) use a total of 102 accounting, governance, audit, market, and business variables to predict accounting misstatements. They find that a dummy for qualified opinion over internal controls is one of the top seven variables with the most influence on detecting misstatements.

Internal control over financial reporting may also affect firm operations. For example, Feng et al. (2015) find that firms with inventory-related material weaknesses have systematically lower inventory turnover ratios and are more likely to report inventory impairments relative to firms with effective internal control over financial reporting. They also examine all material weaknesses in internal control over financial reporting, regardless of type, and provide evidence that firms' returns on assets are associated with both their existence (-) and remediation (+).

Companies' reports on the effectiveness of internal controls informs on earnings quality also in nuanced ways. For example, after restating their financial statements, companies may voluntarily restate their previously issued internal control (IC) reports for the financial statement misstatement periods, changing them from "effective" to "ineffective." Feng et al. (2021b) find that companies with less severe IC problems which can be remediated more quickly are more likely to restate their IC reports.

Examples of material weaknesses include inadequate documentation of accounting policies, procedures, accounts, or transactions; problems with resources, competency, or training of accounting or internal audit personnel or members of the audit committee; problems with information technology, software or implementation related to accounting information; and incorrect, untimely or otherwise deficient recording or reporting of accounting information.

4.5 Accounting and auditing

4.5.1 Accounting policies

The following are indicators of potential problem areas related to accounting policies:

- Key accounting policies either appear aggressive or involve substantial discretion or uncertainty
- The company uses non-standard accounting policies or metrics
- There are significant differences between audited and unaudited data reported by the company

Three sections of the annual report are particularly useful for evaluating accounting policies:

1. Summary of significant accounting policies (typically first note)
2. The discussion of critical accounting policies/estimates from the MD&A,¹³³ and

¹³³ MD&A disclosures of critical accounting policies (CAPs) represent management's identification and disclosure of the accounting policies that are most crucial to the portrayal of the company's financial condition and require its most difficult, subjective, and/or complex judgements. Szerwo (2020) find that (1) CAPs covering four areas are predictive of subsequent restatements: revenue, derivatives, short-term liabilities, and capitalization of expenditures; and (2) the market reaction to restatements is more severe when the areas restated were previously disclosed as CAPs.

3. Auditor's disclosure regarding critical audit matters (CAM, U.S. reporting)¹³⁴ or key audit matters (KAM, international).¹³⁵

Relevant questions to address when evaluating accounting policies include:

- How significant is the item?
- How significant are the discretion and uncertainty?
- Is the company's disclosure proper?
- Are the company choices similar to those of peers?

Using a sample of initial CAM disclosures in 10-K filings for the period August 2019-May 2020, Klevak et al. (2021) find that a larger number of CAMs, a greater number of required auditing procedures and more wordy and extensive CAM discussions are negatively associated with stock returns immediately around the 10-K filings. They also document significantly more negative analyst earnings revisions for firms whose auditors report more CAMs and provide more verbose CAM disclosures.

4.5.2 Accounting changes and error correction

Accounting changes include:

Change in accounting estimate – for example, uncollectible receivables, inventory obsolescence, service lives and salvage values of depreciable assets, warranty obligations, etc.

Change in accounting estimate effected by a change in accounting principle – for example, a change in the method of depreciation, amortization, or depletion for long-lived assets (presumably due to a change in the estimated pattern or duration of future benefits), or a change in the units of accounting in multiple performance obligations transactions.

Change in accounting principle – a change from one accounting principle to another accounting principle when both methods are generally accepted (and the new one is preferred) or when the accounting principle formerly used is no longer generally accepted. Common examples include a change from LIFO to FIFO, and a change in goodwill impairment measurement date. A use of a new accounting principle due to transactions that are either new or “clearly different in substance” is not consider a change in accounting policy.

Companies are required to disclose information about material accounting changes, and such changes should also be recognized in the auditor's report. In addition, when public companies make a voluntary change in accounting principles, they are generally required to obtain a “preferability letter” from their independent auditor. In the letter, the auditor states that the

¹³⁴ PCAOB Auditing Standard 3101 requires the disclosure of critical audit matters (CAMs) starting in 2019 (2020) for large (small) companies. A critical audit matter is any matter arising from the audit of the financial statements that was communicated, or required to be communicated, to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements, and (2) involved especially challenging, subjective, or complex auditor judgment. For each critical audit matter communicated in the auditor's report, the auditor must identify the critical audit matter, describe the principal considerations that led the auditor to determine that the matter is a critical audit matter, describe how the critical audit matter was addressed in the audit, and refer to the relevant financial statement accounts or disclosures that relate to the critical audit matter.

¹³⁵ ISA 701, which requires the disclosure of key audit matters, was issued by the International Audit and Assurance Standards Board (IAASB) in January 2015 and became effective for periods ending on or after December 15, 2016.

change in principle is in accordance with GAAP and that the new policy is preferable to the old one.

Accounting treatment

Error corrections (restatements) are accounted for retrospectively, that is, current and comparative numbers are adjusted as if the error has never been made.

Changes in accounting estimate and changes in accounting estimate effected by a change in accounting principle are accounted for prospectively. The effect on income is recognized in the period of change (e.g., change in estimated uncollectible accounts), or, if future periods are also impacted (e.g., change in estimated salvage value), spread over the current and future periods. For example, if estimated salvage value is increased by \$50 and remaining life at the beginning of the year is 5 years, depreciation for the current and next four years will be reduced by \$10 each year.

Changes in accounting principle are accounted for retrospectively (i.e., similar to error correction), that is, current and comparative numbers are adjusted as if the new principle had always been used. However, if retrospective approach is “impracticable,” the company may use the prospective approach.

Earnings quality issues

Firms may increase reported income by changing accounting policies to less conservative or more aggressive ones. If the change is not accounted for retrospectively, in the period of change net income may include some or all the incremental earnings that would have been recognized in previous periods if the new policy was in effect then. Even if the change is justifiable, the “catch-up” earnings effect is transitory. To the extent that this effect is not properly disclosed by the company (e.g., SEC AAER No. 1542), or that investors do not adjust reported earnings to exclude this effect, future earnings are likely to disappoint. More generally, deficient disclosure regarding accounting changes and their effects reduces earnings quality.

Example: Impact of a change in accounting principle

Assume that a company changed its revenue recognition method as follows:

	Old method	New method
Year of sale (contract signing)	50%	100%
Subsequent year	50%	0%

- (1) The accounting change is considered a change in estimate
- (2) The firm had \$1,000 of new contracts two years prior to the year of change
- (3) Contract volume increases by \$100 each year

Revenue is:

	Old method	New method	Reported revenue
A year ago	500+550 = 1,050	1,100	1,050
The year of change	550+600=1,150	1,200	1,200+550 = 1,750
The following year	600+650=1,250	1,300	1,300

If the change is considered a change in accounting principle, reported revenue for the year of change will be \$1,200 and the comparative prior year numbers will be adjusted to \$1,100 a year ago and \$1,000 two years ago.

Using a sample of 4,452 firm-quarter observations of changes in accounting estimates (CAEs) obtained from Audit Analytics, Chung et al. (2021) find that firms time their decisions to make CAEs to meet earnings targets, smooth earnings, or take a big bath. For example, they find that 28.1 percent of income-increasing CAEs are implemented in quarters where pre-CAE earnings are below a forecasted earnings benchmark but inclusion of the CAE effectively allows the firm to meet the benchmark. DeFond et al. (2021) find an increase in the frequency and magnitude of discretionary income-increasing CAEs following auditor switches. In addition, companies reporting a CAE following an auditor dismissal are more likely to subsequently overstate earnings, receive SEC comment letters regarding accounting estimates, meet or beat earnings targets, and receive clean audit opinions, relative to non-switching firms. Thus, a CAE following an auditor change implies a decline in earnings quality.

Another earnings quality issue related to accounting changes and error corrections is that they may be accounted for improperly. For example, according to SEC AAER No. 4094, “In March 2018, a PPG business unit discovered that it had inadvertently failed to record monthly amortization in connection to a certain intangible asset for a number of years. The unit determined that it was necessary to make an entry of \$1.4 million in that quarter. However, Officer A directed his staff not to make the entry but instead inappropriately spread the amortization amount over the remaining life of the asset.”

Another earnings quality issue related to accounting changes is the timing and method of adopting a new standard. Some accounting standards allow for early adoption and/or alternative methods of adoption (e.g., retrospective versus adjustment to beginning-of-period retained earnings). Companies may use this discretion to increase reported earnings or otherwise improve the reported financials. Evaluating the impact of this discretion is important especially when peers make different decisions. For example, if a company elects to early adopt a standard that results in a substantial increase in earnings while its peers do not, comparability is reduced.

4.5.3 Fiscal quarter

Companies’ ability to manage interim earnings, and the sustainability of interim earnings, often depend on the fiscal quarter. This is due to several reasons, as explained below.

Integral approach

Accounting procedures for preparing quarterly reports are not identical to those used for preparing annual reports. Under U.S. GAAP, fiscal years are viewed as discrete periods, but

quarters are viewed primarily as an integral part of the fiscal year.¹³⁶ Accordingly, some expenses in quarterly reports are adjusted to reflect the effects of actual and expected activities in other (past or future) quarters of the same fiscal year. For example, repairs and maintenance, advertising, auditing, year-end bonuses, and other costs that are expensed as incurred in annual reports are often capitalized or accrued in quarterly reports, so that the expected annual amount is recognized in a systematic way during the fiscal year, based on the passage of time, sales, or other activity measures (e.g., these costs may be allocated to interim quarters as a percentage of expected annual sales with the year-to-date recognized expense adjusted as the estimates are revised during the year). Additional examples include income taxes, which are reported based on the year-to-date pretax income and the expected effective tax rate for the year (see Section 5.8), and inventory write-downs and LIFO liquidations, which are recognized only if not expected to be reversed by fiscal yearend (and are reversed if initially recognized but are subsequently recovered). One implication of the integral approach is that the correlation between fourth quarter earnings and the next quarter earnings is likely to be weaker than that in earlier quarters, because the “smoothing” mechanism that characterizes the integral approach is applied within fiscal years.

Correction of estimation errors made in prior quarters during the fourth quarter

Another important difference between interim and annual information is that the former is often based on estimates rather than actual amounts. For example, when preparing quarterly reports, merchandising firms are permitted to estimate cost of goods sold and ending inventory based on the level of sales during the quarter and the “normal” level of gross profit (the gross profit method). In contrast, when preparing the financial statements for the year, firms must use the actual level of inventory, as measured based on a fiscal count. The use of estimates implies that earnings in the fourth fiscal quarter, which include adjustments for estimation errors made in the prior fiscal quarters, are likely to be more volatile and less informative about future quarterly earnings compared to earnings in the first three fiscal quarters.

Audit

Annual reports are subject to independent audits while quarterly reports are only reviewed by the auditor. An audit provides a reasonable level of assurance in the form of a positive statement (‘presents fairly’). In contrast, a review provides only limited assurance, in the form of a negative statement (‘not aware of any material [issue]’). Accordingly, an audit involves substantially greater effort than a review. In many countries interim reviews are voluntary, implying an even larger difference between the quality of annual and interim reports (e.g., Kajüter et al. 2020).

Inclusion of special items in the fourth quarter report

Fourth quarter earnings are different from earnings in the first three fiscal quarters also because firms typically recognize unusual items such as restructuring and impairment charges in the

¹³⁶ There are some exceptions to the integral approach, referred to as discrete items. Examples include costs and expenses that “cannot be readily identified with other interim periods,” gains and losses, changes in the deferred tax valuation allowance, and the effect of tax law changes on deferred tax assets and liabilities. These items are recognized in the quarter in which the transaction or event occur.

fourth fiscal quarter. This further reduces the correlation between fourth quarter earnings and earnings in subsequent quarters.

Seasonality

Many firms select a fiscal year end date that is characterized by a low level of business activities (e.g., end of January for retailers), and so there is little continuation of earnings from ongoing transactions after the fourth fiscal quarter.

Mendenhall and Nichols (1988) argue that the above-mentioned provisions of interim reporting provide managers with a potential means of delaying bad news earnings until the fourth-quarter earnings announcement, implying that firms report bad news in interim quarters only if they are severe enough that they cannot be delayed. Consistent with this hypothesis, they document a significantly larger market reaction to bad news when the news relates to non-fourth-quarter earnings.

Rangan and Sloan (1998) show that the post earnings announcement drift (earnings momentum) is smaller following fourth quarter earnings announcement compared to the first three fiscal quarters. This result is consistent with several of the features of interim reporting discussed above, including effects of the integral approach, special items, and seasonality.

Brown and Pinello (2007) argue that because the annual reporting process is subject to an independent audit and more rigorous expense recognition rules than interim reporting, it provides managers with fewer opportunities to manage earnings upward. They document that, relative to interim reporting, annual reporting reduces the likelihood of income-increasing earnings management and, to a lesser extent, of negative surprise avoidance, but increases the magnitude of downward expectations management. Similarly, Fan et al. (2010) find that classification shifting (i.e., shifting core expenses to special items) to manage “core earnings,” which is a substitute for accruals management, is more common in the fourth fiscal quarter, consistent with a greater difficulty to manipulate earnings in the fourth quarter. In contrast, Das et al. (2009) provide evidence of annual earnings smoothing in the fourth quarter. They show that (1) reversals of earnings changes in the fourth quarter occur more frequently than would be expected by chance; and (2) other indicators of earnings management, such as the size and direction of discretionary accruals, reversal of subsequent accruals, recognition of special items, and adjustment of R&D spending and effective tax rate, suggest that firms with earnings reversals are more likely to have managed earnings than control firms. In summary, while executives have lower ability to manipulate fourth quarter earnings compared to earlier quarters, they may have stronger incentives to do so due to the importance of annual performance measures.

4.5.4 Change in fiscal year

Firms change fiscal year-ends for a variety of reasons, including changes in corporate control (e.g., being acquired by a company with a different fiscal year end), regulation (e.g., Goldman Sachs and Morgan Stanley changed their fiscal year-end from November to December in 2008 when they became bank holding companies), business seasonality, and industry norm. Often the

change is to a fiscal year end within a fiscal quarter (e.g., the GS and MS change mentioned above). In such cases, one or two months become “orphan” or “missing” (for example, December 2008 in the GS and MS example). Du and Zhang (2013) find that firms tend to report lower income for the missing months than for adjacent quarters, mainly by recording higher operating expenses.

4.5.5 Aggressive non-GAAP reporting

Research suggests that executives effectively follow a peaking order when it comes to earnings management. They start with *accruals management* and shift to *real earnings management* when it becomes increasingly costly or difficult to manage accruals (Cohen and Zarowin 2010). Next in the hierarchy are *classification shifting* (i.e., shifting core expenses to special items or discontinued operations, or shifting income from discontinuing to continuing operations; McVay 2006, Fan et al. 2010, Barua et al. 2010, SEC AAER No. 4094), followed by *expectations management* (i.e., managing analysts’ earnings expectations downward to avoid negative earnings surprises; Matsumoto 2002, Brown and Pinello 2007).¹³⁷ The final tool is *aggressive non-GAAP reporting* in the form of excluding recurring items from non-GAAP earnings measures or otherwise manipulating the disclosure (Doyle et al. 2013).¹³⁸

In general, indications of earnings management at one level imply that the company has also managed earnings at higher levels in the hierarchy. Thus, aggressive non-GAAP reporting implies that GAAP earnings also have likely been managed. Relatedly, managers that engage in aggressive non-GAAP reporting practices are more likely to be ones that also follow aggressive practices in measuring reported earnings (e.g., Curtis et al. 2014).

¹³⁷ The following is a recent example of expectations management, in this case one that violates Regulation FD. On March 5, 2021 (<https://www.sec.gov/news/press-release/2021-43>), the SEC “charged AT&T, Inc. with repeatedly violating Regulation FD, and three of its Investor Relations executives with aiding and abetting AT&T’s violations, by selectively disclosing material nonpublic information to research analysts. According to the SEC’s complaint, AT&T learned in March 2016 that a steeper-than-expected decline in its first quarter smartphone sales would cause AT&T’s revenue to fall short of analysts’ estimates for the quarter. The complaint alleges that to avoid falling short of the consensus revenue estimate for the third consecutive quarter, AT&T Investor Relations executives ... made private, one-on-one phone calls to analysts at approximately 20 separate firms. On these calls, the AT&T executives allegedly disclosed AT&T’s internal smartphone sales data and the impact of that data on internal revenue metrics, despite the fact that internal documents specifically informed Investor Relations personnel that AT&T’s revenue and sales of smartphones were types of information generally considered ‘material’ to AT&T investors, and therefore prohibited from selective disclosure under Regulation FD. The complaint further alleges that as a result of what they were told on these calls, the analysts substantially reduced their revenue forecasts, leading to the overall consensus revenue estimate falling to just below the level that AT&T ultimately reported to the public on April 26, 2016.”

¹³⁸ Non-GAAP earnings adjust standards-compliant earnings by excluding items required by accounting standards (typically) and/or by including items not permitted by accounting standards (much less common). They are also called pro-forma earnings, street earnings, adjusted earnings, non-IFRS earnings, recurring earnings, earnings ex items, core earnings, and cash earnings. Non-GAAP earnings are reported at the discretion of the company, but they are subject to regulation.

Aggressive non-GAAP reporting practices¹³⁹ include

- Excluding from non-GAAP earnings recurring expenses (e.g., amortization, stock-based compensation, R&D)
- Excluding items that—while volatile over time—do recur and are typically negative (e.g., restructuring, impairments), although this practice is very common (see Buffett’s quote below)
- Excluding losses but not gains
- Reporting non-GAAP earnings when net exclusions are negative but not when net exclusions would have been positive (e.g., due to a large one-time gain)
- Changing the definitions of non-GAAP earnings over time to increase current non-GAAP earnings or to improve their trend (e.g., changing to a definition that reduces prior year comparative non-GAAP earnings)
- Reporting a non-GAAP measure that adjusts a particular charge or gain in the current period and for which other, similar charges or gains were not also adjusted in prior periods
- Using misleading labels or calculations of non-GAAP metrics¹⁴⁰

¹³⁹ In the U.S., extensive regulation—including Regulation G, Item 10(e) of regulation S-K, and SEC guidance—attempts to prevent these abuses, but often fails to do so. *Regulation G*, which applies to all public disclosures that include a non-GAAP financial measure, requires: (1) a presentation of the most directly comparable GAAP measure; and (2) a reconciliation of the differences between the non-GAAP measure disclosed or released with the most directly comparable GAAP measure. In addition, Regulation G prohibits disclosing a non-GAAP financial measure that contains an untrue statement of a material fact or omits to state a material fact necessary in order to make the presentation of the non-GAAP financial measure, in light of the circumstances under which it is presented, not misleading. *Item 10(e) of regulation S-K*, which applies to all annual and quarterly reports filed with the SEC, requires: (1) presentation, with equal or greater prominence, of the most directly comparable GAAP measure; (2) a reconciliation of the differences between the non-GAAP measure and the most directly comparable GAAP measure; (3) a statement disclosing the reasons why management believes the presentation of the non-GAAP measure provides useful information to investors regarding the registrant’s financial condition and results of operations; and (4) to the extent material, a statement disclosing the additional purposes, if any, for which management uses the non-GAAP measure (e.g., compensation). Item 10(e) of regulation S-K prohibits: (1) adjusting a non-GAAP performance measure to eliminate or smooth items *identified* as non-recurring, infrequent, or unusual, if the nature of the charge or gain is reasonably likely to recur within 2 years or if there was a similar charge or gain within the prior 2 years (firms may still exclude such items, but they may not refer to them as “non-recurring”); (2) presenting non-GAAP financial measures on the face of the GAAP financial statements or in the notes; (3) presenting non-GAAP financial measures on the face of any pro forma information required to be disclosed; and (4) using titles or descriptions of non-GAAP measures that are the same or confusingly similar to GAAP titles. *Guidance issued by the SEC* (especially in 2016) clarified the rules and provided examples of potentially misleading or disallowed disclosures.

¹⁴⁰ The following is an example of such manipulation (SEC AAER No. 4181): “These proceedings arise out of BGC’s false and misleading disclosures concerning how it calculated a key non-GAAP financial measure, which BGC reported in its quarterly and annual earnings releases and during earnings calls. BGC called this measure post-tax distributable earnings (“Post-Tax DE”). From its first quarter of 2015 through its first quarter of 2016 (the “Relevant Period”), BGC repeatedly emphasized Post-Tax DE as a key financial measure of its after-tax profitability. To arrive at this measure, BGC multiplied distributable earnings before taxes (“PreTax DE”) by a DE tax rate. BGC, however, excluded certain expenses from its calculation of Pre-Tax DE, while continuing to apply a tax deduction associated with these expenses when calculating the DE tax provision and ultimately, Post-Tax DE. As a result, when calculating Post-Tax DE, BGC took the benefit of a tax deduction without reducing Pre-Tax DE income by the amount of the expense that was the basis for the deduction.”

- Presenting non-GAAP metrics with greater prominence than the GAAP metrics to which they are reconciled.

The above practices imply especially aggressive management if

- Peers do not engage in similar activities. For example, excluding SBC is particularly aggressive if this practice is not common among industry peers
- Management provides little or no justification for the adjustments
- The non-GAAP measures are not used by the company itself (e.g., for planning, budgeting, performance evaluation, compensation, or segment disclosures¹⁴¹)

In his 2018 Letter to Berkshire Hathaway Shareholders, Warren Buffett noted: “When we say ‘earned,’ moreover, we are describing what remains after all income taxes, interest payments, managerial compensation (whether cash or stock-based), restructuring expenses, depreciation, amortization and home-office overhead. That brand of earnings is a far cry from that frequently touted by Wall Street bankers and corporate CEOs. Too often, their presentations feature ‘adjusted EBITDA,’ a measure that redefines ‘earnings’ to exclude a variety of all-too-real costs. For example, managements sometimes assert that their company’s stock-based compensation shouldn’t be counted as an expense. (What else could it be – a gift from shareholders?) And restructuring expenses? Well, maybe last year’s exact rearrangement won’t recur. But restructurings of one sort or another are common in business – Berkshire has gone down that road dozens of times, and our shareholders have always borne the costs of doing so. Abraham Lincoln once posed the question: ‘If you call a dog’s tail a leg, how many legs does it have?’ and then answered his own query: ‘Four, because calling a tail a leg doesn’t make it one.’ Abe would have felt lonely on Wall Street.”

Aggressive non-GAAP reporting may also affect real activities and reported earnings. Laurion (2020) find that firms with a history of reporting non-GAAP earnings pursue more and larger acquisitions, have higher total capital investment, are more likely to restructure, and are more likely to recognize discretionary impairments. Relatedly, the increasing focus of market participants on non-GAAP disclosures may create or increase incentives to manipulate the classification of items in the income statement. For example, according to SEC AAER No. 4094, “In Q4 2016, PPG released \$3.4 million of restructuring reserves which, at Officer A’s direction, was improperly classified as an increase to ‘other income.’ This treatment was inconsistent with PPG’s accounting practices; the effect was to improperly increase, by \$3.4 million, PPG’s adjusted income from continuing operations, a non-GAAP measure that was a component of PPG’s reported EPS for the quarter.”

4.5.6 Audit quality

Research suggests that the following metrics inform on audit quality (e.g., DeFond and Zhang 2014, Rajgopal et al. 2021, Aobdia 2019) and by extension on earnings quality. In fact, some studies define higher audit quality as greater assurance of high financial reporting quality, within

¹⁴¹ Like non-GAAP earnings, segment earnings—as reported in the notes to the financial statements—afford management flexibility in defining performance. However, segments disclosures are audited, and segments earnings are used for internal purposes (ASC 280’s management approach).

what is permitted by GAAP (e.g., DeFond et al. 2018).¹⁴² Similarly, auditors and the PCAOB use earnings quality indicators in assessing audit quality (e.g., Aobdia 2019).

Big N auditor

Substantial research documents a positive correlation between big N auditors and audit quality. For example, Lennox and Pittman (2010) and Donelson et al. (2021) find a negative relation between having a Big N auditor and subsequently being targeted by SEC enforcement, consistent with Big N auditors reducing fraud risk. Given their scale, Big N auditors have access to better resources related to technology, training, and facilities (e.g., DeFond et al. 2016). They are also considered to be more independent than smaller audit firms, because few if any clients account for a significant portion of their revenue. Large auditors also have more to lose if they conduct low quality audit (reputation, litigation; e.g., Skinner and Srinivasan 2012); in particular, their “deep pockets” make them a target for litigation.

While the identity of the auditor firm may inform on audit quality, recent research suggests that partner and component auditor identity have insignificant implications. In early 2017, the Public Company Accounting Oversight Board (PCAOB) mandated the disclosure of audit participants, including the lead audit partner and other audit firms participating in the audit (“component auditors”). Using trading volume, absolute abnormal returns, and bid–ask spreads, Doxey et al. (2021) find little evidence of a significant investor response following the disclosure of partner identity or component auditor participation, including when these disclosures are most likely to be informative (e.g., partners associated with restatements or component auditors with PCAOB deficiencies).

Audit fee relative to the size of the audited firm

Large audit fee suggests high auditor effort. Alternatively, it may suggest high audit risk, especially if the fee is substantially larger than in the prior period. Lobo and Zhao (2013) find that higher fees are associated with fewer restatements, suggesting high effort is the more likely explanation for high fees.

Audit fee relative to total fees paid by the client to the auditor

A high ratio suggests auditor independence as non-audit services may compromise auditor independence. For example, Bertomeu et al. (2020b) use a total of 102 accounting, governance, audit, market, and business variables to predict accounting misstatements. They find that the ratio of non-audit fees to total fees is one of the top seven variables with the most influence on

¹⁴² Rajgopal et al. (2021) provide and discuss examples of low-quality audits, derived from AAERs and securities class action lawsuits. Common audit deficiencies include: Failure to gather sufficient competent audit evidence; inadequate audit procedures despite knowledge of potential risks associated with the client; issuing an unqualified opinion despite alleged knowledge of the fraudulent accounting policies or schemes used; deficient audit planning and supervision; lack of independence; failure to obtain an understanding of internal control; Insufficient level of professional skepticism; failure to faithfully state whether financial statements are in accordance with GAAP; and failure to evaluate the adequacy of disclosure; Inadequate consideration of fraud risks.

detecting misstatements. Rajgopal et al. (2021) find that the ratio of audit fees to total fees predicts five of the most cited audit deficiencies in AAERs and securities class action lawsuits.

Audit fee relative to total audit fees charged by the auditor's office

This ratio measures the importance of the client for the audit firm's office. Auditors have higher incentives to compromise their independence and conform to client requests when conducting audits for their more important clients.

Auditor tenure

Research suggests that longer auditor tenure improves (or is associated with higher) audit and financial reporting quality (e.g., Myers et al. 2003). On the other hand, a long auditor-firm relation can reduce auditor independence from the client due to social or economic bonding (e.g., Davis et al. 2009). Bell et al. (2015) find that first-year audits receive lower internal assessments of audit quality and that quality improves shortly thereafter and then declines as tenure becomes very long.

New client

If managers "shop" for lenient auditors, a change in auditor may imply a reduction in audit quality (e.g., DeFond et al. 2000). In addition, short term tenure means that the auditor needs to go through a steep learning curve, which may negatively affect audit and financial reporting quality (Bell et al. 2015). However, in some cases (e.g., ex-Andersen clients), a firm's new auditor may exert more audit effort to avoid potential litigation (Cahan and Zhang 2006).

Auditor lenience

Indication of auditors' lenience may inform on the quality of their audits in other cases. Ege and Stuber (2021) provide suggestive evidence. Using alternative measures of audit lenience (shifting a loss to a profit using accounting estimates, the likelihood of issuing a going-concern opinion), they find that audit office lenience is positively associated with subsequent market share changes. The effect is driven by increases in the likelihood of keeping existing, non-manipulating clients.

Inspections of the auditor

Among its primary responsibilities, the Public Company Accounting Oversight Board (PCAOB) conducts inspections, investigations, and disciplinary proceedings of registered accounting firms. These activities may inform on the quality of the auditor and by extension on the quality of financial reporting by the audited firm. For example, Shroff (2020) investigates the effect of the PCAOB international inspection program on companies' financing and investing decisions. He finds that companies respond to their auditor receiving a "deficiency-free" inspection report by issuing additional external capital and increasing investment. He also provides suggestive evidence that these effects are due to improved earnings quality.

Other metrics

Firm's headquarters located in a large city (easier to audit); firm's headquarters is in the same city as its auditor's office (easier to audit); large auditor office size (auditor competency); industry specialization (typically measured using the auditor's market share of audit fees from firms in the same industry and city, e.g., Reichelt and Wang 2010); and the quality of the individual auditor, which is partially explained by characteristics such as educational background, Big N audit firm experience, rank in the audit firm, and political affiliation (e.g., Gul et al. 2013, Aobdia et al. 2015).

4.5.7 Reliance on third party services

Audited financial reports involve not just the company and its auditors. There are typically several additional (third) parties that provide judgements and estimates that the company and the auditors rely on in preparing and auditing the financial statements, respectively. This is especially common with outside counsellors (litigation and other legal or contractual issues), valuation experts (valuing assets and liabilities acquired in business combinations as well as recurring revaluations and impairment tests), actuaries (pension and insurance reserves) and investment bankers (due diligence in M&A, underwriting, restructuring and other activities). Thus, the quality of financial reports is affected by the quality of the services provided by such third parties in addition to that of management and the auditor.

Companies often mention in financial reports the reliance on third part services, typically implying that the related disclosures are of high quality because they are based on the opinions of objective experts. This may not always be the case. Third-party experts are often dependent on the company for obtaining recurring business and in some cases have limited expertise. The following is a nice example of management's ability to influence third-party reports, in this case in the context of valuing mortgage servicing rights (SEC AAER No. 4174): "A manager in Fulton's financial reporting and control function subsequently contacted the valuation expert and expressed surprise that the Standard December Report 'came in so much higher' than the November Interim Report given the recent change in interest rates. The manager ... asked the valuation expert if there was 'any opportunity to re-evaluate some of [the expert's] assumptions to lower the value.' The valuation expert responded that 'giving you a lower value is not a problem,' but that interest rates are not the only consideration when estimating fair value. ... Nevertheless, the valuation expert also stated in its response that it would be 'happy to accommodate' Fulton by 'lowing [sic] by a couple of [basis points],' since a two-basis point lower valuation 'still falls with[in] our range.' The manager responded that '[l]owering by a couple (or 3)' basis points would be Fulton's preference. A couple of hours later, the valuation expert provided Fulton with an 'adjusted' report with a three-basis point lower value ..."

Estimating the quality of third-party services in the context of financial reports is difficult. There is typically limited if any information available to outsiders. In some cases, the identity of the third parties is disclosed, which may provide some information on the likely quality of their services. In general, whether and the extent to which a company relies on third-party services does not necessarily inform on the reliability or quality of the financial report. Referring to the Fulton example above, "the notes to Fulton's financial statements stated that MSR '[f]air values

are determined at the end of each quarter through a discounted cash flows valuation, prepared by a third-party valuation expert’ and that ‘[b]ased on a fair value analysis, the Corporation determined that net additions of \$1.3 million to the valuation allowance were appropriate during 2016’.” (SEC AAER No. 4174).

4.5.8 Mechanism of going public

Traditionally, private companies entered capital markets primarily through an initial public offering (IPO). However, in recent years there has been a dramatic increase in the use of Special Purpose Acquisition Companies (SPACs), and as of early 2021 SPACs exceed traditional IPOs in numbers and dollars raised. A SPAC is a blank-check company that raises capital from investors in an IPO to use in the future to acquire a target that has not been identified at the time of the IPO. Merging with a SPAC offers private companies a way to go public without conducting an IPO.

Going public through a merger with a SPAC creates financial reporting, auditing, and governance challenges due to the nature of transaction and the accelerated timeline. A private company may spend years preparing to transition to a public company in a traditional IPO, focusing on significant changes to various functions, including people, processes, and technology, that will have to be in place to meet SEC filing, audit, tax, governance, and investor relations needs. In contrast, a SPAC generally has 18-24 months to identify and complete a merger with a target company or liquidate and return proceeds to shareholders. The accelerated timeline and complex financial reporting considerations related to going public through a de-SPAC transaction imply an elevated risk of low earnings quality.¹⁴³ Blankespoor et al. (2021) provide evidence consistent with low information quality of SPAC mergers. They examine SPAC mergers from 2004 through 2021 and find that 80% of firms provide projections for four years ahead on average. For the sample of SPAC mergers with observable post-merger revenue, only 35% of firms meet or beat their revenue projections. This proportion declines for forecasts that are longer horizon, and non-serial SPAC sponsors miss forecasts by greater percentages. Comparing SPAC projected revenue growth to benchmark samples of IPO firms and matched public firms, the SPAC projections are approximately 3 times larger on average than benchmark firms’ actual revenue growth, with even greater differences for long-term projections.¹⁴⁴

¹⁴³ See “Financial Reporting and Auditing Considerations of Companies Merging with SPACs” (Paul Munter, SEC Acting Chief Accountant, March 31, 2021, <https://www.sec.gov/news/public-statement/munter-spac-20200331>), for a description of issues and considerations related to going public through a de-SPAC transaction, including market, timing, financial reporting, internal control, corporate governance, audit committee, and auditor.

¹⁴⁴ Blankespoor et al. (2021) note that they do not compare the accuracy of SPAC mergers projections to those of IPO firms because IPO firms in the U.S. rarely provide such forecasts, due in part to PSLRA safe harbor protections not extending to them (SEC Release No. 33-8591).

4.6 Monitoring by outsiders

4.6.1 Investor base

The composition of a firm's investor base may affect its managers' ability or incentives to manage earnings as well as the form of earnings management, or it may otherwise inform on the likelihood of financial misconduct. Dedicated institutional investors (i.e., those having low portfolio turnover and a long-term relation with portfolio firms) may effectively serve as monitors of the firm, limiting managers ability and incentives to manipulate earnings (Chung et al. 2002). Ownership by dedicated institutions informs on earnings quality also because these investors are attracted to firms with high disclosure quality and strong governance (e.g., Bushee and Noe 2000, Bushee et al. 2014).¹⁴⁵ Relatedly, because firms benefit from such ownership, those with high institutional ownership are likely actively engaged in activities that increase or maintain earnings quality, to reduce the risk of exit.¹⁴⁶

In contrast, ownership by transient institutions (i.e., institutions that trade frequently to profit from short-term price changes) may create incentives to manipulate earnings. Managers may be more inclined to manage earnings to achieve short-term earnings targets, including engaging in costly real earnings management activities (e.g., cutting value-creating R&D) if the company's investor base includes a high proportion of transient institutional investors (Bushee 1998, Chan et al. 2015). While transient institutional ownership may create incentives to manipulate earnings to meet benchmarks, trading by these institutions may speed price discovery (e.g., Lev and Nissim 2006) and thus reduce executives' incentives to manage earnings in some cases.¹⁴⁷

Another dimension of the investor base that may affect or inform about the likelihood of corporate fraud is their prior experience with financial misconduct. Nguyen (2021) finds that mutual funds that experienced corporate fraud at one of their portfolio firms subsequently chose firms with lower probabilities of fraud and financial misconduct, compared to otherwise similar funds that did not experience any corporate malfeasance incidents. Furthermore, mutual funds that experienced corporate fraud intensify their corporate governance activities and vote significantly more against management at other firms in their portfolios, especially on issues related to director election (particularly problematic directors), audit, and financial statement. Reflecting the above effects, firms held by more fraud-experienced investors observe a significant drop in the propensity to get an accounting fraud sanction in subsequent years.

¹⁴⁵ Institutional investors prefer firms with high disclosure quality and strong governance structure because of their higher stock liquidity (Lev and Nissim 2006) and lower cost of monitoring (e.g., Chung and Zhang 2011). In addition, institutional investors may benefit from detailed disclosures due to their superior ability to interpret this information (e.g., Bushee and Noe 2000).

¹⁴⁶ Institutional ownership reduces information asymmetry and thus increases liquidity and lowers the cost of capital (Akins et al. 2011, Dhaliwal et al. 2011).

¹⁴⁷ Trading by institutional investors may speed price discovery also due to other investors copycatting trades disclosed in 13F (e.g., Cao et al. 2021), 13D, or 13G filings.

4.6.2 Analysts' following

Similar to institutional ownership, coverage by sell-side analysts may reduce executives' ability or incentives to manage earnings due to monitoring by these market participants (e.g., Yu 2008, Chen et al. 2015, Irani and Oesch 2016). For example, in the context of goodwill impairment, Ayres et al. (2019) hypothesize—and provide supporting evidence—that analysts impact managers' impairment decisions by improving the information environment through their analysis of firm performance (i.e., ex ante monitoring) as well as by increasing the likelihood the manager and firm experience negative consequences when they fail to record a necessary impairment (i.e., ex post monitoring). Bradley et al. (2017) find that coverage by analysts with prior industry experience is associated with reduced earnings management, lower likelihood of committing financial misrepresentation, less CEO excess compensation, and higher performance sensitivity of CEO turnover. They also provide evidence that the channels through which industry expert analysts exert their monitoring influence include discussing corporate governance issues in research reports, issuing cash flow forecasts along with earnings forecasts, and deviating from management guidance in making earnings forecasts.

Analysts' coverage may also inform on earnings quality because analysts prefer to follow firms with high disclosure quality and strong governance (e.g., Dhaliwal et al. 2011, Lang et al. 2004). Relatedly, to maintain the benefits of analysts' coverage (discussed below), firms with relatively high analysts' followings may be less inclined to manage earnings compared to other firms.

Firms benefit from increased analysts' following due to its impact on information asymmetry, stock liquidity, investor recognition, and cost of capital (e.g., Roulstone 2003, Bowen et al. 2008, Armstrong et al. 2011, Kirk 2011, Li and You 2015). These effects are particularly strong in bad times (Loh and Stulz 2018) or when the analysts are from top brokers, are more experienced, have prior industry experience, or have prior experience with the firm's executives (e.g., Yu 2008, Bradley et al. 2017, Brochet et al. 2013). Analysts following also has spillover effects in the sense that the number of analysts covering the industry is associated with the quality of research incremental to the firm level analysts' coverage (Merkley et al. 2017).

The research discussed above suggests a positive correlation between analysts' coverage and earnings quality. However, studies that examine analysts' ability to evaluate earnings quality find that analysts often fail to incorporate earnings quality information into their forecasts or recommendations (e.g., Bradshaw et al. 2001, Asness et al. 2019, Engelberg et al. 2020). This is consistent with the survey results of Brown et al. (2015b), which indicate that sell-side analysts generally do not focus on detecting fraud or intentional misreporting.

4.6.3 Short selling and short interest

As noted above, institutions and other investors play a monitoring role in part due to the threat of exit. In some cases, they may take short positions. In addition, some investors specialize in short selling. Short selling has negative consequences for the firm not only due to the supply effect but also because of the negative inferences associated with having a high short interest, the impact on stock return volatility due to short squeezes (e.g., the 2021 GameStop episode), and the impact of media or online campaigns that some short sellers engage in. Moreover, short sellers

often take positions in companies based on their assessment of the likelihood of financial fraud (Karpoff and Lou 2010) or earnings quality issues (Park 2017). In some cases, they may possess private information (e.g., Bao et al. 2021). Thus, the threat of being a target of short sellers may play a particularly strong deterrent effect on earnings management, and a high level of or an increase in short interest may suggest a higher-than-average likelihood of fraud or other earnings quality issues.¹⁴⁸ The ability of short interest to inform on earnings quality may be improved by controlling for determinants that are unrelated to earnings quality.¹⁴⁹

Using an SEC pilot program under which one-third of the Russell 3000 index were arbitrarily chosen as pilot stocks and exempted from short-sale price tests, Fang et al. (2016) provide evidence that short selling, or its prospect, curbs earnings management, helps detect fraud, and improves price efficiency. This evidence suggests that companies whose stock is relatively easy and inexpensive to short face a greater risk and higher expected costs if they engage in earnings management activities.¹⁵⁰ The positive correlation between the cost of short selling and earnings management is also due to reverse causation. Earnings management or its prospects may increase the cost of short selling and reduce the supply of lendable shares. For example, Beneish et al. (2015) find that financial statement variables that indicate overvaluation (e.g., accruals, the M-score) elevate the cost of borrowing shares and decrease the available supply.

4.6.4 Banks and other lenders

Lenders often possess private information about the firm and have strong interest in the firm's reporting quality, especially in the timeliness of loss recognition. In addition, compared to other capital market participants, banks have superior information-processing abilities. These information and incentives effects make banks effective monitors of firms' reporting quality. For instance, Khan and Lo (2019) find that borrowers increase their asymmetric timely loss recognition in response to the tightening of lending standards.

The effectiveness of banks monitoring depends on the bank's importance to the borrower (e.g., bank-dependent borrowers versus borrowers with access to multiple banks or to capital markets), the extent of private information possessed by the bank (including through monitoring activity in deposit accounts or other cross-selling activities), the bank's exposure to the borrower (e.g., the

¹⁴⁸ Bertomeu et al. (2020b) use a total of 102 accounting, governance, audit, market, and business variables to predict accounting misstatements. They find that short interest is one of the top seven variables with the most influence on detecting misstatements.

¹⁴⁹ For example, Bao et al. (2019) measure their short interest indicator as the residual from a regression of [short interest / shares outstanding] on (1) [institutional ownership / shares outstanding], a proxy for the availability of loanable shares; (2) an indicator for the presence of convertible debt or convertible preferred stocks, a proxy for hedge-based shorting (convertible security arbitrage usually involves buying a convertible security whose imbedded call option appears undervalued and shorting the underlying stock to hedge against the risk associated with stock price movements); and (3) a trend variable (Bao et al. 2019) or calendar-quarter fixed effects (Bao et al. 2021), to account for market-wide fluctuations in shorting.

¹⁵⁰ Companies whose stock is relatively easy and inexpensive to short are those with low loan fee, high rebate rate, high supply of shares available for lending, and low utilization of the supply, as measured by data providers such as Markit. The cost and availability of lendable shares is determined by or correlated with institutional ownership (- with cost, + with availability), number of institutions owning the stock (-,+), size (-,+), liquidity (-,+), volatility (+,-), growth (+,-), and other factors (see, e.g., Beneish et al. 2015).

bank may reduce exposure by buying CDS protection), and the extent of monitoring by other parties. For example, Su (2021) examines the effect of banks' joint provision of lending and underwriting services to the same firm on the borrower's financial reporting quality. She hypothesizes that compared to issuing stand-alone loans, cross-selling (1) increases the bank's risk exposure to the firm and therefore gives the bank more motivation to monitor the borrower's financial condition (incentive effect), and (2) enables information sharing between the underwriting and lending divisions and allows the bank to have a closer understanding of the borrower's underlying economics, thereby better disciplining the borrower's ability to withhold bad news (information effect). She provides evidence in support of both effects.

While borrowing from banks may lead to more timely loss recognition, public borrowing (i.e., bond issuance) may be even more strongly associated with earnings quality. Unlike banks, investors in public debt cannot use private information to design the terms of the contract or monitor the loan ex post. In addition, because there are many investors in each bond issuance, the free-rider problem in monitoring the borrower and difficulties in renegotiating debt contracts are much more severe for public debt. These effects imply that for firms with low accounting quality the costs of issuing public debt may be excessive. Bharath et al. (2008) show that borrowers with poorer accounting quality are more likely to use private debt after controlling for the other determinants of the choice of private versus public debt.

4.6.5 Media

Substantial research examines the monitoring and information dissemination roles of the media in capital markets (for a review and discussion of this literature, see, e.g., Tetlock 2014 and Miller and Skinner 2015). Related to earnings information, several studies provide evidence that the press helps reduce information asymmetry around earnings announcements. For example, Bushee et al. (2010) find that greater press coverage lowers spreads and increases market depth around earnings announcements, with broad dissemination of information having a bigger impact than the quantity or quality of press-generated information. (Market depth is measured using average quote's depth, the sum of the dollar offer size and the dollar bid size.) Similarly, Guest (2021) finds that WSJ earnings articles improve price discovery and increase trading volume at S&P 500 earnings announcements. Using textual analysis, Guest (2021) also shows that media articles that differ more from the firm's earnings release increase trading volume, and that the differences speed up (slow down) price discovery when they corroborate (contradict) the tone of the firm's news.

More specific to earnings quality, several studies provide evidence on media coverage leading to the discovery of accounting irregularities (e.g., Miller 2006, Dyck et al. 2010, Donelson et al. 2020). Heese et al. (2021) find that media coverage may reduce the frequency and severity of firms' misconduct. Studying the effects of local newspaper closures on violations by local facilities of publicly listed firms, they find that after a local newspaper closure local facilities increase violations and penalties. Cahan et al. (2021) examine whether the media has an indirect corporate governance effect on financial reporting quality (FRQ) that operates through auditors. This occurs because greater media coverage can magnify an auditor's business risk by exposing the auditor to more potential litigation and reputation damage if an audit failure occurs. They find a positive association between media coverage and FRQ that is mediated by audit fees, and

the results are stronger for firms with greater incentives to engage in earnings manipulation. In contrast, they find no evidence that the media has a direct corporate governance effect on FRQ.

4.7 Event-based indicators

4.7.1 Resignation or change of auditors, lawyers, executives, or directors

Such events may indicate disagreement regarding accounting policies and therefore a higher-than-average likelihood that earnings have been managed. In some cases, they may facilitate earnings management in subsequent periods. For example, DeFond et al. (2021) find an increase in the frequency and magnitude of discretionary income-increasing changes in accounting estimates following auditor dismissals. They further show that these companies are more likely to subsequently overstate earnings, receive SEC comment letters regarding accounting estimates, meet or beat earnings targets, and receive clean audit opinions, relative to non-switching firms. Companies are required to disclose a change in their independent auditor under Item 4.01 of Form 8-K, and they must disclose the departure of directors or certain officers under Item 5.02.

If a board member resigns or refuses to stand for reelection because of a disagreement with the company relating to the company's operations, policies or practices, or a director is removed for cause from the board, the company must describe the circumstances of the disagreement. If the director provides a letter regarding her resignation, refusal or removal, the company must file the letter as an exhibit to the 8-K. Similarly, if a high-level executive officer—such as the CEO, president, CFO, chief accounting officer, or COO—retires, resigns, or is terminated, the company must disclose that fact. Companies must also disclose if they dismissed their independent auditor, if the auditor resigned or declined to stand for re-appointment, and if they hired a new auditor.

For departing auditors, the following circumstances (which must be disclosed in Form 8-K if relevant) are widely seen as red flags:

- The auditor gave an adverse or qualified opinion on the company's financial statements or had significant disagreements with the company over accounting principles or practices, financial statements, or the scope or procedure of the audit.
- The auditor advised the company that (1) the necessary internal controls to prepare reliable financial statements do not exist; (2) the auditor can no longer rely on management's representations or is unwilling to be associated with the financial statements prepared by management; (3) the auditor believed it should further investigate a matter or significantly expand the scope of its audit, and the auditor did not do so; or (4) the auditor has found new information that materially impacts the fairness or reliability of current or prior financial statements, and the issue has not been resolved to the auditor's satisfaction.

Bryan and Mason (2020) find a positive association between earnings volatility and auditor resignations, consistent with auditors viewing volatile earnings as riskier (e.g., volatile earnings imply less reliable accounting estimates). Feng et al. (2011) find that—compared to other times—CFOs are more likely to leave prior to an accounting manipulation period, consistent with some CFOs leaving their job or being fired because they refuse to participate in accounting manipulations under CEO pressure. Hazarika et al. (2012) provide evidence that the likelihood

and speed of forced CEO turnover—but not voluntary turnover—are positively related to a firm’s earnings management. Gao et al. (2017) find that during the fraud committing period (before fraud is discovered and before lawsuits are filed), outside directors in fraud firms exhibit an abnormal level of turnover. Female directors, directors who have greater stock ownership in the firm, and directors with multiple directorships at other firms are more likely to depart fraud firms. Abnormal director turnover is significantly higher for fraud that is considered more egregious (i.e., involving fictitious transactions and disclosure problems) or more serious (as proxied by higher ex-post settlement amounts and longer fraud duration).

4.7.2 Non-standard audit opinion

Most audit reports express an “unqualified opinion” that the financial statements fairly present the company’s financial position in conformity with GAAP. Therefore, if the auditor expressed a qualified opinion, adverse opinion, or disclaimer of opinion, the reliability of the financial statements is likely to be low, especially if the departure from unqualified opinion is due to material disagreements with management.¹⁵¹

Non-standard or modified audit opinions may suggest lower likelihood of earnings sustainability also for economic reasons. In particular, when the audit report includes a *going concern* qualification, the likelihood of future losses or earnings decreases is relatively high. This follows because a going concern qualification is issued when the auditor’s assessment is that there is a substantial doubt regarding the company’s ability to continue in the future (which is defined as the following year). In reaching going concern conclusions, auditors consider factors that are directly related to earnings sustainability, including: negative trends in sales, earnings, or key financial ratios; loss of key employees; legal proceeding against the company; expiration of key licenses, patents, or other contractual rights; loss of major customers; etc.

While there are several possible opinions, for public companies two types of opinion are observed in practice—unqualified (large majority) and going concern. Publicly held companies in the U.S. cannot file financials with audit reports containing adverse or disclaimer opinions, and going-concern opinions are the only qualified opinions acceptable by the SEC. This is because the SEC requires companies to file financial statements that are prepared in accordance with GAAP, so if the auditor concludes that there are “misstatements” or any deviation from GAAP, the SEC will not accept the financials. Financials with a disclaimer of opinion due to inability to obtain sufficient evidence are also not accepted by the SEC, as they require fully audited financials.

¹⁵¹ A *qualified opinion* is issued if the (1) the auditor concludes that misstatements, individually or in the aggregate, are material but not pervasive to the financial statements; or (2) the auditor is unable to obtain sufficient appropriate audit evidence on which to base the opinion, and the possible effects on the financial statements of undetected misstatements, if any, could be material but not pervasive. An *adverse opinion* is issued if the auditor concludes that misstatements, individually or in the aggregate, are both material and pervasive to the financial statements. A *disclaimer of opinion* is issued if the auditor is unable to obtain sufficient appropriate audit evidence on which to base the opinion, and the possible effects on the financial statements of undetected misstatements, if any, could be both material and pervasive. Pervasive effects on the financial statements are those that (1) are not confined to specific elements, accounts, or items of the financial statements; (2) if confined, represent or could represent a substantial proportion of the financial statements; or (3) relate to disclosures that are fundamental to users’ understanding of the financial statements.

4.7.3 Restatements, revisions, and out-of-period adjustments

Restatements are issued when management, the auditor, or the SEC finds a material mistake in previously issued financial statements. Restatements are either “reissuance restatements” or “revision restatements”. Reissuance restatements are the more severe type of restatements (often referred to as “big R”); they are issued when a material error implies that past financial statements can no longer be relied upon. These restatements require the filing of an 8-K, Item 4.02, to inform the public of the discovery of the error, and the subsequent filing of the restated financial statements (10-K/A or 10-Q/A). Revision restatements (referred to as “Little r”) are adjustments to comparative numbers contained in a periodic report without a prior 8-K disclosure. If an error is so immaterial that recognizing its cumulative effect in the current period does not distort current period income, then the error is account for as an out-of-period adjustment, with no restatement of prior period amounts.

Restatements are associated with a strong negative market reaction, especially those that involve fraud (as opposed to unintentional error), affect more accounts, decrease reported income, are initiated by auditors, or do not quantify the effect (Palmrose et al. 2004, Henns et al. 2008). The strong negative market reaction to restatements is in part due to an increase in the pricing of information risk (Kravet and Shevlin 2010).

Unlike reissuance restatements, there is less transparency around revisions and out-of-period adjustments, making them more difficult to identify and a less timely red flag ([see, e.g., “Shh! Companies Are Fixing Accounting Errors Quietly,” WSJ December 5, 2019](#)). Still, revisions and adjustments do inform about earnings quality. Choudhary et al. (2021) find that these corrections are associated with modestly and discernibly negative share returns that are more negative for income-decreasing corrections and corrections that involve multiple issues. Moreover, revisions and out-of-period adjustments are a leading indicator of poor reporting reliability as measured by future material and immaterial reporting errors, material weaknesses in internal controls, and SEC comment letters. They are also much more frequent than reissuance restatements, providing earnings quality-related information on a larger set of companies.

4.7.4 SEC enforcement actions

For firms selected by the SEC for enforcement actions, there is typically strong evidence of manipulation. These firms often have already admitted a “mistake” by restating earnings or having large write-offs, have already been identified by the press or analysts as having misstated earnings, or were reported to the SEC by insider whistleblowers (Dechow et al. 2011). While less significant than *AAER*, *comment letters* may also indicate problems. For example, Dechow et al. (2015) find that SEC comment letters relating to revenue recognition are associated with both insider trading and negative stock returns. In addition, comment letters are associated with other proxies for low earnings quality. Casseii et al. (2013) show that low profitability, high complexity, engaging a small audit firm, and weaknesses in governance are positively associated with the receipt of a comment letter, the extent of comments, and the cost of remediation. In addition, comments letters may result in restatements, especially for smaller

companies or for companies engaging a small audit firm. The likelihood and type of comment letters vary over time.¹⁵²

While regulatory actions such as SEC enforcement actions may indicate higher than average likelihood of earnings management, they may lead to an improvement in earnings quality. Using a dataset of employee whistleblower cases related to financial misconduct, Wilde (2017) examines the change in financial misreporting from before the allegation to after the allegation. He finds that in the pre-allegation period whistleblower firms exhibit a higher incidence of financial misreporting (SEC enforcement actions) compared with control firms. Following the allegations, whistleblower firms are significantly more likely to experience a decrease in the incidence of accounting irregularities compared with control firms, suggesting that the deterrent effect of whistleblowing (and the SEC enforcement actions) persists for at least two years beyond the year of the allegation. Whistleblower firms also have significantly lower (less income increasing) accruals in the year of the allegation, consistent with accrual reversals from prior periods.

4.7.5 Accounting-related shareholder litigation

Shareholders that believe they suffer damages from the corporations in which they hold shares may be able to file a shareholder class-action lawsuit (also called a direct lawsuit) or a shareholder derivative lawsuit. A shareholder class-action lawsuit is filed on behalf of a particular class or group of shareholders (e.g., investors that bought shares during a specified period). In a shareholder derivative lawsuit, shareholders sue the company's management on behalf of all shareholders (e.g., related to corporate governance or allegations of mismanagement). Thus, information related to shareholder litigations may help identify or learn more about financial reporting issues. For example, Hennes et al. (2008) show that securities class action lawsuits often follow restatements that involve fraud. Donelson et al. (2021) show that securities class actions (SCAs) are rare and do not inevitably occur after large stock price drops. Focusing on SCAs alleging 10b-5 (fraud) GAAP violations, they show that settled SCAs exhibit higher merit proxies than dismissed cases (e.g., larger abnormal accruals, higher frequency of restatements, larger increase in bid-ask spread). They further show that accounting- and market-based measures that predict SEC enforcement actions (e.g., "soft" assets, change in ROA, share issuance, stock return volatility) also predict settled accounting 10b-5 SCAs. While

¹⁵² Kubic (2021a) derives a measure of SEC error detection rates using information from comment letter reviews. Conditional on the SEC issuing a comment letter, the review team detects an error resulting in a restatement in 4.6 percent of cases, while firms eventually restate financial reports for 13.6 percent of periods under review. These estimates imply that conditional on the financial statements containing an error, the SEC detects that error only about 33% of the time. The SEC is more likely to detect an error when there are more accountants, rather than lawyers, assigned to the review. In a closely related paper, Hills et al. (2021) show that the SEC comment letter process has shifted its focus over time, away from financial reporting and towards non-traditional issues such as terrorism. This shift occurs at the same time as a shift in the SEC labor mix away from accountants and towards lawyers. This suggests that as the SEC is under pressure to focus on non-traditional areas, their ability to regulate traditional financial reporting issues (such as compliance with applicable US GAAP and disclosure standards) may suffer. Black et al. (2021) provide evidence that immediately following the implementation of a new major accounting standard, the SEC focuses its attention on that standard (measured using the topics covered in comment letters). Expecting this, firms that managed earnings to meet or beat analysts' consensus earnings forecasts in the first years of the new revenue recognition standard's effectiveness did so using expenses rather than revenues.

potentially informative about fraud, the settlement of class action lawsuits may have a deterrence effect or it may be associated with other changes that lead to improvement in earnings quality (e.g., a new CFO), so the implications for ex-ante measures of earnings quality are unclear.

To the extent that a company operates in an environment that is conducive to shareholder litigation, earnings quality may actually improve. Because litigation has reputation and career implications for management and directors (e.g., Brochet and Srinivasan 2014), it serves a deterrence role. For example, Hopkins (2018) provide evidence that the threat of shareholder litigation can discipline managerial reporting practices and deter misreporting. Huang et al. (2020) further show that the threat of shareholder litigation deters real earnings management (e.g., overproduction) by constraining managers' ability to issue optimistic and misleading disclosures to conceal such activities (for example, that overproduction is due to anticipated demand). Kim and Skinner (2012) show that the risk of shareholder litigation is related to industry membership (dummy for a high litigation industry—biotechnology, computers, electronics, or retail), firm size (+; log of total assets), sales growth (+; the change in sales deflated by total assets), abnormal stock returns(-), stock return volatility (+), stock return skewness (-; sensitivity to bad news), and stock turnover (+). Donelson et al. (2021) show that these relationships also hold when the proxy for fraud is a settled SEC enforcement case.

4.7.6 Reports by short-sellers, analysts, or the media claiming accounting irregularities

Some short sellers (e.g., Muddy Waters Capital) issue reports that focus on accounting irregularities (e.g., Kartapanis 2019). In addition to the content of the report and the credibility of the issuer, the firm's response to the report may also inform on earnings quality. Brendel and Ryans (2021) show that the frequency of activist short seller reports has grown substantially in recent years. Although firms respond only 31% of the time, this rate increases substantially when the report is accompanied by significantly negative abnormal returns and when the report contains new evidence. Not responding is associated with a less negative stock price response at report release and fewer adverse outcomes. Firms that launch internal investigations following the report release have significantly higher subsequent rates of stock exchange delisting and SEC enforcement actions, and lower rates of being acquired.

While sell-side analysts generally do not focus on detecting fraud or intentional misreporting (Brown et al. 2015b), some do (e.g., Dyck et al. 2010, Khan et al. 2020). The press both rebroadcasts information related to reporting fraud and conducts original investigation, especially the business-oriented press (e.g., Miller 2006, Dyck et al. 2010, Donelson et al. 2020; the Financial Times articles on WeWork and Wirecard).

4.7.7 Late Filings

Late filing of recent quarterly or annual reports, of the annual proxy, or of other required financial disclosures may indicate disagreement regarding the information, either internally, with the auditor, or with other outside parties involved in the reporting process.

4.7.8 Material related-party transactions

When the party to a transaction is not independent of the company or its shareholders, the transaction price and other terms may not reflect fair value. Therefore, a material related-party transaction indicates the potential for earnings management.

4.7.9 M&A

Business combinations provide firms with ample opportunities to manipulate earnings in the period of acquisition as well as in subsequent periods. The likelihood of earnings management is especially high if earnouts are used (e.g., Ferguson et al. 2021) or if the transaction results in material goodwill or indefinite life intangibles (see Sections 5.5 and 5.17). For example, Chen et al. (2016) find that targets depress performance when investor attention declines once the deal parameters are set, and much of that performance understatement is transferred to boost post-acquisition acquirer performance.

4.7.10 Issuance of management forecasts

Research suggests that the issuance of management forecast implies that earnings are relatively predictable, in part because initiating guidance may result in an effective commitment to continued future guidance (Graham et al. 2005, Chen et al. 2011). For example, Allee et al. (2021b) find that firms with higher-quality IPO information (as measured by registration time, the accruals quality factor, S-1 percentage of uncertain words, and S-1 length) are more likely to provide earnings guidance during the first year after an IPO. The large decline in the issuance of management forecasts following the onset of COVID-19 in 2020 provides a nice example of the relationship between earnings predictability and management forecasts.

4.7.11 Potentially problematic transactions

Some transactions involve particularly high levels of discretion or transitory earnings effects, or they may have questionable commercial rationale. The existence of such transactions suggests higher than average potential for earnings manipulation. While typically legitimate, the following are examples of potentially problematic transactions: bill and hold sale, contingent/unbilled revenue (contract assets), and off-balance sheet arrangements. In many cases, these transactions are due to innate factors such as the nature of industry or the company's business model, but their existence nevertheless implies higher than average potential for manipulation. Some of these transactions are discussed in Chapter 5 in the context of evaluating the quality of specific line items.

4.7.12 Events at related firms

If any of the events discussed in this section (e.g., restatement, SEC enforcement action) occurs at a related firm, it may suggest a higher likelihood of a similar event or more generally earnings quality issues for the company. For example, Chiu et al. (2013) provide evidence that earnings management spreads between firms via shared directors (board interlocks): a firm is more likely to manage earnings when it shares a common director with a firm that is currently managing

earnings, especially if the shared director has a leadership or accounting-relevant position (e.g., audit committee chair or member) on its board or the contagious firm's board. Bizjack et al. (2009) provide similar evidence with respect to options backdating.

4.8 “Soft” indicators

4.8.1 Managerial ability

Research suggests a positive association between managerial ability and earnings quality. For example, Demerjian et al. (2013) find that more able managers are associated with fewer subsequent restatements, higher earnings and accruals persistence, lower errors in the bad debt provision, and higher quality accrual estimations. These results are consistent with the premise that managers impact the quality of the judgments and estimates used to generate and report earnings. Of course, managerial ability is unobservable. Studies (see Demerjian et al. 2013 for a review) use proxies that include historical returns, media citations, manager fixed effects (identification through managers who switch firms), abnormal revenue (relative to inputs), managerial pay, and the price reaction to management departures from the firm.

4.8.2 Executives' traits

Overconfidence

Research shows that overconfident CEOs report less conservatively; they delay loss recognition and use less conservative accounting principles (Ahmed and Duellman 2013). This behavior increases stock price crash risk (Kim et al. 2016) and the likelihood of intentional misstatements (Schrand and Zechman 2012).¹⁵³ CEO overconfidence is measured using holdings of deep in-the-money exercisable options, CEOs stock purchases, excess firm investment, excess M&A, excess leverage, and zero dividend.

Biological measures

Jia et al. (2014) argue that facial structures capture variation in CEO personal characteristics (e.g., aggression, egocentrism, risk-seeking) that are associated with financial reporting. They document a positive association between CEO facial masculinity and various misreporting proxies and find that facial masculinity is not a measure of overconfidence. Relatedly, Francis et al. (2015) find that female CFOs are more risk averse than male CFOs, which leads female CFOs to adopt more conservative financial reporting policies.

¹⁵³ Schrand and Zechman (2012) find that many cases of financial misreporting start with misstatements that reflect an optimistic bias that is not necessarily intentional. Because of the bias, however, in subsequent periods these firms are more likely to be in a position in which they are compelled to intentionally misstate earnings. Overconfident executives are more likely to exhibit an optimistic bias and thus are more likely to start down a slippery slope of growing intentional misstatements.

Legal records

CEOs and CFOs with a legal record are more likely to perpetrate fraud (Davidson et al. 2015).

Behavior

“Un-frugal” CEOs—measured by their ownership of luxury goods—oversee a relatively loose control environment characterized by relatively high and increasing probabilities of other insiders perpetrating fraud and unintentional material reporting errors during their tenure. Further, cultural changes associated with an increase in fraud risk are more likely during un-frugal (vs. frugal) CEOs’ reigns, including the appointment of an un-frugal CFO, an increase in executives’ equity-based incentives to misreport, and a decline in measures of board monitoring intensity (Davidson et al. 2015).

Narcissism

Ham et al. (2017) argue that CFOs with narcissistic personality attributes (e.g., self-entitlement, exploitativeness, domineeringness, and inflated self-perception) are more likely to misreport, consistent with the link between narcissism and unethical behavior in the psychology literature. They find that CFO narcissism, as measured by signature size, is associated with more earnings management, less timely loss recognition, weaker internal control quality, and a higher probability of restatements. The results are robust to controlling for CFO overconfidence and CEO narcissism.

Trustworthiness

Hsieh et al. (2020) employ a machine-learning-based face-detection algorithm to measure executives’ facial trustworthiness, based on facial structure (e.g., eyebrow shape, face shape, chin angle, and philtrum length). They find that auditors charge lower audit fee to firms with trustworthy-looking CFOs than to those with untrustworthy-looking CFOs, but CFO’s facial trustworthiness is not associated with financial reporting quality or litigation risk.

4.8.3 Disclosure characteristics

Psychological and linguistic studies provide insights that can be used in evaluating management credibility and the likelihood of earnings management. For example, research (e.g., Vrij 2008) suggests that deceivers are likely to make short, indirect and evasive statements, which lack specific details or self-references. Their statements contain fewer than average singular pronouns (I, me, mine, etc.) and more than average first-person plural pronouns (we, us, our, etc.). Deceivers are also more likely to use negations (no, not, etc.) than assent (agree, yes, ok, etc.), and they are more likely to use tentative words (maybe, perhaps, etc.) than express certainty (always, never, etc.). Deceivers may also provide irrelevant information as a substitute for information that they do not want to disclose. In addition, when they have time to prepare or rehearse their story, deceivers may provide a long response.

Building on this work, accounting research shows that different disclosure characteristics (e.g., readability, linguistic, vocal markers, visual cues) inform on the firm's performance, earnings quality, and the likelihood of earnings management. The following are a few examples.

Readability

Li (2008) documents a positive relationship between annual report readability and the level and persistence of the firm's earnings, where readability is measured using the length of the document (-; the number of words) and the Fog index (-; a function of the average sentence length in words and the percentage of words with more than two syllables).¹⁵⁴ This result could be due to poorly performing firms needing to have more text and longer sentences to fully explain their situation to investors. Alternatively, it may be due to executives attempting to hide earnings management. Indeed, using the Fog Index to measure readability, and focusing on the management discussion and analysis section of the annual report (MD&A), Lo et al. (2017) find that firms most likely to have managed earnings to beat the prior year's earnings have MD&As that are more complex (measured using the Fog index).

Language

Many studies use textual analysis to examine the *tone* and *sentiment* of corporate 10-K reports, newspaper articles, press releases, conference calls, and investor message boards. They generally find that negative word classifications can be effective in predicting earnings, stock returns and other financial variables. For example, Loughran and McDonald (2011) develop a negative word list (e.g., loss, claim, impairment, against, adverse, restructuring, litigation...), use it to measure the tone of 10-K reports (based on the proportion of negative words in the 10-K), and find that negative tone predicts negative 10-K filing returns, abnormal trading volume, abnormal return volatility, fraud, and material weakness. Loughran and McDonald (2013) find that IPOs with more uncertain S-1 filing text (words such as assume, approximately, risk, and believe) have higher first-day returns, absolute offer price revisions, and subsequent volatility.

Other studies use word and term classifications to evaluate *management credibility*. For instance, Larcker and Zakolyukina (2012) classify quarterly earnings conference calls as "truthful" or "deceptive" based on subsequent financial restatements. They show that the language of deceptive executives exhibits more references to general knowledge (you know, you would agree, everybody knows, etc.) and fewer references to shareholder value (value for shareholders, stockholder value, investor value, etc.). In addition, deceptive CEOs use significantly more extreme positive emotion (amazing, brilliant, awesome, etc.) and fewer anxiety words (worried, fearful, nervous, etc.).

Topics

Brown et al. (2020) use a machine learning technique to assess whether the thematic content of financial statement disclosures is incrementally informative in predicting intentional

¹⁵⁴ Loughran and McDonald (2014) report that 10-K document file size provides a simple readability proxy that outperforms the Fog Index, does not require document parsing, facilitates replication, and is correlated with alternative readability constructs.

misreporting. Using a Bayesian topic modeling algorithm, they determine and empirically quantify the topic content of a large collection of 10-K narratives. They find that the algorithm produces a set of topics (e.g., “digital technology and services,” “legal proceedings”) that predict financial misreporting and improves the detection of financial misreporting when added to models based on commonly used financial and textual style variables. They conclude that the topics discussed in annual report filings and the attention devoted to each topic are useful signals in detecting financial misreporting.

Consistency

Changes in the text of the footnotes, or inconsistency relative to other sections of the financial report (particularly the MD&A) or relative to disclosures by peers, may reflect attempt to hide unfavorable developments. For example, Peterson et al. (2015) specify measures of accounting consistency both across time and across firms based on the textual similarity of accounting policy footnotes disclosed in 10-K filings. They find that accounting consistency over time is positively associated with earnings persistence, predictability, accrual quality, and absolute discretionary accruals. They also find that greater accounting consistency in the time-series and the cross-section is associated with lower information asymmetry, as proxied by bid-ask spread and illiquidity. Cohen et al. (2020) show that changes to the language and construction of financial reports (full text) have strong implications for firms’ future returns and operations. Specifically, changes to 10-Ks are associated with negative future stock returns, future earnings, profitability, and future news announcements. Amel-Zadeh and Faasse (2016) find that changes in the text of the MD&A and footnotes and differences between the tone of the two sections predict negative future stock returns and operating performance. The implications of changes in the MD&A for earnings quality, however, are less clear, because a firm’s MD&A is potentially uninformative if it does not change appreciably from the previous year after significant economic changes at the firm (Brown and Tucker 2011).

Vocal and visual cues

Hobson et al. (2012) examine whether vocal markers (e.g., tone of voice) of cognitive dissonance are useful for detecting financial misreporting. Using speech samples of CEOs during earnings conference calls, they find that vocal dissonance markers are positively associated with the likelihood of subsequent irregularity restatements. Similarly, research has shown that visual cues (e.g., gestures, body movement, facial expressions, eye contact, walking gait, posture) can be used to assess management quality or trustworthiness. For example, Blankespoor et al. (2017) develop a composite measure of investors’ perception of management using 30-second content-filtered video clips of IPO roadshow presentations. They show that this measure, designed to capture overall perceptions of a CEO’s competence, trustworthiness, and attractiveness (based on viewers’ assessment of these traits), is positively associated with the pricing of the IPO. More recently, Banker et al. (2021b) investigate how investors respond to CEOs’ dynamic hemifacial asymmetry of expressions (HFAsy) shown on CNBC’s video interviews about corporate earnings. They find that (1) the stock market reacts negatively to the CEO’s HFAsy shown on the interview video, (2) the abnormal bid-ask spread around the interview date is positively associated with the CEO’s HFAsy, and (3) analyst forecast revisions are negatively associated

with CEOs' HFAsy. They further show that these effects are more pronounced for firms with weaker information environments.

Distribution of digits

Somewhat related to this literature, Amiram et al. (2015) create a measure of the extent to which features of the distribution of a firm's financial statement numbers diverge from the theoretical distribution posited by Benford's Law. They then show that their construct is correlated with proxies for earnings management.

4.9 Macroeconomic indicators

Economic conditions affect earnings sustainability and should therefore be incorporated in the analysis. Indeed, when conducting top-down valuation, one starts with analyzing macroeconomic factors before moving to industry and firm-level drivers. Consistent with this approach, empirical research finds that much of the variation in firm profitability can be explained by macroeconomic factors. For example, Ball et al. (2009) show that industrial production, real GDP growth, the unemployment rate, and inflation explain a substantial portion of the time-series variation in firm-level earnings. This section discusses several key macroeconomic indicators. Some of these factors are also discussed in other sections of the monograph, especially Sections 2.11 and 3.1.4.

4.9.1 Inflation

The relationship between inflation and near-term earnings depends on the cause of price change. ***Cost-driven inflation*** (e.g., due to an increase in commodity prices) affects near-term earnings in ways that vary substantially across firms, depending primarily on the elasticity of the demand to the firm's products. In general, companies with significant pricing power (as indicated, for example, by a relatively high and stable profit margin, a large market share, or a strong brand) fair better than other firms at times of cost-driven inflation, as they can adjust prices in response to cost hikes. In addition, some companies hedge input costs, reducing the impact of cost inflation on near-term earnings. (See also "oil prices and other commodities" below.)

Price-driven inflation may increase reported earnings because, holding constant the quantity of products sold, an increase in product prices implies growth in nominal sales. In contrast, some expenses—including historical cost depreciation and FIFO cost of goods sold—adjust to inflation with a substantial delay, resulting in an increase in *real* earnings. However, costs eventually catch up, reversing the real earnings effect. A further negative effect on earnings is due to the increase in real corporate taxes (paid or accrued), resulting from decreases in the real value of (1) depreciation and other asset-based deductions (Feldstein 1980), and (2) tax basis of assets sold during the period (e.g., investments) or marked-to-market through P&L (e.g., trading assets, passive investments in public equity). In general, the long-term earnings effect of inflation—whether cost- or price-driven—is to increase nominal earnings but reduce real earnings (e.g., Nissim and Penman 2003b).

The impact of cost- and price-driven inflation varies across sectors and industries. In general, firms from the consumer staples and health care sectors tend to have relatively high pricing power as the elasticity of demand to their products is relatively low. In addition, companies from the energy and materials sectors produce the inputs of other firms, so what is cost inflation for most firms, is price inflation for them. Other companies that perform relatively well in high inflation environments include real estate and infrastructure firms, whose assets' value and revenue tend to increase with inflation. Industry membership is important also because in concentrated industries (as measured, for example, using the Herfindahl-Hirschman index), or under other circumstances that imply limited competition, even a small firm may be able to adjust prices to fully offset the impact of a cost increase. This is especially likely if the firm uses inputs similar to those used by most peers, or the demand for the industry's products is relatively inelastic.

4.9.2 Interest rates

In making investment decisions, firms select projects with internal rates of return greater than the corresponding hurdle rates, which are determined in part by interest rates. Thus, increases in interest rates reduce the set of positive NPV projects and activities available to the firm, thereby leading to a decline in investment, and conversely for decreases in interest rates (Abel and Blanchard 1986). Because many economic investments are expensed as incurred (e.g., R&D, advertising, start-up costs, hiring, IT, etc.), changes in interest rates are negatively related to subsequent changes in reported expenses. However, changes in interest rates also affect consumers, with increases leading to a reduction in demand and therefore in firms' revenue (and conversely for decreases in interest rates).¹⁵⁵ In addition, for many firms a substantial portion of their revenue is derived from investment activities of other firms, further contributing to the negative relation between changes in interest rates and firms' revenue. Increases in interest rates also increase firms' interest expense, and their negative effect on investments reduces firms' ability to generate profits in future periods. Therefore, the net earnings effect of changes in interest rate is a priori unclear.

The relationship between changes in interest rate and earnings also depends on the underlying cause of the interest rate change. Changes due to monetary policy actions (e.g., changes in the target federal funds rate) may affect earnings due to their impact on credit availability and credit spreads (the *credit channel* of monetary transmission; e.g., Bernanke and Gertler 1995). For example, tightening monetary policy (which increases interest rates) may reduce banks' loanable funds, causing them to cut lending and charge higher credit spreads. It may also reduce the ability of companies to borrow due to the negative effects on their financial position (*balance sheet channel*; lower value of interest-rate sensitive real estate and other collateral, higher interest costs, slowing economic activity). Such changes may in turn exacerbate moral hazard

¹⁵⁵ Increases (decreases) in interest rates make saving more (less) attractive and increase (reduce) the cost of borrowing, both effects leading to a reduction (increase) in consumers' demand, especially for durable goods (Argyle et al. 2021). Industries that are particularly sensitive to this effect include housing, autos, and retailing.

and adverse selection effects, leading to further increases in credit spreads, especially for firms with low accounting quality (Armstrong et al. 2019).¹⁵⁶

Examining short-term effects (up to eight quarters) of changes in short-term interest rates, Binz et al. (2021a) find that one and two quarters after a federal funds change the operating expense effect exceeds the revenue effect (the two effects are described above), yielding a positive relation between unexpected rate changes and firm profits. Three quarters after the shock the revenue and expense effects partially reverse in a balanced way, resulting in no further net effect on firm profits.¹⁵⁷ Nissim and Penman (2003b) report similar earnings effects with respect to changes in longer-term interest rates, finding an initial positive correlation that becomes insignificant after the year following the interest rate change. Their evidence, however, relates to a period that predates the financial crisis (and QE), and does not differentiate among industries and firms. In the post financial crisis environment, long-term interest rates have been significantly affected by government interventions in addition to expectations about short-term interest rates and other “traditional” factors, and they may therefore have different earnings effects than changes in short-term interest rates.

As mentioned above, changes in interest rates alter the set of acceptable investment projects, affecting the average profitability of *new* projects selected by the company. However, such changes may also impact the profitability of *existing* operations, especially for firms operating in competitive industries. For example, a decrease in interest rate may lead to increases in firms’ investment, with the resulting increase in operating capacity putting downward pressure on prices and overall profitability. Thus, declines in interest rates—especially prolonged ones—may have a negative effect on long-term earnings sustainability for companies operating in competitive markets.¹⁵⁸ Moreover, when interest rates (and hence expected profitability) decline, some companies may take on more risk to offset the interest rate effect.¹⁵⁹ Changes in interest

¹⁵⁶ Facing high credit spreads, high quality firms may not borrow (adverse selection) and borrowing firms may take on high-risk investments to generate expected returns above the cost of borrowing (moral hazard).

¹⁵⁷ While these patterns reflect the average effects, the authors document larger effects for firms in certain industries, such as automobile wholesalers and consumer-facing firms, suggesting substantial heterogeneity in firm responses to monetary policy shocks.

¹⁵⁸ Perhaps the best example of the negative effects of prolonged declines in long-term interest rates on earnings sustainability is provided by the insurance industry. Investment income of insurance companies, which is a significant portion of their revenue, is measured using the at-purchase yield-to-maturity of interest-earning assets. Thus, a change in interest rates affects investment income in many subsequent years, until the maturity or sale of all the securities purchased at the new rate. In particular, a persistent decline in interest rates leads to a protracted monotonic decline in portfolio yield as bonds mature and new (low yield) ones are purchased. Reported earnings of other financial institutions are also directly affected by interest rates. For example, banks’ ability to profit from deposits is positively related to interest rates because most deposits either do not earn interest or their interest rate adjust partially (and with a delay for increases) to changes in interest rates (e.g., Calomiris and Nissim 2014). Indeed, several studies document a positive relationship between bank profitability and interest rates (e.g., Borio et al. 2017).

¹⁵⁹ In his 2020 Letter to Berkshire Hathaway Shareholders, Warren Buffett noted: “bonds are not the place to be these days. Can you believe that the income recently available from a 10-year U.S. Treasury bond – the yield was 0.93% at yearend – had fallen 94% from the 15.8% yield available in September 1981? In certain large and important countries, such as Germany and Japan, investors earn a negative return on trillions of dollars of sovereign debt. Fixed-income investors worldwide – whether pension funds, insurance companies or retirees – face a bleak future. *Some insurers, as well as other bond investors, may try to juice the pathetic returns now available by shifting*

rates may also affect firms' dividend policy, which in turn affects earnings sustainability. For example, a low interest rate can induce firms to initiate or increase dividends to cater to income-consuming investors (Daniel et al. 2021).

The direct effect of changes in interest rates on firms' earnings may be offset or augmented by indirect effects. Interest rates are both affected by and correlated with other macroeconomic variables such as GDP, inflation, and F/X, so when evaluating their impact on earnings sustainability other macroeconomic factors should also be considered. For example, an increase in inflation is likely to lead to an increase in expected inflation and therefore to a rise in nominal interest rates (the Fisher effect); an increase in aggregate demand is likely to increase both interest rates and GDP; and an easy monetary policy (which lowers interest rates) is more likely at times of economic contraction.

Interest rates may be related to earnings sustainability also due to their effects on earnings management activities. For instance, lower interest rates may be associated with a higher likelihood of earnings overstatement since the valuation boost from additional earnings is greater, making it more attractive for companies to overstate earnings. As noted in Section 4.1, companies with high valuation ratios are more likely to manipulate earnings, and this cross-sectional effect may also hold in the time series (e.g., when valuation ratios are high due to low interest rates).

4.9.3 Foreign currency exchange rates

Foreign currency fluctuations add volatility to the reported earnings of most companies, reducing earnings sustainability. The direct effects are due to both F/X transactions and F/X translation (see Section 5.18). Depending on the level of product substitutability, firms mitigate these effects by passing through part of currency changes to customers. In addition, they utilize operational hedges (e.g., locating manufacturing facilities in the sales markets), financial hedges (e.g., borrowing in local currency), and derivative hedges (e.g., using forward F/X contracts to lock in exchange rates). Still, it is rarely feasible to eliminate the effects of F/X changes.¹⁶⁰ Therefore, in periods of heightened F/X volatility, earnings are generally less sustainable. In general, a strengthening of the domestic currency leads to decreases (increases) in the earnings of net exporters (importers). The impact of F/X fluctuations on the competitiveness of importers indirectly affects all companies that operate in the same industry, including those with only local operations.

Given the potentially large effects of F/X fluctuations on revenue and earnings, evaluating these exposures is important when conducting earnings quality analysis. Using the 2015 Swiss Franc

their purchases to obligations backed by shaky borrowers. Risky loans, however, are not the answer to inadequate interest rates. Three decades ago, the once-mighty savings and loan industry destroyed itself, partly by ignoring that maxim."

¹⁶⁰ Using a sample of 1,150 manufacturing firms in 16 countries, Bartram et al. (2010) find that firms pass through part of currency changes to customers and utilize both operational and financial hedges. For a typical sample firm, pass-through and operational hedging each reduce exposure by 10–15% and hedging with foreign debt and FX derivatives decreases exposure by about 40%. Altogether, firms reduce their gross exchange rate exposure by about 70% via these channels.

Shock (30% strengthening against the Euro following the unexpected announcement of the Swiss National Bank that it would abandon the longstanding minimum euro-Swiss franc exchange rate), Hail et al. (2021) provide evidence that firms with more transparent disclosures regarding their F/X risk exposure ex ante exhibit lower information asymmetry ex post. The information gap—measured using bid-ask spreads—appears within 30 minutes of the announcement and persists for two weeks, during which new information gradually substitutes for past disclosures. Hail et al. (2021) construct their disclosure proxy by scoring the availability of qualitative and quantitative information on: revenue generated outside of Switzerland, assets held outside of Switzerland, costs/profits generated outside of Switzerland, the currency distribution of short-term monetary assets and liabilities, the exposure to and hedging of foreign currency risk, and the sensitivity of net income or shareholders' equity to changes in foreign exchange rates.

The impact of F/X fluctuations on earnings sustainability depends on the underlying cause of the F/X change. Three major factors that contribute to F/X fluctuations are changes in (1) relative interest rates (domestic versus foreign), (2) relative inflation expectations, and (3) relative expected economic growth. Increases in domestic interest rates increase the demand for domestic financial assets and therefore increase the demand for the domestic currency (the currency is needed to buy the assets) and lead to its strengthening. Conversely, increases in foreign interest rates increase the demand for foreign currencies and lead to a weakening of the domestic currency. Changes in relative inflation expectations affect expected net export and hence the F/X. For example, an increase in expected domestic inflation predicts an increase in the demand for foreign products (and thus foreign currencies), leading to an immediate weakening of the domestic currency as market participants react to this information. Similarly, changes in relative growth expectations predict changes in net export and cause a change in the F/X. For instance, an increase in the expected growth of foreign countries predicts an increase in export to those countries and hence an increase in the supply of foreign currencies. Anticipating these effects, market participants bid up the price of the domestic currency.

As noted, when analyzing the impact of F/X fluctuations on earnings sustainability, it is important to consider the likely cause of the change. This is due to two reasons. First, the persistence of the F/X effect varies depending on the cause of the F/X change. For example, a strengthening of the dollar due to an increase in Treasury rates is likely to be followed by gradual depreciation due to the negative effect on the forward rate (interest rate parity). In contrast, a strengthening of the dollar due to a decrease in expected inflation is likely to persist if the new level of expected inflation is relatively stable. Second, the factors that cause changes in F/X (interest rates, expected inflation, and expected growth) have direct effects on earnings sustainability, which vary from each other as well as across companies.

4.9.4 GDP

Corporate revenues and earnings are directly related to measures of economic activity, as firms deliver the majority of value added reflected in GDP.¹⁶¹ Accordingly, expectations regarding GDP growth inform on the likely growth and sustainability of earnings. Empirically, GDP

¹⁶¹ GDP is equal to the sum of value added by the different factors in the economy. The value added by a firm is approximately equal to the total of pretax earnings, interest expense, and wages, that is, a metric between sales and bottom-line earnings.

growth performs well in explaining the time-series variation in firm-level earnings (e.g., Ball et al. 2009), and GDP forecasts help in predicting revenue and earnings. For example, Li et al. (2014b) show that combining geographic segment sales disclosures and forecasts of country level GDP generates significant improvement in forecasting firm level profitability. GDP growth forecasts play a particularly important role in forecasting long-term revenue and earnings. For instance, using a survey of 172 valuation specialists, Allee et al. (2020) report that the most highly rated response to the question “how often do you apply the following assumptions to your forecast after the explicit forecast horizon?” is “future growth based on economy-wide rate.” Mukhlynina and Nyborg (2020) report that valuation professionals from the asset management industry most commonly use GDP growth in estimating firm-specific steady-state growth.

The impact of changes in GDP on earnings sustainability varies across industries and firms. Reported earnings of firms with the following characteristics tend to be particularly sensitive to changes in the economy: (1) operate in cyclical industries (e.g., consumer discretionary, materials),¹⁶² (2) sell products to diversified end customers, (3) have high operating leverage, (4) are small, or (5) have value or low-quality characteristics.

Because GDP measures aggregate economic activity, past and expected values of GDP reflect and indicate the economy’s stage in the business cycle.¹⁶³ Considering the phase of the business cycle when evaluating earnings sustainability is important because the revenue and earnings of firms operating in different sectors of the economy vary predictably over the cycle. In the recovery phase of the business cycle (often referred to as early cycle or reflation stage), governments typically pursue accommodating monetary and fiscal policies, with the resulting decrease in interest rates stimulating credit-sensitive sectors like housing and consumer durables. These industries tend to have a multiplier effect on economic activity (e.g., buying a house is often associated with other expenditures and activities), benefiting industrials and other economy-sensitive sectors. Similarly, fiscal stimulus in the form of transfer payments (e.g., unemployment insurance) and government spending provides further support to consumers, contributing to the earnings of consumer-driven sectors such as consumer discretionary and financials.¹⁶⁴ The expansion stage of the business cycle (referred to as mid cycle) is characterized by increased business investment, which leads to particularly large increases in the earnings of industrials, technology, and communication companies. Still, due to multiplier effects, other sectors of the economy also perform well. In the late expansion and peak phases (referred to as

¹⁶² Cyclical sectors include consumer discretionary, materials, real estate, and financial services. Defensive sectors include consumer staples, utilities, and health care. Sectors with intermediate sensitivity include communications services, energy, industrials, and technology.

¹⁶³ Past GDP growth rates provide only a partial and delayed indication of the current stage in the business cycle. A key to identifying the phase of the cycle is to focus on the direction and rate of change of key indicators as well as the relationships among them. Top leading indicators include the yield curve, durable goods orders, the stock market, manufacturing orders, and building permits. Additional variables that help identify the stage of the business cycle and predict changes in GDP include credit spreads and credit volumes, inflation, corporate profitability, and inventory changes, as well as many other leading and coincident indicators.

¹⁶⁴ The impact on financial firms varies by industry (e.g., commercial banks versus property-casualty insurers) and firm characteristics. For example, banks that focus on consumer lending benefit from increased lending activities, while banks that generate most of their earnings from core deposits may actually experience a negative earnings effect (see, e.g., Calomiris and Nissim 2014).

late cycle), increases in inflation and interest rates negatively affect credit-sensitive sectors but benefit the commodity-related sectors (materials and energy). In addition, due to slow growth rates, the relative performance edge of economically sensitive industries substantially declines. Finally, in the recession phase, most firms experience earnings declines, but firms operating in defensive sectors (consumer staples, healthcare, and utilities) fare better than others.

As noted at the beginning of Section 4.9, when conducting top-down valuation, one starts with analyzing macroeconomic factors before moving to industry- and firm-level drivers. Thus, in addition to the reasons discussed above, considering GDP when evaluating earnings sustainability is important because the persistence of earnings shocks due to changes in overall economic activity may be different from that due to industry- or firm-specific factors. For example, Jackson et al. (2018) decompose profitability into market, industry, and firm-idiosyncratic components, and document that the three components are differentially persistent.

In addition to its direct effects on earnings, *information* about GDP may itself affect earnings sustainability. For example, Binz et al. (2021b) investigate how GDP nowcast estimation errors affect firms' real decisions and profitability. They find that the excess of GDP nowcast over actual GDP is positively associated with one-quarter-ahead changes in firms' capital investments, production, inventory, and profitability, consistent with firms reacting to the nowcast release. They also document long-run reversal in these reactions, consistent with firms adjusting their activities in response to revised information.

Earnings sustainability may be correlated with economy-wide activity also through a financial reporting channel. Povel et al. (2007) develop a model that links financial reporting fraud to the state of the economy. According to the model, when investors' priors reflect low or average numbers of good firms (poor state of the economy), there is little or no fraud because, even if a firm's public information is positive, enough uncertainty remains that investors find it worthwhile to monitor the firm carefully, and so fraud has little upside. When priors are optimistic (e.g., in periods of extended economic expansion), however, investors do not monitor a firm with positive public information carefully, because this merely confirms their view that the firm is very likely to be good, increasing incentives for fraud. Beneish et al. (2021) provide evidence that financial misreporting peaks before economic busts.

4.9.5 Tax rates and other policies

Changes in tax rates or other tax-related provisions affect corporate income taxes and therefore affect the sustainability of earnings. For example, the 2017 TCJA tax reform resulted in a significant decrease in corporate income taxes.¹⁶⁵ The tax reform also implied significant effects

¹⁶⁵ Warren Buffett provided a nice explanation of this effect in the 2018 letter to Berkshire Hathaway Shareholders: "Like it or not, the U.S. Government 'owns' an interest in Berkshire's earnings of a size determined by Congress. In effect, our country's Treasury Department holds a special class of our stock – call this holding the AA shares – that receives large 'dividends' (that is, tax payments) from Berkshire. In 2017, as in many years before, the corporate tax rate was 35%, which meant that the Treasury was doing very well with its AA shares. Indeed, the Treasury's 'stock,' which was paying nothing when we took over in 1965, had evolved into a holding that delivered billions of dollars annually to the federal government. Last year, however, 40% of the government's 'ownership' (14/35ths) was returned to Berkshire – free of charge – when the corporate tax rate was reduced to 21%. Consequently, our 'A' and 'B' shareholders received a major boost in the earnings attributable to their shares. This happening materially

on economic activity and hence on pretax earnings (e.g., lower individual tax rates, bonus depreciation, the “freeing” of offshore cash balances).

Tax legislation has several additional effects on earnings sustainability. In the year of enactment (or substantial enactment under IFRS), the impact of changes in tax rates or other tax-related provisions on deferred tax assets and liabilities is fully recognized on the balance sheet, with the net effect generally included in the income tax expense. This accounting treatment implies that in periods of tax legislation reported earnings likely contain a significant transitory earnings component. In addition, actual or expected changes in tax rates or other policies may lead firms to change their behavior in a way that affects the sustainability of reported earnings. For example, Lynch et al. (2020) find that firms engaged in real earnings management activities to shift income from the high-tax period prior to the TCJA (2017) to the low-tax period after TCJA to realize tax benefits. In contrast, firms used accrual-based earnings management, which has a lower degree of book-tax conformity, to shift book income from 2018 to 2017. Hanlon and Heitzman (2010) and Graham et al. (2012) provide reviews of tax research, including studies that examine how taxes affect firms’ earnings.

4.9.6 Oil prices and other commodities

Crawford et al. (2020) find that, on average, an individual firm’s sales, expenses, and investments increase with oil price increases, while earnings decrease slightly. These effects vary across oil producers (positive effect on earnings) and oil consumers (negative effect on earnings). In addition, while the impact of oil prices on a firm’s earnings and investments varies significantly by industry, the firm’s operational strategy—including hedging activities (e.g., MacKay and Moeller 2007)—is much more important in explaining these effects. In addition to energy companies, changes in oil prices greatly affect industries like airlines, delivery services, and manufacturers. Oil prices have widespread effects on the economy as they also affect the prices of oil-based products and oil-based energy (e.g., Baumeister and Kilian 2016).

Like other macroeconomic variables that have direct effects on earnings sustainability, oil prices are partially endogenously determined. Therefore, when evaluating their implications for earnings sustainability, other macroeconomic variables should also be considered, especially economic activity. In some cases, oil price changes are due to exogenous shocks, such as petroleum supply limitations by OPEC or disruptions to supplies from extreme weather or accidents (e.g., the weather in Texas in early 2021 or the ship running aground in the Suez Canal in March 2021).

While oil price changes affect essentially all firms in the economy, other commodities have less widespread effects or are sensitive to other macroeconomic factors besides economic activity (e.g., gold price is particularly sensitive to U.S. interest rates, F/X, and inflation). Still, commodities like metals and agriculture impact a variety of industries. Prices of other commodities have strong earnings effects for some industries, primarily those that produce those commodities or for which the commodities are a key raw material (e.g., soybeans are an

increased the intrinsic value of the Berkshire shares you and I own. The same dynamic, moreover, enhanced the intrinsic value of almost all of the stocks Berkshire holds.”

important ingredient for many food manufacturers and restaurants). In general, producers benefit from increases in commodity prices, while consumers experience a negative earnings effect, especially those that face elastic demand for their products.

4.9.7 Macroeconomic uncertainty and investor sentiment

Macroeconomic uncertainty—as measured, for example, using the dispersion in GDP forecasts, the CBOE’s Volatility Index (VIX), or newspaper coverage¹⁶⁶—may affect firms’ earnings in various ways. For example, an increase in uncertainty may cause customers to cut purchases, suppliers to limit credit, lenders to increase credit spreads, and the firm to cut investments or make other adjustments. Binz (2021) finds that firms’ revenues and expenses fall in response to macroeconomic uncertainty, possibly because consumers and managers pull back purchases and investment, the main drivers of revenues and expenses. In the short run, the expense effect exceeds the revenue effect, leading to an increase in profits. In the long run, however, this effect reverses.

Economic uncertainty may also affect firms’ reporting choices. Chui and Wei (2021) hypothesize that increased uncertainty raises the demand for conditional conservatism that, in turn, leads to a larger incremental bad news’ sensitivity. Using firm-level data from 22 countries over 1995 to 2019, they document a positive relationship between economic policy uncertainty and conditional conservatism (i.e., the extent of timelier recognition in earnings of losses versus gains).

Investor sentiment refers to “optimism” (or “pessimism”) not justified by existing fundamentals. Proxies for investor sentiment include the closed-end fund discount (-; the value-weighted average difference between the net asset values of closed-end stock fund shares and their market values), equity share in new issues (+; gross equity issued by public firms divided by the sum of gross equity and long-term debt issuance), aggregate corporate investments, net inflow into equity mutual funds or from debt to equity mutual funds (+), trading volume/turnover (+), consumer confidence index (+), credit spreads (-), the value-weighted dividend premium (-; the difference between the market-to-book ratios of dividend paying firms and non-dividend paying firms; market-wide valuation ratios (+; e.g., P/E), IPO volume (+), # of IPOs (+), and average first-day IPO returns (+).

Investor sentiment may affect earnings sustainability through its effects on the choice of capital (equity versus debt) and cost of capital, which in turn affect investments and other operating decisions (and therefore operating profit) as well as reported interest expense. For instance, Khan et al. (2012) find that the probabilities of seasoned equity offerings and stock-based acquisitions increase significantly in the four quarters following mutual fund buying pressure.

¹⁶⁶ For example, Baker et al. (2016) develop an index of economic policy uncertainty based on the frequency of articles in 10 leading U.S. newspapers that contain the following trio of terms: “economic” or “economy”; “uncertain” or “uncertainty”; and one or more of “Congress,” “deficit,” “Federal Reserve,” “legislation,” “regulation,” or “White House.” They find that the index spikes near tight presidential elections, Gulf Wars I and II, the 9/11 attacks, the 2011 debt ceiling dispute, and other major battles over fiscal policy.

Investor sentiment may also affect the likelihood of aggressive reporting. For example, Brown et al. (2012) find that managers are more likely to disclose and emphasize pro forma earnings metrics that exceed GAAP-based earnings during periods of high investor sentiment. Amin et al. (2021) document that when investor sentiment is high, the likelihood of misstatements is higher and audit quality is lower (auditors are less likely to include a going concern qualification in their reports on the financial statements of clients that subsequently file for bankruptcy).

4.10 Additional ecosystem and firm-specific indicators

Ecosystem factors that affect earnings sustainability are discussed throughout the monograph, especially in Section 2.8 in the context of mean reversion in profitability. This section elaborates on several additional effects.

4.10.1 Customers

Information about the *performance of major customers*—especially those with a longstanding relationship with the firm—helps predict the firm’s performance. For example, Cohen and Frazzini (2008) provide evidence on the stock return predictability implications of such links, and Guan et al. (2015) demonstrate their informativeness for forecasting earnings.¹⁶⁷

In addition, *customers’ activities that are abnormal or inconsistent with the firm’s reported revenue* may inform on earnings management. For instance, abnormal purchases by major customers, or sales growth substantially larger than the growth in purchases of major customers, may indicate channel-stuffing, sales pull-in, or other forms of revenue overstatement by the company. Li et al. (2021) show that (1) the discrepancy between the firm’s sales growth and customer purchase growth and (2) customer excess purchases predict revenue fraud. As another example, Chiu et al. (2020) find that Google searches of firm products (search volume index or SVI; obtained from Google Trends) provide information about firm sales, and that large deviations between reported sales growth and Δ SVI can detect low revenue quality. Firms with such large discrepancies have (1) low sales growth persistence, (2) increases in accounts receivable, (3) lower allowance reserved for bad debts, and (4) higher upward revenue misstatements that are later subject to SEC enforcement actions.

Firms’ *dependence on major customers* may also affect their accruals and real earnings management activities, albeit in potentially offsetting ways. For example, Cen et al. (2018) find that dependence on key customers lead suppliers to delay bad news and accelerate good news related to litigation outcomes. In contrast, Chen et al. (2021b) find that firms with a concentrated customer base are less likely to commit misconduct, measured using violations or penalties related to workplace safety, environmental, wage and hours, false claims, consumer protection,

¹⁶⁷ Specifically, Guan et al. (2015) document that the likelihood of an analyst following a supplier-customer firm pair increases with the strength of the economic ties along the supply chain, as measured by the percentage of the supplier’s sales to the customer. In addition, analysts who follow a covered firm’s customer provide more accurate earnings forecasts for the supplier firm than analysts who do not.

etc.¹⁶⁸ This customer base effect is especially strong when major customers have high brand equity or high bargaining power, or the firm operates in a manufacturing industry (where workplace safety issues and environmental violations are more likely).¹⁶⁹

Finally, *events involving customers* may inform on the firm's earnings sustainability. For instance, Files and Gurun (2018) find that a restatement by a major customer significantly increases the company's loan spread, consistent with the restatement implying higher risk of performance decline.

4.10.2 Peers

Peers' decisions and activities affect the competitive landscape and thus impact the sustainability of the firm's earnings. In some cases, they may also inform on the firm's accounting quality. For example, Files and Gurun (2018) find that restatements by peer firms in the same industry increase the firm's loan spread, suggesting that lenders utilize information from peer restatements to anticipate future restatements by the borrowing firm.

4.10.3 Industry

Industry membership and industry characteristics may affect or be correlated with (and hence inform on) earnings quality for various reasons. As discussed in Chapter 2, earnings sustainability is affected by risk and growth prospects, which vary substantially across industries (e.g., Fama and French 1997). The underlying drivers of these cross-industry differences also affect earnings sustainability. For example, the level, volatility, and uncertainty of changes in the operating environment—and therefore earnings sustainability—vary substantially across industries.¹⁷⁰ In addition, as noted in the previous section, the nature of the industry—cyclical versus defensive—affects the relationship between earnings sustainability and the stage in the business cycle. The potential for error, manipulation or other distortions of reported earnings also vary across industries, due primarily to differences in assets and liabilities. For example, loan portfolios—the largest asset category of most banks—are considered particularly opaque. Additional examples include the potential manipulation and historical cost distortions in accounting for fixed assets and acquired intangibles, the distortions resulting from the immediate expensing of organic investments in intangibles, the discretion involved in recognizing and

¹⁶⁸ Chen et al. (2021b) obtain violation data from Violation Tracker, a dataset that collects information from agency enforcement records from more than 40 federal regulatory agencies as well as from settlements announced in press releases.

¹⁶⁹ Chen et al. (2021b) use five alternative measures of customer concentration: (1) an indicator for firms with major customers (customers that account for at least 10% of total sales); (2) the number of major customers; (3) the fraction of the firm's total sales to major customers; (4) the highest percentage sales to a major corporate customer; and (5) a customer sales-based Herfindahl-Hirschman Index calculated by summing the squares of the ratios of major corporate customer sales to the supplier's total sales.

¹⁷⁰ In providing feedback on this monograph, a marketing professor colleague noted “I think sustainability depends a lot on industry patterns and competitive activity including new product/technology introduction. I remember a long time ago I provided some input to a private investor about the value of a typewriter company. My red flag was the introduction of word processors. To me events like this (new technologies), major companies entering a market, etc. pose the most significant risk to sustainability.”

measuring working capital items (e.g., accounts receivable, inventory), and the uncertainty associated with litigation-related exposures. The significance of each of these factors varies substantially across industries.

Variation across companies in the above factors (e.g., sensitivity to the business cycle, fixed asset intensity) is obviously not completely explained by industry membership. Much of the remaining variation can be captured using the ratios described in Chapters 3 and 4. Still, other factors are difficult to quantify and require qualitative assessment (e.g., strategy, business model, plans; see, e.g., Teece 2010). The remainder of this section discusses two easily observable firm-characteristics that are often correlated with earnings sustainability: dividends and size.

4.10.4 Dividends

Firms are reluctant to cut dividends (e.g., Brav et al. 2005); therefore, an increase in dividend per share implies that managers believe that the level or stability of earnings have increased (e.g., Nissim and Ziv 2001). In addition, dividend paying firms and firms that increase their dividends have lower probability of committing accounting fraud compared to otherwise similar firms (Caskey and Hanlon 2013). In general, a relatively high dividend payout or high yield implies earnings sustainability (e.g., Skinner and Soltes 2011), provided that the high payout or yield is not due to a decline in earnings or price, respectively.

4.10.5 Size

Large firms are more likely to have products at the maturity stage, which is characterized by relatively stable earnings. They are also less likely to make significant investments, which often have negative effects on short-term profitability. In many cases, large firms have diversified operations (across products, geographies, channels, etc.), and therefore relatively stable earnings. In addition, some large firms have persistent competitive advantage and thus relatively high earnings sustainability, often due to “first mover’s advantage” (see “Firm characteristics” in Section 2.11). Finally, size is correlated with many of the characteristics discussed previously that affect or are correlated with earnings quality, such as the strength of corporate control, quality of auditing, monitoring by outsiders and the information environment.

4.11 Additional environmental, social and governance (ESG) effects

ESG factors are discussed in several sections of the monograph. This section describes additional ESG effects, primarily “E” and “S,” which do not fit into other sections. ESG considerations may affect earnings sustainability in various ways (described below), but evaluating these effects is challenging. The difficulties in conducting the analysis relate not just to quantifying ESG characteristics (e.g., the extent of diversity and inclusion activities), but also to measuring the impact of a given level of ESG activities on earnings sustainability. Moreover, the current levels of ESG factors may fail to reflect the implications for future earnings (and earnings sustainability) if they are expected to change significantly. Thus, an informative ESG analysis requires a forward-looking focus to anticipate the future trajectory of a company’s sustainability efforts.

While there are several ESG frameworks and ratings (e.g., TCFD, GRI, SASB, ISS ESG, MSCI ESG) and many metrics, research finds that most ESG dimensions have relatively small effect on firm performance, and those that do have a significant effect vary by industry and business model (e.g., Khan et al. 2016, Porter et al. 2019, Serafeim and Yoon 2021). This evidence suggests that to properly evaluate ESG performance, one needs to identify and focus on industry-specific or even firm-specific highly material ESG factors instead of using overall ratings or dashboards with many metrics. For example, relevant issues for an apparel company may include working conditions in supply-chain factories, overuse of water and chemicals, and human-rights risks in cotton farming. In contrast, for a pharmaceutical company, drug pricing and accessibility, product quality and safety, and sales ethics may be particularly important, while for an energy company, carbon and toxic emissions may carry more weight relative to other factors. Of course, some ESG aspects—such as climate change (e.g., electricity consumption), executive pay, and diversity—are material for most companies.

4.11.1 ESG effects on operating profits

ESG may affect the level and sustainability of operating profits for several reasons. One channel is the reduction in agency costs due to enhanced stakeholder engagement (e.g., Cheng et al. 2014). Another, possibly more important channel, is related to the increasing attention that customers, employees, suppliers, and other operating counterparts pay to ESG ratings and perceptions. In such an environment, high ESG performance may create valuable brand-like intangibles. Conversely, being a target of social media attacks related to the “S” (e.g., D&I or other social injustice) or “E” (e.g., carbon emission, pollution, water consumption), or other negative ESG-related reputational shocks (e.g., media coverage, government actions) may have significant negative effects on performance and value.

4.11.2 ESG risks

A major motivation for engaging in ESG-related activities is to reduce risk—for society, but also for the company. For example

- A strong governance structure reduces operational risks.
- Emphasizing social and environmental effects reduces exposure to litigation, claims or other potential obligations related to products, employees, pollution, etc.
- Loyal employees may help the company absorb negative shocks.

More generally, to the extent that a company emphasizes ESG considerations, its business model may be more sustainable, implying lower overall risk.

While the common view appears to be that ESG-related efforts reduce risk, they may actually increase some aspects of risk, at least from the perspective of the providers of capital. For example, if a company emphasizes employee satisfaction, it may not be as flexible in adjusting headcount, compensation, or other employee-related costs in response to negative sales shocks. In other words, ESG activities may increase operating leverage (the percentage of fixed costs relative to total costs) and cost stickiness (the tendency of costs to increase more when sales increase than they decline when sales decline). Research in finance and accounting suggests that operating leverage and cost stickiness are important risk factors (see Sections 2.4, 2.8, and 2.10). For example, several studies (e.g., Zhang 2005) provide evidence that value stocks are riskier

than growth stocks because they have greater exposure to the effects of operating leverage and cost stickiness (compared to growth stocks, value stocks have a higher likelihood of experiencing a significant sales decline).

More generally, strong commitment to ESG, and creating bureaucracy around it, may reduce firms' flexibility and hence increase risk, at least from the perspective of the providers of capital.

4.11.3 ESG effects on the cost of capital

A strong ESG profile or ESG-related activities or disclosures (e.g., issuance of corporate social responsibility or CSR reports) may reduce the cost of capital (e.g., Dhaliwal et al. 2011) or increase the availability of capital (Cheng et al. 2014). These effects in turn may increase the sustainability of earnings by reducing interest cost, or they may increase the value creation associated with the same level of earnings (another dimension of earnings quality, see Section 1.1) by reducing the cost of equity capital.

ESG activities and disclosures may impact the cost of capital due to their effects on various risks, as discussed in the previous subsection, as well as through demand and information effects. Investors pay increasing attention to ESG ratings and perceptions in making investment decisions. ESG-driven demand for the firm's equity and debt securities may lead to lower borrowing cost and lower cost of equity capital for the same level of risk. ESG-related disclosures may increase transparency (e.g., Cheng et al. 2014) and thus reduce information asymmetry between management and stakeholders. They may also attract analyst coverage (e.g., Dhaliwal et al. 2011), further contributing to the reduction in information asymmetry and cost of capital.

4.11.4 ESG and earnings management

Real earnings management activities may lead to negative outcomes for employees, customers, and other parties that interact with the firm, as well as for the environment and society at large. For example, using establishment-level injury data collected by the Occupational Safety and Health Administration, Caskey and Ozel (2017) provide evidence that managers seeking to meet or beat earnings expectations compromise workplace safety (e.g., by cutting safety related expenditures or increasing workloads). Similarly, using plant-level data on toxic releases from the Environmental Protection Agency, Thomas et al. (2020) show that U.S. firms that meet or just beat consensus EPS forecasts release significantly more toxins because they cut pollution abatement costs to boost earnings. A third example is a study by Raghunandan (2021), which examines data from the U.S. Department of Labor's Wage & Hour Division on wage theft violations (e.g., not paying employees for working overtime or forcing them to underreport the number of hours worked). He shows that (1) wage theft is more prevalent when firms just meet or beat earnings targets, and (2) wage theft often precedes financial misconduct. These studies suggest that disclosures about employee health and safety, pollution, or wage violations can serve as signals to investors about certain forms of real activities management, which lower earnings sustainability and often precede financial misconduct. Decreases in

discretionary spending may also lead to a decline in product safety, customer satisfaction, or other ESG-related performance measures that are affected by the expenditures.

The above examples focus on problematic ESG-related activities, which are not likely to be common. Less extreme forms of ESG-related earnings management may be more common. For example, Grieser et al. (2021) argue that charitable giving is an ideal candidate for real earnings management because it is expensed, discretionary, and often deferred until the end of the year. Using a sample of electric utilities, they find a significant positive sensitivity of charitable spending to weather-driven demand shocks, consistent with these firms using charitable giving to smooth earnings.

ESG may be related to earnings management for additional reasons besides real earnings management activities. For example, impairment tests for tangible and intangible assets require forecasts of future cash flows, which are increasingly sensitive to ESG risks and opportunities. This is due not just to increased interest in ESG by investors, employees, consumers and other stakeholders, but also to the increase in intangible intensity over the last three decades (e.g., Nissim 2019a). ESG activities may also affect investors' trust and thus lead to an increase in market efficiency with respect to corporate disclosures. Berkovitch et al. (2021) find that firms with higher levels of corporate social responsibility (CSR) have higher earnings response coefficient and greater speed of price adjustment to the earnings news.

4.12 Uncertainty and information risk

Low earnings quality implies that there are relatively high levels of (1) uncertainty about future earnings, and (2) information asymmetries between insiders and outsiders. Therefore, proxies for uncertainty and information risk may inform on earnings quality.¹⁷¹

4.12.1 Abnormal trading volume around earnings announcement

Abdel-Mguid et al. (2019) use abnormal trading volume during earnings announcements as a proxy for investor disagreement regarding the valuation consequences of earnings announcements, which in turn reflects uncertainty. They show that the abnormal trading volume is positively associated with indicators of low earnings quality (abnormal accruals and low earnings persistence).

4.12.2 A high or increasing dispersion in analysts' earnings forecasts or credit ratings

Forecast dispersion is widely used as a proxy for uncertainty about future earnings or degree of consensus among analysts or market participants (e.g., Barron et al. 1998, Diether et al. 2002). Lehavy et al. (2011) report a negative association between forecast dispersion and measures of the readability of the 10-K, and Lo et al. (2017) show that measures of annual report readability are negatively associated with earnings management. Relatedly, Akins (2018) finds that better

¹⁷¹ An alternative definition of information risk, which is used in the auditing literature, is the probability that the information circulated by the company is false or misleading.

reporting quality is associated with less uncertainty about credit risk as captured by disagreement among the credit rating agencies.

4.12.3 A high or increasing bid-ask spread

The bid-ask spread is often used as a proxy for information asymmetry (e.g., Leuz and Verrecchia 2000). Affleck-Graves et al. (2002) find that firms with relatively less predictable earnings have consistently higher bid-ask spreads than firms with more predictable earnings. Studies have also linked the bid-ask spreads to earnings management. For example, Donelson et al. (2021) show that settled securities class actions alleging 10b-5 (fraud) GAAP violations exhibit increases in bid-ask spread. Bertomeu et al. (2020b) use a total of 102 accounting, governance, audit, market, and business variables to predict accounting misstatements. They find that the bid-ask spread is one of the top seven variables with the most influence on detecting misstatements.

4.12.4 R&D intensity

R&D intensity is positively associated with both the level of uncertainty about future earnings, and information asymmetries between insiders and outsiders. For example, Kothari et al. (2002) find that the benefits from R&D are substantially less certain than those from fixed assets. In addition, in case of failure, there is typically little if any exit value for investments in intangibles. Related to information asymmetry, Aboody and Lev (2000) find that insider gains in R&D-intensive firms are substantially larger than insider gains in firms without R&D, and insiders also take advantage of information on planned changes in R&D budgets.

5. Line-item Earnings Quality Issues and Related Red Flags and Analysis

This chapter describes potential earnings quality issues for each key line item from the financial statements, related red flags, and how to address the issues in financial analysis, and valuation. The information is presented in a tabular form, with separate sections for key financial statement line items. To enhance the reader's understanding of the earnings quality issues, each section starts with a description of the related accounting principles. Table 5A lists the line items and related quality issues discussed in this chapter.

Table 5A: Line-item earnings quality issues

Line item	Quality issue
1. Revenue	Channel stuffing
	Sales pull-in
	Recognizing revenue before transfer of control
	Using side agreements to recognize revenue prematurely or from transactions that lack economic substance
	Recognizing fraudulent revenue and inflating inventory by engaging in round tripping transactions
	Fictitious sales
	Revenue from related party transactions
	Manipulating estimates of variable consideration (e.g., expected returns, volume rebates, bonus or penalty)
	Manipulating the identification of or price allocation to performance obligations
	Manipulating revenue from "bill and hold" sales
	Shipping incomplete products and recognizing revenue
	Recognizing revenue when the probability of collection is not established
	Recognizing revenue when there is uncertainty regarding the terms of the contract
	Manipulating sales cut-off
	Reporting revenue gross despite the seller acting as an agent rather than a principal
	Overstated revenue from real or fictitious barter transactions
	Including gains or rebates from suppliers in reported revenue
	Reporting contra revenue as expense
	Manipulating revenue recognized over time
	Recognizing revenue at a point in time instead of over time
2. Accounts receivable and bad debt	Manipulating unrealized gains and losses included in mark-to-market revenues
	Using an accounting change to manipulate revenue
	Deficient disclosure
	Manipulated the bad debt accruals
	Transitory earnings
	Deteriorating credit quality of customers
	Overstated receivable due to time value of money
	Removing receivables by factoring (selling) or securitizing them to hide revenue overstatement and/or increase cash from operations
	Hiding receivables
	Off balance sheet exposure
	Understated losses from factoring, selling or securitizing receivables

Line item	Quality issue
3. Inventory and cost of goods sold (COGS)	Excess capitalization of costs into inventory
	Misrepresenting incurred costs as advance payments
	Overproducing to reduce fixed cost per unit and increase reported income
	Manipulating estimates or attribution of vendor allowances
	Excluding production costs from reported gross profit
	Gross margin comparability
	Timing inventory transactions to manipulate earnings (LIFO and weighted average)
	Manipulating inventory write-downs
	Misrepresenting inventory items owned
	Holding gains/losses (FIFO or weighted average)
	Understatement of assets and equity (LIFO)
	Managing inventory-related estimates in interim reports
4. Property, plant and equipment (PP&E) and related expenses	Manipulating cost estimates of assets acquired in business combinations or in combined transactions (e.g., land and building)
	Manipulating cost estimates of assets acquired in non-cash transactions
	Manipulating the estimated cost of asset retirement
	Interest capitalization
	Excess capitalization
	Extending the classification of assets as being under construction to avoid depreciation
	Classifying assets as held for sale to avoid depreciation
	Historical cost distortions
	Manipulating depreciation methods or estimates
	Interrelationship between depreciation and maintenance cost
5. Intangible assets and related expenses	Manipulating impairment losses
	Understated capex
	Depreciation expensed and EBITDA are measured with error
	Balance sheet distortions due to the expensing of organic investments in intangibles
	Income statement distortions due to the expensing of organic investments in intangibles
	Manipulating cost estimates of intangible assets acquired in business combinations
	Goodwill is a low-quality asset
	Manipulating amortization methods or estimates
	Manipulating impairment losses on finite life intangible assets
	Unrecognized impairment losses on goodwill or indefinite life intangible assets
	Low comparability
	Improper capitalization of intangibles
	Misclassifying software – developed for sale versus for internal use
	Cloud versus on-premises computing – lack of accounting comparability
6. Restructuring, loss contingencies, and other operating expenses	Misclassifying operating expenses as R&D or advertising
	Conducting R&D through or for off-balance sheet vehicles
	Excluding amortization from non-GAAP earnings
	Limited disclosure
	Cutting discretionary expenses
	Manipulating estimates of accrued expenses
	Failure to recognize accrued expenses
	Classifying recurring expenses as “one time”
	Manipulating estimates in interim reports
	Improper recognition of loss contingencies
	Improper disclosure

Line item	Quality issue
7. Assets and liabilities held for sale and discount. Operations	Classifying assets as held for sale to avoid depreciation
	Shifting income from discontinued operations to continuing operations
	Manipulating fair value estimates used in measuring assets held for sale
	Manipulating the classification of discontinued operations
8. Income taxes	Change in the tax valuation allowance
	Change in the liability for unrecognized tax benefits
	Relatively small income tax payments
	Designating earnings of foreign subsidiaries as “permanently reinvested” to avoid having to recognize deferred tax liabilities
	No discounting for the time value of money
	Effective tax rate different from the economic tax rate
	No discount for risk (deferred tax liability)
	Deficient disclosure
	Change in the projected effective tax rate used in measuring quarterly income taxes
	Transitory income taxes
	Income taxes in equity flow valuation
	Income taxes in DCF valuation
	Income taxes in EV/EBITDA valuation
9. Leases	Lack of comparability – before versus after the 2019 accounting change
	Lack of comparability – across companies
	Lack of comparability – over time (U.S. GAAP)
	Manipulation of lease classification (U.S. GAAP)
	Manipulation of whether a contract contains a lease or not
	Structuring or interpreting transactions or manipulating estimates to understate or even omit the reported lease liability
	Understatement of capex
	Sales-leaseback
	Leases in DCF
	Leases in relative valuation
10. Pension and other postretirement benefits	Manipulating assumptions used in calculating pension or OPB obligations or expenses
	“Smoothing” of economic volatility
	Understated net interest cost
	Financing items included in operating income (prior to 2018)
	Net reporting of assets and liabilities hides risk
	Excessive risk taking
	Uncertainty and limited disclosure about funding needs
	Low reliability of the fair value of pension plan assets
	Overstated net pension liability from the perspective of equityholders
	Overstated net pension liability from the perspective of debtholders
	Pension in DCF
	Pension in EV/EBITDA valuation

Line item	Quality issue
11. Debt payable	Gains and losses from early retirement of debt
	Manipulation of fair value estimates
	Distortions related to convertible bonds
	Gains or losses from using the fair value option
	Distorted cash from operations
	Debt book value significantly different from fair value
	Unsustainable interest expense
	Short-term debt classified as long-term
	Off-balance sheet debt
	Debt due to reverse factoring included in accounts payable
	Debt modifications
	Debt in valuation
12. Loans receivable and related accounts	Manipulating loan loss accruals
	Transitory component of the provision for loan losses
	Loan growth reducing reported earnings
	Increased earnings volatility
	Misclassifying purchased loans as credit-deteriorated
	Deteriorating credit quality of borrowers
	Overstating gains from selling or securitizing loans
	Derecognizing loans when there is no transfer of control
	Manipulating the subsequent reporting of assets or liabilities recognized in loan sale or securitization
	Manipulating the estimated fair value of loans
	Book value significantly different from fair value
	Unsustainable interest income
13. Investment in debt securities	Gains trading
	Reclassifying Securities
	Manipulating fair value estimates
	Manipulating impairments
	Unrealized gains or losses recognized in income (trading securities or other investments accounted for under the fair value option)
	Book value significantly different from fair value
	Unsustainable interest income
	Limited disclosure on interest rate risk
14. Derivatives	Off-balance sheet risk
	High risk assets
	Low precision of fair value estimates
	Artificial volatility – unrecognized fair value hedges
	Cash flow hedges and change in firm value
	Transitory earnings
	Improper use of hedge accounting
	Discretionary hedge classification
	Unrecognized embedded derivatives
15. Passive investments in equity securities	Transitory gains or losses
	Low quality or manipulated fair value estimates of thinly traded securities or private companies
	Failing to recognize impairments
	Gains trading

Line item	Quality issue
16. Equity method investments	Improperly avoiding the equity method for investments in loss-generating companies
	Transitory items included in equity method earnings
	Failure to eliminate profits from intercompany transactions
	Manipulation of the attribution or amortization of basis differences
	Failing to recognize impairment
	Limited disclosure
	Equity method investments in valuation
17. Business combinations	Managing fair value estimates
	Creating or overstating reserves in business combinations and subsequently releasing them into income
	Counterintuitive income effect of earnouts
	Overstated margins
	Accounting for asset acquisitions as business combinations or vice versa
	Improperly capitalizing transaction costs
	Time-series comparability
18. Consolidation	Failing to consolidate controlled entities
	Consolidating uncontrolled entities
	Improper consolidation start date
	Improper elimination of the effects of intercompany transactions
	Low earnings quality of subsidiaries
	Tunneling
	Consolidation-related distortions in M&A years
	Loss-of-control gains or losses
	Non-controlling interests in valuation
19. Equity	Unrecognized gains and losses from equity transactions
	Significant other comprehensive income
	Valuation of equity claims other than common
20. Share-based payments	Manipulating assumptions or estimates underlying the calculation or recognition of SBC
	Excess tax benefits/shortfalls inducing volatility into earnings and the effective tax rate
	Backdating grants to understate equity-classified SBC
	Timing or manipulating disclosures to understate equity-classified SBC
	Timing grants of equity-classified SBC to understate the expense
	SBC in valuation
21. Earnings per share	Share transactions distorting reported EPS
	Diluted EPS understates potential dilution from outstanding options
	Diluted EPS measures dilution from convertibles with substantial error
	Contingent claims in valuation

Line item	Quality issue
22. Insurance accounting [To be completed]	Issues related to investment in debt securities
	Issues related to loan receivables and related accounts
	Issues related to passive investments in equity securities
	Issues related to investments in real estate
	Issues related to derivatives
	Loss reserve – manipulation
	Loss reserve – no discounting
	Loss reserve – anti-conservative provision
	Loss reserve – uncertainty and measurement error
	Loss and loss adjustment expenses including transitory component
	Manipulation of DAC and related expenses
	Reinsurance-related manipulations
23. Banking [To be completed]	Issues related to loan receivables and related accounts
	Issues related to investment in debt securities
	Issues related to derivatives
	Issues related to trading assets and liabilities
	Omission of the core deposit intangible
	Understated disclosed fair value of deposits
	Fair value not reflecting cash realization value

5.1 Revenue

Under ASC 606, *Revenue from Contracts with Customers*, an entity recognizes revenue to depict the transfer of promised goods or services to customers at an amount that reflects the consideration the entity expects to be entitled in exchange for those goods or services. The principles in the standard are applied using the following five steps:

1. Identify the contract(s) with a customer (a contract creates enforceable rights and obligations)
2. Identify the performance obligations in the contract (obligations that are both capable of being distinct and distinct in the context of the transaction)
3. Determine the transaction price (including variable consideration)
4. Allocate the transaction price to the performance obligations in the contract (generally based on relative fair values)
5. Recognize revenue when (or as) the entity satisfies a performance obligation.

Any consideration received from the customer before all the above criteria are met is generally recognized as a deposit (liability)

Step 1: Identify the contract(s) with a customer

A contract is an agreement between two or more parties that creates enforceable rights and obligations and satisfies the following criteria:

- The contract has commercial substance
- Rights to goods or services can be identified
- Payment terms can be identified
- The consideration the entity expects to be entitled to when due is probable of collection
- The contract is approved, and the parties are committed to their obligations

Step 2: Identify the performance obligations in the contract

A contract includes promises to transfer goods or services to a customer. If those goods or services are distinct, the promises are separate performance obligations. A good or service is distinct if it satisfies both of the following criteria:

1. It is capable of being distinct – The customer can benefit from the good or service on its own or together with other resources that are readily available to the customer.
2. It is distinct in the context of the contract – The entity's promise to transfer the good or service to the customer is separately identifiable from other promises in the contract.

Multiple goods or services transferred are not likely to be distinct if any of the following holds:

- The entity provides a significant integration service, indicating that it is using goods and services as inputs to deliver the combined output specified by the customer.
- One or more of the goods or services significantly modifies or customizes other goods or services in the contract.
- The goods or services are highly interdependent or highly interrelated with one another.¹⁷²

¹⁷² For this condition to hold, there must be two-way dependency. For example, a transaction that involves selling software and providing upgrades over time is not likely to satisfy this condition because, although upgrades requires having the software, it may be possible to benefit from the software without the upgrades.

For example, a contract to build a house includes many items that are capable of being distinct (e.g., lumber, sheetrock, nails, etc.), but these items are not distinct in the context of the contract. In contrast, most contracts that cover both the delivery of a product (e.g., equipment, software) and the subsequent servicing of that product (including regular service or a warranty with a service element) are likely to contain at least two separate performance obligations—the product and the service. Similarly, a contract that covers both the delivery and installation of standard items (e.g., TV) likely includes two separate performance obligations (the product and the installation).

If the distinct goods or services are substantially the same and have the same pattern of transfer to the customer over time, they are combined into a single performance obligation (a “series”). This is often the case with service contracts (e.g., daily cleaning services).

Determining when goods or services need to be combined into a single performance obligation, and when they should be accounted for separately, often requires significant judgement.

Step 3: Determine the transaction price

The transaction price is the amount of consideration to which an entity expects to be entitled in exchange for transferring promised goods or services to a customer. It includes the estimated amount of *variable consideration* related to contingencies such as returns (-), rebates (-), discounts (-), chargebacks (-), slotting fees (-), usage (+/-), performance-based pricing (+/-; e.g., bonuses or penalties), cost-based pricing (+/-), and other contingent pricing (+/-), but it should not include credit losses (credit losses are reported as an expense).

Variable considerations are measured using the probability-weighted expected value (e.g., expected product returns; when there are many similar transactions) or most likely outcome (e.g., bonus or penalty; when there are few possible outcomes and/or unique transaction-specific provisions). Still, the estimated amount of variable consideration is included in the transaction price only to the extent that it is probable (i.e., $\geq 75\%$) that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved.

While credit losses should be accounted for as an expense, variable considerations may still be affected by credit considerations. Many entities offer customers *price concessions* after the initial contract, resulting in the seller receiving less consideration than it is entitled to in the contract. This is especially common in health care, where providers are willing to grant price concessions due to the customers’ inability or unwillingness to pay, reducing both reported revenue and the bad debt expense. Entities have significant judgement in determining whether they have provided an implicit price concession (which is considered variable consideration) or if the collection of the contract price will be reduced due to the customer’s credit risk (which is accounted for as a bad debt expense).¹⁷³

¹⁷³ The following factors suggest that the entity has offered a price concession: (1) the entity has a customary business practice of accepting less than contractual amounts; (2) the customer has a valid expectation that the entity will accept less than the contractually stated price; (3) the entity provides goods or services to the customer even

Variable consideration is estimated at contract inception and is updated at each reporting date (generally each quarter) for any changes in circumstances. This requires adjusting revenue (cumulative effect to date of the change in estimate) as well as revenue-related assets and liabilities. For example, as noted above, the transaction price should be net of estimated returns that the company expects to repay or credit to its customers. The company records a refund liability for the estimated amount to be refunded, and an asset for the goods that will be recovered. The refund liability is remeasured at each reporting date to reflect changes in the estimate, with a corresponding adjustment to revenue.¹⁷⁴

The transaction price may also include *noncash consideration* (e.g., financial instruments, barter revenue), which is measured at fair value at contract inception. The transaction price should be net of *consideration payable to a customer* (e.g., volume rebates, slotting fees), unless the payment is for distinct goods or services the entity receives from the customer. If there is a significant *financing component* (payment is received significantly before or after the transfer of goods or services), the transaction price should be adjusted for imputed interest expense or income. For contracts where the time between cash collection and performance is less than one year, companies may elect to use a practical expedient that allows them to ignore the possible existence of a significant financing component within the contract.

Step 4: Allocate the transaction price to the performance obligations in the contract

An entity generally allocates the transaction price to each performance obligation on the basis of the relative standalone selling prices of each distinct good or service promised in the contract.¹⁷⁵ The stand-alone selling price is the price at which an entity would sell a promised good or service separately to a customer. If a standalone selling price is not observable, an entity is required to estimate the price using techniques that maximize the use of observable inputs.

Step 5: Recognize revenue when (or as) the entity satisfies a performance obligation

An entity recognizes revenue when (or as) it satisfies a performance obligation by transferring control of the good or service to a customer. The amount of revenue recognized is the amount allocated to the satisfied performance obligation. A performance obligation may be satisfied at a point in time (typically for promises to transfer goods to a customer) or over time (typically for promises to transfer services to a customer). A performance obligation is satisfied over time if one of the following criteria is met:

when historical experience or other information indicates the customer will pay less than the stated contract price; and (4) the entity has a customary practice of not performing a credit assessment before transferring goods or services to the customer.

¹⁷⁴ The asset is initially measured at the book value of the goods before the sale, less any expected costs to recover the goods and any expected reduction in value. It is updated whenever the refund liability changes (e.g., due to increases or reductions in expected returns) and for other changes in circumstances that might suggest an impairment of the asset. Changes in the asset are generally recognized by adjusting cost of goods sold.

¹⁷⁵ In some cases a discount or variable consideration is allocated to one or more, but not all, performance obligations. For example, if a transaction includes both equipment and installation and the contract specifies a bonus for speedy installation, the bonus should be allocated to the installation.

- The customer simultaneously receives and consumes the benefits as the entity performs (e.g., rent, cleaning, security).
- The entity's performance creates or enhances an asset that the customer controls as the asset is created or enhanced (e.g., building a facility on the customer's property or providing updates to a software used by the customers).
- The entity's performance does not create an asset with an alternative use to the entity, and the entity has an enforceable right to payment for performance completed to date (e.g., highly specialized equipment).

For performance obligations satisfied over time, an entity recognizes revenue over time by selecting an appropriate method for measuring the entity's progress toward complete satisfaction of that performance obligation (an input or output method).¹⁷⁶ For revenue recognized at a point in time, recognition is when the customer obtains control of the good or service. Indicators of transfer of control include: the customer accepted the product, or has a present obligation to pay, physical possession, legal title, or risks and rewards of ownership.

In addition to the five-steps framework described above, relevant GAAP includes the following items.

An important area of revenue recognition, with specific guidance, is related to ***licenses of intellectual property***. This area is particularly relevant for companies in the media and entertainment, software, technology, and pharmaceutical industries. Under the guidance, if a license is not distinct from the other promised goods or services, the entity is required to determine whether the combined performance obligation is satisfied over time or at a point in time and recognize revenue accordingly. For example, a license that grants customers access to an online service is not distinct from the content that the customers can access via the service. If the license is distinct, the entity is required to determine whether the intellectual property underlying the license is functional or symbolic. *Functional IP* has significant stand-alone functionality and derives a substantial portion of its utility from this characteristic. Revenue from a license of functional IP (e.g., software, drug formula, completed media content) is recognized at the point in time that control of the IP is transferred to the customer. *Symbolic IP* (e.g., brand names, logos) is anything that is not functional IP. Revenue from a license of symbolic IP is recognized over time using an appropriate measure of progress.

Another topic related to revenue transactions, which is significant in some industries, is ***contract costs***. The guidance distinguishes between costs of obtaining a contract and those associated with fulfilling a contract. The incremental *costs of obtaining a contract* with a customer (i.e., costs that would not have been incurred if the contract had not been obtained, such as commissions) are recognized as an asset if the entity expects to recover them. A practical expedient permits an entity to immediately expense contract acquisition costs when the asset that would have resulted from capitalizing these costs would have been amortized in one year or less. *Costs incurred to*

¹⁷⁶ A nice example of revenue recognized over time is that associated with gift card “breakage” (i.e., the portion of gift cards sold that is not redeemed). Expected breakage is recognized in proportion to customer redemption of the gift cards. Breakage estimates are updated each reporting period, and any changes are accounted for by adjusting the contract liability to reflect the remaining rights expected to be redeemed, with the change in the liability included in revenue.

fulfill a contract with a customer (e.g., set up costs, learning curve costs associated with a single performance obligation) that are within the scope of other guidance (e.g., inventory, PP&E, internal-use software), should be accounted for in accordance with that guidance. If the costs are not in the scope of other accounting guidance, they should be recognized an asset only if they meet all the following criteria: (1) the costs relate directly to a contract or to an anticipated contract that the entity can specifically identify; (2) the costs generate or enhance resources of the entity that will be used in satisfying (or in continuing to satisfy) performance obligations in the future; and (3) the costs are expected to be recovered. Any capitalized contract costs are amortized, with the expense recognized as the entity transfers the related goods or services to the customer. Capitalized contract costs are subject to an impairment assessment.

A third revenue-related issue that is relevant for many companies is that of ***shipping and handling***. Companies may elect to either treat shipping and handling as a separate performance obligation or account for them as activities to fulfill the promise to transfer goods. The former requires allocating revenue to the shipping activity, while the latter requires the accrual of related shipping and handling costs at the time of revenue recognition.

While it does not affect reported profit, whether the company serves as a ***principal or an agent*** has a big impact on reported revenue. This issue arises in internet commerce, advertisements, mailing lists, event tickets, travel tickets, auctions and reverse auctions, magazine subscription brokers, and catalog, consignment, or special-order retail sales. An entity is a principal and, therefore, records revenue on a gross basis if it controls the specified good or service before transferring that good or service to the customer (as noted above, indicators of obtaining control include acceptance, obligation to pay, physical possession, legal title, and risks and rewards of ownership). An entity is an agent and records as revenue the net amount it retains for its agency services if its role is to arrange for another entity to provide the specified goods or services. Because it is not always clear whether an entity controls a specified good or service, the standard provides additional indicators of control in the context of principal versus agent, including the entity (1) is primarily responsible for fulfilling the promise to provide the specified good or service, (2) has inventory risk before the specified good or service has been transferred to a customer or after transfer of control to the customer (e.g., if the customer has a right of return), or (3) has discretion in establishing the price for the specified good or service.

In addition to introducing a new framework for revenue recognition, ASC 606 extends ***disclosure*** requirements. Under the new standard, companies are required to provide comprehensive information about the nature, amount, timing, and uncertainty of revenue and cash flows arising from the entity's contracts with customers, including:

- Disaggregation of revenue into appropriate categories, such as business segments, products, geographic areas, revenue recognition method, distribution channels, etc.¹⁷⁷
- Contract balances, including the opening and closing balances of receivables, contract assets, and contract liabilities.¹⁷⁸

¹⁷⁷ The adoption of ASC 606, which requires disaggregation of revenue (typically in the revenue recognition footnote), has likely led some companies to modify their segments disclosure to provide more granular information (e.g., Tesla).

¹⁷⁸ Contract asset is an entity's right to consideration in exchange for goods or services that the entity has transferred to a customer when that right is conditioned on something other than the passage of time (for example, the entity's

- Performance obligations, including when the entity typically satisfies its performance obligations (e.g., upon shipment, as services are rendered) and the transaction price that is allocated to remaining performance obligations (i.e., how much revenue the company expects to record from existing contracts).
- Significant judgments, and changes in judgments, made in applying the requirements to those contracts.
- Assets recognized for the costs to obtain or fulfill a contract with a customer.

ASC 606 is effective for public entities since 2018. While the framework of ASC 606 is different from that of *prior GAAP*, under both frameworks revenue is generally recognized at the time of delivery.¹⁷⁹ Primary changes include:

- More multiple elements/deliverables (now called “performance obligations”)
- Recognition at “transfer of control” rather than “transfer of risks and rewards”
- For variable consideration, the expected value or “most likely amount” is used, rather than delayed recognition (until the uncertainty is resolved)
- Some differences for specific transactions such as percentage of completion method and license revenue
- Substantially more disclosure

These and other changes suggest that for some firms (and industries) the new standard accelerated revenue recognition while for others it led to more deferral of revenue. Still, for many companies the effects on the amount recognized are small.

Revenue recognition involves considerable *discretion*. Research indicates that about half of the cases of misstatements identified by the SEC were related to revenue recognition (e.g., Dechow et al. 2011) as were about half of company restatements (e.g., Plumlee and Yohn 2010). While these misstatement cases relate to violation of revenue recognition principles under the old standard, discretion under the new standard is probably even higher. For example, ASC 606 requires many more transactions to be accounted for as multiple element transactions (now called “performance obligations”), which require substantial judgment (e.g., identifying the elements and allocating the transaction price). Implementing revenue recognition under the new standard also involves substantial discretion in estimating variable consideration, an issue that was less significant under prior GAAP as many forms of variable considerations were previously recognized only when the uncertainty was resolved. Another significant change that increases management subjective judgement is the elimination of the requirement to use “vendor-specific objective evidence” (VSOE) in allocating the price of multiple elements transactions.¹⁸⁰

future performance). Accounts receivable, in contrast, represent an unconditional right to payment. Contract liability is an entity’s obligation to transfer goods or services to a customer for which the entity has received consideration from the customer. A contract liability is also recognized if the entity has an unconditional right to bill the customer (in which case a receivable rather than cash is increased on the asset side).

¹⁷⁹ Under prior GAAP, revenue was recognized when the following four conditions were satisfied: (i) persuasive evidence of an arrangement exists, (ii) product delivery has occurred or services have been rendered, (iii) pricing is fixed or determinable, and (iv) collection is reasonably assured. This typically occurred at the time of delivery.

¹⁸⁰ While ASC 606 likely increased executives’ ability to manage earnings, it also made earnings potentially more informative by recognizing revenue closer to when the economic substance of the arrangement occurs. Microsoft’s decision to early adopt ASC 606 and discontinue the reporting of a non-GAAP revenue number is consistent with such improvement. Microsoft stated on an investor call:

Since 2018, **IFRS** and U.S. GAAP for revenue recognition are basically converged (IFRS 15 and ASC 606, respectively). There are some differences though, including the following:

- Under ASC 606 firms have the option to treat shipping and handling activities that occur after the customer obtained control of the entity's good or service as a fulfillment cost. IFRS does not allow for this option and requires the deferral of the associated revenue.
- ASC 606 allows companies to elect to exclude sales tax and certain other taxes from the measurement of the transaction price in step 3. IFRS does not allow for this option.
- Under both standards, step 1 in revenue recognition requires that the consideration the entity expects to be entitled to is probable of collection. However, U.S. GAAP defines "probable" as if the future events are likely to occur (generally interpreted as >75%), while IFRS defines "probable" as if the future events are more likely than not to occur (i.e., >50%).
- Under IFRS 15, impairment losses taken on capitalized contract costs must be reversed when the impairment conditions no longer exist or have improved. Under GAAP, no such reversal for impairment losses is allowed.

Key ratios used to evaluate earnings quality related to revenue recognition include: days sales outstanding (DSO; see [Section 3.1.1](#)), deferred revenue intensity ([Section 3.1.2](#)), revenue mix ratios ([Section 3.1.5](#)), and the gross margin ([Section 3.3.4](#)).

Table 5.1A describes **earnings quality issues**, red flags and analyses related to revenue recognition.

"On July 1, 2017, we adopted two new accounting standards that cover revenue recognition and lease accounting. We chose to adopt the new standards early, primarily to simplify the communication of our results by eliminating the need for non-GAAP revenue reporting. ... The most material change to our GAAP financials is the move to upfront recognition for Windows 10 OEM revenue. Since the launch of Windows 10 in July of 2015, we have been providing non-GAAP measures to exclude the impact from Windows 10 OEM revenue deferrals from our results. Going forward, the new revenue standard will enable us to eliminate that adjustment and report solely on a GAAP-basis."

Table 5.1A: Earnings quality – Revenue

Earnings quality issue	Explanation	Red flag or analysis
Channel stuffing	- Forcing products through a distribution channel to expedite revenue recognition.¹⁸¹ - Often done by extending excessive discounts or credit terms to distributors to “pull in” sales from the next quarter. - Especially problematic if the distributors’ obligation to pay is contingent on resale, that is, consignment-like transactions. - May violate step 1 (enforceable rights and obligations) or step 5 (transfer of control) - Even if within GAAP, implies lower earnings sustainability - Very common abuse	- The primary red flag for channel-stuffing is an increase in days sales outstanding (DSO). - In evaluating changes in DSO, it is important to consider changes in revenue mix. For example, an increase in DSO that is due to an increase in the relative magnitude of wholesale compared to retail sales should not be construed a red flag. - Because channel stuffing is often associated with sales pull-in activities such as offering deep discounts, lenient credit terms, or generous return privileges, additional red flags for channel stuffing are: - A decline in profit margin - Excessive write-offs of A/R - Excessive product returns - Excessive write-downs of inventories (of returned products) - Liberal return policies - Negative effect on the gross margin may also be due to inefficient production to accommodate pull-in activities.¹⁸² - An increase in days inventory held (DIH) of customers that acquire significant portions of their inventories from the company (e.g., Li et al. 2021).¹⁸³ - Factoring or other activities aimed at hiding abnormal increases in receivables (see Section 5.2)

¹⁸¹ Examples of **channel stuffing**: **Example 1** (SEC AAER No. 2075): From Q1 2000 through Q4 2001, Bristol-Myers Squibb inflated its sales and earnings by: (1) stuffing its distribution channels with excess inventory near the end of every quarter in amounts sufficient to meet sales and earnings targets; and (2) improperly recognizing about \$1.5 billion in revenue from consignment-like sales. Channel-stuffing was contributing to a buildup in wholesaler inventory levels, which posed a risk to Bristol-Myers’ future sales and earnings. **Example 2** (SEC AAER No. 3712): from 2010 to 2012, the CEO of OCZ Technology Group engaged in a scheme to channel-stuff OCZ’s largest customer by shipping more goods than the customer could sell in the normal course of business to inflate reported revenue and earnings.

¹⁸² Example of the **impact of channel-stuffing and other sales pull-in activities on the gross profit** (SEC AAER No. 4169): “PSI’s [Power Solutions International, Inc.] revenue targets became increasingly difficult to meet in 2015 when the price of oil was depressed. In order to achieve these targets, Winemaster and Davis pressured PSI’s salesmen to provide incentives to their customers to take additional product before the end of quarters, including by incenting customers to place additional orders for product they did not currently need and pushing customers to take delivery of already ordered product earlier than desired. Doing so resulted in a significant amount of sales being “pulled ahead” from future periods to a current quarter. For example, approximately 24 percent of PSI’s sales for the first quarter of 2015 were pulled ahead from the second quarter to the first quarter. These end-of-quarter drives to hit revenue targets led to PSI’s customers accumulating inventory that they did not need and ultimately led to PSI’s customers having little appetite to purchase additional product from PSI in 2016. *This practice also was detrimental to PSI’s gross profit margins in 2014 and 2015 because cost of goods sold increased due to inefficient production rushes, labor overtime, and expedited freight charges related to those sales.*”

Earnings quality issue	Explanation	Red flag or analysis
Sales pull-in	- Offering excessive discounts, credit terms or return privileges to “pull in” sales that would otherwise likely occur in subsequent quarters.¹⁸⁴ - When the sales are to distributors, such activities are part of channel-stuffing. But companies often engage in “pull in” activities also in sales to end customers. - May violate step 5 (transfer of control) - Even if within GAAP, implies lower earnings sustainability.	- An increase in DSO - A decline in profit margin - Excessive write-offs of A/R - Excessive product returns - Excessive write-down of inventories (of returned products) - Liberal return policies - Factoring or other activities aimed at hiding abnormal increases in receivables (see Section 5.2)

¹⁸³ Example of the *relevance of customers’ inventory data for evaluating channel stuffing* (SEC AAER No. 4183): “HP measured its channel inventory levels using Weeks of Supply (WOS), a calculation of HP’s Tier 1 channel inventory [i.e., inventory held by distributors to which HP sold directly] divided by an average of previous weeks’ sales in order to give an indication of how many weeks of inventory were in the channel if sales continued at the recent pace. HP did not disclose its WOS metric to the market (or the calculations behind that metric), but on its quarterly earnings calls HP would disclose whether it was within or above its internal targeted WOS range as a proxy for its channel health.”

¹⁸⁴ Example of *sales pull-ins* (SEC AAER No. 4076): “Faced with a substantial decline in customer demand in its core product markets, and concerned about the adverse consequences that would result from missing its public guidance, Marvell [a producer of semiconductor components] orchestrated a plan to accelerate, or pull-in, sales that had originally been scheduled for future quarters to the current quarter in order to close the gap between actual and forecasted revenue, meet publicly-issued guidance, and mask declining sales. As a result, Marvell made materially misleading public statements and omitted to disclose certain facts regarding its financial results for the fourth quarter of fiscal year 2015 (Q4 FY2015) and first quarter of fiscal year 2016 (Q1 FY2016). In particular, Marvell made positive statements regarding its Q4 FY2015 results and met its revised public revenue guidance in Q1 FY2016 without disclosing the significant impact on revenues from its use of pull-ins. Marvell also failed to disclose that the pull-ins reduced future sales, thereby making it exceedingly difficult for Marvell to meet its revenue guidance in future quarters, particularly in a declining market. From approximately January 2015 through July 2015 (the “Relevant Period”), Marvell’s senior management directed the effort to pull-in sales for the purpose of meeting public revenue guidance. Marvell’s senior management placed significant pressure on its sales employees to push customers to agree to accept products earlier than scheduled, and it closely tracked the gap between actual and forecasted revenue, and the use of pull-ins to bridge that gap. Marvell used the pull-ins despite internal concerns that the pull-ins were masking declining market conditions and also obfuscating the company’s deteriorating financial results, thereby misleading investors. Senior management, however, refused to abandon its use of pull-ins, and those who raised concerns were ignored. Marvell’s senior management also failed to inform the company’s Board of Directors or its independent auditor of its pull-in scheme.” Another recent example is provided by SEC AAER No. 4170.

Earnings quality issue	Explanation	Red flag or analysis
Recognizing revenue before transfer of control	- For revenue recognized at a point in time, recognition is when the customer obtains control over the good or service. - Indicators of transfer of control include: (1) the customer accepted the product or has (2) a present obligation to pay, (3) physical possession, (4) legal title, or (5) risks and rewards of ownership. - In some cases, companies have substantial discretion in identifying the point of transfer of control, and they may use the discretion to manipulate revenue recognition. In extreme cases, they may recognize revenue in situations where there was clearly no transfer of control to the customer. - For example, a company may recognize revenue upon delivery to third parties,¹⁸⁵ upon shipment but before customer delivery, or before receiving confirmation of customer acceptance (although only one of several indicators, in some cases customer acceptance is the critical criterion).¹⁸⁶ - Additional examples include shipping goods (and recognizing revenue) earlier than agreed upon,¹⁸⁷ or recognizing revenue when there are disputes, excessive return privileges, performance guarantees, or recourse obligations that effectively eliminate the customer's exposure (i.e., there is no transfer of risk to the customer). - Violates step 5 (satisfying performance obligations). Often this occur in transactions that also involves violation of step 1 (binding contract).¹⁸⁸	- A high or increasing ratio of product returns to revenue - A high or increasing ratio of bad debt expense or write-offs to revenue - Existence and magnitude of contract assets (contingent/unbilled revenue) - Disclosures regarding disputed revenues

¹⁸⁵ Example of **revenue recognition upon delivery to third parties** (SEC AAER No. 4196):” Beginning in the first quarter of 2017, Wiser participated in and approved a practice where Grass Valley shipped goods to warehouses that it paid for and controlled and improperly recognized revenue before the end of quarters when customers were not ready or unwilling to take possession of the goods they had ordered by quarter end.”

¹⁸⁶ Example of **recognizing revenue before transfer of control** (SEC AAER No. 4163): Super Micro Computer, Inc., a producer of computer servers headquartered in California, engaged in improper accounting—prematurely recognizing revenue and understating expenses from at least fiscal year (“FY”) 2015 through FY 2017. One of the violations was **revenue recognition upon delivery to third parties**. In certain instances, Super Micro employees sent goods to warehouses or other storage facilities controlled by third parties at quarter-end and paid for the storage fees until the goods were delivered to its customer. In other instances, Super Micro asked its freight forwarders to hold the goods until the date that the customer was prepared to accept the goods, rather than ship and deliver them on the date agreed to with the customer. Another violation was **revenue recognition upon shipment but before customer delivery**. From at least 2014 through 2017, purchase orders submitted by a large customer specified “FOB Destination” as the shipping terms. Sales with FOB Destination shipping terms are not realized or earned until delivery has occurred at the customer-designated location and title to the goods has passed to the customer. Super Micro, however, improperly recorded revenue upon shipment to the customer. A third violation was **revenue recognition before customer acceptance**. Super Micro prematurely recognized revenue in connection with sales transactions that included customer acceptance clauses. Where an agreement contains a substantive customer acceptance clause, permitting customers to return the goods if they did not meet the customer's specifications, revenue generally should not be recognized until Super Micro received confirmation of customer acceptance, the customer acceptance provisions lapsed, or, alternatively, Super Micro received payment from the customer. Super Micro's internal accounting control for tracking customers with acceptance clauses, and for determining whether those clauses had been satisfied, was lacking. As a result, Super Micro recognized revenue in connection with numerous sales before it received customer acceptance. Although these manipulations occurred under the old standard, they would have been considered violation also under the new standard.

¹⁸⁷ Example of **shipping goods earlier than agreed upon** (SEC AAER No. 4163): Super Micro Computer, Inc., shipped goods on multiple occasions prior to the delivery dates agreed with, or specified by, its customers in order to record and recognize the revenue prior to quarter-end.

Earnings quality issue	Explanation	Red flag or analysis
Using side agreements to recognize revenue prematurely or from transactions that lack economic substance	- Side agreements often imply significant remaining performance, create significant uncertainties, or may even negate a revenue transaction. Often the accounting department is not aware of such side agreements.¹⁸⁹ - May violate step 1 (enforceable rights and obligations) or step 5 (satisfying performance obligations)	This type of manipulation is difficult to identify from the outside. However, because it is often used to effectively pull in sales from subsequent periods, the same red flags discussed with respect to sales pull-in activities are relevant here too.

¹⁸⁸ One of the first cases that the SEC issued an accounting and auditing enforcement release concerning the new revenue recognition standard (ASC 606) involves Pareteum, a telecommunications “Software as a Service” or “SaaS” company that offers various products such as SIM cards, WiFi service, and a Cloud platform (AAER 4247). According to the release “Pareteum recognized revenue without confirming whether the criteria of ASC 606 had been fully satisfied. Instead, starting in or around January 2018, Pareteum began recognizing the entire amount of a customer’s initial purchase order with Pareteum, even though these purchase orders were non-binding and the product had not yet been shipped. ... In practice, Pareteum’s revenue recognition procedure for mobile bundled services customers during the relevant time period was as follows: (1) a new customer signed a contract and master services agreement, (2) a purchase order was drafted by Pareteum, providing the number of SIM cards the customer intended to purchase, as well as an estimated cost for the average monthly plan they were expecting to sell to downstream consumers; (3) the customer signed this purchase order, which in most cases indicated that the full cost listed was just an estimated forecasted amount that would not be due until the customer sold the product to downstream consumers; and (4) Pareteum recognized revenue for the entire amount listed in the purchase order. ... Pareteum should have ensured that the SIM cards had been shipped, and that the platform had been created and was operational. Further, under the terms of most of the purchase orders, the SIM cards also had to have been sold to and activated by an end-user before the customer was obligated to pay Pareteum. In multiple instances, Pareteum failed to meet all of these requirements prior to recognizing revenue.”

¹⁸⁹ Examples of *manipulation using side agreements*: Example 1 (SEC AAER No. 4091): “Matta [CEO of Comscore, a data services company] agreed to deliver data to a counterparty by the end of a quarter and then entered into undisclosed side agreements to deliver additional data after the quarter closed. Placing future data delivery obligations into a side agreement allowed Comscore to take the position that all data at issue had been delivered before the current quarter closed, thereby permitting Comscore to recognize all of the revenue associated with the transaction in that quarter rather than defer some or all of the revenue to subsequent quarters.” Example 2 (SEC AAER No. 1215): Informix recognized revenue from software license purchase commitments by resellers prior to the completion of the earnings process. Sales personnel and managers used written and oral side agreements which: (1) allowed resellers to return unsold licenses and receive a refund or credit; (2) committed Informix to use its own sales force to find customers for resellers; (3) assigned future end-user orders to resellers; (4) extended payment dates beyond twelve months; (5) committed Informix to purchase computer hardware or services from customers under terms that effectively refunded the license fees paid by the customer; (6) diverted Informix future service revenues to customers as a means of refunding their license fees; and (7) paid fictitious consulting or other fees to customers to be repaid to Informix as license fees. Example 3 (SEC AAER No. 4169): “PSI’s revenue was recorded through PSI’s enterprise resource planning system, EPICOR. The accounting department relied upon “word of mouth” from PSI’s sales department to ensure any non-standard terms granted to customers for orders matched what was input into EPICOR. PSI’s sales department personnel, including Needham, were told by accounting department personnel on multiple occasions to inform accounting of any side arrangements or atypical terms entered into with PSI customers that were different from PSI’s standard terms ... In late May 2015, in order to meet its quarterly sales target, Needham approached Customer C to take \$10 million of product by the end of June 2015. At the time, Customer C did not have the demand from its customers to justify such a purchase given the decrease in the price of oil. 53. Nonetheless, after receiving pressure from Needham to take the \$10 million worth of engines, Customer C agreed to do so, but only after negotiating a side letter agreement with PSI (‘June 2015 Letter Agreement’). That side agreement contained numerous protections should Customer C not have sufficient demand for the engines from its own customers. The June 2015 Letter Agreement provided, among other things, that: (i) Customer C would not have to pay for each engine until 30 days after the engine was placed in a Customer C generator (which Customer C did not do until it had a customer that desired to lease the generator); and (ii) Customer C could exchange engines at a later date for others that were more in demand. This engine exchange right did not contain a time limitation. Customer C referenced the June 2015 Letter Agreement on its purchase order for the engines, specifically stating the order was ‘[p]ursuant to letter dated June 8, 2015 from PSI and signed by Jim Needham.’ (The purchase order is hereinafter referred to as the “June 2015 PO.”) The engines purchased pursuant to the June 2015 PO were shipped to Customer C by the end of June 2015.”

Earnings quality issue	Explanation	Red flag or analysis
Recognizing fraudulent revenue and inflating inventory by engaging in round tripping transactions	- Round-tripping transactions are effectuated through “circles” of entities, each of which includes the firm, a third-party “customer,” and a related “vendor.” - Typically, the customer and the vendor in each circle share a common owner. - The firm “sells” the product to the customer, the customer “sells” the product to the vendor, and the vendor sells the product back to the firm. - Allows firms to recognize fictitious revenues and inflate reported assets.¹⁹⁰ - Violates step 1 (commercial substance) and step 5 (satisfying performance obligations)	- An increase in DIH, resulting from the inflation of inventory at the end of the cycle - Significant related party transactions (the “customer” or the “vendor” may be related parties)
Fictitious sales	Recognizing revenue from a transaction that did not occur or that is expected to be reversed.¹⁹¹	Fictitious sales are often described as “bill and hold” sales as the company often continues to hold the inventory after the recording of the sale. Thus, the disclosure of “bill and hold sales” or their significance can be a red flag to recognition of fictitious revenues.¹⁹²

¹⁹⁰ Example of **round-tripping transactions** (SEC AAER No. 1938): From 1998 through early 2002, Suprema engaged in circular round-tripping transactions that generated fictitious sales revenues representing approximately 60% of its reported revenue of approximately \$1.13 billion during this period. Each round-tripping “circle” involved three parties: Suprema, a third-party “customer,” and a related “vendor.” In most instances, the customer and vendor shared a common owner. Fictitious paperwork was created purporting to represent sales of cheese products from Suprema to the customer. The customer then “sold” these or related products to the vendor, who in turn “sold” other products (often purporting to be the raw materials for cheese manufacturing) back to Suprema. In most cases, no goods were actually sold or purchased, or otherwise changed hands.

¹⁹¹ Examples of recognizing revenue from **fictitious sales**: **Example 1** (SEC AAER No. 2822): During the period 2004-2006, employees of GlobeTel’s telecommunications created \$119 million in fake invoices that appeared to reflect transactions between telecom companies and GlobeTel. These invoices falsely created the appearance that GlobeTel was buying and selling telecom “minutes” at no profit. In reality, GlobeTel never bought or sold anything under what was referred to as the “off-net” revenue program. GlobeTel did not pay the invoices supposedly sent by the suppliers and did not receive payment from the customers to whom invoices were supposedly sent. GlobeTel employees concealed the millions of dollars in unpaid bills by setting off the receivables attributable to the “off-net” revenue program against the liabilities attributable to that program. **Example 2** (SEC AAER No. 4196): “in late 2017, Wiser arranged for Grass Valley to make purported sales totaling approximately \$4.5 million to a former employee who would act as a distributor to lease or resell the goods. The former employee, however, had no experience as a distributor, no warehouse, no customers, and was unable to pay for the goods he purchased. Nevertheless, Belden, with Wiser’s authorization, improperly recorded the revenue in connection with these sales. The former employee never re-sold or leased any goods, and the products were returned to Belden after Belden decided to unwind the transactions.”

¹⁹² Example of **describing fictitious sales as “bill and hold” sales** (SEC AAER No. 4180): “Manitex improperly recognized revenue on and misled its auditor about approximately \$12 million in purported “bill and hold” sales of cranes to S.V.W. Crane Equipment Company (“SVW”). In March 2016, Manitex approached SVW to enter into an agreement to purchase Manitex cranes and rent them to third parties. SVW had no operations, revenue, or significant assets, and did not have the financial ability to obtain financing or otherwise pay for or store the cranes purchased from Manitex. At the COO’s direction, the GM took charge of the SVW relationship, secured the financing for SVW’s crane purchases, and, on behalf of Manitex, guaranteed the financing for the cranes. The GM, in consultation with the COO, then created a purported financing subsidiary for SVW called Rental Consulting Services Company (“RCSC”), to conceal the fact that Manitex was making the financing payments. In order to make the payments, the GM created a series of fraudulent invoices on RCSC letterhead for fictitious services that RCSC purportedly provided to Manitex.”

Earnings quality issue	Explanation	Red flag or analysis
Revenue from related party transactions	- When the customer is not independent of the firm or its shareholders—for example, when both the customer and the firm are controlled by the same entity or individual, when either the customer or the firm holds non-controlling interest in the other, or when there is any management overlap between the firm and the customer—the transaction price and other terms may not reflect fair value. - Firms may use related-party transactions to inflate or even create revenue. Abuses related to related-party transactions include manipulations of the terms and/or failure to disclose the nature of the transactions.¹⁹³	Significant related party transactions or transaction volume
Manipulating estimates of variable consideration	- Bonus (+) or penalty (-) tied to performance, returns (-), discounts for prompt payment (-), rebates (-), refunds (-), incentives (-), allowances for damaged or unsatisfactory merchandise (-), other credits (-) - Estimates of these items are generally included in the “transaction price” (step 3 in the revenue recognition standard), which is allocated to the performance obligations. - Firms may manage revenue by exploiting the discretion involved in estimating these items.¹⁹⁴	- Revenue-related disclosure indicating significant - Variable consideration - Adjustments to variable consideration - Contract assets or contract liabilities - Revenue-related disclosure indicates significant revenue from prior period adjustments (e.g., revenue includes an increase in estimated variable consideration for performance obligations satisfied or partially satisfied in prior periods).

¹⁹³ Example of a problematic **related party transaction** (SEC AAER No. 3322): Escala, a company operating in the collectibles market, falsely represented that it sold several large stamp archives at prices determined by reference to independent stamp catalogues and appraisals, when in fact Escala’s CEO—who controlled the company that bought the stamp collections—set the catalogue prices and influenced and edited the appraisals. In addition, Escala did not disclose the related-party status of the company that bought the collection.

¹⁹⁴ Examples of **manipulating variable consideration**: Example 1 (SEC AAER No. 2016): In its fiscal year ending in September 2000, Lucent, a provider of communication networks, recognized \$125 million revenue from a sale of software pool to Winstar. However, in a set of side agreements in connection with this transaction, Lucent agreed to a \$35 million credit to be applied to Winstar’s future purchases, a \$45 million credit to cover the cost of a network integration laboratory for Winstar, and reduced pricing for Winstar on purchases of equipment for building and hub sites. To ensure that Lucent’s accountants would not deduct the value of Lucent’s obligations documented in the side agreements from the \$125 million revenue, the letters documenting the side agreements were post-dated to October 2000. Example 2 (SEC AAER No. 2005): Warnaco—an apparel manufacturer—overstated revenue and accounts receivable during the period 1998-2000 by not accruing sufficient reserves for customer returns and discounts. Example 3 (SEC AAER No. 3712): from 2010 to 2012, the CEO of OCZ Technology Group concealed large product returns from OCZ’s finance department and OCZ’s auditor so that those returns would not be recorded in OCZ’s books and records.

Earnings quality issue	Explanation	Red flag or analysis
Manipulating the identification of or price allocation to performance obligations	- In some cases, companies have significant discretion in identifying performance obligations and may overstate revenue by arguing that performance obligations are distinct when they are in fact interrelated (e.g., a contract that covers software and cloud service, where the software requires the cloud service to function) or vice versa (this would likely result in understatement of revenue but in many cases suggest larger recurring revenue, see below). - To increase reported revenue, firms may overstate amounts associated with immediately recognized elements (e.g., dealer profit) and understate gradually recognized revenues (e.g., service, warranty, financing).¹⁹⁵ - In some cases, incentives to manipulate the price allocation may relate to the characterization of revenue rather than to the timing of recognition. For example, when some elements are less recurring than others (e.g., installation, implementation and staff training versus subscription and service), companies may overstate the value of the recurring elements and understate the value of the other items. (The cost of this manipulation is that it would often result in deferral of revenue recognition.) - This may violate step 2 (identifying performance obligations) or step 4 (allocating the transaction price) under the revenue recognition standard.	- An increase in the proportion of revenue from performance obligations that are recognized early (e.g., product sales versus service or warranty) - Limited disclosure regarding when the entity typically satisfies its performance obligations and the transaction price that is allocated to the remaining performance obligations in a contract - A significant increase in the DSO or a decrease in deferred revenue intensity. - Revenue mix (e.g., installation versus service) that is significantly different from that of peers. - Analysts, investors, or the company itself emphasizing “recurring” revenue.

¹⁹⁵ Example of **manipulating price allocation** (SEC AAER No. 1542): The revenue stream from Xerox’s customer leases typically had three components: the value of the equipment (“box”); revenue that Xerox received for servicing the equipment over the life of the lease; and financing revenue that Xerox received on loans to its lessees. Under GAAP, Xerox was required to book revenue from the “box” at the beginning of the lease but was required to book revenue from servicing and financing over the course of the entire lease. In 1997, Xerox started to use new accounting methodologies which shifted lease revenue from servicing and financing to the “box,” so that a greater portion of that revenue could be recognized immediately. These changes in accounting methods and estimates, which were not disclosed by Xerox, increased equipment revenues by \$2.8 billion and pre-tax earnings by \$660 million from 1997 to 2000.

Earnings quality issue	Explanation	Red flag or analysis
Manipulating revenue from “bill and hold” sales	• Bill-and-hold arrangements arise when a customer is billed for goods that are ready for delivery, but they are not shipped to the customer until a later date. • Revenue from a bill and hold transaction can be recognized prior to delivery of the goods if certain criteria are met, including: – A bill-and-hold arrangement should have substance (e.g., the customer requests the bill-and-hold arrangement because it lacks the physical space to store the goods, or if goods previously ordered are not yet needed due to the customer’s production schedule) – The goods must be identified as belonging to the customer, they cannot be used to satisfy orders for other customers, and they must be ready for delivery upon the customer’s request. • Revenue from bill-and-hold transactions is particularly easy to manipulate.¹⁹⁶ • This may violate step 5 (transfer of control) under the revenue recognition standard.	• Significant revenues from bill-and-hold sales • An increase in the ratio of bill and hold sales to revenue • If there is indication of bill and hold sales, an increase in DSO. • Limited disclosure regarding bill-and-hold sales when there is indication that such transactions occurred.
Shipping incomplete products and recognizing revenue	• This violates step 5 (satisfying performance obligations).¹⁹⁷	
Recognizing revenue when the probability of collection is not established	• Revenue from credit transactions can be recognized only if collection is expected to be probable when due. Credit transactions, especially with newly established or undercapitalized customers, require an assessment of the customer’s creditworthiness to satisfy this condition.¹⁹⁸ • This violates step 1 (enforceable rights and obligations)	• High allowance ratio, problem receivables ratio, net write-off intensity, or bad debt intensity.

¹⁹⁶ Example of manipulating revenue from **bill and hold sales** (SEC AAER No. 2740): Starting in November 2000, Nortel Networks Corp. systematically approached targeted customers and urged them to execute bill and hold transactions. Customers that previously had placed orders or that were expected to place orders with delivery in 2001 were provided incentives to execute bill and hold sales in 2000. Those incentives included price discounts, interest deferments and extended billing terms. The vast majority of transactions entered into had no substantial business purpose for the buyer. In an effort to create the false appearance that the bill and hold had been customer-initiated, Nortel typically drafted the order letter and submitted it to the customer to be printed on customer letterhead. In all, Nortel accelerated more than \$1 billion in revenues into 2000 through improper bill and hold transactions.

¹⁹⁷ Example of **shipping incomplete products and recognizing revenue** (SEC AAER No. 4163): Super Micro Computer, Inc., improperly recognized revenue for products that it sold where employees knew the goods were incomplete or mis-assembled at the time of shipment. The goods were shipped to customers at the end of quarters so that Super Micro would recognize the revenue before quarter-end. Although these manipulations occurred under the old standard, they would have been considered violation also under the new standard.

¹⁹⁸ Example of **revenue recognition when the probability of collection is not established** (SEC AAER No. 4163): Super Micro Computer, Inc., had a distributor customer to which it sold hundreds of millions of dollars in products from FY 2015 to FY 2017. The distributor, however, was consistently unable to pay within its payment terms—its payables were often multiple months past due. Super Micro received information on multiple occasions that the distributor’s ability to pay was tied to its receipt of funds from its own customers (i.e., end-customers). Considering these facts, under GAAP, Super Micro was required to recognize revenue when it received payments from its distributor customer. Super Micro, however, prematurely recognized more than \$150 million in total revenue at the time of shipment from FY 2015 through FY 2017. Although this manipulation occurred under the old standard, it would have been considered a violation also under the new standard.

Earnings quality issue	Explanation	Red flag or analysis
Recognizing revenue when there is uncertainty regarding the terms of the contract	This violates step 1 (enforceable rights and obligations)	
Manipulating sales cut-off	- This is done primarily in (unaudited) quarterly reports and generally involves backdating invoices.¹⁹⁹ - This may violate step 1 (enforceable rights and obligations) or step 5 (satisfying performance obligations) under the revenue recognition standard	An increase in <i>DSO</i>
Reporting revenue gross despite the seller acting as an agent rather than a principal	- When valuing stocks, especially stocks of firms in early growth stage, investors tend to focus on revenue. This has induced some firms to overstate revenue in ways that do not necessarily increase earnings. One such method is to include in revenue product sales derived from acting as a broker or an agent on behalf of other firms (as opposed to a principal).²⁰⁰ - If the company serves as an agent, revenue should be reported on a net basis—that is, the amount billed to the customer less the amount paid to the supplier.	An increase in <i>revenue margin</i> (the ratio of revenue to gross bookings) concurrent with a decrease in <i>gross margin</i>.
Overstated revenue from real or fictitious barter transactions	- Some firms, particularly internet, media, and telecom, report revenue from two-way (“barter”) transactions. - In a barter transaction, each firm commits to purchase some assets or services from the other (e.g., ad space on web pages) and recognizes both revenue and expense when the transaction occurs. - While reported income is generally not affected, the increase in reported revenue may benefit firms that are valued by investors using revenue multiples (e.g., firms/industries in early growth stages). Moreover, in some cases (e.g., telecom capacity swaps), firms may capitalize the expense side of the transaction and report it as part of capital expenditures, hence inflating earnings in addition to revenue. - The primary concern with barter transactions is that they may not represent the same economic performance as true sales, or that the value exchanged is overstated.²⁰¹	- A reduction in <i>gross margin</i> or in <i>operating profit margin</i> (in a typical barter transaction, revenue and cost are increased by the same amount, resulting in lower profit margin) - The description of revenue transactions or other disclosure indicates that the company engaged in barter or other non-cash transactions.

¹⁹⁹ Example of *manipulating sales cut-off* (SEC AAER No. 1786): From at least 1989 through May 2001, Minuteman International Inc., a manufacturer of commercial floor care products, intentionally recognized quarterly revenue from sales occurring in a new quarter in the prior quarter’s financial statements. The Company left its sales registers open for several days after a quarter ended and improperly recorded post-period sales in that quarter. For these post-period sales, the sales invoices were falsely dated with the last date of the prior quarter. The date of shipment and invoice processing, however, was after quarter end. The practice was not followed at year-end.

²⁰⁰ A nice, high profile, example of the gross versus net revenue reporting issue is Groupon’s amended IPO filing, where the restatement of revenue cut Groupon revenue in half.

²⁰¹ Example of *overstating barter revenue* (SEC AAER No. 4091): “In its NMTs [non-monetary transactions], Comscore and a counterparty would negotiate and agree to exchange sets of data without any cash consideration. In theory, each party was acquiring data it could use to build or enhance its products and services without having to pay any cash. As described below, even though no cash is changing hands, ... [GAAP] permit revenue recognition for NMTs as long as, among other things, the fair value of the assets subject to the exchange is determinable within reasonable limits and the transaction is expected to have a significant impact on Comscore’s future cash flows, also known as having

Earnings quality issue	Explanation	Red flag or analysis
Including gains or rebates from suppliers in reported revenue	- Investors and other market participants pay closer attention to recurring revenue than to gains or rebates. This may induce firms to classify gains or rebates from suppliers as revenue. An extreme version of this manipulation is to include the <i>gross</i> amount in revenue.²⁰² - Under GAAP, sales of assets other than inventory result in the recording of a net gain or loss—the difference between the sale price and the book value. Moreover, gains should not be classified as revenue. They should be reported below operating income, either separately (if material) or combined with other gains and losses in “other income (expense).” - This violates step 1 (contract with a customer)	- The description of revenue transactions suggests that assets that provide operating capacity (i.e., PP&E or other long-lived assets) are being sold, with the proceeds included in revenue rather than being reported net of the assets’ book value in “other income” - A significant reduction in gross fixed assets with little or no corresponding gains or losses in the income statement - An increase in the DIH (reclassification of fixed assets as inventory) - A significant change in revenue mix
Reporting contra revenue as expense	Another way of overstating revenue is to report contra revenue accounts as expenses, inflating revenue and gross margin (but not earnings).²⁰³	

“commercial substance.” ... The NMTs were recorded in Comscore’s books and records as if Comscore had negotiated and agreed to an exchange of assets of equivalent value. The actual substance of the NMTs, however, was significantly different. Comscore’s NMTs often involved data exchanges where the contracts provided for Comscore to deliver substantially more data – including historical data – than counterparties wanted or intended to use. None of the counterparties recognized revenue on the NMTs, and were generally indifferent to Matta’s including substantial amounts of additional data. Comscore and Matta [the CEO]– facing quarter-end shortfalls to analysts’ revenue targets – used the NMTs as an opportunity to increase reported revenues, primarily by including such unwanted Comscore data in the contract or making unsupported, false, or misleading statements in an effort to support the fair values attributed to the transactions.”

²⁰² Example of ***inclusion of gains in revenue*** (SEC AAER No. 2127): When Qwest management realized that it could not meet the projected growth in revenue through increases in recurring communications service revenue, it sold portions of the domestic fiber-optic network originally held for its own use by selling indefeasible rights of use (“IRUs”) – irrevocable rights to use specific fiber strands or specific amounts of fiber capacity for a specified time period. The IRUs Qwest sold were designated as PP&E on its balance sheet. Contrary to GAAP, Qwest reported the gross amounts as revenue on its income statement.

²⁰³ Example of ***reporting contra revenue as expense*** (SEC AAER No. 3712): From 2010 to 2012, the CEO of OCZ Technology Group mischaracterized sales discounts as marketing expenses to inflate OCZ’s revenues and gross margins.

Earnings quality issue	Explanation	Red flag or analysis
Manipulating revenue recognized over time	- Revenue recognition from construction, many service contracts (under ASC 606), and some other transactions is based on estimates of costs and progress. - These estimates often involve substantial judgement. For example, the following quote is from the discussion of critical accounting estimates in a recent MD&A of a retail firm: “For technical support membership contracts, we typically recognize revenue over time on a usage basis, an input method of measuring progress over the related contract term. This method involves the use of expected usage patterns, derived from historic information. ... There is judgment in ... estimating current and future usage patterns. When insufficient history of usage is available, we generally recognize revenue ratably over the life of the contract.” - Firms may manipulate these estimates to overstate earnings, or they may make estimation errors.²⁰⁴ - This violates step 5 (satisfying performance obligations)	- Change in revenue mix toward revenue recognized over time, especially if revenue is recognized using an input method rather than straight-line over time. - An abnormal increase in contract assets (contingent/unbilled revenue) - An abnormal increase in estimated earnings added to contract assets (e.g., construction in progress)
Recognizing revenue at a point in time instead of over time	- In some transactions—especially rendering of services—revenue should be recognized over time. Some companies may recognize revenue from such transaction at the time of sale.²⁰⁵ - This violates step 5 (satisfying performance obligations)	Revenue-related disclosures, particularly related to the identification and recognition of performance obligations
Manipulating unrealized gains and losses included in mark-to-market revenues	- Some assets and liabilities, particularly financial instruments, are measured at fair value with unrealized gains and losses recognized in income. - For many instruments, measuring fair value involves significant assumptions and estimates, which may be exploited to manipulate reported fair values and holding (unrealized) gains and losses.²⁰⁶ - While gains and losses are generally excluded from revenue, those related to trading operations are reported as part of revenue. - This issue is relevant primarily for large financial institutions with trading assets and liabilities. It is outside the scope of the revenue recognition standard (ASC 606)	- Large positions in illiquid instruments that are marked-to-market - A large or increasing magnitude of mark-to-market revenue - Mark-to-market revenue is based primarily on level 3 fair value estimates - Mark-to-market revenue relates primarily to risky, illiquid instruments that are difficult to value - The implied rate of return on the marked-to-market assets is too high considering the economic environment and the composition of the assets.

²⁰⁴ Example of **overstating revenue recognized over time** (SEC AAER No. 3946): “The restated earnings, which resulted in charges of \$156 million, primarily arose from failures in KBR’s Canada business (‘KBR Canada’) to make accurate and reliable estimates of the costs to complete seven pipe fabrication and modular assembly contracts in Canada. KBR Canada experienced rapid growth in 2012 and 2013, and it did not have sufficient resources or sufficiently trained project managers, project controls personnel, and accounting and executive management professionals to perform cost estimates and project oversight reviews. KBR’s internal accounting controls were not properly designed to identify or prevent the errors in the estimates of the costs to complete the company used to recognize revenue on these contracts.”

²⁰⁵ Example of **recognizing revenue at a point in time instead of over time** (SEC AAER No. 4163): Super Micro Computer, Inc., prematurely recognized revenue on certain extended warranties it sold to customers by recognizing the revenue at the time of sale, rather than ratably over the duration of the warranty term. Although this manipulation occurred under the old standard, it would have been considered a violation also under the new standard.

²⁰⁶ Example of manipulation of **marked-to-market revenue** (SEC AAER No. 2901): In 2007, Bank of Montreal (BMO) restated its financial results by reducing net income by approximately 237 million Canadian dollars after learning that David Lee, one of its senior commodity traders, had engaged in a long-running scheme to overvalue BMO’s portfolio of natural gas options by deliberately “mismarking” trading positions for which market prices were unavailable. Lee overvalued the positions on BMO’s books by

Earnings quality issue	Explanation	Red flag or analysis
Using an accounting change to manipulate revenue	- Accounting principles should be changed only if the new method results in improved information. However, in some cases companies change accounting policies to manipulate revenue.²⁰⁷ - Accounting changes often result in a “catch-up” effect in the year of change. This effect is transitory in nature and, to the extent that it is not disclosed properly, may result in misleading information.	Disclosure and discussion of accounting changes by the company and the auditor.
Deficient disclosure	The new revenue recognition standard requires substantial disclosure related to revenue. However, the standard allows for significant discretion, and there is considerable variation in practice.²⁰⁸	Limited disclosure, especially compared to peers

regularly recording inflated values that were then purportedly validated by Optionable, a publicly traded commodities brokerage firm. Optionable held itself out to BMO and the public as a provider of independent derivatives valuation services, but that was false, as its management schemed with Lee to have Optionable simply rubber-stamp whatever inflated values Lee recorded. BMO was Optionable’s largest customer, and BMO trades accounted for as much as 60% of Optionable’s commodity brokerage business. Lee’s trading accounted for virtually all of BMO’s business with Optionable. As a result, Optionable’s management was willing to do whatever it took to keep Lee happy.

²⁰⁷ Example of **changing accounting principle** to manipulate revenue (SEC AAER No. 1907): In 1997, Enron entered into a large contract to supply energy on demand at agreed prices to the Tennessee Valley Authority (“TVA”) that resulted in an immediate mark-to-market gain to Enron of approximately \$50 million. In mid-1998, when energy prices in the region in which the TVA was located sharply increased, Enron’s unhedged position in the TVA contract suddenly fell to a loss in the hundreds of millions of dollars. To avoid recognition of the loss, Enron managers removed the TVA contract from Enron’s mark-to-market accounting books and instead applied accrual accounting to the contract.

²⁰⁸ The following quotes are from recent SEC comment letters demonstrate potentially **deficient disclosures**. Example 1: “We note your disclosure under ‘identifying the performance obligations’ that service agreements are one performance obligation. Please help us fully understand the nature of the various products and services transferred in these agreements and explain to us how you determined that the products and services in these agreements should be combined. Refer to ASC 606-10-25-19 through 22.” Example 2: “We note your disclosure that revenue is recognized when obligations under the terms of a contract are satisfied, which generally occurs with the transfer of control of your products. Please explain how and when such transfer of control will occur. Refer to ASC 606-10-25-24 and ASC 606-10-50-12(a). In addition, please tell us the nature of the post-shipment obligations that you may have and how you recognize the revenue in accordance with ASC 606-10-32-29.” Example 3: “We note your disaggregated revenue disclosures by product and by geographic region in Note XX. With respect to the disclosure requirements of ASC 606-10-50-5, please tell us how you considered the guidance in paragraphs ASC 606-10-55-89 through 55-91 for disclosing further disaggregation of revenue for other products similar to the table disclosed on page XX and in your earnings releases furnished on Form 8-K. Please tell us why you believe your current disclosures meet the objective of depicting how the nature, amount, timing and uncertainty of revenue and cash flows are affected by economic factors.”

5.2 Accounts receivable and bad debt

Accounts receivable (A/R) are amounts due from customers for goods or services provided in the normal course of business. A/R are informal credit arrangements which are supported by invoices. Receivables accompanied by formal promissory notes are referred to as notes receivable. A/R are reported at the undiscounted amount expected to be received—that is, the amount owed to the company less allowance for doubtful accounts and possibly other allowances (less common since 2018).²⁰⁹ Notes receivable are reported discounted.

Most firms calculate the *allowance for doubtful accounts* (also called the allowance for uncollectible accounts) by aging receivables; that is, they (1) classify accounts based on their age (e.g., current, 1-30 days past due, 31-60 days past due, 61-90 days past due, 91-120 days past due, and 120+ days past due), (2) multiply each group of receivables by a corresponding percentage, with larger percentages applied to older receivables, and (3) aggregate the estimated expected losses across the age groups. When A/R includes large individual balances, those accounts are often evaluated separately.

Until 2019, the loss percentages were estimated based on past experience, adjusted for the likely impact of differences between current economic conditions and those over the period used to estimate the age-based loss rates. For example, if loss rates were estimated based on experience over the last twelve quarters, and economic conditions at the time of calculating the allowance were worse than they were over the prior three years (e.g., the economy entered recession), the loss rates used to calculate the allowance were adjusted upward. Starting 2020 (ASC 326-20), firms are required to also consider reasonable and supportable forecasts of *future* economic conditions in estimating the allowance. In addition, the new standard requires that the allowance reflect estimated *lifetime* expected losses rather than just incurred losses (under the prior standard companies often did not record allowance for receivables that were either current with respect to their payment terms or not yet due).

A/R are often used in *funding arrangements*, either in collateralized borrowing, factoring (sale), or securitization. Firms have different motivations for engaging in receivables-related funding, including: to satisfy immediate cash needs (receivables are among the most liquid assets); to avoid the cost of processing and collecting receivables; to reduce investment in working capital; to obtain funds when loan covenants preclude new borrowing; to reduce perceived leverage; or to manage the perception of earnings quality (increase operating cash flow, reduce A/R turnover). Additional motivations—which are primarily relevant for financial firms—are to free up regulatory capital or to recognize gains from selling or securitizing receivables, typically loans receivables.

²⁰⁹ Other possible allowances that may be netted against accounts receivable include allowances for damaged goods and sales returns, sales incentives, trade promotions, cash discounts, and other credits. However, under ASC 606 (effective 2018), provisions for sales returns and some other adjustments are now reported as accrued liabilities. In addition, the value of inventory that represents the right to recover products from customers associated with sales returns, which was previously often netted against the return allowance (which in turn was netted against accounts receivable) is now recorded as a separate asset (often included in “other current assets”).

Factored or securitized receivables are removed from the balance sheet (derecognized) if and only if the company (transferor) has surrendered control over the receivables.²¹⁰ If control is not surrendered, the transaction is accounted for as secured borrowing: cash and debt are increased by the amount borrowed; A/R are unchanged; and the company provides footnote disclosure regarding the transaction and the restrictions on A/R. Secured borrowing transactions involving receivables include pledging of receivables, assignment of receivables (i.e., collections are used to pay back the debt), and factoring or securitization transactions where control over the receivables is not surrendered.

If control is surrendered, the transaction is accounted for as a sale: cash is increased; the receivables and any related account (e.g., allowances) are removed from the balance sheet (derecognized); retained or acquired interests, if any, are recognized at fair value; recourse obligations, if any, are recognized at fair value; servicing assets or liabilities, if any, are recognized at fair value; and a gain or loss is recognized (a plug number).

IFRS for receivables are generally similar to U.S. GAAP, especially with respect to held receivables. There are some differences in the criteria for derecognition of receivables, generally making derecognition of receivables less likely under IFRS. Unlike U.S. GAAP, IFRS focuses on risks and rewards of ownership as opposed to control over the receivables.

Key ratios used to evaluate earnings quality related to receivables and credit losses include: the bad debt-related ratios (see [Section 3.2](#)) and days sales outstanding (DSO; [Section 3.1.1](#)).

Table 5.2A describes **earnings quality issues**, red flags and analyses related to receivables and bad debt.

²¹⁰ Control is considered surrendered if all following conditions are met (a) the transferred receivables have been legally isolated from the company and its creditors; (b) the transferee has the right to pledge or exchange the receivables; and (c) the transferor does not maintain effective control over the transferred receivables. The third condition is satisfied if there is no agreement that (1) both entitles and obligates the transferor to repurchase or redeem the receivables before their maturity (e.g., repos), (2) gives the transferor the right to reacquire specific receivables, or (3) gives the transferee the right to sell the receivables back to the transferor at price favorable to the transferee. Note that these conditions may be satisfied even if the transferor retains (acquires) some interests, services the receivables, or provides limited recourse.

Table 5.2A: Earnings quality – receivables and bad debt

Earnings quality issue	Explanation	Red flag or analysis
Manipulated bad debt accruals	- Because measuring the allowance for credit losses and bad debt expense involves substantial discretion, it is relatively easy for firms to “manage” these accounts.²¹¹ - In addition, due to the complexity and uncertainty associated with estimating bad debt, there are often substantial unintentional errors. - While the concern is typically that the allowance is understated, in some cases companies overstate the allowance to enable them to increase reported income in subsequent periods.²¹²	- Low or decreasing values of [bad debt expense / net write-offs] or [allowance / problem receivables] may indicate insufficient bad debt provisioning, since the denominators of these ratios are relatively objective measures of credit losses. - Low or decreasing value of [allowance / gross receivables], especially if DSO has increased. (An increase in DSO implies that receivables are on average becoming older, and old receivables are more likely to be written off)
Transitory earnings	- Even if unmanipulated, the balance sheet approach used to measure the bad debt allowance and expense (aging receivables) implies that any unexpected improvement (deterioration) in credit quality would result in a potentially large positive (negative) bad debt effect on earnings, which is unrelated to current operations. - For example, if at the end of the previous year economic conditions were relatively poor and the company accordingly recognized a large allowance (related to prior year sales), an improvement in credit conditions in the current year would result in lower-than-expected credit losses from prior year sales, with the gain recognized in current earnings (lower bad debt expense than credit losses expected from current period sales).	- A decrease in the [bad debt expense / revenue] ratio or in the [allowance / gross accounts receivable] ratio - Unexpected improvement in economic conditions, especially if it occurs at the beginning of the year
Deteriorating credit quality of customers	While not a violation of GAAP, deterioration of customers’ credit quality implies lower earnings sustainability.	- High or increasing values of [net-write offs / sales] or [problem receivables / total receivables] - High or increasing value of [allowance / gross receivables] or [bad debt expense / sales], especially if it is unlikely that the company is attempting to understate earnings.
Overstated receivables due to time value of money	Accounts receivable are generally reported undiscounted, so their book value overstates the underlying economic asset.	High DSO (receivables are economically significant and the time to collection is relatively long)

²¹¹ Example of **understatement of the bad debt expense** (SEC LR No. 19477): Friedman’s delegated to store level employees wide discretion in granting credit, resulting in an increasing level of bad debt. The Company disregarded its write-off procedures in order to avoid taking write-offs. This enabled the company to understate its bad debt expense and thereby inflate earnings. It also enabled the company to avoid increasing its allowance for doubtful accounts above 10% at fiscal year-end, as it should have, and thereby conceal the rising level of its uncollectible receivables.

²¹² Example of **reversal of previously recognized allowance** (SEC AAER No. 2097): In 2001 Fleming—a supplier of consumer-packaged goods to retailers—released portions of a previously established bad debt allowance to increase reported earnings.

Earnings quality issue	Explanation	Red flag or analysis
Removing receivables by factoring (selling) or securitizing them to hide revenue overstatement and/or increase cash from operations	- Channel-stuffing and other forms of revenue overstatement increase receivables. To hide such revenue manipulation, a firm may reduce reported receivables by factoring or securitizing some receivables.²¹³ - This issue is particularly problematic if the transaction is not a true sale. - These transactions also allow companies to increase reported cash from operations, which (incorrectly) suggests higher earnings quality.	- Large or increasing scale of receivables' sale or securitization - Large impact of sale or securitization transactions on DSO, especially if the effect is to significantly reduce an otherwise large increase in the ratio.
Hiding receivables	Instead of (or in addition to) removing receivables from the balance sheet, firms may simply hide them, either by (1) including some receivables in "other current assets" or in "investments,"²¹⁴ (2) combining them with non-trade receivables or notes receivable, or (3) netting unrelated allowances or liabilities against the receivables (e.g., allowances for non-A/R credit losses or recourse obligations related to sold receivables)	- Significant or increasing "notes receivable," "other current assets," or "other assets" - Significant or unspecified allowances netted against accounts receivable.
Off balance sheet exposure	Removing receivables from the balance sheet while retaining significant risk	- Large or increasing scale of receivables' sale or securitization - Disclosure regarding the outstanding balance of sold receivables and risk retention by the company
Understated losses from factoring, selling or securitizing receivables	- Selling or factoring non-interest-bearing receivables (as are most accounts receivable) typically generates reported losses as the factor (buyer) is discounting for expected losses as well as for the time value of money. - This is achieved by manipulating fair value estimates of retained (acquired) interests, servicing rights/obligations, or recourse obligations, and thus the resulting gain/loss.	- Large or increasing scale of receivables' sale or securitization - Substantial retained interests, servicing rights, or recourse obligations related to the sale or securitization of receivables (for recourse obligations, a significant decrease is a red flag) - Small or decreasing ratio of losses from sale or securitization of receivables to receivables sold or securitized, especially if interest rates are relatively high or increasing

²¹³ Example of **removing receivables by factoring** (SEC AAER No. 1648): To prevent uncollectible receivables from remaining on L&H Korea's books, thereby raising questions about the quality of the company's reported earnings, a series of transactions with four Korean banks were staged to remove the receivables from the books. These transactions were accounted for as factoring on a non-recourse basis. In fact, L&H Korea entered into side agreements with the banks requiring L&H Korea to maintain blocked deposits to cover the amounts of the "factored" receivables, which the banks could apply to satisfy any collection shortfalls. Thus, these transactions were essentially fully secured loans from the banks to L&H Korea, rather than sales of receivables from L&H Korea to the banks.

²¹⁴ Example of **hiding receivables** (SEC AAER No. 4105): "the former CFO of Iconix Brand Group, Inc. ("Iconix"), a company that owns and licenses apparel and entertainment brands, ... kept hidden the growing receivable balance from the licensees' failure to meet royalty payments ... as the receivable balance continued to grow, Iconix entered into transactions with these licensees, including a deal in which Iconix purchased from the owner of Company 3 a 49% interest in a consolidated subsidiary that held Brand 2, ... Iconix paid a higher acquisition price in order to provide Company 3 with \$20 million ... in funds to pay past-due and future royalties."

5.3 Inventory and cost of goods sold (COGS)

For merchandising firms, inventories consist of goods held for sale in the ordinary course of business. For manufacturing firms, inventories include raw materials, incomplete products (work in process inventory), and complete products (finished goods inventory). Inventories are classified as a current asset and are generally reported at the ***lower of cost or net realizable value***.²¹⁵

Cost includes all expenditures incurred to purchase or produce the inventory items and to get them ready for sale. Cost determination involves identifying and measuring these costs, which include purchase price (net of any discounts or other credits), taxes, transportation, handling, and other outlays to bring the products (merchandising firms) or raw materials (manufacturing firms) to their storage location. For manufacturing firms, inventory cost also includes the cost of conversion (direct labor and variable and fixed manufacturing overhead, including depreciation, indirect labor, energy, rent, property taxes, utilities, etc.). Inventory cost should exclude storage costs of finished goods, excessive waste, administrative overheads unrelated to production, selling costs, foreign exchange differences and interest cost. Inventory cost should also exclude above normal fixed production cost per unit due to below normal production level (the excess should be expensed).

Determining inventory cost and the cost of goods sold expense also involves measuring the flow of costs among the inventory accounts and, eventually, to the income statement. These include choices and procedures related to cost allocation (i.e., how to allocate production cost—particularly overhead—to units produced), inventory system (i.e., the method of measuring and recording inventory transactions—perpetual versus periodic),²¹⁶ cost flow assumption (i.e., the approach for assigning costs to units—FIFO, LIFO, weighted average, or specific identification), and inventory count (e.g., physical count versus estimates, timing of count, estimation approaches).

In some cases, companies use ***cost estimates*** instead of actual costs, including *standard cost* (the cost of work in process and finished goods inventory is estimated based on norms) and the *retail method* (the cost of merchandise inventory is estimated by subtracting the average markup from inventory measured at retail prices). These methods are allowed if the results approximate actual cost.

²¹⁵ Inventories whose cost is based on the LIFO or retail inventory methods are written down to market value when market value is less than cost, where market value is defined as current replacement cost limited by net realizable value (ceiling) and net realizable value less a normal profit margin (floor).

²¹⁶ There are two alternative inventory accounting systems. The *perpetual inventory system* keeps a running, continuous record that tracks inventories and cost of goods sold (COGS) on a day-to-day basis. The *periodic inventory system* computes COGS periodically on the basis of physical counts. The perpetual system offers two important managerial advantages: it lowers the probability of being out of stock by providing up-to-date information on inventory on hand, and it aids in controlling inventory losses (e.g., due to breakage, theft, waste, obsolescence, etc.) by providing information that facilitates the measurement of such losses. By ignoring volatility in the level of inventory during the period, the periodic system reduces the likelihood of LIFO liquidation and thus increases the benefits that LIFO accounting offers (see [Section 3.3.3](#)). For these reasons, LIFO firms typically use the periodic system for financial reporting purposes and the perpetual system for managerial purposes.

A write-down of inventory to net realizable value (or to “market value,” in the case of LIFO or the retail method) is recognized as an expense in the period in which it occurs, and it is not reversed for subsequent recoveries in value (reversals occurring in subsequent quarters of the same fiscal year are recognized).

While increases in the value of inventory above cost are generally not recognized, there are a few exceptions. Under some conditions, *harvested crops and animals held for sale* are measured at net realizable value, with changes recognized in profit or loss. The requirements for this accounting treatment are that the harvested crops or animals held for sale (1) have a reliable, readily determinable and realizable market value; (2) have relatively insignificant and predictable costs of disposal; and (3) are available for immediate delivery.

For *tax* purposes, U.S. companies generally use either the FIFO or LIFO methods. If they use the LIFO method, they must also use it for financial reporting purposes. This conformity rule is probably the primary reason for the common use of LIFO in U.S. financial reports. Public firms that use the LIFO assumption are required to provide information in the notes to the financial statements that allows users to convert the financial statements from LIFO basis to FIFO basis (see [Section 3.3.3](#) for further discussion of LIFO-related disclosures).

IFRS is similar to U.S. GAAP, except

- IFRS prohibits the use of LIFO and requires that the same cost formula be applied to all inventories having a similar nature and use to the entity.
- Under some limited circumstances, borrowing costs (interest) can be included in cost of inventories.
- If the net realizable value of an item that has been written down increases subsequently, the write-down is reversed.
- Growing crops and animals being developed for sale (“biological assets”) are reported at fair value less costs to sell, with changes recognized in income. If it is impossible to measure fair value reliably, biological assets are reported at cost. Under U.S. GAAP they are measured on a cost basis.
- Harvested crops and animals held for sale are measured at fair value less costs to sell at the point of harvest. After harvest, the inventories standard generally applies.

Key ratios used to evaluate earnings quality related to inventory and COGS include: days inventory held (DIH; see [Section 3.3.1](#)), LIFO effect on the gross margin ([Section 3.3.3](#)), and the gross margin ([Section 3.3.4](#)).

Table 5.3A describes *earnings quality issues*, red flags and analyses related to inventory and COGS.

Table 5.3A: Earnings quality – inventory and COGS

Earnings quality issue	Explanation	Red flag or analysis
Excess capitalization of costs into inventory	• Inventory cost should include all expenditures directly related to the acquisition or manufacturing of inventory. • Many firms, especially manufacturing ones, have substantial discretion in deciding which costs (or which amounts) to capitalize into inventory and which ones to expense immediately. • For example, some costs (e.g., related to facilities or employees) are used both in the production/acquisition of inventory and in SG&A. Firms may overstate the portions associated with production/acquisition, which are initially capitalized into inventory. • As another example, “normal” amounts of idle facility costs, freight, handling costs, and wasted material (spoilage) are capitalized, while abnormal levels are expensed immediately. Companies have substantial discretion in estimating the “normal” levels of these costs. • Similarly, allocation of fixed production overheads to the costs of conversion should be based on the normal capacity of the production facilities. In periods of low production, fixed overhead should be applied to inventory based on rates for “normal” production levels (i.e., average level of production over several typical years for the company), with the difference expensed immediately. Companies have substantial discretion in estimating “normal” production levels.	• An increase in DIH. Excess capitalization results in larger reported inventory and smaller COGS in the capitalization year. Like most earnings management activities, the earnings effect of excess capitalization reverses in future periods when the inflated inventory units are sold.
Misrepresenting incurred costs as advance payments	• Firms may classify payments for inventory purchased during the year as advance payments for future purchases (thereby excluding those payments from current year COGS).²¹⁷	• Abnormal level of advance payments to suppliers (an asset).
Overproducing to reduce fixed cost per unit and increase reported income	• For manufacturing firms, inventory costs include variable production costs (e.g., raw material, energy, some labor) and allocated fixed production costs (e.g., depreciation, rent, property taxes, some labor). • Because fixed costs are spread over the units produced, fixed cost per unit—and therefore overall cost per unit and COGS—decline with the level of production. Some firms take advantage of this accounting treatment to manage reported earnings by changing production levels. In particular, when firms overproduce, the same fixed costs are spread over a larger number of units, thereby reducing reported COGS and overstating the gross profit and earnings.	• An increase in DIH (see discussion in Section 3.3.1).

²¹⁷ Example of ***misrepresenting incurred costs as advance payments*** (SEC AAER No. 3527): “One of the [Diamond Foods, Inc.]’s significant lines of business involves buying walnuts from its growers and selling the walnuts to retailers. With sharp increases in walnut prices in 2010, Diamond encountered a situation where it needed to pay more to its growers in order to maintain longstanding relationships with them. Yet Diamond could not increase the amounts paid to growers for walnuts, which was its largest commodity cost, without also decreasing the net income that Diamond reports to the investing public. And Neil [the CEO] was facing pressure to meet or exceed the earnings estimates of Wall Street stock analysts. The Commission alleges that while faced with competing demands, Neil orchestrated a scheme to have it both ways. He devised two special payments to please Diamond’s walnut growers and bring the total yearly amounts paid to growers closer to market prices, but improperly excluded portions of those payments from year-end financial statements. Instead of correctly recording the costs on Diamond’s books, Neil instructed his finance team to consider the payments as advances on crops that had not yet been delivered. By disguising the reality that the payments were related to prior crop deliveries, Diamond was able to manipulate walnut costs in its accounting to hit quarterly targets for earnings per share (EPS) and exceed estimates by analysts. For instance, after adjusting the walnut cost in order to meet an EPS target for the second quarter of 2010, Diamond went on to tout its record of ‘Twelve Consecutive Quarters of Outperformance’ in its reported EPS results during investor presentations.”

Earnings quality issue	Explanation	Red flag or analysis
Manipulating estimates or attribution of vendor allowances	- Many retailers and other companies receive funds or discounts from their vendors based on purchase or sales volumes or for product advertisement or placement in their stores. - These funds are generally recognized as a reduction of cost of sales when the associated inventory is sold. However, if the funds are not specifically related to purchase or sales volumes, the funds are recognized ratably over the performance period as the product promotion or placement is completed. In addition, funds that are determined to be a reimbursement of specific, incremental and identifiable costs incurred to sell a vendor's products are recorded as an offset to the related expense when incurred. - There are often significant judgments and uncertainties involved in accounting for vendor allowances. For example, the following quote is from the discussion of critical accounting estimates in a recent MD&A of a retail firm: "Due to the quantity and diverse nature of our vendor agreements, estimates are made to determine the amount of funding to be recognized in earnings or deferred as an offset to inventory. These estimates require a detailed analysis of complex factors, including (1) proper classification of the type of funding received; and (2) the methodology to estimate the portion of purchases-based funding that should be recognized in cost of sales, which considers factors such as inventory turn by product category and actual sell-through of inventory." - A company may overstate earnings by (1) overstating expected volume (thus increasing recognized allowances), (2) understating the portion of the allowance that is attributed to inventory (thus reducing COGS), or (3) prematurely recognizing vendor rebates, discounts, credits or other vendor-related savings.²¹⁸	- An increase in DIH. - An abnormal increase in receivables from vendors.

²¹⁸ Examples of *prematurely recognizing vendor rebates, discounts, credits or other vendor-related savings*. Example 1 (SEC AAER No. 3933): "In November 2012, James learned that a vendor had agreed to issue a \$750,000 credit to Computer 2000 if it ordered a certain volume of products from the vendor with delivery dates in February and March 2013. Because the delivery dates were not until Tech Data's Q1FY2014, GAAP prohibited Computer 2000 from recognizing the \$750,000 credit in Q4FY2013.5 Nevertheless, Computer 2000, with James's knowledge, recorded the entire amount of the credit in Q4FY2013." Example 2 (SEC AAER No. 4248): " 'Prebate Transactions' – KHC [Kraft Heinz] procurement division employees agreed to future year commitments, like contract extensions and future-year volume purchases, in exchange for savings discounts and credits by suppliers ('Prebates'), but mischaracterized the savings in contract documentation, which stated that they were for past or same-year purchases made by KHC ('Rebates'); 'Clawback Transactions' – KHC procurement division employees agreed to take upfront payments subject to repayment through future price increases or volume commitments, but documented the transaction in ways which obscured the repayment obligation; and 'Price Phasing Transactions' – Suppliers agreed to reduce their prices during a certain period in exchange for an offsetting price increase in a future period, but the full nature of the arrangement was not communicated by KHC procurement division employees to KHC controller group employees. In accordance with U.S. GAAP, KHC should have recognized the savings provided in exchange for future commitments over the period of time that KHC performed the commitments. Accordingly, when a prebate was provided in exchange for a contract extension or future-year volume commitment, the savings should have been recognized over the life of the extension, or the future period in which KHC purchased the goods from the supplier. Conversely, rebate savings from past or same-year commitments should have been recognized ratably over the period in which they were earned. Finally, clawback transactions should have been recognized ratably over the clawback period—when it was reasonably estimable that KHC would satisfy its repayment obligation."

Earnings quality issue	Explanation	Red flag or analysis
Excluding production costs from reported gross profit	Analysts pay particular attention to the gross profit, as it is typically more persistent than other income statement line items (see Section 3.3.4). This may induce firms to exclude some production costs from the gross margin and report them separately.²¹⁹	Separate reporting of expenses that should be at least partially included in cost of revenue (e.g., depreciation or amortization).
Gross margin comparability	- Cost of sales and therefore the gross margin may not be comparable across companies or even over time. - Companies have some discretion in deciding which costs and expenses to include in cost of sales versus in SG&A expenses, and this discretion may hinder comparability. Perhaps the best example is shipping and handling costs—some companies include them in cost of sales while others classify them as SG&A. - A related issue is that some companies present cost of sales excluding depreciation and amortization (D&A) and report D&A separately. In such cases it may not be clear whether the reported D&A includes all D&A or just production D&A—if it is the former (which is likely to be the case), the gross margin cannot be calculated.	- Examine and compare disclosures regarding the classification of shipping and handling costs and any other information regarding the items included in cost of sales and SG&A across companies and over time - Company report in the income statement “cost of sales excluding D&A”
Timing inventory transactions to manipulate earnings	- Under LIFO and weighted average, firms may time inventory transactions to manipulate reported income. - Particular concern: liquidation (i.e., expensing) of old LIFO layers to inflate earnings. This is achieved by postponing purchases or production.²²⁰ - Alternatively, firms may increase the LIFO reserve by increasing year-end purchases (for instance, in order to reduce taxable income)	A reduction in the LIFO reserve, especially if there was no decline in economic activity (e.g., sales volume).

²¹⁹ The following quote is from a recent SEC comment letter. “You present cost of goods sold exclusive of depreciation and amortization expense along with the subtotal, gross profit. Please tell us how your presentation complies with the guidance in SAB Topic 11.B, as gross profit appears to represent a figure for income before depreciation.”

²²⁰ Example of **LIFO liquidation** (SEC AAER No. 2666): Nicor, Inc., a major Chicago-area natural gas distributor, deliberately accessed its LIFO layers of gas inventory to inflate income during the period 1999 through 2002. Additionally, Nicor failed to disclose that it had recorded material increases to income resulting from the liquidation of its LIFO inventory, and that the continued liquidation of Nicor’s low-cost inventory was not sustainable.

Earnings quality issue	Explanation	Red flag or analysis
Manipulating inventory write-downs	- Inventory is reported at the lower of cost or net realizable value. There are significant judgments and uncertainties involved in estimating net realizable value. For example, the following quote is from the discussion of critical accounting estimates in a recent MD&A of a retail firm: “Markdown adjustments involve uncertainty because the calculations require management to make assumptions and to apply judgment about the expected recovery rates. The determination of the expected recovery rates includes the evaluation of historical recovery rates as well as factors such as product type and condition, forecasted consumer demand, product lifecycles, the promotional environment, vendor return rights and the expected sales channel of ultimate disposition. We also apply judgment in the assumptions about other components of net realizable value, such as vendor allowances and selling costs.” For manufacturing companies, there is the added uncertainty related to completions costs. - Companies may take advantage of this judgement and estimation to manipulate earnings. They may delay the recognition of inventory write-downs to reduce COGS (U.S. GAAP and IFRS), or they may improperly reverse prior write-downs (IFRS and quarterly reports under U.S. GAAP) to increase earnings.²²¹	- A high level of or an increase in ratio of inventory to cost of goods sold, especially when focusing on finished goods inventory - A decrease in the ratio of the allowance for inventory obsolescence to gross inventory
Misrepresenting inventory items owned	- Firms may include in inventory items that do not belong to the company (e.g., inventory held under consignment agreements, inventory sold under “bill and hold” sales), or they may misrepresent the quantities or types of items owned by the firm.²²² - Because COGS is generally measured by subtracting the change in inventory from the cost of goods acquired or produced during the period, overstating inventory lowers COGS.	- An increase in DIH. - Significant revenue from bill-and-hold sales - Significant revenue from selling products held under consignment agreements

²²¹ Examples of **manipulation of inventory write-down**: Example 1 (SEC AAER No. 2674): During 1999-2003, Saks Inc. improperly deferred permanent markdowns from one period to another at the Saks Fifth Avenue Enterprises division. Permanent markdowns were the means by which Saks recognized that inventory on the sales floor could not sell at the existing retail price. The effect of a permanent markdown on Saks’ financial statements was to reduce the value of all inventory subject to the markdown and increase cost of goods sold, thereby reducing reported net income. Thus, the improper deferral of markdowns resulted in Saks’ overstating its inventory and net income in reporting periods from which permanent markdowns were deferred. Example 2 (SEC AAER No. 3704): “From at least 2010 to November 2012, Stein Mart, Inc. (“Stein Mart”) materially misstated its pre-tax income in certain quarterly periods as a result of improperly valuing inventory that was subject to price discounts, or markdowns. During the relevant period, Stein Mart used three types of markdowns: a temporary markdown, which was a temporary price reduction for certain promotional sales; a permanent markdown, which was a permanent price reduction; and a “Perm POS” markdown, which also was a permanent price reduction but the merchandise subject to Perm POS markdowns was marketed in a manner similar to merchandise subject to temporary markdowns. ... despite the fact that merchandise subject to Perm POS markdowns had a permanent price reduction, Stein Mart improperly valued the inventory associated with Perm POS markdowns by writing down the inventory values at the time the product was sold as opposed to immediately when the markdown was taken. ... As a result [of the Perm POS markdowns error], in the first quarter of 2012, Stein Mart materially overstated its pre-tax income by almost 30%.”

²²² Examples of **inventory misrepresentation**: Example 1 (SEC AAER No. 1938): From 1999 through early 2002, Suprema, a manufacturer and distributor of cheese products, deliberately overvalued its inventory through the purchase of imitation cheeses and other non-cheese products and the subsequent relabeling of these products as high priced premium cheeses. Example 2 (SEC AAER No. 4177): “In January 2014, during a downturn in Manitex’s business, Manitex’s Load King subsidiary in Elk Point, South Dakota reported to Manitex’s headquarters that it had found a shortfall of approximately \$1.4 million while conducting its year-end 2013 physical inventory count. ... Harrison directed Load King’s general manager and controller to override the physical inventory count and add the missing inventory back onto Load King’s books and records so that Load King would not have to write off the missing inventory and recognize a loss in earnings.”

Earnings quality issue	Explanation	Red flag or analysis
Holding gains/losses (FIFO or weighted average)	• An increase in the gross margin due to holding gains on inventory is likely to subsequently reverse. • Holding gains and losses are due to changes in the cost of inventory between the acquisition/production date and the selling date. For FIFO firms, they can be quite significant. • The inclusion of holding gains and losses in the profit margin generally increases its variability and lowers its persistence. For example, an increase in production costs (e.g., energy prices) that leads to higher sale prices increases the margin because, unlike sales revenue, COGS does not immediately reflect the increase in energy costs. In effect, the holding gain on inventory is netted against the economic COGS. • The significance of holding gains and losses, and the volatility that they add to the margin, depend on three factors: (1) the volatility of the costs included in inventory, (2) the length of time that inventory is held (i.e., days inventory held or the inverse of the inventory turnover), and (3) the timing and extent to which changes in costs affect product prices.	• An increase in DIH concurrent with an improvement in gross margin may reflect temporary holding gains on inventory • An increase in the gross margin spread between FIFO and LIFO firms.
Understatement of assets and equity (LIFO)	• An important disadvantage of LIFO is the resulting understatement of assets and equity, which increases reported leverage and generally reduces the quality of balance sheet information. • This distortion is important also because it reduces comparability across FIFO and LIFO companies.	• Large LIFO reserve
Managing inventory-related estimates in interim reports	• Accounting procedures for preparing quarterly reports are not identical to those used for preparing annual statements. Fiscal years are viewed as discrete periods, while quarters are viewed as an integral part of the fiscal year. Accordingly, some items in quarterly reports are adjusted to reflect the effects of actual and expected activities in other (past and future) quarters of the same fiscal year. The following are two examples related to inventory: – Inventory write-downs due to the implementation of lower of cost or net realizable value rule are not recognized if they are expected to be recovered in subsequent quarters of the same fiscal year. – The effect of liquidating old LIFO layers is not recognized if it is expected to reverse in subsequent quarters of the same fiscal year. These standards provide firms with additional discretion in preparing quarterly reports, which may be exploited to manipulate earnings. Specifically, managers may argue that a permanent LIFO liquidation or permanent market value decline is temporary or vice versa. • Another important difference between quarterly and annual reports, which is especially relevant for inventory, is that quarterly data are often based on estimates rather than actual amounts. For example, when preparing quarterly reports, merchandising firms are permitted to estimate cost of goods sold and ending inventory based on the level of sales during the quarter and the “normal” level of gross profit. Again, some managers may exploit this discretion to manipulate reported inventory and income in quarterly reports.	• Significant changes in gross margin or in DIH

5.4 Property, plant and equipment (PP&E) and related expenses

Property, plant, and equipment (PP&E) are tangible long-lived assets that provide the firm with operating capacity, such as land for plant site, buildings, equipment, and furniture. PP&E items are reported on the balance sheet at cost less accumulated depreciation, possibly adjusted downward for impairment.

The **cost** of a fixed asset includes all expenditures directly attributable to bringing the asset to the location and working condition for its intended use (e.g., acquisition cost, site preparation, delivery and handling, installation, assembly, testing, professional fees).

For assets that require relatively long construction periods, such buildings and plants, cost may also include **interest** on borrowings during the construction period that could have been avoided had construction not occurred. Interest is capitalized when the following three criteria are met: construction has begun, expenditures on construction are being made, and interest costs are being incurred. The amount of interest capitalized depends on the amount and timing of expenditures, and the amount and cost of borrowings.²²³ Specifically, borrowing costs capitalized are equal to the weighted-average accumulated expenditures during the year times the borrowing rate.

For an asset that require significant dismantlement, removal, restoration, or other **disposal costs** at the end of their useful life (e.g., oil and gas production facilities, nuclear facilities, mining, chemicals production), cost includes the present value of expected cash outflows at retirement.²²⁴ A corresponding asset retirement liability is recognized on the balance sheet. The liability is increased each period for the periodic undoing of discounting, with the corresponding accretion expense included in operating expenses. The present value of changes in expected cash outflows at retirement is recognized as an increase or decrease in both the asset and liability.

Some assets are acquired in a **non-cash transaction** (by issuing financial instruments or in exchange for other assets) or in a **combined transaction** (business combinations or other combined transactions). When an asset is purchased by issuing debt or equity instruments, such as notes payable or common shares, the asset and the financial instruments are generally recorded either at the asset's estimated fair value or at the financial instruments' fair value, whichever is more readily determinable. Usually, it is the fair value of the financial instruments that is more readily determinable. No gain or loss is recognized. When an asset is purchased in exchange for another asset, the accounting treatment depends on whether the exchange has commercial substance or not. An exchange is deemed to have commercial substance if it is expected to significantly change the future cash flows from the asset. If the exchange has commercial substance, the new asset is recorded at its fair value and the difference between the fair value of the new asset and the net book value of the old asset is recognized as a gain or loss. If the exchange has no commercial substance (uncommon), the new asset is recorded at the book

²²³ The rationale of this standard is that the benefits from the borrowing will be realized in future years, once construction is complete and the asset is used in operations. Therefore, consistent with the matching principle, the borrowing cost is added to the asset's cost during construction, and it is expensed through depreciation when the asset is used in operations.

²²⁴ Restoration costs that relate to environmental remediation are not capitalized.

value of the old asset and no gain or loss is recognized. When an asset is purchased in a combined transaction that involves additional assets and possibly liabilities (other than a business combination), cost determination involves the following steps: (a) The fair values of all acquired assets and liabilities are estimated; (b) The fair value of the liabilities is added to the purchase price; (c) The amount calculated in (b) is allocated to the assets acquired based on their relative fair values (some exceptions apply). Assets acquired in business combinations are generally recorded at their estimated fair value.

The cost of fixed assets also includes post-acquisition expenditures that extend the asset's useful life or increase the quantity or quality of the asset services beyond original expectations. **Additions, replacements, and improvements** are examples of such expenditures. **Repairs and maintenance** should be expensed as incurred because they merely enable the asset to provide the benefits originally expected of it.

The cost of PP&E is allocated to (i.e., **depreciated** over) the periods that benefit from the assets. Assets are depreciated over their expected economic or *useful life*, which is often shorter than the physical life (e.g., computers). Land is not subject to depreciation because it has indefinite useful life, but land improvements are often depreciated. Idle assets are depreciated, but assets held for sale are not (assets held for sale are reported at the lower of the carrying amount or estimated fair value less selling costs). The depreciation period begins when the asset is ready for use; assets under construction are not depreciated. The amount to be depreciated—called *depreciable cost*—is equal to the cost estimated to expire during the economic life, that is, the difference between the asset's cost and the estimated *residual* or *salvage value* (i.e., the estimated proceeds from selling the asset at the end of its economic life.) Separately depreciating major components of an asset is allowed but not required under U.S. GAAP. Estimates of useful life and residual value, and the method of depreciation, are reviewed when events or changes in circumstances indicate that the current estimates or depreciation method no longer are appropriate. Any changes are accounted for prospectively.

Firms can select one or more of several alternative methods of depreciation. The most used depreciation method for financial reporting purposes is *straight-line*. This method allocates the same amount of depreciation to each period of use. Another application of straight-line, which is much less common, is the *unit-of-production/use method*. Under this method, the same amount of depreciation is associated with each unit of output or input (instead of time), and periodic depreciation is calculated as the product of the number of units produced or used during the period and the depreciation per unit. The alternative to straight-line depreciation is *accelerated depreciation*—that is, methods that recognize larger amounts of depreciation in the early years of the asset's useful life compared to the later years (e.g., the double-declining-balance and the sum-of-the-year's-digits methods); as noted above, these methods are uncommon.²²⁵ Depreciation is

²²⁵ Under the *double-declining-balance* (DDB) method, Annual depreciation = beginning net book value $\times \frac{2}{\text{useful life}}$. Because the calculation of annual depreciation under DDB ignores the residual value and would never fully depreciate the asset, this approach incorporates a “switching rule:” switch to straight-line if either (1) using SL from the current year on would result in higher depreciation, or (2) continuing to use DDB would result in net book value lower than the residual value. Under the *sum-of-the-year's-digits* method, Annual depreciation = $\frac{\text{remaining life at the beginning of the year}}{1+2+3+\dots+\text{useful life}} \times \text{depreciable cost}$.

accumulated in a contra asset account called *accumulated depreciation*, which is netted against the reported cost of PP&E on the balance sheet.

For *tax* purposes, companies generally use the *Modified Accelerated Cost Recovery System* (MACRS). This is essentially the double-declining-balance method, except that (1) it assumes zero residual value, (2) it specifies the depreciation period for each asset class, (3) it assumes the asset is purchased and sold at the middle of the fiscal year, and (4) it uses 150% or 100% instead of 200% for assets that have long depreciation periods. In addition, for some asset acquisitions, companies may deduct *bonus depreciation*, immediately expensing part or all of the acquisition cost. Depreciation book-tax differences often explain most of the deferred tax liability (see Section 5.8). Impairment losses are not recognized for tax purposes and therefore reduce the deferred tax liability or create a deferred tax asset.

GAAP requires that fixed assets be reviewed for *impairment* whenever events or changes in circumstances indicate that the carrying amount of the asset (i.e., its net book value) may not be recoverable. In conducting the review, assets should be grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities. To evaluate recoverability, the firm should estimate the future net cash flows expected to result from the use and eventual disposition of the asset or asset group. Impairment losses are recognized if the sum of undiscounted expected cash flows from the asset or asset group is less than book value (first step); if recognized, the loss is measured as the difference between book and fair values (second step). Impairment losses are typically classified as an unusual item in the income statement, although firms occasionally include impairment charges in COGS or SG&A. Reversals of impairments are prohibited. An impairment loss for an asset group is allocated to the long-lived assets in the group based on their relative carrying amounts. Goodwill, corporate assets, and indefinite-lived intangibles are tested for impairment separately and are excluded from this loss allocation.

Unlike other areas, there are significant differences in accounting for fixed assets between *IFRS* and U.S. GAAP. These differences—which are described below—relate primarily to the classification of assets as PP&E, the measurement basis, interest capitalization, depreciation, and impairment.

IFRS distinguishes between—and specify different accounting for—PP&E and *investment property*, where investment property is defined as land and buildings held to earn rentals or for capital appreciation. Under IFRS, investment property may be accounted for on a historical cost or fair value basis. If fair value is applied, revaluations gains and losses are recognized in income, and the carrying amount is not depreciated. If investment property is accounted for under the cost model, its estimated fair value should be disclosed in the notes. In contrast, under U.S. GAAP investment property is reported as part of PP&E and is accounted for accordingly.

IFRS permits two alternative accounting models for PP&E: the cost model (like U.S. GAAP), or the *revaluation model*. Under the revaluation model, the asset is carried at a revalued amount, being its fair value at the date of revaluation less subsequent depreciation and impairment. Revaluations should be carried out regularly, so that the carrying amount of an asset does not differ materially from its fair value. If an item is revalued, the entire class of assets to which that

asset belongs should be revalued. Value increases are credited to other comprehensive income (“revaluation surplus”), unless they represent the reversal of a revaluation decrease of the same asset previously recognized as an expense, in which case it should be recognized as income. Value decreases are expensed to the extent that they exceed any amount previously credited to the revaluation surplus relating to the same asset. Depreciation is calculated based on the revalued amount less residual value over the remaining useful life. Because cumulative revaluations are generally positive (due to inflation), this accounting treatment implies that depreciation expense is generally larger under the revaluations model compared to the cost model. When a revalued asset is disposed of, any revaluation surplus may be transferred directly to retained earnings, or it may be left in equity under the heading “revaluation surplus.” The transfer to retained earnings should not be made through the income statement (that is, no “recycling” through profit or loss). Because cumulative revaluations are generally positive (due to inflation), this accounting treatment implies that net disposal gains recognized in income are smaller under the revaluations model compared to the cost model. The cost of implementing the revaluation model, the increase in depreciation, and the reduction in disposal gains, make the revaluation model less popular than the cost model.

With respect to *interest capitalization*, unlike U.S. GAAP, under IFRS borrowing costs eligible for capitalization include exchange rate differences from foreign currency borrowings. In addition, under IFRS actual borrowing costs to fund the asset construction are capitalized irrespective of incurred costs, but they are offset by investment income earned on those borrowings.

Under IFRS, *production animals* (e.g., dairy cattle, sheep and breeding stock) are measured at fair value less costs to sell unless it is not possible to measure fair value reliably, in which case they are measured at cost. Gains and losses from changes in fair value less costs to sell are recognized in profit or loss. In contrast, under U.S. GAAP production animals are generally accounted for as PP&E (cost, depreciation, impairment).

There are several differences related to *depreciation*. First, significant components of an item of PP&E for which different depreciation methods or rates are appropriate (for example, components of an airplane: engines, landing gear, software, cabin fittings, etc.) are depreciated separately. U.S. GAAP allows for—but do not require—component depreciation, and in practice it is rarely used. In addition, under IFRS, estimates of useful life and residual value are reviewed each balance sheet date, while U.S. GAAP require such reevaluation only when there are indicators that the estimates or method of depreciation are no longer appropriate.

Consistent with the use of component depreciation, under IFRS the costs of a major *overhaul* representing a replacement of an identified component are capitalized, and the carrying amount of parts or components that are replaced are derecognized. Under U.S. GAAP, in contrast, costs representing a replacement of an identified component can either be (1) expensed as incurred, (2) accounted for as a separate component asset, or (3) deferred and amortized over the period benefited by the overhaul.

Under IFRS, *accretion expense* on asset retirement obligations can be reported as part of interest expense (i.e., outside of operating income), while U.S. GAAP requires that accretion expense be treated as an operating cost.

The *impairment* test under IFRS is different from its U.S. GAAP counterpart. Under IFRS, an impairment loss is recognized if and to the extent that an asset's carrying amount exceeds its recoverable amount, where the recoverable amount is the greater of fair value less cost to sell and value in use, that is, the present value of future cash flows. In contrast, under U.S. GAAP, impairment is recognized only if the carrying amount is greater than the undiscounted sum of future cash flows, and it is measured relative to fair value. Reversals of impairment are recognized under IFRS but are prohibited under U.S. GAAP. Impairments of revalued assets are charged first to the revaluation reserve.

Key ratios used to evaluate earnings quality related to PP&E and associated expenses are discussed in [Section 3.4](#).

Table 5.4A describes *earnings quality issues*, red flags and analyses related to PP&E and associated expenses.

Table 5.4A: Earnings quality – PP&E and associated expenses

Earnings quality issue	Explanation	Red flag or analysis
Manipulating cost estimates of assets acquired in business combinations or in combined transactions	- Measuring the cost of fixed assets often involves significant discretion, which may be exploited by management to manipulate earnings. This is especially true for assets acquired in business combinations or in other transactions in which the acquisition cost is allocated to more than one asset (e.g., acquisition of a building and the land on which it is situated) or more than one component (IFRS).²²⁶ - For example, firms may reduce future depreciation by understating the value of depreciable PP&E (e.g., equipment) and overstating the value of non-depreciable or slowly depreciating assets (e.g., land, goodwill, buildings). - Firms that emphasize non-GAAP earnings metrics that exclude amortization of acquired intangibles may have a particularly strong incentives to understate the cost of depreciable assets. These firms may increase non-GAAP earnings not just by “shifting” the cost of depreciable assets to goodwill (which is subject to a periodic impairment test) but also by shifting the cost to finite-life intangible assets (Ashby et al. 2020).	- Excessive goodwill, indefinite life intangibles, or land - A low or decreasing D&A rate - Firm emphasizes non-GAAP earnings metrics that exclude amortization of acquired intangibles
Manipulating cost estimates of assets acquired in non-cash transactions	- Firms may manipulate cost estimates of assets acquired in exchange for other assets if the exchange has commercial substance and the fair value of the acquired asset is not readily determinable. There may be offsetting incentives here – on the one hand understating the fair value of the acquired asset would lead to lower depreciation, but on the other hand overstating its fair value would facilitate gain recognition (the difference between fair value of the acquired asset and the book value of the assets provided in the exchange). - Firms may manipulate cost estimates of assets acquired in exchange for hard to value financial instruments (e.g., equity instruments issued by a private company) if the fair value of the acquired assets is not readily determinable.	
Manipulating the estimated cost of asset retirement	- In some industries (e.g., oil and gas, mining), firms may defer depreciation by understating expected asset retirement costs. - IFRS firms may also increase reported operating income by overstating the discount rate used to measure asset retirement obligations (under IFRS accretion costs are classified as financing).	- Relatively small (compared to peers) or declining ratio of asset retirement obligations to gross PP&E - Upward adjustments to PP&E and asset retirement obligations (indicating initial understatement) - A relatively high discount rate used to measure asset retirement obligations (IFRS)

²²⁶ IFRS requires component depreciation, that is, significant components of an item of PP&E for which different depreciation methods or rates are appropriate are depreciated separately. To implement component depreciation, companies allocate the asset’s cost to the different components (e.g., the cost of an airplane is allocated to the airframe, engines, systems, etc.), which are then depreciated using different schedules. US GAAP permits but does not require component depreciation.

Earnings quality issue	Explanation	Red flag or analysis
Interest capitalization	- For assets that require relatively long construction periods, such as buildings and plants, asset cost may include interest on borrowings during the construction period that could have been avoided had construction not occurred.²²⁷ - Interest capitalization mixes operating and financing activities. Firms constructing similar assets may report the assets (and therefore subsequent depreciation) at substantially different amounts depending on how the assets are funded. - Moreover, firms may manipulate the amount of interest capitalized.²²⁸ - Another issue with interest capitalization is that interest expense will increase once construction is complete and interest capitalization ceases.	- Because the separation of operating and financing activities is at the core of most valuation models, some analysts attempt to “undo” capitalized interest from the book value of PP&E. - Significant amount of capitalized interest.
Excess capitalization	- Firms may increase current income by designating period costs as directly related to the acquisition of an asset or its preparation for use. For example, managers may classify general training expenditures as part of the cost of a new machine.²²⁹ - Excess capitalization may also occur after the initial acquisition. Firms have substantial discretion in classifying expenditures as improvements, additions, or replacements—which improve the asset or extend its life and are therefore considered capital expenditures—versus repairs, maintenance, or other operating expenditures—which enable the asset to perform according to original expectations and are therefore considered period costs. In many cases the abuse is related to the amount capitalized rather than the decision to capitalize. - In addition to increasing current income, equity, and assets, excess capitalization increases reported cash from operations. Capitalized outlays are classified in the cash flow statement as investing rather than operating cash flow. Unlike the earnings effect, which is subsequently reversed due to the increase in depreciation, operating cash flow and EBITDA are permanently increased by excess capitalization.	- A high or increasing capex intensity - A high or increasing PP&E intensity - A high asset replacement ratio, especially if there isn’t much growth - In some cases, the amount of excess capitalization can be estimated by comparing growth in reported assets to growth in other measures of operating activity such as number of facilities, square footage, # of employees, etc. See Section 2.3.2.

²²⁷ Interest is capitalized if the following three criteria are met: (1) construction has begun, (2) expenditures on construction are being made, and (3) interest costs are being incurred. The amount of interest capitalized depends on the amount and timing of construction expenditures, and the amount and cost of borrowings.

²²⁸ Example of **manipulation of interest capitalization** (SEC AAER No. 1532): During the period 1989-1997, Waste Management reduced period expenses by using an improper method for capitalizing interest on landfill construction costs. GAAP allow interest to be capitalized as part of the cost of acquiring assets that take time to bring to the condition required for use. Once the asset becomes substantially ready for its intended use, GAAP require that interest capitalization cease. A landfill qualifies for interest capitalization because a relatively long period is required to obtain permits, construct the facility, and prepare it to begin receiving waste. However, Waste Management used a method that included interest capitalization related to cells of landfills that were receiving waste.

²²⁹ Example of **excess capitalization** (SEC AAER No. 1650): WorldCom improperly reduced its operating expenses by re-characterizing certain expenses as capital assets. One of WorldCom’s major operating expenses reported on its income statement was its so-called “line costs” – fees paid to third-party telecommunication carriers for the right to access their networks in order to serve customers. Under GAAP, these fees must be reported as an expense, and WorldCom did so through the fourth quarter of 2000. Starting the first quarter of 2001 and through the first quarter of 2002, WorldCom fraudulently reclassified billions of dollars of line cost expenses to a variety of capital asset accounts. WorldCom did not disclose the change in its treatment of line costs.

Earnings quality issue	Explanation	Red flag or analysis
Extending the classification of assets as being under construction to avoid depreciation	- Assets under construction are not subject to depreciation. - Firms may reduce current depreciation by delaying the classification of “construction in progress” as a completed—and therefore depreciable—asset.	A low or decreasing depreciation rate
Classifying assets as held for sale to avoid depreciation	Once classified as held for sale, depreciation is discontinued (see Section 5.7). Thus, companies may increase earnings by classifying fixed assets as held for sale.	Significant fixed assets classified as held for sale or included in assets of discontinued operations
Historical cost distortions	- Revenue reflects current prices, while the depreciation expense is measured at historical cost, resulting in overstated earnings. - Because the timing of asset purchases varies across companies, reported earnings may deviate from economic earnings to a varying degree in the cross-section, reducing earnings comparability across companies. - As the average age of assets and inflation rates vary over time, so does the magnitude of the depreciation distortion, reducing earnings comparability over time (for the same company).	- A high average age of depreciable PP&E (see Section 3.4.6) - A high asset replacement ratio (see Section 3.4.3) - Estimate the understatement of depreciation and fixed assets using the average age of the assets and the level of past inflation. For example, if the assets are on average 6 years old, and annual inflation in recent years averaged 3%, then the understatement is approximately 20%.
Manipulating depreciation methods or estimates	- Depreciation should be recognized over time consistent with the pattern in which the entity consumes the asset’s benefits. - Firms may exploit the latitude in selecting depreciation methods and estimates to postpone expense recognition. For example, they may overstate the useful life or residual value of assets subject to depreciation.²³⁰ - Almost all firms use straight-line depreciation, although in many cases the quality or quantity of the asset’s services decline over time or maintenance costs increase over time. In such cases, accelerated depreciation methods would result in better matching of costs against benefits in the income statement. - The reporting benefits of understating depreciation include not only the postponement of expense recognition but also the impact on perceived “core” or “recurring” income. Insufficient depreciation often results in impairment or disposal losses, which are deemed by many analysts as “one-time” or “unusual.” That is, by understating depreciation firms are able to permanently increase perceived recurring income.	- A low or decreasing depreciation rate - A high or increasing average useful life of depreciable PP&E - A high or increasing PP&E intensity - A high asset replacement ratio, especially if there isn’t much growth - Frequent or large impairment charges or disposal losses

²³⁰ Example of *manipulation of depreciation estimates* (SEC AAER No. 1532): The principal fixed assets of Waste Management (WM) in the US and Canada consisted of garbage trucks, containers, and equipment, representing approximately \$6 billion of the Company’s assets during the relevant period. In each of the nine years from 1988 through 1996, WM made unsupported changes to the estimated useful life or salvage value of one or more categories of vehicles, containers, or equipment, always resulting in a net reduction of depreciation expenses. The changes were recorded as top-level (headquarter) adjustments and were most often made in the fourth quarter and improperly applied cumulatively from the beginning of the year. The changes were not disclosed to investors.

Earnings quality issue	Explanation	Red flag or analysis
Interrelationship between depreciation and maintenance cost	- Assets are depreciated over their expected holding period or useful life. The same asset may have different holding periods across different companies or even for the same company over time. - In general, when the expected holding period is long, or when a company decides to extend the holding period of an asset, depreciation expense declines immediately, but this will be offset by higher maintenance costs as the asset mature. - Thus, a company may increase current earnings by deciding to increase the holding period. To the extent that the company does not disclose this decision, investors may not be able to predict the likely increase in future maintenance costs.²³¹	- A low or decreasing depreciation rate - A high or increasing average useful life of depreciable PP&E - A high or increasing PP&E intensity
Manipulating impairment losses	- As noted above, impairment losses are recognized if the sum of undiscounted expected cash flows from the asset or asset group is less than book value (first step); if recognized, the loss is measured as the difference between book and fair value (second step). - In recognizing and measuring impairment losses for fixed assets, firms have substantial discretion regarding each of the following elements: (1) timing of the test (“whenever events or changes in circumstances indicate that [the asset’s] carrying amount may not be recoverable”); (2) level of grouping (“long-lived asset or assets shall be grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities;” when assets are grouped together, losses on impaired assets are offset by gains on other assets, reducing the likelihood and amount of impairment); (3) forecasting the amount and timing of cash flows associated with the asset or asset group, including disposition cash flows and future capital expenditures required to obtain the benefits from the asset or asset group; and (4) estimating the discount rate used to measure fair value (second step). - Firms may exploit the discretionary nature of impairment tests to manipulate the recognition of impairment losses.²³² - While failure to recognize impairment losses and understatement of impairment losses are the more likely abuses, in some cases firms may overstate impairment charges to reduce future depreciation (e.g., following the appointment of a new CEO).	A high or increasing PP&E intensity, especially if (1) the company reports low and declining operating profitability, and (2) the depreciation rate is relatively low

²³¹ Example of *the interrelationship between depreciation and maintenance cost* (SEC AAER No. 4012): “Hertz, consistent with the regular course of its business, routinely estimated how long it would hold cars before disposing of them and replacing them. The planned holding periods were one of the variables in the formula Hertz used to depreciate its car rental assets, and also could have impacted other aspects of Hertz’s business, such as maintenance costs. During 2013, Hertz decided to extend the holding periods of a significant portion of its U.S. car rental fleet. That decision, and its impact on aspects of Hertz’s business, were not adequately disclosed to investors. ... For Hertz, extending holding periods had a short-term benefit: it spread out over more months the depreciation expense Hertz had to incur on its cars, lowering such expense overall for current quarters. At the same time, extending holding periods had long-term risks, including that older cars were likely to require more costly maintenance, and could injure Hertz’s premium brand.”

²³² Example of *manipulation of impairment losses* (SEC AAER No. 2730): Tidewater, a company operating offshore service vessels supporting the energy industry, classified the status of its vessels as either active or withdrawn. Withdrawn vessels were individually subject to a formal review for potential impairment, consistent with SFAS 144 which requires that long-lived assets be tested for recoverability whenever there are indicators of potential impairment, such as a significant adverse change in the extent or manner in

Earnings quality issue	Explanation	Red flag or analysis
Non-cash capex	• Reported capex in the cash flow statement excludes assets acquired in non-cash transactions (for example, with vendor financing or by issuing equity directly to the seller). • This distortion often results in overstatement of estimated free cash flow. • The overstatement of free cash flow may also be due to the inclusion of vendor financing liabilities in working capital (e.g., in their 2020 annual report, AT&T included these liabilities in “accounts payable and other accrued liabilities”). • Most analysts forecast depreciation and capex based on reported past values. For example, they may forecast capex as the product of forecasted sales and the average ratio of capex to sales in prior years. • In contrast to reported capex, depreciation relates to all recognized fixed assets, including those acquired in noncash transactions or M&A as well as PP&E recognized under finance leases. • Because depreciation is added back to net income in measuring free cash flow, while capex is deducted, the incompleteness of reported capex results in overstatement of forecasted free cash flow and thus overstated enterprise and equity value estimates.	• Add noncash capex to reported capex when estimating and forecasting free cash flow.

which the assets are being used. Starting September 2001 through March 2004, Tidewater stopped classifying vessels as withdrawn to avoid having to test the vessels for impairment. It also did not review or changed its depreciation estimates as required under GAAP when circumstances change.

Earnings quality issue	Explanation	Red flag or analysis
Depreciation expensed and EBITDA are measured with error	- For reasons discussed in this and the next section, depreciation and amortization (D&A) are particularly problematic accruals (historical cost distortions, manipulation of D&A, impact of impairment losses on subsequent D&A, inconsistent treatment of acquired versus internally developed intangibles, manipulation of purchase price allocation). - Accordingly, analysts and other market participants typically focus on EBITDA rather than EBIT when measuring operating profitability. - Measuring EBITDA requires one to identify the D&A expensed in EBIT. For manufacturing firms, this amount can only be estimated. - Most manufacturing firms include current year depreciation not only in SG&A expenses but also in cost of goods sold and in the ending balance of work in progress and finished goods inventories. In measuring EBITDA, analysts use the depreciation add-back from the cash flow statement. This amount, however, is generally different from the total amount of depreciation expensed—it also includes depreciation which has been capitalized into the ending balance of inventories, and it excludes prior year depreciation which was included in the beginning balance of inventories and expensed in the current year. Consequently, for many manufacturing firms EBITDA estimates contain significant error.²³³	- Examine the change in work-in-process and finished goods inventory - EBITDA is generally overstated for growing firms (more depreciation is included in ending inventory compared to beginning inventory) and understated for firms with a decline in finished goods and work in process inventories. - An estimate of this error can be calculated as the product of the change in finished goods and work-in-process inventory and the ratio of depreciation to total costs.

²³³ Example: Depreciation expense versus depreciation addback. Assume Company A's only activity in year 1 was to produce inventory, and the only production cost was \$100 depreciation. In year 2, the only activity was to sell the inventory for \$300.

Income statement			Cash flow Statement		
	Year 1	Year 2		Year 1	Year 2
Sales	-	300	Net Income	0	200
Cost of goods sold / depreciation	-	100	Depreciation	100	0
Net income	-	200	Inventory decrease (increase)	(100)	100
			Cash from operations	0	300

In this example, the difference between the depreciation addback and depreciation expense is equal to the change in inventory. In real life, only a portion of the change in inventory is due to depreciation, so the difference between the depreciation addback and depreciation expense is approximately equal to the product of the change in inventory and the ratio of depreciation to total costs.

5.5 Intangible assets and related expenses

Intangible assets are long-lived nonfinancial assets that lack physical substance, such as goodwill, patents, tradenames, trademarks, franchises, customer lists, customer relationships, computer software, copyrights, non-compete covenants, permits, licenses, contracts, and agreements. Similar to PP&E, intangible assets provide the firm with operating capacity.

Accounting theory stipulates that costs incurred to acquire an asset should be capitalized. However, due to the following standards, most expenditures made to develop intangible assets are reported as an expense in the income statement and as an operating cash outflow in the cash flow statement: “Costs of internally developing, maintaining, or restoring intangible assets (including goodwill) that are not specifically identifiable, that have indeterminate lives, or that are inherent in a continuing business and related to an entity as a whole, shall be recognized as an expense when incurred” (ASC 350-20-25-3). In addition, U.S. GAAP requires that research and development costs be charged to expense when incurred (ASC 730).

As a consequence of the above standards, few internally developed intangibles are reported on the balance sheet, with the primary ones being costs associated with the development of computer software intended to be sold (ASC 985-20) or for internal use (including Websites; ASC 350-40 and ASC 350-50).²³⁴ Another relatively common example is direct-response advertising.²³⁵ In contrast, all acquired intangibles are reported on the balance sheet.

Intangibles are rarely acquired on a stand-alone basis, but often constitute a significant portion of the assets recognized in a business combination. Intangibles acquired in a business combination are either identifiable or are considered part of goodwill. Identifiable intangible assets are classified as having either finite or indefinite life. Goodwill is considered to have indefinite life, and it is recognized only when acquired in a business combination. Identifiable intangibles can be acquired in a transaction other than business combination, but this is not common. In fact, most intangible assets result from business combinations.

Identifiable intangibles are either grounded in contracts or other legal rights or are separable from the business. Examples of identifiable intangibles include marketing-related intangible assets (e.g., trademarks, trade names, internet domain names, noncompetition agreements), customer-related intangible assets (e.g., customer lists, order or production backlog, customer contracts and customer relationships), artistic-related intangible assets (e.g., plays, books, song lyrics, advertising jingles, pictures, photographs, motion pictures, music videos, television

²³⁴ Development costs for software to be used internally are capitalized once management commits to funding the computer software project and it is probable that the project will be completed and the software will be used to perform the function intended; not all development costs qualify for capitalization – for example, preliminary, administrative, overhead, and post implementation costs are expensed as incurred. For Websites development costs there is additional guidance. Development costs for software to be marketed are capitalized once technological feasibility has been established (completion of a detailed program design or completion of a working model). Capitalized intangible assets are subject to amortization and (possibly) impairment.

²³⁵ Direct response advertising costs can be capitalized only if past experience indicates that the incremental future net revenues will exceed the capitalized costs.

programs), contract-based intangible assets (e.g., rights related to licensing, royalty, advertising, construction, management, servicing, lease, franchise, broadcasting, drilling or employment), and technology-based intangible assets (e.g., patented and unpatented technology, computer software, databases, formulas, processes and recipes).

Identifiable intangibles are initially recorded at their estimated fair value. Other acquired intangibles are included in recognized goodwill, which is measured as the excess of the fair values of (1) assets transferred (cash and possibly other assets), (2) incurred liabilities to previous owners, (3) equity interests issued to previous owners, (4) contingent consideration, (5) previously held equity interests in the target, and (6) non-controlling interests (if less than 100% of the target is acquired), over the fair value of the business's net identifiable assets.

The following are examples of intangible assets that do not meet the criteria for separate recognition (i.e., they are neither separable from the business nor grounded in legal or contractual rights), and which therefore constitute part of reported **goodwill**: human capital, customer base, customer service capability, presence in geographic markets or locations, nonunion status or strong labor relations, ongoing training or recruiting programs, outstanding credit ratings, access to capital markets, and favorable government relations. Because it is measured as a residual amount, goodwill may also reflect payment for expected synergies, overpayment, understatement of the value of identifiable assets, or overstatement of the value of acquired liabilities, contingent consideration, previous holdings in the target, or non-controlling interests.

After the initial recognition, the accounting for recognized intangible assets is based on their useful lives to the reporting entity. **Finite-life intangible assets** are amortized over their estimated useful lives and are subject to the same type of impairment test as PP&E, that is, they are reviewed for impairment whenever events or changes in circumstances indicate potential impairment. An impairment loss is recognized if the undiscounted sum of future cash flows is smaller than the asset's book value. However, if deemed impaired, the asset is written down to its estimated fair value.

Goodwill and **indefinite-lived intangible assets** are not amortized but instead are tested for impairment annually (at the same time each year, which does not have to be the end of the year) or more frequently if events or changes in circumstances indicate that the asset may be impaired. An indefinite life intangible asset (other than goodwill) is considered impaired if its carrying amount exceeds fair value, in which case an impairment loss is recognized in an amount equal to that excess and the intangible asset is written down to its fair value. For goodwill, impairment is tested at the reporting unit level (i.e., an operating segment or one level below) and is recognized only if the reporting unit's fair value is lower than its book value. Under ASU 2017-04, which became effective in 2020 (early adoption was allowed since 2017), goodwill impairment is measured as the difference between the total book value of the reporting unit and its fair value. Firms can avoid the quantitative impairment tests if qualitative factors suggest that it is not likely that goodwill or the indefinite-lived intangible is impaired.

Unlike other areas, there are significant differences in accounting for intangible assets between **IFRS** and U.S. GAAP. These differences relate to the capitalization of expenditures, measurement basis, and impairment.

Under IFRS, *internal development expenditure* is capitalized if all the following criteria can be demonstrated (IAS 38):

1. The technical feasibility of completing the intangible asset so that it will be available for use or sale.
2. The intention to complete the intangible asset and use or sell it.
3. The ability to use or sell the intangible asset.
4. How the intangible asset will generate probable future economic benefits. Among other things, the entity can demonstrate the existence of a market for the output of the intangible asset or the intangible asset itself or, if it is to be used internally, the usefulness of the intangible asset.
5. The availability of adequate technical, financial, and other resources to complete the development and to use or sell the intangible asset.
6. The ability to measure reliably the expenditure attributable to the intangible asset during its development.

In most cases IFRS firms capitalize little if any development costs. For pharmaceutical and biotech companies, the capitalization criteria are met late in the development phase, because drug approval must be received before commercial feasibility of the drug can be demonstrated. Other companies may have greater ability to capitalize development costs, but they often capitalize minimal if any costs. This is possibly because (1) R&D amortization reduces subsequent earnings and, unlike expensed R&D which is often considered an indicator of the future product pipeline, is related to products already being marketed; (2) capitalized costs may have to be written down due to impairment; and (3) expensing R&D enables companies to manipulate earnings by timing R&D.

Under IFRS, intangible assets may be *revalued* to fair value if they trade in active markets. Because intangible assets are generally not traded in active markets, this option is rarely relevant.

Impairment tests under IFRS are different from their U.S. GAAP counterparts:

- Under IFRS, for finite and indefinite life intangibles, impairment is both tested and calculated relative to the recoverable amount, which is defined as the greater of fair value less cost to sell and value in use (present value of expected cash flows). In contrast, under U.S. GAAP impairment of finite life (indefinite life) intangibles is tested relative to the undiscounted sum of future cash flows (fair value), and is calculated relative to fair value.
- Goodwill impairment is tested at the cash generating unit rather than reporting unit. Cash generating unit is the smallest group of assets that generates cash inflows that are largely independent of those generated by other assets. If a cash generating unit is found to be impaired, the impairment is first allocated to the unit's goodwill, and then pro-rata to other assets.
- Reversals of impairment of intangible assets other than goodwill are recognized under IFRS but are prohibited under U.S. GAAP.

Key ratios used to evaluate earnings quality related to intangibles and associated expenses include the D&A rate ([Section 3.4.1](#)), Goodwill and indefinite life intangible intensity ([Section 3.4.8](#)), life-stage index ([Section 3.4.7](#)), and discretionary expense intensity ([Section 2.4](#)).

Earnings quality issues related to intangible assets are due primarily to the inconsistent treatment of acquired versus internally developed intangible assets. As noted above, most investments in internally developed intangibles are expensed as incurred, while acquired intangible assets are recognized on the balance sheet. Another source of earnings quality issues is the high level of discretion involved in measuring the cost, amortization and impairment of acquired intangible assets. The following is a detailed discussion of earnings quality issues related to intangibles and associated expenses.

Table 5.5A describes **earnings quality issues**, red flags and analyses related to intangible assets.

Table 5.5A: Earnings quality – intangible assets and related expenses

Earnings quality issue	Explanation	Red flag or analysis
Balance sheet distortions due to the expensing of organic investments in intangibles	• Due to the immediate expensing of most investments in internally developed intangibles (e.g., R&D, advertising, investments in human capital, IT), reported assets and equity are understated for most companies. • Assets and equity are understated due to two additional reasons: early losses and expost success, which effectively generate unrecognized goodwill. • In the early years of a business, reported income is low or even negative, both because some investments are expensed (e.g., start-up costs, assembling work force, developing processes, investing in technology, advertising, etc.), and revenue is low compared to fixed costs (it takes time to reach scale). These early losses are effectively an unrecognized investment that generates subsequent profits. • Many start-ups do not survive. Thus, the average profitability of existing companies overstates the expected profitability at the time of inception. This excess profitability implies unrecognized goodwill.	• High R&D, advertising, or SG&A expense intensity. • Industry or firm characteristics that suggest the potential for high unrecognized goodwill. For example, high operating leverage or high risk (implying early losses or significant effect of expost success). • Estimate omitted assets (R&D capital, brand equity, organizational capital) by capitalizing R&D, advertising, or SG&A expenses (e.g., Lev et al. 2005).
Income statement distortions due to the expensing of organic investments in intangibles	• Unlike the balance sheet effects, the direction of the earnings distortion related to the immediate expensing of organic investments in intangibles depends on the <i>change</i> in investment intensity, which in turn depends on discretionary choices and the stage in the firm's life cycle. • The expensing of current investments in intangibles is offset by the omission of amortization of past investments in intangibles that contribute to current revenue (those investments were expensed in the past so there is no book value to amortize). • For growing firms, the understatement of income due to the expensing of current expenditures is only partially offset by the omission of periodic amortization of unrecognized intangibles. • In contrast, for firms with a declining trend of expenditures, current year expenditures are smaller than the omitted amortization of unrecognized intangibles, resulting in overstated earnings. • Firms may manage reported income and cash from operations by changing the magnitude or timing of R&D, advertising, or other internal investments in intangibles. In particular, reducing discretionary spending is a common form of earnings management (e.g., Graham et al. 2005).	• A decline or a declining trend in R&D, advertising, or SG&A expense intensity. • High values for the life stage index (i.e., mature or declining company). • Estimate pro-forma earnings using alternative assumptions about the useful lives of R&D, advertising, and other expensed investments. See Section 2.11.5. Evaluate trends in estimated proforma earnings and compare them to reported earnings.

Earnings quality issue	Explanation	Red flag or analysis
Manipulating cost estimates of intangible assets acquired in business combinations	• Most reported intangibles result from business combinations. • In business combinations, firms have substantial latitude in identifying individual intangibles, measuring their fair values, and classifying them as having either finite life or indefinite life. Firms may use this discretion to manipulate the financial statements. • For example, a company may classify an acquired finite-life trademark as having indefinite life, thereby avoiding the periodic amortization which reduces earnings.²³⁶ • In general, firms may increase near-future reported income by understating the value of finite-life intangibles (or other depreciable or otherwise expensed assets), especially those having short useful lives. Any understatement of the fair value of identifiable assets is absorbed (i.e., increases) reported goodwill, which is not subject to periodic amortization.²³⁷ • Some firms may have weaker incentives to understate finite-life intangible assets or may even overstate them. Ashby et al. (2020) provide evidence that firms that emphasize non-GAAP earnings metrics that exclude amortization of acquired intangibles allocate more of the purchase price to definite-lived intangible assets, primarily by shifting away from tangible assets. They note that this strategy yields two benefits. First, it increases non-GAAP earnings by shifting the depreciation of tangible assets, which non-GAAP earnings includes, to amortization, which non-GAAP earnings excludes. Second, it decreases the likelihood of future goodwill impairments by reducing goodwill.	• A low or decreasing D&A Rate. • High goodwill and indefinite life intangible intensity • Frequent impairment losses of goodwill or other indefinite life intangible assets • Compared to other firms, firms that emphasize non-GAAP earnings measures that exclude amortization of acquired intangibles are less likely to understate the cost of finite-life intangibles assets.
Goodwill is a low-quality asset	• The approach used to measure goodwill (essentially a plug number) implies that goodwill reflects five potential components: (1) the fair value of intangibles that are neither separable from the business nor grounded in legal or contractual rights; (2) payment for expected synergies; (3) possible overpayment; (4) understatement of the fair value of net identifiable assets; and (5) overstatement of contingent payment obligations (“earn-outs”) • Goodwill is a low-quality asset because: (a) the first component implies that goodwill has no exit value in case of bankruptcy, (b) expected synergies or other sources of control premium are often overstated,²³⁸ and (c) the last three components represent overstatement.	• A relatively large amount of recognized goodwill, especially if from conglomerate-type acquisitions and/or stock deals (as opposed to cash deals)

²³⁶ The following quote from a recent SEC comment letter demonstrates this discretion. “Tell us how you determined that the acquired intangible asset ... was deemed to have an indefinite useful life. In your response, please tell us why you believe that no legal, regulatory, contractual, competitive, economic, expected use or other factors could limit the useful life of these intangible assets.” Examples of assets that, depending on the circumstances, can be classified as having either finite or indefinite life include trademarks and franchise rights.

²³⁷ Example of *overstatement of goodwill* (AAER No. 3912): Premier represented in public statements around the time it purchased TPC that it acquired certain customer contracts and receivables that purportedly had value. Therefore, it should have assigned a portion of the purchase price to such assets. Yet, the full amount was allocated to goodwill.

²³⁸ In his 2020 Letter to Berkshire Hathaway Shareholders, Warren Buffett noted: “Berkshire is often labeled a conglomerate, a negative term applied to holding companies that own a hodge-podge of unrelated businesses. And, yes, that describes Berkshire – but only in part. To understand how and why we differ from the prototype conglomerate, let’s review a little history. Over time, conglomerates have generally limited themselves to buying businesses in their entirety. That strategy, however, came with two major problems. One was unsolvable: Most of the truly great businesses had no interest in having anyone take them over. Consequently, deal-hungry conglomerateurs had to focus on so-so companies that lacked important and durable competitive strengths. That was not a great pond in which to fish. Beyond that, as conglomerateurs dipped into this universe of mediocre businesses, they often found themselves required to pay staggering “control” premiums to snare their quarry. Aspiring conglomerateurs knew the answer to this “overpayment” problem: They simply needed to manufacture a vastly overvalued stock of their own that could be used as a “currency” for pricey acquisitions. (“I’ll pay you

Earnings quality issue	Explanation	Red flag or analysis
Manipulating amortization methods or estimates	• Amortization should be recognized over time consistent with the pattern in which the entity consumes the asset's benefits. • Firms have significant discretion in selecting amortization methods and estimating the useful life of finite-life intangibles, which they may exploit to manipulate the financial statements. For example, a company may overstate the useful life of intangible assets to reduce the periodic amortization expense and increase reported income in the near term. • Almost all firms use straight-line amortization, although in many cases the quality or quantity of the asset's services decline over time. In such cases, accelerated amortization methods would result in better matching of costs against benefits in the income statement.²³⁹ Poor matching in the income statement increases the volatility of reported income and decreases its predictive ability. • The reporting benefits of understating amortization include not only the postponement of expense recognition but also the impact on perceived "core" or "recurring" income. Insufficient amortization often results in impairment losses, which are deemed by many analysts as "one-time" or "unusual." That is, by understating amortization firms can permanently increase perceived recurring income.	• A low or decreasing amortization rate • Frequent impairment losses of finite life intangible assets • A high or increasing finite life intangible intensity, especially if (1) no significant business combinations occurred recently, (2) the company reports low and declining operating profitability, and (3) the amortization rate is relatively low

\$10,000 for your dog by giving you two of my \$5,000 cats.") Often, the tools for fostering the overvaluation of a conglomerate's stock involved promotional techniques and "imaginative" accounting maneuvers that were, at best, deceptive and that sometimes crossed the line into fraud. When these tricks were "successful," the conglomerate pushed its own stock to, say, 3x its business value in order to offer the target 2x its value. Investing illusions can continue for a surprisingly long time. Wall Street loves the fees that deal-making generates, and the press loves the stories that colorful promoters provide. At a point, also, the soaring price of a promoted stock can itself become the "proof" that an illusion is reality. Eventually, of course, the party ends, and many business "emperors" are found to have no clothes. Financial history is replete with the names of famous conglomerateurs who were initially lionized as business geniuses by journalists, analysts and investment bankers, but whose creations ended up as business junkyards. Conglomerates earned their terrible reputation."

²³⁹ The following quote from a recent SEC comment letter demonstrates the discretion related to expensing pattern. "If you amortize customer relationships using the straight-line method rather than an accelerated method, please tell us why you believe this method reflects the pattern in which the economic benefits are consumed or explain why you cannot reliably determine the pattern in accordance with ASC 350-30-35-6. Note that customer relationships may dissipate at a more rapid rate in the earlier periods following a company's succession to these relationships, with the rate of attrition declining over time until relatively few customers remain who persist for an extended period."

Earnings quality issue	Explanation	Red flag or analysis
Manipulating impairment losses on finite life intangible assets	- As noted above, impairment losses on finite life intangible assets are recognized if the sum of undiscounted expected cash flows from the asset or asset group is less than book value (first step); if recognized, the loss is measured as the difference between book and fair value (second step). - In recognizing and measuring impairment losses for finite life intangible assets, firms have substantial discretion regarding each of the following elements: - timing of the test (“whenever events or changes in circumstances indicate that [the asset’s] carrying amount may not be recoverable”); - level of grouping (“long-lived asset or assets shall be grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities”; when assets are grouped together, losses on impaired assets are offset by gains on other assets, reducing the likelihood and amount of impairment); - forecasting the amount and timing of cash flows associated with the asset or asset group, including disposition cash flows and future capital expenditures required to obtain the benefits from the asset or asset group; and - estimating the discount rate used to measure fair value (second step). - Firms may exploit the discretionary nature of impairment tests to manipulate the recognition of impairment losses. - While failure to recognize impairment losses and understatement of impairment losses are the more likely abuses, in some cases firms may overstate impairment charges to reduce future amortization (e.g., following the appointment of a new CEO).	A high or increasing finite life intangible intensity, especially if (1) no significant business combinations occurred recently, (2) the company reports low and declining operating profitability, and (3) the amortization rate is relatively low

Earnings quality issue	Explanation	Red flag or analysis
Unrecognized impairment losses on goodwill or indefinite life intangible assets	- Like impairment of finite life intangible issues (discussed in the previous earnings quality issue), companies have substantial discretion in recognizing and measuring impairment losses on goodwill and other indefinite-life intangible assets, and they may exploit this discretion to manipulate impairment losses. - A particularly important concern is that companies may not recognize impairment that has occurred.²⁴⁰ - The concern of unrecognized impairment is especially important for goodwill and indefinite life assets because these assets are not subject to amortization, even though in reality they are effectively “consumed” over time.²⁴¹ - Moreover, the goodwill test has several “buffers” built into it, including (1) there may be organic businesses (on which no goodwill has been recognized) within the same reporting unit (this effect is often referred to as “shielding”), and (2) under current GAAP assets other than goodwill within the reporting unit are not fair valued when measuring the goodwill impairment loss.	A high or increasing goodwill and indefinite life intangible intensity, especially if (1) the company reports low or declining operating profitability, (2) the market value of equity is low relative to its book value,²⁴² or (3) significant reporting units combine acquired businesses with organic ones.

²⁴⁰ Examples *manipulating impairment losses*. **Example 1** (SEC AAER No. 4200): “Apex’s inaccurate books and records were due to its failure to timely recognize impairment of certain trademarks, while the Company was experiencing a series of significant setbacks in its business and industry environment, licensing business, and market valuation [loss of major contracts, declining financial performance, decline in demand, change in business strategy]. Apex performed only limited qualitative impairment assessments that failed to appropriately take into account negative information indicating that the trademarks were more likely than not impaired. Such an indication would have required a quantitative assessment of value, which Apex did not perform.” **Example 2** (SEC AAER No. 4241): “Sequential Brands Group [a company that owns a portfolio of consumer brands and promotes, markets, and licenses those brands through retailers, wholesalers and distributors] ... filed materially inaccurate disclosures ... regarding goodwill. By the fourth quarter of 2016, Sequential’s goodwill was more likely than not impaired, but impairment was not recognized until the fourth quarter of 2017, when Sequential belatedly impaired \$304.1 million of goodwill. During the Relevant Period and in accordance with GAAP, Sequential was required to test its goodwill for impairment at least annually. Sequential was also required to conduct interim goodwill impairment tests to the extent an event occurred or circumstances arose that indicated that it was more likely than not that a goodwill impairment existed. Accounting guidance references a sustained decrease in stock price as one such event or circumstance to be considered. Sequential passed its annual goodwill impairment test as of October 1, 2016. However, after the Company lowered its 2016 and 2017 earnings guidance on November 3, 2016, its stock price, which had been declining since at least mid-2015, dropped by approximately 40 percent. Sequential subsequently conducted two internal fair value calculations, as of mid-December 2016 and year-end 2016, which showed that the Company’s market capitalization (including a control premium) had declined below its carrying amount. These internal calculations used the same methodology that Sequential had disclosed in its SEC filings and had used in connection with its annual goodwill impairment testing. Sequential, however, did not appropriately account for this quantitative evidence of likely impairment and instead performed a qualitative analysis, which omitted consideration of its internal fair value calculations and did not give sufficient consideration to other negative factors relevant to the Company’s business. As a result, the Company unreasonably concluded that goodwill was not impaired.”

²⁴¹ “The term indefinite does not mean the same as infinite or indeterminate. The useful life of an intangible asset is indefinite if that life extends beyond the foreseeable horizon—that is, there is no foreseeable limit on the period of time over which it is expected to contribute to the cash flows of the reporting entity. Such intangible assets might be airport route authorities, certain trademarks, and taxicab medallions.” FASB Accounting Standard Codification 350 Intangibles—Goodwill and Other.

²⁴² The following is from an SEC comment letter (Sabre Corporation, October 13, 2020): “We note that a sharp decline in your stock price resulted in a significant decline in your market capitalization. On page 17, we further note that you concluded that goodwill was not impaired for any business unit as of June 30, 2020 but did not provide a discussion of the methodology used to estimate fair value. In your Critical Accounting Estimates on page 45 you imply that since the filing of your Form 10-K February 26, 2020 there have been no material changes to critical accounting estimates over Goodwill, yet it appears that the quantitative factors used to determine the Level 3 fair value related to goodwill may have been significantly impacted by the uncertainties of the pandemic. In this regard please, • Tell us the method(s) you used to estimate the fair value of your reporting units. If more than one method was used, please indicate how you weighted each method. • Provide qualitative and quantitative descriptions of the material assumptions and factors used to

Earnings quality issue	Explanation	Red flag or analysis
Low comparability	- Intangibles are recognized primarily in M&A; internally generated intangibles are mostly omitted from the balance sheet. This reduces comparability across firms and over time.²⁴³ - In general, by acquiring intangibles (typically through business combinations) instead of developing them organically, firms increase reported assets and equity. They also increase reported EBITDA and EBITA, and in many cases increase reported EBIT (if (1) the company is growing, (2) goodwill and indefinite life intangibles are overstated, or (3) the amortization expense is understated).	- Consider differences in intangible intensity when comparing a firm to its peers or when examining changes in performance over time. - Evaluate the level of and trend in measures of profitability and turnover that exclude intangibles from the denominator and amortization from the numerator (for profitability measures).
Improper capitalization of intangibles	- As noted, most expenditures incurred internally to develop intangible assets are expensed as incurred. There are a few exceptions, however, which may be used to overstate earnings.²⁴⁴ - Companies have significant discretion when capitalizing software development costs. This is especially true for software developed for sale, as the guidelines provide management with a great deal of flexibility in determining “technological feasibility.” (In contrast, capitalization of software developed for internal use typically starts quite early in the development process as there is no need to demonstrate technological feasibility.)	- An increase in [capitalized intangibles / sales] - Note that capitalized software development costs may be included in PP&E

support each reporting unit's fair value determination and describe the degree of uncertainty associated with your key assumptions. • Quantify the headroom between fair value and carrying value of your reporting units. In particular, we note that the fair value of the Airline Solutions reporting unit approximated its carrying amount as of March 31, 2020. It is unclear to us why despite its negative revenue results as of June 30, 2020, you recorded no goodwill impairment for that reporting unit. • Tell us how you reconciled and evaluated your market capitalization to the fair value of your reporting units and describe the reasons for significant differences, if any. Further disclose the stock price (or average stock price) that you used to determine your market capitalization and how it was selected.”

²⁴³ For example, in its comment letter to the IASB dated January 28, 2021, the European Financial Reporting Advisory Group, states: “In considering the accounting for intangible assets, EFRAG considers it necessary that the IASB takes into account the concerns of investors who want to compare companies that grow by acquisitions more easily with those that grow organically and, as such, starts a project on IAS 38 Intangible Assets.”

²⁴⁴ Examples of *improper capitalization of intangibles*: Example 1 (SEC AAER No. 1257): America Online, Inc. (“AOL”) capitalized most of the costs of acquiring new subscribers—including the costs associated with sending computer disks to potential customers—and reported those costs as an asset on its balance sheet, instead of expensing them as incurred. “Direct response advertising costs” can be capitalized only if past experience indicates that the incremental future net revenues will exceed the capitalized costs. AOL could not meet this requirement because: it operated in a nascent business sector characterized by rapid technological change; its business model was evolving; its rapidly growing customer base caused significant changes to its customer demographics; customer retention rates were unpredictable; product pricing was subject to potential change; AOL’s competition was increasing; and AOL was experiencing negative cash flow. The advertising costs improperly capitalized by AOL reached approximately \$385 million by September 30, 1996, when AOL wrote them off in their entirety. Example 2 (SEC AAER No. 3270): Between 2004 and 2009, Zale Corporation recorded certain television advertising costs as prepaid advertising when, in fact, those costs should have been expensed in the periods in which they were incurred.

Earnings quality issue	Explanation	Red flag or analysis
Misclassifying software – developed for sale versus for internal use	- In some cases, companies have discretion is classifying software as being developed for internal use versus for sale. For software developed for both purposes, the discretion relates to the allocation between the two. - Classifying software as being developed for internal use gives several reporting benefits: (1) cost capitalization starts earlier in the development process compared to software developed for sale; (2) the amortization of software developed for sale may be accelerated (if revenue declines over time) but not less than straight-line (for software developed for internal use the amortization is generally straight-line); (3) impairment recognition for software developed for sale is more likely (periodic tests based on net realizable value versus PP&E-like impairment test); (4) cash outflows related to software developed for internal use (sale) are classified as investing (operating); and (5) software developed for internal use may be included in PP&E instead of in intangible assets.	Significant software classified as being developed for use or included in PP&E by a software company (software intended for sale cannot be included in PP&E)
Cloud versus on-premises computing – lack of accounting comparability	- The accounting treatment can be quite different. For cloud, there are generally smaller capitalized costs and the recognized expense reflects primarily payments for cloud services instead of amortization of a long-lived asset, lowering cash from operations and EBITDA. - Capitalized cloud-related costs (e.g., implementation costs) are generally included in deferred costs (rather than in intangibles) and their expensing is recognized outside of amortization.	- When comparing companies that vary in the extent of cloud versus on-premise computing, the impact on earnings and cash flow metrics (especially EBITDA) should be accounted for. - Similar adjustments are needed when conducting time-series analysis of a company that changed (typically increased) its use of cloud services.
Misclassifying operating expenses as R&D or advertising	Firms may classify operating expenses as R&D, or expenses not directly related to advertising as advertising, hoping that investors will view these expenses as economic investments.²⁴⁵	An increase in R&D or advertising intensity concurrent with a decrease in cost of sales or other operating expenses
Conducting R&D through or for off-balance sheet vehicles	- Firms may engage in R&D activities through joint ventures or other off-balance sheet vehicles to defer the negative impact of R&D outlays on current earnings. - For example, a firm may establish a separate, unconsolidated entity that will conduct R&D, and have rights to the products of that R&D in return for an investment in the R&D entity, the transfer of preliminary research findings, future royalty payments, or other consideration. - Alternatively, a firm may conduct R&D on its own but establish an unconsolidated entity that will pay them fees for the R&D, own the rights to the R&D, and commit to providing access to the R&D findings in return for future royalty payments.	Significant joint ventures or VIEs that engage in R&D activities or that pay the company for R&D activities

²⁴⁵ Examples of *misclassifying operating expenses as R&D*: Example 1 (SEC AAER No. 1760): During 2000-2001, L90, an advertising firm that provides internet-based marketing services, misclassified expenses for correcting problems with existing computer system as research and development expenses. Example 2 (SEC AAER No. 3712): During the period 2010 to 2012, the CFO of OCZ Technology Group instituted or maintained policies that caused OCZ to reclassify costs of goods sold as research and development expenses without sufficient basis for doing so.

Earnings quality issue	Explanation	Red flag or analysis
Excluding amortization from non-GAAP earnings	- Companies increasingly report and emphasize non-GAAP performance measures that exclude amortization (e.g., Ciesielski and Henry 2017, Nissim 2019a). - Earnings ex-amortization overstate true profitability. For example, if a company develops a new technology, its earnings ex-amortization (EBA) will be reduced by R&D expense during the development years. In contrast, if the company acquires a business that already developed that technology, EBA will not reflect the cost of developing the technology. In both cases, though, EBA will reflect the benefits from the new technology. Thus, focusing on EBA may create the impression that acquisitive companies are able to indefinitely generate high margins, while in reality EBA margins are not sustainable without periodically engaging in acquisitions.	Reporting of Non-GAAP measures that exclude amortization
Limited disclosures	- For many companies, intangibles are the most important resource; yet, when developed organically, these assets are generally omitted from the balance sheet. Moreover, there is typically limited information about intangibles in the footnotes. - While reliability issues may prevent the recognition of some intangibles on the balance sheet, there is a lot of information that investors and other stakeholders may find relevant when evaluating intangibles (e.g., Mizik and Nissim 2011, Section 2.10 above). Companies increasingly provide such information in disclosures other than the financial statements and related footnotes (e.g., in integrated reports, CSR reports, proxy statements, MD&A [for example, the new human capital disclosures], other sections of financial reports or filings, investor presentations, company websites, etc.). This trend is likely to continue and even accelerate as companies increasingly emphasize ESG-related disclosures and due to the development of the virtual economy since the beginning of the pandemic. - Evaluating intangibles is important not just because of their economic significance but also because of their attributes. As Horn and Ohl (2021) point out: “Many intangible assets, such as certain technologies, are infinitely scalable, meaning they can be deployed in additional situations for no or little additional cost; as a result, their economies of scale often dwarf those that can be achieved through tangible assets. In addition, some intangibles, such as patents, are unique and protected by legal or other barriers to competition, thereby enhancing their value.”	- Examine information and metrics related to intangibles disclosed in integrated reports, CSR reports, proxy statements, MD&A, and other reports and disclosures by the company. - To the extent possible, integrate relevant metrics into the analysis (see Section 2.10).

5.6 Restructuring, loss contingencies, and other operating expenses

This section describes accounting issues related to some operating expenses, which are generally classified as selling, general and administrative (SG&A) expenses. SG&A expenses include all operating expenditures other than those related to the acquisition or production of inventory or the rendering of services. They comprise:

- Labor (salary, wages, and fringe benefits for all non-production employees)
- Outside services (e.g., advertising, legal, accounting, consulting)
- Rentals & leasing (other than production-related)
- Facilities (other than production-related—including utilities, electricity, communication, repairs and maintenance, real estate taxes, etc.)
- D&A (other than production-related)
- Information technology, processes and networks
- ... and many other items (e.g., warranty, travel, bad debt, bank charges, contributions, insurance).

Companies often report some operating expenses separately from SG&A. Especially common is the separation of amortization, R&D, and “unusual” expenses (e.g., restructuring, impairment). Additional items that may be reported separately include advertising expense and other organic investments in intangibles such as start-up costs or pre-opening costs.

Some operating expenses (e.g., bad debt, D&A, R&D) have been discussed in previous sections. In particular, Section 5.5 discusses organic investments in intangibles, which are generally expensed as incurred and are often included in SG&A expenses (e.g., hiring or training costs). Other operating costs (e.g., operating lease cost, pension and OPB, stock-based compensation) will be discussed in subsequent sections. With some overlap, this section focuses on restructuring charges, loss contingencies, and a catch-all residual category—“other operating expenses.” I first discuss the accounting treatment for these items and then turn to earnings quality issues.

Restructuring

Restructuring liabilities consist of the following items: costs to terminate employees, contract termination costs (e.g., leases), and costs to consolidate or close facilities and relocate employees. *Costs to terminate employees* are generally not recognized until there is a formal plan and details of the restructuring have been communicated to those affected by the plan. Even then, termination benefits are recognized at the communication date only if all services required to receive the benefits have been performed. If the benefits are conditional on the affected employees delivering a period of future service (i.e., a “stay bonus”), they are recognized over the period of service.²⁴⁶ *Contract termination costs* (e.g., leases) are recognized only when the

²⁴⁶ There are a few exceptions. Contractual termination benefits (i.e., benefits required by the terms of a pre-existing arrangement if involuntary termination occurs) are recognized when it is probable that employees will be entitled to the benefits and the amount can be reasonably estimated; no announcement to the workforce nor initiation of a restructuring plan is required prior to expense recognition. In addition, voluntary termination benefits to be paid under a non-binding offer to employees (i.e., offer that the entity can withdraw) are generally recognized only when

contract is terminated or the entity has permanently ceased using the rights granted under the contract. *Costs to consolidate or close facilities and relocate employees* are recognized in the period in which the liability is incurred, which is generally when goods or services associated with the activity are received. Restructuring liabilities are initially measured at fair value and subsequently adjusted for changes in expected cash flows and for accretion (i.e., the increase in the present value of the payments due to the passage of time). Revisions to estimated cash flows should be discounted using the credit-adjusted risk-free rate that was used to measure the liability initially.

Loss contingencies

A contingency is an existing condition, situation, or set of circumstances involving varying degrees of uncertainty that may result in a gain or loss when one or more future events occur or fail to occur. Resolution of the uncertainty may lead to inflow or outflow of economic resources. Gain contingencies (potential inflows) are generally not recognized in the financial statements but are disclosed in the notes if material.²⁴⁷ Loss contingencies (potential outflows) may arise from pending or threatened litigation, claims or assessments, guarantees of indebtedness of others,²⁴⁸ obligations of commercial banks under standby letters of credit, uncollectible receivables, obligations related to service warranties and defects, or other factors. Common loss contingencies relate to litigation, environmental matters, employment related disputes, insurance, tax assessments, and government investigations (e.g., antitrust). For a given loss contingency, the likelihood that a future event or events will confirm the incurrence of a liability or impairment of an asset is either *probable* (the future event or events are likely to occur, generally interpreted as 75% or greater likelihood), *reasonably possible* (the chance of the future event or events occurring is more than remote, but less than likely), or *remote* (the chance of the future event or events occurring is slight).

An estimated loss from a contingency should be accrued by a charge to expense and either a recognition of liability or a reduction in asset if both of the following conditions are met: (1) information available prior to the issuance of the financial statements indicates that it is probable that a liability has been incurred or an asset has been impaired at the date of the financial statements, and (2) the amount of the loss can be reasonably estimated. Recognized contingent liabilities are generally measured at the single most likely outcome even if the possible outcomes are mostly higher or lower than that amount. If the entity can only estimate a range for the expected loss with all values in the range equally likely, the lower end of the range should be accrued. If there is a large homogeneous population (e.g., warranty), the

an employee accepts the offer, while benefits to be paid under a binding offer are recognized when the offer is made and measured based on the number of employees expected to accept the offer.

²⁴⁷ Gain contingencies may arise from pending litigation or claims that when settled may provide the entity with economic benefits. While gains are generally not recognized prior to their realization, contingent assets (and related gains) that offset a recognized loss and are probable to result in an inflow of resources (e.g., expected insurance recoveries) are recognized.

²⁴⁸ Generally, guarantees are initially recognized at fair value, but the potential loss is accounted for as any other loss contingency. The initial liability is derecognized gradually or at a point in time, depending on the change in exposure. For example, a liability related to debt guarantees should be reduced as the principal is paid down.

obligation is generally measured at its expected value. Recognized contingencies are generally not discounted. Material loss contingencies accrued require footnote disclosure of the nature of the contingency and the amount accrued. If one or both conditions for accrual of a material loss contingency are not met and the loss contingency is classified as probable or reasonably possible, the nature of the loss contingency and the range of possible loss, if estimable, should be disclosed in the notes. If the likelihood of incurring a liability is remote, neither accrual nor disclosure is required.

Other operating expenses

As noted above, the accounting treatment for several expenses (e.g., D&A, pension) is discussed in separate sections of this monograph. Other operating expenses are generally recognized when they are incurred or consumed. In some cases, the cash payment occurs in the same period in which the services are received. In other cases, the payment occurs before or after the services are consumed, necessitating the recognition of prepaid expense asset (e.g., rent, insurance) or accrued expense liability (e.g., utilities, consulting, compensation), respectively. Prepaid expenses (accrued expenses) are generally measured based on the cash payment (expected cash payment or cost to settle the liability) and are adjusted each period for the amount consumed (accrued). The related expense is calculated as the sum of the periodic cash payment minus (plus) the change in the prepaid asset (accrued liability). Measuring some prepaid and accrued expenses involves significant discretion, especially in interim reports.

IFRS

Restructuring charges. Termination benefits are recognized at the earlier of (1) when an entity can no longer withdraw an offer of termination benefits, or (2) upon communication to affected employees based on a detailed formal restructuring plan. Provisions are recognized when a contract (e.g., a lease) becomes onerous (see below) regardless of whether the entity has ceased using the rights under the contract. Accrued liabilities must be discounted if such reduction would be material.

Onerous contracts. A provision for onerous contracts is recognized when the expected benefits to be derived by the company from a contract are lower than the unavoidable cost of meeting its obligations under the contract. Such provision is measured at the present value of the lower of the expected cost of terminating the contract and the expected net cost of continuing with the contract. In contrast, under U.S. GAAP expected losses from onerous contracts are generally recognized only if part of a restructuring program and the entity has ceased using the rights under the contract.

Loss contingencies. IFRS results in the recognition of more contingencies than do U.S. GAAP. The threshold for recognizing contingencies under IFRS is “more likely than not” (i.e., greater than 50%) rather than the U.S. GAAP’s “likely to occur” threshold, which is generally interpreted as 75% probability or more. Recognized loss contingencies are referred to as *provisions* under IFRS, and the term “contingencies” is generally used in reference to

unrecognized amounts.²⁴⁹ The amount recognized may also be different under the two systems. Under IFRS, when there are equally likely outcomes the amount recognized is the midpoint of the range, while under U.S. GAAP it is the low end of the range, a less conservative measure. Potentially offsetting this difference is the IFRS requirement of discounting provisions, while under U.S. GAAP loss contingencies are generally reported undiscounted. IFRS allows companies to limit disclosures regarding loss contingencies “in extremely rare cases” where disclosure may seriously prejudice the position of the entity in a dispute. U.S. GAAP has no such exception.

Other operating expenses. Under IFRS, accrued liabilities must be discounted if such reduction would be material. The related accretion expense (i.e., the increase in the liability due to the passage of time) can be reported as part of the finance expense. Under US GAAP, liabilities are generally discounted only if the timing and amount of future cash flows are fixed or determinable; when operating liabilities are discounted, the accretion expense is included in operating expenses.

Key ratios used to evaluate earnings quality related to other operating expenses include Discretionary expense intensity ([Section 2.4](#)), Unusual expense intensity ([Section 2.5](#)), Life stage index ([Section 3.4.7](#)), and Other asset intensity ([Section 3.4.9](#)).

Table 5.6A describes *earnings quality issues*, red flags and analyses related to operating expenses.

²⁴⁹ The term “provisions” as used under IFRS also refers to restructuring liabilities, asset retirement obligations, onerous contracts, and other estimated liabilities. Provisions are recognized when (i) the company has a present legal or constructive obligation as a result of past events, (ii) it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation, and (iii) a reliable estimate of the amount of the obligation can be made. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and, where appropriate, the risks specific to the liability.

Table 5.6A: Earnings quality – operating expenses

Earnings quality issue	Explanation	Red flag or analysis
Cutting discretionary expenses	- Companies have quite a lot of flexibility in “managing” the timing—and in some cases the ultimate amount recognized—of most of SG&A expenses. Many of the items that are included in SG&A expenses are either discretionary in nature or involve substantial discretion in measurement or recognition. - Examples of items that are typically <i>discretionary in nature</i>: R&D; advertising and other marketing efforts; investments in information technology, processes, and networks; training; hiring (e.g., search cost) and laying off employees; repairs and maintenance; contributions or donations (which are effectively investments in the brand or economic goodwill of the company) - Examples of items that involve substantial <i>discretion in measurement</i>: bad debt, warranty, provisions for the cost of laying-off employees, restructuring (if included in SG&A), impairment (if included in SG&A). - Examples of items involving <i>discretion in recognition</i>: deciding which investments in fixed assets to capitalize versus expense, including the cut off for materiality (items that are individually not material enough to require capitalization) and whether an expenditure represents repair or maintenance (and should therefore be expensed) versus addition, improvement or replacement (that should be capitalized). - Cutting discretionary expenses increases reported income, but the increase is temporary. Moreover, in subsequent period the company would have to catch up on the expenses (e.g., postponed repairs and maintenance costs), or will have lower revenue of higher costs (e.g., cutting advertising or R&D)	A decline in the SG&A/revenue ratio or in components of SG&A that are particularly discretionary or that represent investments in unrecognized intangibles (e.g., R&D, advertising)

Earnings quality issue	Explanation	Red flag or analysis
Manipulating estimates of accrued expenses ²⁵⁰	- Accrued expenses include compensation, vacation, healthcare, marketing, warranty, property taxes, and other liabilities that represent obligation for services that have already been received and consumed by the company but haven't yet been paid for. - In many cases companies have substantial discretion in measuring accrued expenses. This is especially true for estimated (as opposed to contractual) costs (e.g., warranties, restructuring), and in interim reports (see below). - Companies may understate the cost of services already received to understate the liability and related expense.²⁵¹ - Companies may overstate accrued expenses in one period and reverse them in subsequent periods (e.g., in order to smooth earnings). Such manipulation is particularly attractive when the creation of the reserve is classified as unusual or non-core (e.g., restructuring or litigation) and the reversal is hidden in recurring income.²⁵²	- A low level of or a decrease in the accrued liabilities / revenue ratio may indicate understatement or reversal of accrued liabilities, which in turn implies that income is overstated - Repeated negative adjustments to restructuring or other accrued liabilities (this suggests that the liabilities are initially overstated, and that subsequent adjustments reduce reported expenses). - A large increase in the accrued liabilities / revenue ratio may indicate that management is creating "cookie jar" reserves, which in turn implies that income is understated.
Failure to recognize accrued expenses	For example, waiting until receipt of invoice or other supporting documents (e.g., a utility bill) or until payment (e.g., FICA payment on bonus) to recognize the expense.	

²⁵⁰ Accrued liabilities consist of accrued expenses and deferred revenue. This section focuses on accrued expenses; deferred revenue is discussed in Section 5.1.

²⁵¹ Example of **manipulating accrued expenses** (SEC AAER No. 4094): "Healthcare Reserve Accrual: PPG is self-insured and retains a reserve for healthcare claims that have been incurred but not yet reported. It records an accrual every month and evaluates and adjusts, if necessary, the reserve on a quarterly basis. At the end of Q2 2017, the reserve for healthcare claims was underaccrued by \$3.5 million, based on actual claims incurred to that date. Officer A directed a subordinate not to make the \$3.5 million accrual in Q2 2017, but instead to delay the accrual until Q3 2017. Compensation Expense Accrual: Pursuant to a contract requiring compensation payments to a PPG employee who departed in Q2 2017, PPG should have recorded a \$4.8 million accrual in that quarter. Instead, at Officer A's direction and without a reasonable basis, PPG recorded only \$1.3 million in Q2 2017 and spread the remaining \$3.5 million accrual over the rest of the year. Vacation Pay Accruals: During Q2 2017, a policy change related to employee vacation pay required the accrual of \$3.5 million ratably over the rest of 2017. At Officer A's direction, no expense was recorded in Q2 or Q3 2017. While the full amount was accrued in Q4 2017, PPG was underaccrued by \$0.885 million and \$1.329 million in Q2 2017 and Q3 2017, respectively. ... Legal Expenses and Property Tax Accruals: During the closing process for Q1 2018, Officer A directed subordinates not to record certain legal and property tax accruals for the quarter, and instead to put them off until Q2. The proper GAAP accounting is to recognize expenses when they are incurred or the benefit received. This improper failure to record expenses of \$311,684 was reflected in PPG's books and records for Q1 2018 as of mid-April 2018. Incentive Compensation/Management Award Plan Accrual: PPG has an incentive compensation plan that is based on performance factors. PPG adjusts its accrual for this annual expense based on changes in the factors, followed by a true-up in March of the following year to account for differences between the accrued amount and the final amount approved for payout. During the Q1 2018 closing process, Officer A directed his staff not to record the true-up, a \$963,021 expense, but instead to delay it to Q2 2018, in contravention of GAAP."

²⁵² Example of **manipulating restructuring charges** (SEC AAER No. 1393): From the last quarter of 1996 until June 1998, Sunbeam Corporation's senior management created the illusion of a successful restructuring of Sunbeam in order to inflate its stock price and thus improve its value as an acquisition target. To this end, management created \$35 million restructuring reserves and other "cookie jar" reserves as part of a year-end 1996 restructuring, which were reversed into income the following year.

Earnings quality issue	Explanation	Red flag or analysis
Classifying recurring expenses as “one time”	A common abuse is to include recurring expenses in items classified as unusual or non-core (e.g., restructuring or litigation) in order to inflate earnings before one-time charges.²⁵³	- Repeated recognition of restructuring charges - Recognition of restructuring charges accompanied by a decrease in recurring expenses. - Estimate recurring profitability by smoothing rather than excluding volatile operating items such as restructuring charges, impairment losses on assets other than goodwill, litigation losses, etc. One approach is to calculate the “normal” level of such items (to be included in recurring earnings) using the product of revenue and the average level of the charges as a percentage of revenue in recent years.
Manipulating estimates in interim reports	- Manipulating earnings by “managing” accrued expenses is particularly feasible in interim reporting, both because they are unaudited and are prepared using the integral approach (in the US). Under the integral approach (unlike the discrete approach used by IFRS firms), fiscal years are viewed as discrete periods, while quarters are viewed as an integral part of the fiscal year. Accordingly, some items in quarterly reports are adjusted to reflect the effects of actual and expected transactions in other (past and future) quarters of the same fiscal year. - These standards provide firms with additional discretion in preparing quarterly reports, which may be exploited to manipulate earnings.²⁵⁴ - The ability to manipulate may be especially high if the expense is estimated based on measures of annual activity such as earnings-based management bonus.	Unusual patterns in the ratio of accrued expenses to sales.

²⁵³ Example of *including recurring costs in restructuring charges* (SEC AAER No. 1721): In 1997 “SmarTalk reported a one-time charge, a \$25 million restructuring reserve, purportedly for anticipated 1998 costs, after its purchase of several other prepaid telephone card businesses. ... the entire restructuring reserve did not conform to GAAP because the anticipated costs were not proper restructuring costs ... Also, ... SmarTalk improperly understated current period operating expenses by charging 1997 operating expenses and 1998 operating expenses against the restructuring reserve. This enabled SmarTalk to falsely inflate earnings (or earnings before one-time charges) at year-end 1997 and the first two quarters of 1998.”

²⁵⁴ Examples of *manipulating expense estimates in quarterly reports*. Example 1 (SEC AAER No. 4175): “Interface paid non-discretionary management bonuses based on the achievement of established targets for operating income before incentives (‘OIBI’) and cash flow. If Interface met the stated ‘goal’ for those targets, management would receive 100% of their bonus potential. If Interface exceeded the goal, management would receive up to a maximum, 150%, of their bonus potential depending on the amount by which the goal was exceeded. ... During the closing process for the second quarter, ... Bauer kept the accrual level at well below 100% despite the best estimates that showed a maximum, 150%, annual bonus was probable to be paid.” Example 2 (SEC AAER No. 1563): For management purposes, Microsoft established budgets for marketing expenses for each fiscal quarter as a substantially constant percentage of forecasted revenue. During the first three quarters of a fiscal year, recorded expenses typically were less than budgeted expenses. Microsoft treated the difference between recorded expenses and budgeted expense as incurred but unbilled expenses. At the end of each of the first three fiscal quarters, Microsoft adjusted recorded marketing expense by increasing recorded expenses to the budgeted amount. The difference between recorded expenses and budget were credited to a marketing accrual. Microsoft’s marketing accrual tended to increase during the first three fiscal quarters because, during each of these quarters, the difference between recorded and budgeted marketing expenses would be added into reported expenses. At the end of each fiscal year, Microsoft reversed the marketing accrual and released it into income.

Earnings quality issue	Explanation	Red flag or analysis
Improper recognition of loss contingencies	- Given the high discretion involved in estimating loss probabilities and loss magnitudes, it is relatively easy to manipulate the recognition of most loss contingencies. - Managers often have strong incentives to understate the amount or likelihood of potential loss, to provide limited disclosure, or even not to disclose the contingency at all, as such disclosures could be used as an admission of guilt by litigation adversaries or other claimants (e.g., Hennes 2014). - Firms may not recognize probable and estimable loss contingencies, or they may manage earnings by understating or overstating recognized contingencies or reversing previously recognized amounts.²⁵⁵ - Earnings management related to loss contingencies is a major issue when analyzing insurance companies (see Nissim 2010 and Section 5.22 below).	- Recognized amounts appear insufficient given information provided in company disclosures (e.g., footnotes, other 10-K disclosures, 8-K)²⁵⁶ or obtained from other sources such as the media or federal court dockets (e.g., Carrizosa and Cazier 2020). For example, the firm made an offer to the plaintiff more than the amount recognized. - Large changes in recognized loss contingencies (if disclosed) or in “other liabilities.” - Losses recognized only or mostly at the end of litigation. - High Directors & Officers insurance premiums.

²⁵⁵ Examples of *manipulating loss contingencies*. Example 1 (SEC AAER No. 4164): From 2012 until the fourth quarter of 2016, BorgWarner failed to estimate its “incurred but not reported” or “IBNR” liability for future asbestos claims. As a result, BorgWarner’s financial statements were materially misstated. Although the Company recorded liabilities for filed asbestos-related claims and noted that future claims were probable, prior to 2016, BorgWarner concluded that it could not reasonably estimate its IBNR liability for future asbestos claims. BorgWarner came to this conclusion without conducting sufficient analysis, including any substantive quantitative inquiry, despite possessing nearly 40 years of historical raw claims data. Rather, the Company’s assessment was based on untested qualitative assumptions not relevant to calculating an estimate. As reported in its 2017 Form 10-K/A, filed in 2018, BorgWarner could have estimated its IBNR asbestos liability as early as 2012. In the fourth quarter of 2016, BorgWarner recorded a pre-tax \$703.6 million charge for the IBNR liability and identified the charge as being the result of a change in estimate. Thereafter, the Company concluded that the charge was the result of an error and filed a restatement in 2018 to reflect its IBNR liabilities in appropriate prior periods dating back to 2012. The restated numbers were material to the Company’s financial statements and impacted, among other items, the amounts accrued for asbestos-related liabilities and pre-tax earnings. BorgWarner reported that its failure to record the IBNR estimate was due to a material weakness in the Company’s internal controls over financial reporting. Example 2 (SEC AAER No. 4244): “Healthcare Services Group, Inc. (“HCSG”) [failed] to properly accrue for or disclose loss contingencies relating to pending civil litigation in violation of [GAAP], resulting in the reporting of inflated net income and [EPS] in certain periods. From 2014 to 2015, HCSG was facing a series of large class- and collective-action lawsuits filed on behalf of HCSG employees in state and federal courts, alleging the company had violated state and federal wage-and-hour labor laws. HCSG agreed to seek out-of-court settlements with plaintiffs in these lawsuits, and ultimately submitted settlement agreements to the applicable courts for preliminary and final approval. However, John C. Shea (“Shea”), HCSG’s then-Chief Financial Officer, did not direct the accrual for and disclosure of the loss contingencies for those settlements as required by GAAP, resulting in HCSG’s misstatement of net income and EPS that did not accurately reflect the company’s underlying performance in multiple quarters. Had HCSG properly recorded the financial impact of the loss contingencies at the time they were probable and reasonably estimable, the company would have reported lower EPS and missed research analysts’ consensus EPS estimates in many of the applicable quarters, including by as little as a penny. The company also would not have been able to report multiple quarters of EPS growth, including then-record-high EPS. For the quarters when HCSG eventually accrued for the loss contingencies, the accruals contributed to the company’s reporting of a net loss and loss per share, or reporting EPS that missed consensus estimates by a wide margin.”

²⁵⁶ Hennes (2014) finds that company disclosures provide limited quantitative detail regarding the magnitude of expected loss from employment discrimination cases. However, the text of the disclosures does provide qualitative indicators of the probability of loss. In particular, statements about the inestimable nature of the loss and statements about the firm’s willingness to consider a settlement are related to higher probabilities of loss and higher loss amounts. In addition, statements regarding an existing accrual for losses and warnings about materiality reflect a higher likelihood of a nontrivial loss.

Earnings quality issue	Explanation	Red flag or analysis
Improper disclosure	• Since recognized amounts generally fail to reflect the impact of contingencies on the financial position, disclosures play a key role for these items. • Thus, failing to disclose material commitments or contingencies, or inadequate disclosures of material commitments or contingencies, may significantly affect accounting quality.^{257, 258}	• Missing, limited, unclear, “boilerplate” or otherwise inadequate disclosure related to loss contingencies. • Indication of significant lawsuits or other loss contingencies (e.g., from media, analyst reports, court dockets), but limited or no discussion in the financial report.

²⁵⁷ Billings et al. (2021) collect a sample of 75,421 lawsuits filed against 90,255 public company defendants from 2006 through 2016 using federal district court docket information. These lawsuits involve an array of allegations, including product liability, civil rights discrimination, improper compensation and labor practices, antitrust violations, pollution, trademark and copyright violations, and patent infringement. They find that only 3% of lawsuit-defendants disclose the pending litigation at any point, with disclosure by plaintiffs and fellow defendants increasing the overall rate of disclosure to 6%. If disclosed, the decision to do so typically occurs early in the legal process, suggesting that the type of claim and the circumstances surrounding its filing—as opposed to how the lawsuit unfolds over time—drive the decision to disclose. Prior SEC scrutiny, the desire to hide potential losses that may make existing debt look particularly risky, and incentives to shape the narrative relative to other available lawsuit information factor into firms’ disclosure decisions.

²⁵⁸ The following quote is from a recent SEC comment letter. “We note your disclosure that it is reasonably possible that additional exposure to estimated future claims in excess of the amount accrued could have a material, unfavorable impact on the financial statements. If it is at least reasonably possible that a loss exceeding amounts already recognized may have been incurred and the amount of that additional loss would be material, either disclose the estimated additional loss, or range of loss that is reasonably possible, or state that such an estimate cannot be made. Refer to ASC 450-20-50-4.”

5.7 Assets and liabilities held for sale and discontinued operations

Assets and liabilities held for sale

Long-lived assets or disposal groups are classified as held for sale in the period in which all the following criteria are met:

- Management commits to a plan to sell the asset or disposal group
- The asset or disposal group is available for immediate sale
- An active program to locate a buyer and other actions required to complete the plan to sell the asset or disposal group have been initiated
- The sale of the asset or disposal group is probable within one year, except if events or circumstances beyond the company's control extend the period required to sell the asset or disposal group beyond one year
- The asset or disposal group is being actively marketed for sale at a price that is reasonable in relation to its current fair value
- Actions required to complete the plan indicate that it is unlikely that significant changes to the plan will be made or that the plan will be withdrawn

Long-lived assets or disposal groups held for sale are initially measured at the lower of their carrying amount and fair value less costs to sell. In subsequent periods, changes in the fair value less costs to sell are reported as an adjustment to the carrying value of the long-lived assets or disposal groups, as long as the new carrying value does not exceed the carrying value immediately before the held for sale classification. The initial loss, if any, and subsequent losses or recoveries are recognized in income in the periods of change.²⁵⁹ Assets classified as held for sale are not depreciated. Assets and liabilities held for sale are reported separately on the balance sheet, generally in current assets and current liabilities.

Discontinued operations

Discontinued operations are a business—or a component of a business—that the organization has already discontinued or plans to discontinue (and the related disposal group meets the held for sale criteria), provided that the disposal represents a strategic shift that has a major effect on the organization's operations and financial results. A business that meets the criteria for held for sale on the acquisition date is also classified as discontinued operations. Examples of discontinued operations include a disposal of a major geographic area, a major line of business, and a major equity method investment.

Assets and liabilities of discontinued operations are reported separately on the balance sheet, generally in current assets and current liabilities. Income from discontinued operations is reported separately, net of income taxes, below income from continuing operations. Similarly, cash flows from operating, investing, and financing activities associated with discontinued

²⁵⁹ Losses and recoveries associated with disposal groups are allocated to long-lived assets, not to current assets or liabilities (there is no change in the accounting treatment for these items).

operations are reported separately. All comparative financial statements are re-presented to separate the amounts related to discontinued operations.

IFRS

IFRS is generally similar, except

- Held-for-sale accounting also applies to assets and disposal groups held for distribution.
- There is no requirement to re-present comparative financial statements for discontinued operations.

Earnings quality

Table 5.7A describes earnings quality issues, red flags and analyses related to assets and liabilities held-for-sale and discontinued operations.

Table 5.7A: Earnings quality – assets and liabilities held-for-sale and discontinued operations

Earnings quality issue	Explanation	Red flag or analysis
Classifying assets as held for sale to avoid depreciation	Once classified as held for sale, depreciation is discontinued. Thus, companies may increase earnings by classifying fixed assets as held for sale.	Significant fixed assets classified as held for sale or included in assets of discontinued operations
Shifting income from discontinued operations to continuing operations	This can be done either by reporting expenses or losses from continued operations as discontinued (e.g., Barua et al. 2010) or including income or gains from discontinued operations in continuing operations.²⁶⁰	- Higher than expected income from continuing operations or lower than expected income from discontinued operations - Losses from discontinued operations²⁶¹
Manipulating fair value estimates used in measuring assets held for sale	- Assets held for sale are reported at the lower of cost and fair value less cost to sale. Thus, by overstating the fair value of the assets, firms may avoid reporting losses. - Moreover, to the extent that the fair value of impaired assets held for sale recovers, previously recognized losses are reversed. Thus, companies may increase reported income by overstating fair value recoveries.	Gains from recoveries in fair value
Manipulating the classification of discontinued operations	- Disposal groups are classified as discontinued operations only if they satisfy several criteria (discussed above), which are quite subjective. - There is greater transparency with respect to the operating results of discontinued operations versus other disposal groups. - When evaluating performance and estimating the value of companies, investors and analysts generally focus on earnings from continuing operations. Thus, firms generally prefer to classify low (high) profitability disposal groups as part of discontinued (continuing) operations.	Significant disposal groups not classified as discontinued operations.

²⁶⁰ For example, according to SEC AAER No. 4094, “In Q4 2017, PPG determined to release \$2 million of reserve related to the demolition of a former PPG facility used in the flat glass line of business, and \$2.7 million of reserve related to a workers’ compensation contingency connected to the sale of the U.S. fiberglass business. Despite the fact that these were discontinued businesses, Officer A directed his subordinates to misclassify the gains as income from continuing operations.”

²⁶¹ Barua et al. (2010) provide evidence that managers shift operating expenses from continuing operations into income-decreasing, but not income-increasing, discontinued operations. Kaplan et al. (2020) argue—and provide supporting evidence—that valuation considerations explain this asymmetric result; specifically, income-generating discontinued operations are valued using earnings multiples, while loss-making operations are valued based on book value.

5.8 Income taxes

Income measurement for financial reporting is governed by GAAP, while income measurement for determining taxable income is governed by tax laws. GAAP and tax laws treat many transactions differently, and accordingly pretax income in the financial statements (hereafter **book income**) and **taxable income** in the tax return typically differ.

There are two types of differences between book income and taxable income: permanent differences and timing differences. **Permanent differences** are due to items that affect the computation of either book income or taxable income but never affect the other. **Timing differences** are due to items that are recognized in different periods for tax and financial reporting purposes.

Permanent differences include revenues that are never included in taxable income (e.g., most interest earned on state and municipal bonds, officers' life insurance proceeds); expenses that are never deducted in calculating taxable income (e.g., excessive compensation, fines and other expenses that result from a violation of law, officers' life insurance premium payments); and deductions in calculating taxable income that are never recognized as expenses (e.g., stock-based compensation excess tax benefits, deduction for dividends received from U.S. corporations, deduction for percentage depletion of natural resources in excess of their cost).

Timing differences result primarily from transactions that for tax purposes are accounted for on a cash basis (e.g., rent) or non-discretionary basis (e.g., depreciation). They include revenues that are reported in taxable income before they are recognized in the income statement (e.g., subscription revenue); expenses that are deducted in calculating taxable income before they are recognized in the income statement (e.g., bonus depreciation and accelerated depreciation); revenues that are recognized in the income statement before they are included in taxable income (e.g., installment sales); and expenses that are recognized in the income statement before they are deducted in calculating taxable income (e.g., bad debt expense).^{262,263}

Timing differences between book and taxable income create **temporary differences** between the book value and tax basis of related assets or liabilities, which will reverse in future periods. These expected reversals necessitate the recognition of **deferred tax assets and liabilities**, which

²⁶² For tax purposes, the following revenues and expenses are generally recognized on a cash basis: rent, subscription, installment sales, warranty, restructuring, pension, other postemployment benefits, and vacation (this is not a comprehensive list). In addition, depreciation is calculated using mandated tables, inventory write-downs are effectively deducted when the inventory is sold, book impairment is deducted through depreciation, and bad debt expense is deductible when specific receivables are written-off.

²⁶³ Timing differences result primarily from the tax code emphasizing additional considerations besides measuring economic performance, including encouraging some activities (e.g., bonus depreciation and accelerated depreciation lead to increased investments), limiting tax evasion (by reducing discretion), and increasing the likelihood of cash availability to pay taxes (in some cases taxing income when received rather than when earned). Permanent differences result from provisions aimed at discouraging some activities (e.g., non-deductibility of fines and expenses resulting from a violation of laws, limits on deductibility of excess compensation), supporting others (e.g., exclusion of interest income on state and municipal bonds, deduction for percentage depletion), reducing layering of taxes (dividend received deduction), and other considerations.

measure the expected tax consequences of the reversals. For example, paying rent for a period that extends into next year creates a temporary difference between the book value of prepaid rent and its (zero) tax basis at the end of the year (the tax basis is zero because the rent payment has already been deducted for tax purposes). This temporary difference will reverse next year as the prepaid rent asset is expensed, resulting in a larger tax payment than implied by book income (taxable income will be larger than book income because the rent payment cannot be deducted again in the calculation of taxable income next year). Therefore, at the end of the current period, a deferred tax liability is accrued to account for the additional future tax payment. It is calculated as the product of the temporary difference and the enacted tax rate for next year.²⁶⁴

While most temporary differences between the book value and tax basis of assets and liabilities result from timing differences between book and taxable income, some differences are due to other comprehensive income or to business combinations. For example, unrealized gains or losses change the book value but not the tax basis of available for sale securities, with the gain or loss recognized in other comprehensive income rather than in book income. Similarly, asset and liabilities of acquired businesses are generally reported on the balance sheet based on their fair value at the time of the business combination, but their tax basis is often unaffected by the business combination. These temporary differences also necessitate the recognition of deferred tax assets or liabilities.²⁶⁵

Permanent differences, in contrast, affect only the period in which they occur (e.g., interest on state bonds); they do not generate a difference between book income and taxable income in future periods. Thus, permanent differences do not create deferred tax assets or liabilities. Permanent differences are much less common than temporary differences.

Deferred tax assets and liabilities are calculated by applying the *tax rates enacted for future years* to temporary differences between the book value and tax basis of assets and liabilities. Thus, when tax rates change, the amount of deferred taxes is adjusted.

Deferred taxes are reported *undiscounted*, even if reversal is expected in the distant future (e.g., depreciation of long-lived assets). Thus, the book value of deferred taxes often substantially overstates the economic asset or liability.

Future deductible amounts are beneficial only if the firm is expected to have taxable amounts in the future. Thus, a **valuation allowance** should be recognized if it is “more likely than not” that some portion or all the deferred tax asset will not be realized. The valuation allowance is

²⁶⁴ As another example, recognizing accrued warranty costs creates a temporary difference between the book value of the warranty liability and its (zero) tax basis, because warranty costs are deducted when paid for tax purposes. This temporary difference will reverse in future periods when warranty costs are paid, resulting in a smaller tax payment than implied by book income (taxable income will be reduced by warranty payments, but book income will not be reduced again for the same cost). Therefore, at the end of the current period, a deferred tax asset is recognized to reflect the future tax benefit. It is calculated as the product of the temporary difference and the enacted tax rate for next year.

²⁶⁵ An important exception is that no deferred tax liability is recognized with respect to temporary differences arising at the acquisition date from nondeductible goodwill or for the excess of financial reporting goodwill over tax goodwill.

deducted from the deferred tax asset, reducing its book value to the amount expected to be realized. In contrast, firms are not allowed to reduce deferred tax liabilities to the amount expected to be paid.

Deferred tax assets and liabilities are classified as noncurrent and are reported net within tax jurisdictions. For example, a federal deferred tax asset is netted against a federal deferred tax liability but not against a state deferred tax liability.

The recognition of deferred taxes on the balance sheet requires that equity be adjusted. This is generally done by including a deferred tax component in the income tax expense, which adjusts net income and hence retained earnings (equity). That is, the income tax expense is calculated as the sum of two components: income taxes owed for the current period (*current portion*), and the change in the net deferred tax liability (*deferred portion*).²⁶⁶ This approach for measuring the income tax expense is called the asset-liability or balance sheet approach, and it is required under both U.S. GAAP and IFRS.

Although calculated using a balance sheet approach, the income tax expense can also be explained using a generalization of the matching principle. Deferred income taxes are included in the income tax expense to better align it with currently reported pretax book income. Differences in the timing of revenue and expense recognition for book and tax purposes distort the relationship between current income taxes (which are based on taxable income) and pretax book income, and deferred taxes effectively correct this misalignment. For example,

- Accelerated tax depreciation (including bonus depreciation) shifts taxable income from the current to future years – the deferred tax expense is increased to reflect the future taxes.
- Some installment sales are recognized at the time of delivery for book purposes but on a cash basis for tax purposes – the deferred tax expense is increased to reflect the future taxes.
- Many estimated expenses are deducted when paid (e.g., warranty, accrued compensation, restructuring) – the deferred tax expense is reduced to reflect the future tax benefit.

However, inconsistent with matching (and consistent with a balance sheet approach), deferred income taxes also include adjustments to revalue previously recognized tax-related assets and liabilities (e.g., impact of changes in tax rates or tax law, adjustment to the tax valuation allowance).

²⁶⁶ Not all changes in deferred tax assets and liabilities are recognized in the income statement. Changes in deferred taxes due to revaluations of assets and liabilities that haven't yet been recognized in income (e.g., unrealized gains or losses on available for sale securities, cumulative foreign currency translation adjustment) are netted against other comprehensive income (in the statement of comprehensive income) and are thus included in AOCI on the balance sheet. For example, a \$100 increase in the value of available for sales securities is balanced by increasing deferred tax liabilities by $\$100 \times t$ and AOCI by $\$100 \times (1-t)$. In addition, deferred taxes recognized due differences between the fair value and tax basis of assets and liabilities acquired in business combinations during the year are generally reflected in the payment and—to the extent that the recognized amount of deferred taxes is different from their fair value—in goodwill. For example, assume a company can either buy a machine for \$100 or buy a business that owns the same machine but has already depreciated 30% of the cost for tax purposes (so the tax basis is \$70). Assume also that the tax rate is 40%, but the present value of a dollar of depreciation tax shield is \$.8 due to the time value of money and the possibility of not having enough taxable income to benefit from the depreciation tax deduction. In the business combination case, the company will recognize PP&E of \$100 and deferred tax liability of \$12 ($=40\% \times [100-70]$). However, the lost value of depreciation deduction is just $\$30 \times 40\% \times .8 = 9.6$, so the company will pay \$90.4 and goodwill will absorb the \$2.4 difference.

Income taxes are subject to significant uncertainty. Tax authorities often disallow some tax positions, and the tax amount ultimately paid is often significantly larger than that calculated in the initial tax filing. In the financial statements, companies should recognize the tax benefit of an ***uncertain tax position*** only if the position is “more likely than not” to be sustained based on its technical merits. Even then, the net benefit recognized is “the largest amount of tax benefit that is greater than 50% likely of being realized.” The procedure followed is to initially measure current income taxes based on the full benefit claimed (or expected to be claimed), but then adjust it by recognizing a liability (called “***unrecognized tax benefits***”) for any excess of the full benefit over the net benefit (as defined above) along with any expected interest and penalty (if applicable) on the excess.

IFRS is similar to U.S. GAAP, except

- Uncertain tax positions are recognized (1) in full if probability of full deduction is greater than 50%, or (2) using either the expected value or most likely amount if the probability is less than or equal to 50% (IFRIC 23, effective 2019).
- Deferred tax items are measured based on applicable tax rates and tax laws that are enacted or *substantively* enacted.
- Deferred tax assets are recognized to the extent that their realization is “more likely than not;” there is no valuation allowance, but the net effect is the same as U.S. GAAP.
- Income tax effects resulting from intragroup profits are deferred at the buyer’s tax rate and recognized upon sale to a third party.

Key ratios used to evaluate earnings quality related to income taxes include the effective tax rate ([Section 2.6](#)), the ratio of tax-code net income to reported net income ([Section 2.7](#)), and life-stage index ([Section 3.4.7](#)).

Table 5.8A describes ***earnings quality issues***, red flags and analyses related to income taxes.

Table 5.8A: Earnings quality – income taxes

Earnings quality issue	Explanation	Red flag or analysis
Change in the tax valuation allowance	- The measurement of the tax valuation allowance is highly discretionary, and firms may exploit this discretion to manipulate earnings.²⁶⁷ - Changes in the valuation allowance, even if justifiable, represent a transitory earnings effect (see “Transitory income taxes” below).	- A decrease in the tax valuation allowance, or no tax valuation allowance, especially if the deferred tax asset increased and the company appears to perform poorly. - Low or decreasing effective tax rate.
Change in the liability for unrecognized tax benefits	- Measuring this liability involves substantial discretion, which firms may exploit to manipulate income. - Changes in the liability for unrecognized tax benefits that are recognized in earnings, even if justifiable, represent a transitory earnings effect (see “Transitory income taxes” below). - Reductions in the liability for unrecognized tax benefits that are recognized in earnings may lead to higher future income taxes due to higher likelihood of tax audit and lower tax aggressiveness by the company.²⁶⁸ “Unrecognized tax benefits” are typically included in “other liabilities,” with changes in the liability generally recognized by adjusting the current portion of income tax expense.²⁶⁹	- A decrease in the liability for unrecognized tax benefits, especially if due to revisions to past estimates. - Low or decreasing effective tax rate. - Low or decreasing value of [current income taxes / book income]

²⁶⁷ The following quote is from a recent SEC comment letter. “We note that you have net deferred tax assets of \$XX million as of 31 December 2019 and that you have been in a three-year cumulative loss position since 31 December 2018. Please provide us with your comprehensive analysis of the specific positive and negative evidence management evaluated in arriving at the conclusion that a full valuation allowance is not needed as of 31 December 2019. Your analysis should include the weighting of the evidence that is commensurate with the extent to which it is objectively verified. For any tax-planning strategies that you are relying on in your analysis, please ensure that your discussion provides us with a detailed explanation of their nature and any uncertainties, risks and assumptions for those strategies.”

²⁶⁸ Holt et al. (2021) find that firms become less tax aggressive in years subsequent to tax positions going unchallenged, consistent with firms anticipating heightened tax authority scrutiny after disclosing unchallenged tax positions in their financial statements. The authors also find that IRS downloads of firms’ financial statements increase after firms disclose unchallenged tax positions.

²⁶⁹ Example of *manipulating tax reserves* (SEC LR No. 20206): In fiscal year 1999, ConAgra Foods reduced a previously established tax reserve by \$4,658,064. Internal documents noted that this “cushion was recorded to reduce [ConAgra’s] tax expense so that the effective tax rate before restructuring would be 38%,” and that there was “no economic substance” underlying this reduction. Without the reduction, ConAgra would have missed the Wall Street analysts’ consensus estimate of \$0.41 EPS by \$0.01. In the income tax note, ConAgra included the reduction as a component of a \$12.2 million line-item amount entitled “Export and jobs tax credits.” This line item was contained within a tabular presentation of the Company’s income tax expense. This disclosure was inaccurate because the arbitrary reduction of ConAgra’s income tax provision had nothing to do with export and jobs tax credits.

Earnings quality issue	Explanation	Red flag or analysis
Relatively small income tax payments	- Relatively small income tax payments (compared to book income or to perceived economic profits) imply high tax aggressiveness. - High tax aggressiveness, in turn, implies high direct and indirect risks, and therefore low likelihood of earnings sustainability (e.g., Graham et al. 2014), including potential harm to the company's reputation, risk of detection and challenge by the IRS, risk of adverse media attention, and the possibility of having to later restate financial statements. See Section 2.7 for further discussion.	Relatively low levels of the following ratios: <i>current ETR</i> (i.e., ETR measured using only the current portion of income taxes), <i>tax-code net income to net income</i>, and <i>cash ETR</i> (income taxes paid divided by book income).
Designating earnings of foreign subsidiaries as “permanently reinvested” to avoid having to recognize deferred tax liabilities	- Prior to TCJA, repatriated earnings were generally subject to U.S. taxation. Accordingly, firms were required to recognize deferred tax liabilities for earnings of foreign subsidiaries to the extent that those earnings were expected to be repatriated and subject to U.S. taxation. Many firms designated earnings of foreign subsidiaries as “permanently reinvested” to avoid the recognition of deferred taxes. - Since 2017 (TCJA), this issue is less but still relevant (e.g., withholding taxes, translation effect, state taxes).	Significant unrepatriated earnings that (1) will be subject to taxes if repatriated, and (2) are designated as permanently reinvested
No discounting for the time value of money	- Deferred taxes are reported undiscounted. Given that a large portion of deferred taxes is related to items that reverse slowly—especially depreciation and postretirement benefits—this distortion is often quite large. - This distortion implies that both the deferred tax asset and deferred tax liability are overstated. The net effect on equity depends on the relative magnitudes and durations of the deferred tax asset and liability, and the effect on net income depends on the change over the period in the effect on equity.	- To evaluate the extent to which deferred taxes are overstated, one may examine the attribution of deferred tax assets and liabilities, as disclosed in the notes. - For example, if deferred taxes are due primarily to depreciation of fixed assets with relatively long useful lives, the overstatement is likely to be large because reversal is expected to occur over a relatively long period. - This is especially true if the company is growing and fixed assets are on average in their early years (e.g., low life-stage index; see Section 3.4.7)
Effective tax rate different from the economic tax rate	- Related to the previous point, because deferred income taxes are reported undiscounted, the effective tax rate is often a poor proxy for the economic tax rate. - Ignoring other distortions in measuring income taxes, the economic tax rate is generally between the effective tax rate and the ratio of current income taxes to book income.	
No discount for risk (deferred tax liability)	If future taxable income is negative, the deferred tax liability may never be paid. Unlike the deferred tax asset which is reduced by a valuation allowance to the amount expected to be realized, the deferred tax liability is reported in full ignoring the possibility that it may not be paid in whole (or at all).	

Earnings quality issue	Explanation	Red flag or analysis
Deficient disclosure	- An important source of information when predicting future tax rates is the effective tax rate reconciliation (see Section 2.6). In some cases, there is limited information.²⁷⁰ - Companies may have various motivations for providing deficient information or for making the disclosure less transparent.²⁷¹	- Dollar amount ETR presentation. - Limited information in the ETR reconciliation.
Change in the projected effective tax rate used in measuring quarterly income taxes	- The year-to-date income tax expense is generally measured as the product of year-to-date pretax income and the projected annual effective tax rate. Thus, firms may manage the quarterly income tax expense by manipulating the estimated annual effective tax rate.²⁷² - Even if not manipulated, estimating the annual effective tax rate involves substantial discretion and therefore potential measurement error. - Due to the cumulative nature of the quarterly income tax calculation, any change in the projected effective annual tax rate—whether justifiable or not—implies a transitory earnings effect.	Low quarterly effective tax rate, especially if it is lower than the year-to-date effective tax rate.

²⁷⁰ The following quote is from a recent SEC comment letter. “We note from your tax rate reconciliation that foreign income taxed at lower rates significantly impacted your effective tax rates. Please help us understand the nature of this reconciling item, including the primary taxing jurisdictions where your foreign earnings are derived and the relevant statutory rates in those jurisdictions. Please also discuss any incentivized tax rates you have been granted and briefly describe the factual circumstances of any tax holidays, the per-share effects of the tax holiday and the date upon which any special tax status terminates. Refer to ASC 740-10-50-12 and SAB Topic 11.C.”

²⁷¹ For example, when presenting the ETR reconciliation table, firms can choose a format that reveals the tax rate (the percentage format) or one that avoids explicit mention of the effective tax rate (the dollar format). Chychyla et al. (2021) find that firms with low ETRs are 24 percent more likely to use the dollar format and are also less likely to mention their tax rates elsewhere in their disclosures, consistent with the reputational costs associated with disclosing low effective tax rate. They also find that analysts’ tax expense forecasts are less accurate for dollar format firms, suggesting higher processing costs associated with tax-related disclosures for these firms.

²⁷² Example of *manipulating reported income taxes in interim report* (SEC AAER No. 1987): In 1999-2001 Gerber overstated the income tax expense in the early quarters of each fiscal year and reversed the accrued tax liability during the latter quarters by crediting selling, general, and administrative expenses (instead of income taxes). That is, this alleged manipulation involved inflating operating income in addition to income shifting.

Earnings quality issue	Explanation	Red flag or analysis
Transitory income taxes	- The income tax expense may include transitory components such as the impact of changes in tax reserves (called “unrecognized tax benefits” in the U.S.), unreserved prior periods tax payments, changes in the tax valuation allowance (U.S.) or in unrecognized deferred tax assets (IFRS), and the cumulative impact of changes in tax rates or tax laws.²⁷³ - The amount of transitory tax components (e.g., change in the valuation allowance) is often disclosed explicitly in the effective tax reconciliation (if presented in amounts) or can be calculated by multiplying pretax income by the disclosed effect on the tax rate (if the effective tax reconciliation is presented in percentage form). - The effects of changes in the valuation allowance and in unrecognized tax benefits are often also reported in disclosures about deferred tax assets and unrecognized tax benefits, respectively. - Like other transitory items, transitory tax components reduce earnings sustainability.	- Identify transitory income tax components by examining the effective tax reconciliation, information on deferred tax assets (valuation allowance), and information on unrecognized tax benefits (tax reserves). - If there is limited information, or when conducting the analysis on a large set of firms, transitory income taxes can be estimating using the difference between the reported income tax expense and a pro-forma amount, calculated assuming that pretax income was subject to a “normal” tax rate as explained next. - The following procedure often provides reasonable estimates of transitory income taxes: (1) for the most recent year and for several prior years, calculate the ratio of the income tax expense to pretax income before goodwill impairment and equity method earnings (“<i>Adjusted Effective Tax Rate</i>”);²⁷⁴ (2) for each year, divide the adjusted effective tax rate by the year-specific <i>Combined Statutory Tax Rate</i> (“<i>Relative Tax Ratio</i>”);²⁷⁵ (3) calculate the median of the <i>Relative Tax Ratios</i>; (4) multiply the median from step (3) by the <i>Combined Statutory Tax Rate</i> in the most recent year to get the <i>Normal Tax Rate</i>;²⁷⁶ (5) subtract the <i>Normal Tax Rate</i> from the <i>Adjusted Effective Tax Rate</i> in the most recent year; and (6) multiply (5) by the most recent pretax income before goodwill impairment and equity method earnings.²⁷⁷

²⁷³ This is not a complete list. There may be additional transitory tax effects. For example, under ASU 2016-16 (effective since 2018): “an entity should recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. ... Two common examples of assets included in the scope of this Update are intellectual property and property, plant, and equipment.”

²⁷⁴ Goodwill impairment should be excluded because typically (1) goodwill has no tax basis (and so its impairment is not tax deductible), and (2) no deferred taxes are recognized on the corresponding book-tax difference. (Intangible assets other than goodwill also typically have zero-tax basis, but for them a deferred tax liability is recognized with respect to the corresponding book-tax difference. Accordingly, if these assets are impaired (reducing pretax income), the deferred tax liability is reversed (lowering the income tax expense).) Equity method earnings should be excluded because in most cases little if any income taxes are recognized on equity method income due to (1) the dividend received deduction (for U.S. investees); (2) designation of investees’ earnings as permanently reinvested (less important since TCJA but still relevant); (3) foreign tax credits; and (4) territorial taxation (since 2018). Equity method earnings are sometimes reported below the income tax expense, in which case no adjustment is required.

²⁷⁵ In some countries there is more than one layer of taxation (e.g., federal and state in the U.S., or corporation and trade/municipal in Germany). In the U.S., the effective tax reconciliation focuses on the statutory federal tax rate, with state and local income taxes accounted for as a reconciling adjustment. When estimating transitory income taxes using the above procedure (i.e., without considering information from the effective tax reconciliation), using a combined tax rate may produce more accurate estimates. The OECD provides country/year-specific combined tax rates (<http://stats.oecd.org/>). The combined U.S. corporate income tax rate includes federal, state, and local taxes, net of the effect of the deductibility of state and local taxes at the federal level, with state and local income taxes calculated using the weighted average of state and local tax rates considering the composition of business income across states and localities.

²⁷⁶ Alternatively, steps (2)-(4) can be combined to simply calculate the median of the ratios calculated in step (1). The problem with this approach, though, is that some of the variation in the effective tax rate over time may be due to changes in the combined statutory tax rate. For example, if one uses the median effective tax rate during 2016-2018 to estimate the normal tax rate for 2018, the estimate will substantially overstate the 2018 expected tax rate given the reduction in the 2018 tax rate mandated by TCJA. An alternative approach to measuring the normal tax rate is to use the sum of the current combined statutory tax rate and the median difference between the adjusted effective tax rate and the

Earnings quality issue	Explanation	Red flag or analysis
Income taxes in equity flow valuation	When valuing equity using the residual income, dividend discount, or equity flow models (common when valuing financial firms), one has to forecast the tax rate on pretax income to measure net income.²⁷⁸	- Forecast the future tax rate using the “<i>Normal Tax Rate</i>,” estimated using the following procedure (see “Transitory income taxes” above for explanations): (1) for the most recent year and for several prior years, calculate the ratio of the income tax expense to pretax income before goodwill impairment and equity method earnings (“<i>Adjusted Effective Tax Rate</i>”); (2) for each year, divide the adjusted effective tax rate by the year-specific <i>Combined Statutory Tax Rate</i> (to get the “<i>Relative Tax Ratio</i>”); (3) calculate the median of the <i>Relative Tax Ratios</i> over the years; (4) multiply the median from step (3) by the <i>Combined Statutory Tax Rate</i> expected in future years (typically the most recent combined statutory tax rate). - If information from the effective tax reconciliation is available, the above estimate may be improved by subtracting estimated transitory items (e.g., change in the valuation allowance) from the income tax expense in calculating the <i>Adjusted Effective Tax Rate</i> in step (1) above. - If the mix of domestic versus foreign income is expected to change, adjust the forecasted tax rate based on estimates of the domestic and foreign tax rates and the expected shift in the composition of pretax income. (The forecasted tax rates, as measured above, reflect the average composition of domestic and foreign income in past years.)

combined statutory tax rate over recent years. However, unlike the relative tax ratio, the difference is likely to change over time for reasons unrelated to transitory income taxes. For example, if pretax income is \$100 and taxable income is \$80 due to a \$20 permanent book-tax difference, a decrease in the statutory tax rate from 30% to 20% would reduce the effective tax rate by 8%, from 24% ($=80 \times 30\% / 100$) to 16% ($=80 \times 20\% / 100$). The relative tax rate, in contrast, would remain unchanged—0.8 ($=24\% / 30\%$) before the change and 0.8 ($=16\% / 20\%$) after the change.

²⁷⁷ One refinement that may improve accuracy is to exclude years with negative adjusted pretax income in calculating the median relative tax ratios (step (3)). Although the effective tax rate is potentially meaningful even when pretax income is negative (e.g., due to tax refunds or to the recognition of deferred tax assets for net operating losses), it tends to be particularly volatile when income is negative (e.g., due to adjustments to the valuation allowance).

²⁷⁸ The (net) equity flow model is an extension of the dividend discount model, which uses total (instead of per share) flows and includes in the flows net buyback (buybacks minus issuance) in addition to dividends.

Earnings quality issue	Explanation	Red flag or analysis
Income taxes in DCF valuation	- When conducting DCF valuation, at least two tax rates have to be estimated and forecasted: the tax rate on interest expense (for the WACC calculation) and the tax rate on operating profit (for the calculation of NOPAT and free cash flow). - The two tax rates are often quite different, for several reasons: (1) some items change the effective tax rate on operating income but not on interest expense (e.g., R&D tax credits, non-deductible compensation); (2) the distributions of operating profits and interest expense across the different tax jurisdictions that the company operates in may not be the same; and (3) the operating tax rate may vary over the explicit forecast years (e.g., due to expiration of temporary tax benefits to encourage investment), while the tax rate for WACC is assumed constant and is generally estimated using the average tax rate expected over many future years. - These differences generally imply that the tax rate on interest expense should be relatively close to the combined (federal & state) statutory tax rate, while the tax rate on operating profit can differ substantially from the combined statutory tax rate, especially if it is forecasted to change over time.	- When using the effective tax reconciliation to estimate the tax rates, the <i>Tax Rate on Interest</i> can be calculated as the sum of the federal statutory tax rate, the net effect of state and local income taxes, and the effect of foreign taxes being different from the federal tax rate. The last component can be omitted if most borrowing is domestic, or it can be averaged over time if highly volatile. - If there is limited information, or when conducting the analysis on a large set of firms, the tax rate on interest can be measured using the <i>Combined Statutory Tax Rate</i>. However, this approach may result in significant measurement error when valuing multinationals; in such cases, it may be better to use the <i>Normal Tax Rate</i> to measure the tax rates on both interest and operating profit (see previous earnings quality issue for the estimation of the <i>Normal Tax Rate</i>). - The tax rate on operating profit can be calculated using the following procedure. (1) For the most recent year and for several prior years, calculate the following ratio: the sum of (a) the income tax expense, and (b) the product of the <i>Tax Rate on Interest</i> and net interest expense, divided by pretax income before goodwill impairment, equity method earnings and net interest expense (“<i>Adjusted Effective Tax Rate on Operating Profit</i>”); (2) for each year, divide the <i>Adjusted Effective Tax Rate on Operating Profit</i> by the year-specific <i>Combined Statutory Tax Rate</i> (to get the “<i>Relative Operating Tax Ratio</i>”); (3) calculate the median of the <i>Relative Operating Tax Ratios</i> over the years; and (4) multiply the median from step (3) by the <i>Combined Statutory Tax Rate</i> expected in future years (typically the most recent combined statutory tax rate).²⁷⁹ - If information from the effective tax reconciliation is available, the above estimate may be improved by subtracting estimated transitory items (e.g., change in the valuation allowance) from the income tax expense in calculating the <i>Adjusted Effective Tax Rate on Operating Profit</i> in step (1) above. - If the mix of domestic versus foreign income is expected to change, adjust the forecasted tax rate based on estimates of the domestic and foreign tax rates and the expected shift in the composition of pretax income. (The forecasted tax rates, as measured above, reflect the average composition of domestic and foreign income in recent years.)

²⁷⁹ To see the importance of the interest expense adjustment, consider the following example. A company generates operating profit of \$100 and has interest expense of \$40 and operating tax credit of \$8 (e.g., for R&D). The statutory tax rate is 40%. The effective tax rate on operating income is 32% ($= [100 \times .4 - 8] / 100$), while the effective tax rate is 26.67% ($= ([100 - 40] \times .4 - 8) / [100 - 40]$).

Earnings quality issue	Explanation	Red flag or analysis
Income taxes in EV/EBITDA valuation	• EV/EBITDA depends on the expected long-term income tax rate on operating profit (in addition to other factors).	• When selecting peers for EV/EBITDA valuation, estimate and examine the expected long-term tax rate on operating profit of the target and potential peers (see previous earnings quality issue for approaches to estimating this tax rate). • Alternatively, or in addition, adjust the estimated multiple for the likely impact of tax rate differences across the peers and the target company.

5.9 Leases

A *lease* is a contract between a *lessor* and a *lessee* that conveys the right to control the use of identified property, plant, or equipment for a period of time in exchange for consideration. Lease transactions are very common. The benefits to lessees include the ability to obtain control over assets with close to 100% financing, bearing lower risk compared to ownership (e.g., of obsolescence), and having greater flexibility (e.g., asset upgrades or returns, contingent rentals, re-negotiation of terms or exit, borrowing capacity).²⁸⁰ From lessors' perspective, leases are a form of secured lending with enhanced bankruptcy protection benefits (e.g., ability to evict the lessee in a Chapter 11 bankruptcy and find new tenants), which also enables them to earn a dealer's profit and/or profit from lessees' payment for the benefits they obtain. In some cases, lease transactions allow for tax arbitrage, shifting tax deductions between lessors and lessees.²⁸¹

Before 2019, under ASC 840 lessees accounted for almost all leases using the *operating lease method*, under which obligations to make future lease payments and the right to use leased assets were not recognized on the balance sheet. Lease payments were generally recognized as prepaid rent and were expensed over the period to which they related. If the lease contract included escalating lease payments or a "*rent holiday*," the rent expense was straight-lined with a corresponding balance sheet accrual. In unusual cases, where at least one of four criteria were satisfied, the lease was considered to transfer substantially all of the benefits and risks of ownership to the lessee and was accordingly accounted for as borrowing and asset acquisition (*capital lease method*).²⁸² Specifically, at inception the lessee recorded the incurrence of an obligation and the acquisition of an asset equal to the lesser of the present value of the minimum lease payments and the fair value of the leased property. Subsequently, the lessee treated the periodic lease payments as repayment of the lease obligation and interest. The lessee also depreciated the leased property in a manner consistent with its normal depreciation policy for owned assets. The depreciation period was restricted to the lease term rather than the life of the asset, unless the lease provided for transfer of title or included a bargain purchase option.

ASC 842, which is effective **since 2019**, requires the capitalization of substantially all leases on the balance sheet and disclosure of key information about leasing arrangements. Under the new guidance, at the *lease commencement date*, a lessee recognizes a right-of-use asset and a lease liability. The lease liability is measured at the present value of expected lease payments²⁸³ (as of

²⁸⁰ For example, Caskey and Ozel (2019) provide evidence that expanding financing capacity, accommodating volatile operations, and maximizing the present value of tax deductions are all important drivers of leasing decisions.

²⁸¹ Tax considerations related to leasing and debt-financed asset acquisition include bonus depreciation, accelerated depreciation, interest deductibility, and the non-deductibility of payments for acquiring as opposed to leasing land. If the lessee and lessor face different economic tax rates (e.g., due to operating losses or limits on interest deductibility), leasing effectively enables a tax arbitrage.

²⁸² The four criteria were: (1) transfer of ownership at end of lease; (2) option to buy the leased asset at a bargain price; (3) lease term covers at least 75% of the asset's useful life; and (4) the present value of lease payments is at least 90% of the fair value of the leased asset.

²⁸³ *Expected lease payments* include the predetermined payments for the non-cancellable portion of the lease as well as (1) payments for renewal periods for any periods when it's reasonably certain that the lessee will exercise the

the lease commencement date) over the lease term,²⁸⁴ discounted at the rate implicit in the lease or at the lessee incremental borrowing rate (if the rate implicit in the lease is unknown to the lessee, as is typically the case).²⁸⁵ The *right-of-use asset* is measured as the total of the initial lease liability, any lease payments made to the lessor at or before the commencement date, and any initial direct costs incurred by the lessee (e.g., commissions), reduced by any lease incentives received (e.g., tenant improvement allowance, payment by the lessor to release the lessee from a preexisting lease with a third party).

Subsequent (“day 2”) accounting depends on the classification of the lease—operating or finance. The classification criteria are similar to the previous ones, with the term “*finance lease*” used instead of “capital lease.”²⁸⁶ The accounting treatment for finance leases remains unchanged. Interest expense on the lease liability—calculated using the effective interest method (see [Section 5.11](#))—is recognized separately from the amortization of right-of-use assets, which is typically measured on a straight-line basis over the lease term. The lease liability is reduced each period by the difference between the periodic lease payment and the interest expense.

Under the *operating lease* model, in contrast, the operating lease cost (excluding variable lease costs which are accounted for separately) is recognized on a straight-line basis over the lease term (i.e., like the old standard). The change in the lease liability is calculated the same way as under the finance lease method, and the amortization of the right-of-use asset is calculated as the difference between the operating lease cost and the interest on the lease liability. In other words, the amortization of the right-of-use assets is essentially a “plug number” that maintains the balance sheet identity, given the operating lease cost (note that the operating lease cost reduces equity and accruing interest increases liabilities). There is no break-down of the operating lease cost between interest expense and amortization of the right-of-use asset, and the whole amount is reported as an operating expense. In addition, right-of-use assets are tested for impairment in the same manner as long-lived assets.

renewal option; (2) variable payments that are based on an index or a rate (e.g., CPI, LIBOR) based on the index or rate at commencement (payments based on usage or performance are excluded); and (3) the amount probable of being owed under a residual value guarantee (for classification purposes—discussed below—the entire potential payment is included in the lease payments).

²⁸⁴ The *lease term* is the non-cancellable period of the lease, together with: (1) periods covered by an option to extend the lease if the lessee is reasonably certain to exercise that option, (2) periods covered by an option to terminate the lease if the lessee is reasonably certain not to exercise that option, and (3) periods covered by an option to extend (or not to terminate) the lease in which exercise of the option is controlled by the lessor.

²⁸⁵ The *rate implicit in the lease* is the interest rate that causes the aggregate present value of the lease payments and the unguaranteed residual value of the asset to equal the current fair value of the leased asset less any investment tax credit plus the lessor’s deferred initial direct costs. Because lessees are usually unable to readily determine the unguaranteed residual value nor the lessor’s deferred initial direct costs, most lessees use their incremental borrowing rate. The incremental borrowing rate is defined as the rate of interest that a lessee would have to pay to borrow on a collateralized basis over a similar term, an amount equal to the lease payments in a similar economic environment.

²⁸⁶ Under ASC 842, a lease is classified as a finance lease if it satisfies any of the four criteria that were specified under ASC 840 (except that the 75% and 90% bright lines were changed from binding to suggestive, making the standard more principles based), or if the leased asset is so specialized that it is expected to have no alternative use to the lessor at the end of the lease term. Otherwise, the lease is classified as an operating lease.

Variable lease payments (whether relating to finance or operating leases) are accounted for separately and are expensed in the period in which they become payable. They include (1) payments resulting from changes in indexes or rates on which the lease payments are based (e.g., CPI, LIBOR) relative to their levels at lease commencement, and (2) payments based on performance or usage, such as percentage of sales in a retail store lease or excess mileage under a car lease.

The third component of the net lease cost is **sublease income**, which offsets the other components. Companies that report finance leases in addition to operating leases may have up to five components of the net lease cost: operating lease cost, depreciation of lease assets (finance lease cost), interest on lease liabilities (finance lease cost), variable lease cost, and sublease income (-). Depending on the function of the leased assets, the lease cost may be included in cost of revenue, SG&A expense, R&D expense, and possibly be capitalized into some assets (e.g., inventory).

ASC 842 has also changed the accounting for **sale and leaseback transactions**, generally making this treatment more difficult to achieve. A sale and leaseback is a transaction in which an entity (the seller-lessee) transfers an asset to another entity (the buyer-lessor) and leases that asset back from the buyer-lessor. Under ASC 842, there are specific criteria that must be met in order for a leaseback transaction to be able to apply the sale and leaseback. If the criteria aren't met, the transaction is considered a "failed sale," and it must be accounted for as a financing arrangement.²⁸⁷

Lease-related disclosures, which were quite comprehensive under ASC 840, have been further expanded under ASC 842. Under both standards, lessees are required to disclose future lease payments for each of the next five years as well as the total thereafter, separately for operating and finance/capital leases.²⁸⁸ Also, under both standards, companies are required to disclose the operating lease cost/rent expense, variable lease cost/contingent rentals, sublease income, and

²⁸⁷ For a transaction to qualify for sale and leaseback accounting under ASC 842, (1) the transfer of the underlying asset must meet the definition of a sale under the new revenue standard (see Section 5.1), (2) the leaseback cannot result in a lease that would be classified as a sales-type lease or finance lease, and (3) the contract cannot include an economically-significant repurchase option (option < expected fair value or no alternative assets that are substantially the same).

²⁸⁸ Under ASC 840, future lease payments excluded contingent rentals and executory costs (e.g., insurance, taxes, maintenance). ASC 842 continues to exclude contingent rentals and most executory costs, but there are some differences. Instead of executory costs, ASC 842 introduces the concept of lease and non-lease elements. Lessees are required to allocate the payments to lease and non-lease components (defined as payment for a good or service transferred to the lessee that is separate from the right to use the underlying asset). Unless the company takes advantage of a practical expedient in which the lessee can combine the lease and non-lease components, the disclosed future lease payments relate only to the identified lease components. Property taxes and insurance are not considered non-lease components of a contract as they are not for a service provided by the lessor to the lessee. Therefore, if the contract requires the lessee to reimburse the lessor for those costs, these payments are considered part of contract payments. Additional changes in disclosed future lease payments resulted from a revised definitions of lease transactions and operating leases, new timing of lease classification and measurement (inception under 840 versus commencement under 842), and other changes. Nissim (2022b) provides evidence of systematic but relatively small changes in disclosed future lease payments following the adoption of ASC 842.

other quantitative information. ASC 842 further requires lessees to disclose the weighted average discount rate used in measuring the lease liability and the weighted average remaining lease term, separately for operating and finance leases, as well as several additional quantitative items. Finally, ASC 842 has significantly expanded required qualitative disclosures (e.g., description of leases, key terms, restrictions, accounting choices and judgements, etc.).

Most companies adopted the new standard on a modified retrospective basis and applied the new standard to all leases through a cumulative-effect adjustment to beginning retained earnings. As a result, comparative financial information has not been restated and continues to be reported under the accounting standards in effect for those periods. Most companies also elected a package of practical expedients permitted under the transition guidance, which allowed the carryforward of historical lease classification.

A **lessor** classifies a lease as either sales-type, direct financing, or operating.

Sales-type – If the lessee obtains control over the asset, that is, if the lease satisfies any of the five criteria for the lessee to use the finance lease method.

Direct financing – If the lessee does not obtain control over the asset (i.e., none of the five criteria is satisfied), but the present value of the lease payments and residual value guaranteed equals or exceeds substantially all of the fair value of the underlying asset. This generally occurs only when at least part of the residual value guarantee is by a third party (because residual value guaranteed by the lessee are included in the cash flows used to evaluate the present value criterion for finance leases).

Operating – Otherwise.

	Balance sheet	Income statement	Cash flow statement
Sales-type leases	Recognize net investment in the lease (PV of lease payments and residual value) & derecognize the underlying asset	Recognize selling profit at lease commencement & interest income over the lease term	Cash received from leases is generally classified as operating cash flows
Direct financing leases	Recognize net investment in the lease (PV of lease payments and residual value) & derecognize the underlying asset	Recognize selling profit and interest income over the lease term (selling loss should be recognized at lease commencement)	Cash received from leases is generally classified as operating cash flows
Operating leases	Continue to recognize the underlying asset	Lease income generally on a straight-line basis over the lease term	Cash received from leases is classified as operating cash flows

Before 2019, **IFRS** was generally similar to U.S. GAAP. However, IFRS 16 (effective since 2019) created substantial differences relative to U.S. GAAP in lessee's accounting as it eliminated the operating lease method, which was much more common than the finance lease method. In general, the fact that under IFRS all leases are now accounted for under the finance lease method, while under U.S. GAAP most leases are accounted for under the (revised) operating lease method, implies that U.S. firms have higher assets and equity; lower EBITDA, D&A, EBIT, and interest expense; and higher (lower) income in the early (late) lease years.

Another important difference between IFRS and U.S. GAAP is the accounting for lease payments that depend on an index (e.g., CPI) or rate. Under IFRS, the liability is remeasured each year to reflect the most current index, with the change also added to the lease asset. Under US GAAP, the liability is not remeasured for such changes unless remeasurement is required for another reason; instead, the additional payments are recognized as incurred.

In contrast, lessor's accounting under IFRS and U.S. GAAP was and remained generally similar. Under IFRS there is no distinction between "sales-type" and "direct financing" leases, and manufacturer or dealer selling profits from finance leases are recognized at lease commencement (similar to sales-type leases under U.S. GAAP).

Table 5.9A describes *earnings quality issues*, red flags and analyses related to leases.

Table 5.9A: Earnings quality – leases

Earnings quality issue	Explanation	Red flag or analysis
Lack of comparability – before versus after the 2019 accounting change	• Most companies adopted the new standard on a modified retrospective basis, with no adjustment made to prior years comparative numbers. • The new standard significantly affects the financial statements as well as key ratios that are used to evaluate: (1) efficiency (e.g., operating assets turnover is reduced due to the recognition of right-of-use assets), (2) growth and operating capacity (e.g., growth in operating assets), and (3) leverage (e.g., liabilities-to-equity ratio is increased due to the recognition of operating lease liabilities). • For IFRS firms there are also significant effects on the Debt/EBITDA ratio (under IFRS essentially all leases are now accounted for as debt, and the lease expense is excluded from EBITDA), NOPAT (interest expense and the related tax effect are excluded from NOPAT), and ROIC (= NOPAT / capital).	• To obtain better insight into trends in the financial statements and in key ratios, one may use lease disclosures to estimate the amounts that would have been reported if the new standard was in effect in prior years (see Nissim 2022b). Alternatively, when measuring growth rates or trends in quantities or ratios that were affected by the new standard, one may reverse the impact of the standard (e.g., examine trend in operating asset turnover excluding right-of-use assets). • Leased operating capacity (ROU asset) can be estimated either by (1) applying a multiple to the rent expense (the approach used by Moody’s prior to the implementation of the new standard); (2) setting it equal to the capitalized lease liability (S&P approach and new U.S. GAAP); or (3) adjusting the historical financial statements to reflect the capitalization and amortization of lease commitments (consistent with new IFRS)
Lack of comparability – across companies	• There is substantial variation across companies in the tendency to lease versus acquire assets, and there is some variation in the use of the operating versus finance lease methods (although the operating lease method is much more common). • Compared to debt-funded asset acquisitions and finance leases, the operating lease method involves different patterns and classifications of reported assets, liabilities, and expenses. Thus, cross-sectional variation in the tendency to lease and use the operating lease method reduces comparability across companies. • This concern is particularly important when comparing IFRS firms (no operating leases) with those reporting under U.S. GAAP (mostly operating leases).	• When comparing companies, (1) include the operating lease obligation in debt, (2) adjust EBITDA by adding back the rent expense, (3) adjust EBIT and interest expense by adding to each of them an estimate of the interest expense on operating lease obligations. • To estimate interest expense on operating lease liabilities, multiply the disclosed weighted-average discount rate used to measure the operating lease liabilities by their average balance during the year.
Lack of comparability – over time (U.S. GAAP)	• There is some variation over time in the tendency to use operating leases versus acquire assets (or use finance leases). In addition, as noted above, the operating lease method involves different patterns and classifications of reported assets, liabilities and expenses compared to debt-funded asset acquisition (or finance leases).²⁸⁹ • Thus, changes in the tendency to lease versus acquire assets reduce comparability over time.	• Evaluating pro-forma financial statements and key ratios that treat operating leases as debt-financed asset acquisitions may improve comparability and provide relevant insight (see, e.g., Nordstrom disclosures related to leases in their 2019 10-K).

²⁸⁹ This issue was especially relevant under the old lease standard, which treated operating leases as an off-balance sheet activity. While the new standard requires balance recognition, as explained above ASC 842 did not materially change the income statement treatment of operating leases, and the balance sheet recognition is different from finance leases and debt-funded asset acquisitions.

Earnings quality issue	Explanation	Red flag or analysis
Manipulation of lease classification (U.S. GAAP)	- Although the difference between the operating and finance lease method is smaller under new GAAP (under both methods an asset and a liability are now recognized), most companies still prefer the operating lease method as it results in delayed expense recognition relative to the finance lease method. - To obtain the benefit of expense deferral, some companies may structure lease transactions, or use the discretion involved in lease accounting, to classify transactions as operating leases even when the economics of the transaction is consistent with the finance lease method.	- To address this concern, one should examine lease disclosures to evaluate whether the operating lease classification is reasonable. For example, how long is the disclosed weighted average remaining lease term? - In practice, most companies classify all or almost all leases as operating. This is due not just to lessee's incentives but also to lessor's preference to structure lease transactions so that they qualify as "true lease" in case of bankruptcy.²⁹⁰
Manipulation of whether a contract contains a lease	- A contract may be a lease, or it may contain an embedded lease, if it provides a customer with the ability to control an asset that is either explicitly or implicitly specified. In some service contract, this determination involves judgement. - Under the old standard the distinction between leases and service contracts was relatively insignificant, because both contracts typically remained off balance sheet. Under current GAAP, companies have strong incentives to structure transactions or to interpret them as having no lease component or a relatively small lease component.	Disclosures related to service contracts that suggest exposures similar to leasing that are not accounted for as leases.
Structuring or interpreting transactions or manipulating estimates to understate or even omit the reported lease liability	- To reduce the reported liability, companies may structure or interpret lease transactions to minimize the amounts included in the capitalized lease payments (e.g., specify variable lease payments, argue that a renewal option is not "reasonably certain", overstate the portion of the expected payments attributed to non-lease components in the contract), or they may overstate the "incremental borrowing rate" used in discounting the lease payments.²⁹¹ - Lessees may elect not to capitalize leases with an accounting lease term of one year or less. Thus, a company may avoid reporting a liability by signing one-year leases with renewal options that are (or are claimed to be) less than "reasonably certain".	- High ratio of variable-to-total lease payments - Low disclosed "weighted-average remaining lease term" - High disclosed "weighted-average discount rate"

²⁹⁰ See, for example, <https://www.monitordaily.com/article-posts/walking-through-the-shadows-of-bankruptcy-financing-equipment-in-time-of-distress/>.

²⁹¹ Binfare et al. (2021) estimate that 20 percent of firms apply discount rates to their operating lease commitments that are likely too high compared to their normal borrowing rates, thus understating operating lease assets and liabilities. These firms are characterized by high leverage, low profitability, and weaker governance structure and external monitoring (lower institutional ownership, less analysts following). The study also finds that many firms choose a discount rate for leases that likely reflects the unsecured (or subordinated) cost of debt even though operating lease contracts are less risky from the perspective of the lessors (they do not convey asset ownership to the lessee, lease payments have priority in bankruptcy settings, and the lessor has the right to repossess the underlying asset in the event that the lessee enters bankruptcy).

Earnings quality issue	Explanation	Red flag or analysis
Understatement of capex	As discussed above, lease transactions are very common. For many firms, leased assets provide the core of operating capacity. Yet all leases, whether accounted for using the finance or operating lease methods, are excluded from the cash flow statement measure of capital expenditures. Consequently, for many firms, reported capital expenditures significantly understate the true investment in operating capacity.	Consider changes in right-of-use assets when evaluating changes in operating capacity.²⁹²
Sales-leaseback	- These transactions often provide significant benefits (e.g., lowering corporate taxes, increasing liquidity), but in some cases are also motivated by accounting considerations. - When the transaction is accounted for a sale and subsequent lease, the result is often a recognized gain followed by higher operating expenses. In addition, leverage ratios are improved. - Some managers may manipulate the structuring or interpretation of sale-leaseback transactions to achieve reporting benefits. - ASC 842 made this accounting treatment more difficult to achieve, but this issue is still relevant.	Sale-leaseback transactions that result in significant recognized gains or have large balance sheet effects.
Leases in DCF	- The recent change in lease accounting introduced significant confusion regarding the proper treatment of leases in DCF valuation, especially for U.S. firms. - For IFRS firms, all leases are now accounted for—and should be treated in DCF—the same as debt-financed asset acquisitions. - For U.S. companies, there are two alternative approaches, as discussed in the “red flags and analysis” column. - For both U.S. and IFRS companies, capex that is deducted from forecasted NOPAT in measuring free cash flow should include the present value of future finance leases because the forecasted D&A that is added back to EBIT generally includes the depreciation of right-of-use finance lease assets (see discussion of “Understated capex” in Section 5.4).	- All right-of-use assets—whether finance or operating—should be classified as an operating asset, like PP&E. - Operating lease obligations (U.S. GAAP) may be included either in debt or in operating liabilities (i.e., like accounts payable). - For the next few years, treating operating lease obligations as an operating liability is the preferred approach, primarily because it maintains comparability of key ratios such as EBIT margin over time (no effect on EBIT, little effect on net operating assets) and it is easy to implement. (In the future, say after 2024, when pre 2019 information becomes less relevant, then classifying operating lease obligations as debt will become less problematic.) - If the operating lease obligation is classified as debt, there is a big increase in net operating assets in 2019, which distorts historical relationships. In addition, treating operating lease obligations as debt requires estimating the interest expense on operating lease obligations and adding it both to EBIT and to interest expense.

²⁹² From Alphabet’s 2019 10-K: “We continue to make significant investments in land and buildings for data centers and offices and information technology infrastructure through purchases of property and equipment and lease arrangements to provide capacity for the growth of our business. During the year ended December 31, 2019, we spent \$23.5 billion on capital expenditures and recognized total operating lease assets of \$4.4 billion.”

Earnings quality issue	Explanation	Red flag or analysis
Leases in relative valuation	- As noted above (earnings quality issue “lack of comparability across companies”), variation in the use of the operating lease method reduces comparability across companies. - When conducting relative valuation, reported metrics of U.S. companies that use the operating lease method should be adjusted. - The required adjustments are relatively straightforward when using EBITDA multiples, but they are more difficult and “noisy” when using EBIT or EPS multiples.	- EV/EBITDA valuation: use Adjusted EBITDA and Adjusted EV - Adjusted EBITDA = reported EBITDA + operating lease expense - Adjusted EV = EV + operating lease obligations - Intrinsic value of EV = multiple $\times$ Adjusted EBITDA – operating lease obligations.

5.10 Pension and other postretirement benefits

Postretirement benefit plans consist of pension and other plans. A **pension plan** is an arrangement whereby employees receive benefits (payments) after they retire for services they had provided during their employment. Other postretirement benefits (**OPB**) consist primarily of health care and life insurance for retirees.

There are two types of postretirement benefit plans: defined contribution and defined benefits. A defined contribution plan is a postretirement benefit plan under which the employer regularly pays specified contributions into a separate entity and has no further obligation to the employee. All other postretirement plans are considered defined benefit plans. Most pension plans are defined contribution, but some large plans are defined benefits. Essentially all OPB plans are defined benefit plans.

In a **defined contribution plan**, each period the employer contributes cash to the pension plan based on services received during the period, which are determined using some measure of the employees' compensation (typically base salary) and possibly other parameters such as employees' age and tenure with the company. After making the contribution, the employer has no further obligation to the employees (for past service) and has no control on or rights in the plan assets. Accordingly, the employer generally does not recognize any asset or liability on the balance sheet and simply expenses the periodic contribution as the obligation to make payments is incurred.

In a typical **defined benefit pension plan**, the employer promises to pay the employees defined amounts after they retire. The payments are generally based on the number of service years, retirement age, and compensation levels, and in some cases (non-US plans) are adjusted for inflation. Defined benefit obligations are recognized as accounting liabilities because they satisfy the three criteria for recognition: the payments are probable, their present value can be estimated, and the obligation is due to services already performed by the employees.²⁹³

Defined benefit obligations are measured using the present value of both vested and non-vested benefits, estimated considering expected future compensation levels. The calculation of this quantity—referred to as the **projected benefit obligation (PBO)**—requires many actuarial assumptions, such as the **annual rate of compensation increase** (affects the future salary levels used in the formula), **employee turnover** (affects the future salary levels used in the formula), **retirement age** and **mortality** (affect the amount and number of annual payments), **pension increase rate** (non-U.S. plans), and the **discount rate**. Companies have some discretion in measuring the discount rate (e.g., based on annuity contracts versus based on the yields of high-quality corporate bonds; if based on yields – duration-matched versus cash flow-matched, the

²⁹³ Defined benefit pension plans can be contributory or non-contributory, and qualified or non-qualified. **Contributory plans** are plans in which the employees can make additional contributions to the plan, which increase their benefits that they are entitled to upon retirement. **Qualified plans** are plans that qualify for favorable tax treatment under the Internal Revenue Code: the employer deducts the contributions to the plan, and the employees are taxed only when they receive payments.

procedure used to estimate the yield curve, etc.). Most companies use the yields on Corporate AA-rated bonds in estimating the discount rate.

Measuring the liability for postretirement health care benefits also involves significant assumptions, including some of the same assumptions used in measuring the PBO (turnover, retirement age, mortality, discount rate). Unlike the PBO, another important set of assumptions involves the health care cost trends. The recognized liability for OPB—called ***accumulated postretirement benefit obligation***—is measured at the present value of expected benefit payments multiplied by the ratio of services provided to date to services required for full eligibility.

For defined benefit pension plans, companies are required by law to make minimum contributions to the pension plan. This requirement is aimed at ensuring that funds will be available to pay at least some of the promised pension benefits. The rules governing the annual minimum required contribution and the annual maximum tax-deductible contribution are complicated. The minimum annual contribution is affected by—but typically differs significantly from—the funded status of the plan (i.e., the difference between the pension plan assets and the pension obligation). Tax planning, availability of funds, and other considerations also affect the actual amount contributed each year. For OPB plans, no contributions are generally required nor made.

The pension plan invests the contributed cash in securities and other assets, and it pays cash to retired employees. Thus, changes in plan assets during the year are due to company contributions (+), payments to retirees (-), and investment return (+/-).

Since the employer is obligated to make the future payments and will use the plan assets for this purpose, it recognizes a net liability or net asset equal to the difference between the projected benefit obligation and the fair value of plan assets. This amount—referred to as the ***funded status*** of the plan—is reported on the balance sheets of U.S. companies since 2006. Because many companies have multiple plans, the funded status is often reported in two separate line items on the balance sheet: net liability (“***accrued pension liability***”) for plans with PBO greater than the assets, and net asset (“***prepaid pension benefit cost***”) for plans with assets greater than PBO.

Conceptually, the pension expense should be calculated as the change in the pension obligation during the year minus the change in the plan’s assets plus contributions made to the plan during the year. However, U.S. GAAP mandate a different calculation, which smooths the recognition of shocks to the conceptual expense. Specifically, the reported pension expense includes the following components: service cost, interest cost, expected return on pension plan assets, amortization of prior service cost (credit), and amortization of net actuarial gain or loss. I next describe each of these items.

Conceptual expense components	Recognized expense components (U.S.)	Recognized expense components (IFRS)
Service cost	Service cost	Service cost
Interest cost	Interest cost	Interest cost
Actual return on pension plan assets		
	Expected return on pension plan assets	Expected return on pension plan assets
Prior service cost / credit		Prior service cost / credit
	Amortization of past prior service cost / credit	
Impact of changes in assumption		
	Recognition of past net actuarial gain or losses	

Service cost – The increase in the PBO due to the increase in the number of service years that are used to calculate the future payments.

Interest cost – The increase in the PBO due to the passage of time, which makes the future payments closer in time and so increases their present value.

Expected return on plan assets – The return on the pension plan assets assuming that assets that existed at the beginning of the year and net contributions during the year earned an assumed expected rate of return. The **expected rate of return** assumption is a long-term assumption that generally does not change annually; it is set considering historical plan asset returns, current market conditions and asset allocation. In measuring the expected return (amount), companies can elect to apply the expected rate of return either to the fair value of the assets or to a “market-related” value, which effectively amortizes unrealized gains and losses over periods of up to five years. The expected return on plan assets is deducted in the calculation of the pension expense.

Amortization of prior service cost (credit) – **Prior service cost** is the cost of retroactive benefits granted by plan inceptions or amendments. **Prior service credit** results from plan amendments that reduce future benefits. This cost/credit is initially recognized in other comprehensive income and subsequently amortized into earnings as a component of the pension expense. The amortization period is the participants’ remaining years of service (pension) or remaining years of service to the full eligibility (OPB). For plans with substantially all inactive employees, the amortization is over the employees’ life expectancy. The amount amortized is calculated either by allocating the same amount of amortization to each future employee-year (the years-of-service method) or using straight-line amortization.

Amortization (recognition) of net actuarial gain or loss – Gains and losses result from differences between actual experience and expectations regarding factors that determine the ultimate cost of the plan, and from changes in assumptions regarding the factors. These factors include the return on plan assets, employee turnover, employee mortality, discount rates, trend in compensation increase, and other variables. When the realization of these factors differs from expectations (e.g., when the actual return on pension plan assets is different from the expected return), or when the expected values of the factors change (e.g., changes in discount rate or in expected mortality), the funded status of the plan has to be adjusted. The balance sheet is balanced by recognizing the so-called unrecognized gains or losses in OCI. Subsequently, these

gains and losses are gradually recognized in earnings to the extent that their net amount exceeds 10% of the greater of the fair value or market-related value (if elected) of plan assets or PBO at the beginning of the year (this quantity is referred to as the “corridor”).²⁹⁴ Specifically, the excess amount is amortized into income over the average remaining service period of active employees in the plan or, if all or almost all of a plan’s participants are inactive, the average remaining life expectancy of inactive participants. Any other systematic amortization method that is at least as conservative is also acceptable (including immediate recognition).

In March 2017 the FASB issued Accounting Standards Update (ASU) No. 2017-07, which changed the reporting of pension and other postretirement benefits expenses. Under the new standard (effective 2018), only the service cost component of pension and OPB is included in operating costs and expenses (and possibly capitalized into inventory). The other components are reported below operating income.

Changes in pension or OPB obligations and related expenses are occasionally due to settlements or curtailments. A **settlement** is an irrevocable action that relieves the employer of primary responsibility for a pension liability and eliminates significant risks related to the obligation and assets used to effect the settlement. For example, an employer may provide lump-sum cash payments to plan participants in exchange for their rights to receive specified pension benefits, or it may pay an insurance company to assume the liability. A **curtailment** significantly reduces the defined benefits that employees are expected to earn for *future* service either by terminating employees’ services (e.g., closing a facility) or by terminating or suspending the plan so that employees do not earn additional defined benefits for future service.

The accounting for settlements and curtailments is as follows. Settlement gains and losses are recognized in income when the plan settlement is adopted. They are measured as the required adjustment to the balance sheet after removing the net obligation and the related balances from accumulated other comprehensive income (including prior service cost and the net actuarial gain or loss). Curtailment losses are recognized when they are probable and measurable, while curtailment gains are recognized when the plan curtailment is adopted. Curtailments gains (losses) often result from the accelerated recognition of prior service benefit (cost) and actuarial gains (losses).

IFRS is similar to U.S. GAAP except

- The expected return on pension plan assets is based on the fair value of the assets
- The expected rate of return on pension plan assets is set equal to the discount rate used in measuring the obligation (generally high-quality corporate yield, as in the U.S.)
- The interest cost and expected return components of pension cost can be included either in operating or financing costs.
- Prior service cost is recognized immediately in income.
- Actuarial gains and losses are fully, immediately, and permanently recognized in OCI
- Any recognized net asset is subject to a “ceiling”—the lower of (1) the amount of the net pension asset, or (2) the sum of any cumulative unrecognized net losses, unrecognized prior

²⁹⁴ Market-related value is defined as either fair value or a calculated value that recognizes changes in fair value in a systematic manner over not more than five years.

service cost, and the present value of any economic benefits available in the form of refunds or reductions in future contributions to the plan (U.S. GAAP do not limit the recognized amount)

- Insurance contracts are generally accounted for as plan assets (U.S. GAAP generally exclude insurance contracts from plan assets)
- A liability must be recognized for minimum funding requirements when the obligation arises. U.S. GAAP has no such requirement.
- Individual accounts are not a requirement for defined contribution plan accounting.

Table 5.10A describes *earnings quality issues*, red flags and analyses related to pension and OPB.

Table 5.10A: Earnings quality – pension and OPB

Earnings quality issue	Explanation	Red flag or analysis
Manipulating assumptions used in calculating pension or OPB obligations or expenses	- To measure the pension obligation and expense, firms are required to make several assumptions. - These assumptions involve substantial discretion and, in many cases, have large effects on the measured liability and expense. - Firms may exploit this discretion to manipulate the reported amounts. For example, a firm may understate the expected rate of compensation increase to report a lower projected benefit obligation and delay expense recognition.²⁹⁵ - Key assumptions—which involve discretion and may therefore be manipulated—include discount rates (for pension and for OPB), expected rate of return on pension plan assets (e.g., Bergstresser et al. 2006, Dechow et al. 2011), trend in employee compensation, employee turnover, retirement age, mortality, and trend in health care costs. - Companies are required to disclose the following assumptions: expected rate of return, discount rate, expected rate of compensation increase, and expected trend in healthcare cost.	- Expected rate of return assumption too high given the actual or targeted allocation of plan assets (expense is understated) - High discount rate (obligation is understated) compared to Corporate AA yields - Expected rate of compensation increase lower than expected long-term inflation - Expected trends in health cost lower than economists' estimates - More aggressive assumptions compared to peers, which cannot be explained by differences in employee demographics, pension plan allocation, or other relevant factors.
“Smoothing” of economic volatility	Gradual recognition (in the income statement) of actuarial gains and losses and prior service cost/credit. If implemented properly, improves earnings sustainability. But it may be manipulated.	- Large balances of retirement-related components of AOCI (actuarial gains/losses, prior service cost/credit), especially when expected to be amortized into the pension expense in the near future - Expected changes in market-related value of assets (due to the deferral of gains and losses) and their implications for future pension expense
Understated net interest cost	When the expected rate of return is larger than the discount rate (which is typically the case under U.S. GAAP), net income is overstated	Large difference between the expected rate of return and the discount rate
Financing items included in operating income (prior to 2018)	- Before 2018, the interest cost and expected return on plan assets (as well as other components besides service cost) were included in operating income. - Evaluating operating profitability using data from both before and after the 2018 accounting change (ASU No. 2017-07) may result in biased inferences.	When evaluation pre-2018 operating profitability, one should use pro-forma measures that exclude pension and OPB cost components other than service cost.

²⁹⁵ Example of *manipulating pension assumptions* (SEC AAER No. 3033): GM made material misstatements or omissions in its 2002 Form 10-K concerning the disclosure of two critical pension accounting estimates - its pension discount rate for 2002 and its expected return on pension assets for 2003. GM had stated publicly in an August 2002 pension conference call with analysts that it used a duration matched approach to select its discount rate, but failed to disclose in its 2002 Form 10-K that its use of a 6.75% discount rate was developed from a non-duration matched approach, which was materially higher than the rate developed from a duration matched model. In addition, in its 2001 Form 10-K and during the August 2002 pension call, GM referred to its rolling 10-year historical average return of 10% or better as support for the reasonableness of its 10% expected return assumption. In its 2002 Form 10-K, GM did not state that its most recent 10-year average return was below its new assumption set at year-end. If GM had used an expected return consistent with its 10-year historical average, it would have reduced its 2003 pre-tax earnings by \$680 million.

Earnings quality issue	Explanation	Red flag or analysis
Net reporting of assets and liabilities hides risk	- Fluctuations in assets and liabilities do not fully offset each other (in fact, they are often negatively related to each other) - For example, a company with \$100 million of PBO and \$100 million of plan investments in equity securities will have a zero-amount recognized on the balance sheet, but significant exposures to market risks. For example, a recession is likely to cause a large drop in both equity values and interest rates, and thus decrease the value of the plan assets and increase the PBO. - Exposures are better captured by the gross values of postretirement assets and liabilities (e.g., Jin et al. 2006)	- A relatively large proportion of pension plan assets invested in equity securities or other assets classes whose fair value is not strongly negatively related to change in long-term Corporate AA yields. - Recalculate leverage measures adding to liabilities the difference between the PBO and the net liability recognized.
Excessive risk taking	- Companies have substantial discretion in selecting asset managers, asset classes and funds, and they may use this discretion to take excessive risk. - High risk taking does not necessarily hurt shareholders—although it may increase equity risk, the increase in expected cash flows to equity may more than offset the increase in equity risk, because some of the incremental risk is absorbed by the government (e.g., pension guarantees by the PBGC in the U.S.) and employees (unguaranteed benefits)	The pension plan asset allocation suggests relatively high risk, especially compared to peers.
Uncertainty and limited disclosure about funding needs	Unlike debt instruments, the amount and timing of cash payments that the company will be required to make are not certain, and disclosure is limited.	- Examine disclosures about future required contributions and expected benefit payments - Evaluate funding status relative to the accumulated benefit obligation.²⁹⁶
Low reliability of the fair value of pension plan assets	The reported fair value of some assets that are held in the pension plan, such as real estate and private equity funds, may be significantly different from their true value.	- High proportion of investments whose reported fair value may be stale, “noisy” or manipulated (e.g., real estate, private equity funds) - Significant investments in long-term, illiquid or low credit quality instruments, whose fair value is designated level 2 or 3.

²⁹⁶ The accumulated benefit obligation (ABO) is similar to the PBO except that it is calculated assuming no change in compensation levels. U.S. firms are required to disclose the ABO as well as the net liability of pension plans with ABO exceeding the fair value of plan assets. This information is relevant for evaluating the potential for required contributions due to underfunding of some pension plans, as government-mandated funding requirements generally exclude the effect of future salary increases. In addition, from a creditor perspective, the ABO is a more relevant measure of the liability that would have to be settled in case of bankruptcy.

Earnings quality issue	Explanation	Red flag or analysis
Overstated net pension liability from the perspective of equityholders	• In most cases the fair value of the net pension liability is likely to be smaller than the underfunded status (or the net pension asset is larger than the overfunded status). • From the perspective of equity investors, the discount rate used in measuring the pension obligation (corporate AA) is understated, which implies that the pension obligation is overstated. • Most or all the cash flows needed to pay the existing pension obligation will come from investments that generate a higher average return than the discount rate (stocks, high yield bonds, real estate, and alternative investments held in the pension trust). If the company bears all the risk that these investments will not generate enough cash to pay retirees, then using a discount rate that includes a trivial risk premium to measure the obligation is justified. However, some of the investment risk is borne by the government (through pension guarantees) or by the employees themselves, so the reported liability overstates the true liability. • In addition, to the extent that equity investors bear the pension risk, beta and therefore WACC and the present value of free cash flows already reflect at least some of that risk. • In summary, using the funded status to measure the net pension liability, which effectively assumes that equity investors will absorb all pension-related risks, overstates the true liability either because other parties (besides shareholders) will absorb some of that risk, and/or because it effectively double-counts the pension risk (to the extent that beta and WACC capture that risk).	• Estimate the pension liability discounting expected cash flows using an estimate of expected rate of return on pension plan assets instead of the discount rate used by the firm (generally AA corporate bond yield). See Anantharaman and Henderson (2020).
Overstated net pension liability from the perspective of debtholders	• The net pension liability is overstated also from the perspective of debtholders, but for a different reason and by a different amount (Anantharaman and Henderson 2020). • Debtholders aim to estimate the sponsor's probability of default and loss given default. In the event of default, the pension plan would be settled at an amount that reflects employees' and pensioners' current claims (i.e., excluding the effect of future salary increases). • Thus, from the perspective of debtholders, the accumulated benefit obligation is a more correct measure of the economic liability.	• Examine the difference between the projected and accumulated benefit obligations

Earnings quality issue	Explanation	Red flag or analysis
Pension in DCF	- When conducting DCF valuation, the net pension and OPB obligations can be treated as either operating items (like accrued expenses), net debt, or other nonoperating items. - ASU No. 2017-07, which is effective 2018, mandates that all components of the pension and OPB expense other than service cost be excluded from operating income. In addition, many IFRS firms exclude the pension and OPB financing components from operating income. This suggest that if pension or OPB are treated as operating items, reported operating income should be adjusted. - In most cases, the preferred approach is to treat pension as “other nonoperating items,” that is, to exclude it from both debt (and the WACC calculation) and operations (free cash flow calculation). Instead, the product of the fair value of the net liability (see earnings quality issue “Overstated net pension liability from the perspective of equityholders” above) and one minus the tax rate should be added to the present value of free cash flows in measuring enterprise value.²⁹⁷ - In contrast, the preferred treatment for OPB is to include them in operations (and free cash flow). Unlike pension, OPB obligations are typically not funded. They are also less likely to be curtailed or settled, and generally grow with operations. That is, they behave like accrued operating expenses.	- If pension is excluded from operations (and the free cash flow calculation), components of the pension expense other than service cost should be excluded from operating income (relevant for pre-2018 U.S. data and for IFRS firms that report all pension components in operating income). - If OPB is included in operations, all components of the OPB expense should be included in operating income (requires reclassification for post 2017 U.S. data and for IFRS firms that report OPB financing components outside operating income).
Pension in EV/EBITDA valuation	- Like DCF, in estimating equity value using EV/EBITDA multiples one may either treat pension as an operating item or exclude it from operations. - If pension is included in operations, EBITDA should be adjusted by subtracting the net pension interest cost (which is excluded from operating income since 2018), and EV should exclude the net pension obligation (the same way that it excludes accounts payable and other operating liabilities). - If pension is excluded from operations, EV should include the tax-adjusted net pension obligation, effectively treating it similar to debt.	Apply consistent adjustments to the EV and EBITDA of the subject company and each of the peers used in calculating the multiple.

²⁹⁷ Why net of taxes? The present value of aftertax free cash flows gives the aftertax value of operations. Debt is subtracted from this present value without making any tax adjustment because is an aftertax measure—paying back the principal of debt gives no tax deduction. In contrast, paying down the net pension obligation (typically by making contributions into the pension trust) gives a tax deduction. Therefore, if pension is excluded from operations, the present value of the tax savings associated with paying down the net pension obligations should be netted against the fair value of the net pension obligation when estimating equity value.

5.11 Debt payable

Debt instruments include bonds, notes, and loans. They are generally reported on the balance sheet at historical cost (i.e., the amount borrowed net of issuance costs), adjusted for the cumulative amortization of issuance costs and any at-issue **discount** (face value in excess of issue price) or **premium** (issue price in excess of face value). The periodic amortization is measured as the difference between interest expense and interest payments, where interest expense is calculated as the product of the instruments' book value at the beginning of the period and the effective interest rate. The **effective interest rate** is the discount rate that makes the present value of the coupons and principal payments equal to the net proceeds (i.e., after deducting issuance costs).

Using the effective interest rate method implies that on each balance sheet date the book value of debt is equal to the present value of all remaining coupons and principal payments, discounted at the effective (historical) rate.²⁹⁸ The fair value of debt, in contrast, is equal to the present value of all remaining coupons and principal payments discounted at the current borrowing rate. Thus, the difference between the fair and book values of debt reflects the difference between the current and historical borrowing rates. For example, an increase in interest rates or credit spreads reduces the fair value of outstanding fixed-rate debt instruments, but it generally has no effect on their reported book value.

As an alternative accounting treatment, firms may elect the **fair value option** at the time of debt issuance. Under this option, issuance costs are expensed immediately, and debt is reported at fair value with unrealized gains or losses included in income (except those caused by changes in the entity's own credit risk, which are recognized in other comprehensive income). Whether using this option or not, firms are required to disclose the estimated fair value of most financial instruments, including debt, on a quarterly basis.

Debt instruments frequently have features that can cause variations in the amount and/or timing of cash flows or settlement. Common examples include debt instruments that include interest rates that vary based on an index or a formula, prepayment features (e.g., entity call option, holder put option), and conversion options. Terms affecting future cash flows are evaluated as potential embedded derivatives requiring bifurcation. In general, features embedded in a debt instrument that are not clearly and closely related to the economic characteristics and risks of the host contract (e.g., a debt instrument with variable payments linked to an equity market

²⁹⁸ To see why, note that from the definition of the effective interest rate it follows that $B_0 = C \times [1+r]^{-1} + C \times [1+r]^{-2} + \dots + C \times [1+r]^{-n+1} + (F + C) \times [1+r]^{-n}$, where B_0 is the debt's book value immediately after issue, C is the coupon, r is the effective interest rate, F is the face value, and n is the number of interest periods. Under the effective interest rate method, interest expense is calculated as the product of the beginning-of-period book value and the effective interest rate, and the difference between interest expense and the coupon is credited or debited to debt (debt is increased if the expense is larger than the coupon and is reduced if it is smaller, which is known as discount or premium amortization, respectively). Thus, $B_1 = B_0 + (B_0 \times r - C) = B_0 \times (1+r) - C = (C \times [1+r]^{-1} + C \times [1+r]^{-2} + \dots + C \times [1+r]^{-n+1} + (F + C) \times [1+r]^{-n}) \times (1+r) - C = C + C \times [1+r]^{-1} + \dots + C \times [1+r]^{-n} + (F + C) \times [1+r]^{-n+1} - C = C \times [1+r]^{-1} + C \times [1+r]^{-2} + \dots + C \times [1+r]^{-n+2} + (F + C) \times [1+r]^{-n+1}$. That is, B_1 is equal to the present value of all remaining cash flows, discounted at the effective interest rate. The proof with respect to B_2 through B_n follows the same steps.

benchmark) must be separately accounted for as **derivatives**. In contrast, features that modify the interest rate, such as interest rate floors or caps, are generally considered clearly and closely related to the host debt contract and so are not bifurcated. In addition, embedded features that are both indexed to the entity's own stock and that would have been classified in shareholders' equity if they were freestanding, are excluded from the bifurcation requirement. Thus, most **convertible bonds** are not split into debt and equity components; instead, the full amount is reported as debt. The accounting treatment for some convertibles bonds has changed significantly in 2021 (ASU 2020-06). Prior to 2021, convertible debt instruments that may be settled in cash upon conversion were split into debt and equity components (because equity contracts that can be settled in cash are excluded from equity; see Section 5.19). However, starting 2021 (2022) public firms may elect (are required) to report the full amount as debt.

In the **cash flow statement**, interest payments are reported as operating cash outflows, and principal payments are reported as financing cash outflows. In addition, the interest tax shield and any income taxes on gains or losses from early retirement of debt are included in cash from operations. If cash from operations is presented using the indirect approach, three debt-related adjustments may be required: gains (losses) from early retirement of debt should be subtracted from (added back to) net income, discount (premium) amortization should be added back (subtracted from) net income, and the change in interest payable should be added to net income.

Trouble debt restructuring (TDR). If the company is experiencing financial difficulties and the lender grants a concession (for example, lower interest rate), the accounting treatment is simply to adjust the effective interest rate going forward. If the concession results in undiscounted future payments that are less than the debt's book value, the difference is recognized as a gain and the effective interest rate is set to zero.

A **debt modification** or exchange other than TDR is accounted for as the creation of a new debt instrument and the extinguishment of the original debt instrument *if* the terms of the new debt are substantially different from the old debt. This is determined by comparing the present value of the cash flows of the new debt, calculated using the effective interest rate on the old debt, to the book value of the old debt. A difference of at least 10% is considered an extinguishment. The new instrument is recognized at fair value and a gain or loss is recognized. If the terms are not substantially different, the new debt is recorded at the book value of the old debt and a new effective interest rate is calculated.

IFRS is similar to U.S. GAAP, except

- The effective interest rate is calculated using expected rather than contractual cash flows.
- The fair value option is limited to only those financial instruments that either hedge assets or liabilities that are measured at fair value, or are managed and evaluated on a fair value basis in accordance with a documented risk management or investment strategy.
- Interest payments can be reported as a financing cash flow.
- Debt modifications generally trigger gain or loss recognition.
- There are differences in the classification, bifurcation requirements, and measurement of some hybrid financial instruments with liability and equity components. Unlike U.S. GAAP, IFRS generally requires bifurcation between liability and equity components of convertible debt.

Table 5.11A describes *earnings quality issues*, red flags and analyses related to debt payable.

Table 5.11A: Earnings quality – debt payable

Earnings quality issue	Explanation	Red flag or analysis
Gains and losses from early retirement of debt	• An early retirement of debt occurs whenever a firm pays off debt instruments prior to their maturity, either by purchasing them in the open market (for traded debt), by exercising a call provision, or by other means. • Such transactions normally result in reported gains or losses, as the amount paid may be different from book value either because it is affected by changes in interest rates (for example, in an open market transaction), reflects a call premium, negotiated, or for other reasons. • Because early retirement of debt is largely discretionary, firms may manipulate reported income by engaging in such transactions. • The discretionary and transitory nature of gains and losses from early retirement of debt implies that they should be excluded from measures of recurring income. • These items are often reported combined with recurring non-operating income or with interest expense and are difficult to discern.	• Significant gains or losses from debt retirement • Early retirement of debt • When measuring core earnings, “undo” from reported income gains/losses from debt retirement
Manipulation of fair value estimates	• Firms are required to disclose the estimated fair value of most financial instruments, including debt payable, on a quarterly basis. In addition, some firms use the fair value option in accounting for some or all of their debt instruments. • Most bond trading takes place in over-the-counter markets, through a decentralized network of dealers and brokers. In addition, trading volume in corporate debt instruments is relatively low. • Therefore, fair value estimates for debt securities are often derived from models or other methods that involve substantial discretion. And for non-traded debt (e.g., loans payable), companies typically have significant discretion in estimating fair value. • Managers may exploit this discretion to manipulate the estimates, or they may make estimation error.	• A difference between the disclosed fair and book values of debt payable that is inconsistent with changes in interest rates or in the company’s financial condition in recent years, considering debt characteristics such as issuance dates, maturities, and interest rate provisions (e.g., fixed versus floating). • The reliability of fair value estimates is also related to the composition of the debt instruments. For example, fair value estimates of public bonds or commercial paper are less discretionary than estimates related to private bonds or bank debt. In general, the ability to manipulate the disclosed fair value of debt is high when the debt is (1) long-term, (2) not traded or thinly traded, or (3) includes provisions that make its fair value estimation difficult (e.g., conversion features, calls, floors, or caps). • Information on the approaches used for estimating fair value and the level designation of the estimates (when available) may also be useful.

Earnings quality issue	Explanation	Red flag or analysis
Distortions related to convertible bonds	- Convertible bonds and other compound (hybrid) debt-equity instruments are generally not split into debt and equity components; instead, the full amount is reported as debt. Consequently, in such cases debt is overstated, equity is understated, and the effective interest rate is understated. - Interest expense reflects two offsetting distortions—understatement of the effective interest rate and overstatement of the amount of debt—but the first effect dominates; that is, interest expense is understated. For example, a zero-coupon convertible bond may be issued at par if the conversion feature is attractive enough (i.e., interest expense = 0).	- Significant debt with conversion features. - When conducting profitability analysis, deep in-the-money convertibles should be treated as equity, and earnings should be adjusted by “undoing” the aftertax interest expense on those convertibles. Other convertibles should be partially reclassified to equity, and interest expense should be adjusted.
Gains or losses from using the fair value option	- Gains or losses due to fluctuations in market interest rates or in market credit spreads are transitory in nature, so if the debt is not used to hedge other financial instruments that are also market-to-market, reported earnings would include transitory items. - Equity reflects all gains and losses on debt, including those due to changes in the firm’s credit profile (which are included in OCI). Debt-related OCI gains or losses are negatively correlated with economic performance. For example, if the financial condition of a firm deteriorates, the fair value of its outstanding debt will decline, resulting in an OCI gain. To the extent that reported assets do not fully reflect the deterioration of the firm’s value, recognizing the OCI gain on debt results in overstated equity.	- Significant debt accounted for using the fair value option - Significant unrealized gains on debt included in AOCI - When measuring core earnings, “undo” from reported income gains/losses from debt revaluation
Distorted cash from operations	- Reported cash from operations includes debt-related (non-operating) items: it is reduced by interest payments, increased by the interest tax shield, and includes income taxes on gains or losses from debt retirement. - Under U.S. GAAP (and allowed under IFRS), interest payments are classified as operating cash outflow while payments of principal are reported as financing cash outflow. Thus, firms may overstate cash from operations by issuing deep-discount bonds. Due to discount amortization, net income will reflect the true cost of borrowing, but cash from operations will be overstated.	“Undo” the effects of interest from reported cash from operations: add interest paid and subtract the product of interest expense and the tax rate (interest deduction for tax purposes is based on accrued interest, like GAAP). - Adjust reported cash from operations to exclude the tax effect of any gains or losses from debt retirement.
Debt book value significantly different from fair value	- When estimating equity value or measuring leverage, debt book value is often used as a proxy for fair value. - The book value of debt is equal to the present value of all remaining coupons and principal payments discounted at the effective (historical) rate. - Thus, significant changes in risk free rates, credit spreads, or the firm’s credit profile since debt issuance implies that the fair value of debt (which is equal to the present value of remaining contractual cash flows discounted at current interest rates) may be significantly different from book value.	- Large difference between the book and disclosed fair values of debt - Effective interest rate that is substantially different from current market yields on debt with similar credit rating, maturity, and interest rate provisions - When measuring leverage or estimating equity value, use the disclosed fair value of debt payable rather than its book value.

Earnings quality issue	Explanation	Red flag or analysis
Unsustainable interest expense	- Interest expense is measured as the product of book value and the effective (historical) interest rate. - If expected interest rates are significantly different from the average effective interest rate, interest expense is likely to change when debt instruments mature and new ones are issued.	- Average effective interest rate substantially different from current market yields on debt with similar credit rating, maturity, and interest rate provisions. - A large difference between the book and disclosed fair values of debt. (This implies that current interest rates are different from the effective rate, because the fair (book) value is equal to the present value of remaining cash flows discounted at the current (historical) interest rate.)
Short-term debt classified as long-term	- If a firm has the intention and ability to refinance short-term debt on a long-term basis, it may classify it as long-term. - A firm may not have or may lose the ability to refinance short-term debt and still classify it as long-term. - Violation of debt covenants or other contractual agreement that allow the lender to call the debt generally require a reclassification of long-term debt as current. Companies may not follow this rule.²⁹⁹	- Debt-related disclosure indicating or implying that short-term debt has been classified as long-term, especially if there are concerns about liquidity or solvency. - Any indication of violation of debt covenants in the notes or MD&A, or from other sources (e.g., Form 8-K, media reports)

²⁹⁹ Examples of *misclassifying debt*: Example 1 (SEC AAER No. 4045): “[GT’s] failure to meet the fourth milestone [of delivering “sapphire glass”] gave Apple the right to call back \$306 million in GT’s debt from the prior installments [Apple lent GT money to help them fund production] and, by the second quarter 2014, would have required GT to recognize the debt as current and not long-term debt. The “current” debt reclassification would have had an immediate, material impact on GT’s liquidity and status as a going concern. Had GT properly classified the Apple debt as current, its current liabilities would have increased from \$393.5 million to \$700.2 million. The accelerated repayment obligation of \$306.7 million would have affected GT’s liquidity and status as a going concern because GT’s second quarter working capital was only \$155.6 million. For the second quarter, the misclassification of the Apple debt caused GT to overstate working capital by \$306.7 million, or by 200%, and to understate current liabilities by \$306.7 million or 43%.” Example 2 (SEC AAER No. 455): In 1989 Star Technologies, a manufacturer of scientific computers, was in violation of debt covenants which made some long-term loans immediately due and payable. Yet Star classified the loans as a long-term liability. Under GAAP, unless the bank provided a written waiver of Star’s covenant violations for a period of at least one year, the loan should have been reclassified as a current liability.

Earnings quality issue	Explanation	Red flag or analysis
Off-balance sheet debt	- In some cases firms exclude from the balance sheet debt that is effectively owed by the company. Examples include (1) borrowing and investing through unconsolidated entities (e.g., borrowing by equity method investees that are effectively controlled by the company); (2) transferring debt to another company that is controlled by the same shareholders;³⁰⁰ (3) derecognizing securitized, sold or factored loans or other receivables while retaining the asset risk;³⁰¹ and (4) accounting for repos as securities' sale (e.g., Lehman's Repo 105 and 108 or MF Global's repo-to-maturity arrangements).³⁰² - Implications: understated debt, assets, and financial leverage; overstated return on assets.	- Significant unconsolidated VIEs, equity method investments, or other related-party entities - Significant securitization or factoring transactions - Estimate pro-forma financial statements and leverage-related ratio that consolidate off-balance sheet debt

³⁰⁰ Example of *off-balance sheet debt* (SEC AAER No. 1599): Between mid-1999 and the end of 2001, Adelphia—a cable-television company—fraudulently excluded from its financial statements over \$2.3 billion in bank debt. Adelphia entered credit facilities in which it became co-borrower with various other entities controlled by the Rigas family (the same family that controlled Adelphia). Under these agreements, each co-borrower may borrow up to the entire amount of the available credit. In addition, each co-borrower is jointly and severally liable for the entire amount of the indebtedness regardless of whether that co-borrower actually borrowed that amount. Adelphia borrowed significant amounts under the credit facilities and effectively netted the debt against receivables from the Rigas entities (GAAP does not allow for such offsetting), which in turn were created primarily by delivering digital convertors or issuing stock to these entities without receiving any payment (under GAAP, receivables related to the issuance of stock should be recorded as a contra-equity account). In addition, Adelphia did not report amounts withdrawn under the credit facilities by the Rigas entities in spite of the fact that these entities were not sufficiently capitalized to be able to repay the debt, and Adelphia was liable for that debt.

³⁰¹ Using cross-sectional equity valuation regressions, Landsman et al. (2008) provide evidence that the market views securitized assets and liabilities held by a special purpose entity (SPE) as belonging to the sponsor-originator (S-O), i.e., the risk and rewards of ownership of the transferred assets reside with the S-O and not the SPE. These findings are consistent with the explanation that sale-based asset securitizations enable SPE bondholders to retain priority in bankruptcy of the S-O while also enabling the S-O to obtain lower borrowing costs by implicitly guaranteeing the SPE's debt.

³⁰² Lehman took advantage of an accounting loophole that existed at the time that allowed repo transactions to be accounted for as security sales instead of secured borrowing. Under the previous standard for derecognition of financial assets (SFAS 140), if the value of the transferred assets was more than 2% of the cash received by the asset transferor (it was 5% more in the case of Repo 105, hence the name), the transferor was able to account for the transaction as an asset sale. No loss was recognized, because a forward contract assets equal to the 5% difference was recognized at the time of "sale," representing the fair value of a contract that allows the transferor to buy the asset back at a price which is 5% below its value. One cost of Repo 105 is the higher haircut (i.e., less borrowing capacity), but Lehman mitigated that effect by using low-grade securities (which cannot be used or are more difficult to use in regular repos) for the excess cushion. Repo 105 was used fixed term securities and Repo 108 was used for equities.

Earnings quality issue	Explanation	Red flag or analysis
Debt due to reverse factoring included in accounts payable	- Supply chain finance or reverse factoring is a financing program initiated by the company (utilizing its lines of credit) to help fund its suppliers by allowing them to factor amounts owed by the company with no recourse and at better terms than they would otherwise be able to obtain. Such arrangements are typically made by companies whose credit profile and financial flexibility are substantially stronger than those of its suppliers (at least those that take advantage of the arrangement). - Reverse factoring effectively means that <i>short-term debt is misclassified as accounts payable</i>, because these arrangement results in the company (1) losing the flexibility to adjust the amount or timing of payment (e.g., due to disagreement with the supplier), and (2) utilizing the line of credit with the finance provider.	- A large balance of accounts payable (the existence of reverse factoring arrangements allows companies to extend the payment terms) - Reference to reverse factoring arrangements in financial disclosures - Utilization of lines of credit that cannot be explained by reported debt - Chuk et al. (2021) find that the adoption of reverse factoring is more likely for buyers that use more trade credit, are larger in size, use less leverage, pay dividends, have lower return volatility, and are more prone to financial distress.
Debt modifications	Initiating or structuring debt modifications to achieve reporting benefits, either in the form of gain recognition or lower interest expense (see discussion of the accounting treatment at the beginning of the section).	Significant debt modifications
Debt in valuation	- When estimating equity value using enterprise value methods (e.g., DCF, EV/EBITDA multiple), one has to subtract an estimate of the fair value of debt from enterprise value. - Many analysts use the book value of debt, which—as discussed above—may deviate substantially from fair value. - Analysts that subtract the fair value of debt (as they should) often ignore the tax implications of a significant difference between the fair and book value of debt. - Differences between the fair and book values of debt reflect differences between the market and effective interest rates, and these differences do not affect the income tax expense. - For example, an increase in market interest rates will reduce the value of fixed rate debt (to the benefit of shareholders), but this benefit will be offset by the fact that the company deducts interest for tax purposes based on the effective interest rate.	When measuring equity value, subtract from estimated enterprise value the fair value of debt and add the product of the tax rate and the difference between the fair and book values of debt.

5.12 Loans receivable and related accounts

Loans receivable are classified as either held-for-investment or held-for-sale. ***Loans held-for-investment*** are generally reported at amortized cost (defined below), net of the allowance for loan losses. ***Loans held-for-sale*** are reported at the lower of amortized cost or fair value. Loans held for investment are the largest asset category for most banks, typically accounting for more than 50% of total assets. This classification is also significant for other financial firms as well as for some nonfinancial firms. Loans held-for-sale is a less common category, and it is typically significant only for mortgage banks.

To understand the accounting treatment, several terms must be defined first. The *historical cost* of a loan receivable is the amount lent or paid to acquire the loan, plus *origination/acquisition costs* (e.g., commission paid to a third party) and minus *origination fees* (e.g., mortgage points). The amount paid to acquire a loan is equal to the principal plus (minus) any acquisition *premium (discount)*. *Amortized cost* is historical cost adjusted for the cumulative amortization of origination costs, fees, premiums, and discounts. The periodic *amortization* is equal to the difference between interest income and interest receipts, where interest income is calculated as the product of the effective interest rate and the *book value* (amortized cost) at the beginning of the period. The *effective interest rate* is the internal rate of return given the historical cost and the contractual future interest and principal payments.³⁰³ This method of calculating interest income and amortizing any costs, fees, discount or premium—referred to as the ***effective interest rate method***—results in a book value equal to the present value of the remaining contractual payments discounted at the effective rate.³⁰⁴ In contrast, the loan's *fair value* is equal to the present value of the remaining contractual payments discounted at the current market yield. Thus, differences between the fair and book values are due to yield changes; yield increases result in unrealized losses, while yield decreases give rise to gains.

³⁰³ Prior to CECL (effective since 2020 for public companies; discussed below), for purchased credit-impaired loans (purchased loans for which there is evidence of credit deterioration since origination and for which it is probable the investor will be unable to collect all contractually required payments) no allowance was recognized at acquisition and the effective rate was measured using expected rather than contractual cash flows. Credit-related increases in expected cash flows first reversed any previously recognized allowance and then increased the accretable yield. Credit-related decreases in expected cash flows were recognized as impairment. Other changes in expected cash flows (e.g., variable rate loans, prepayments), were accounted for by increasing the accretable yield. CECL changed the definition of purchased credit-impaired loans (now called purchased credit-deteriorated loans) by removing the probability threshold and requiring the recognition of at-acquisition allowance (see below). The effective rate is calculated as the IRR that equated the present value of contractual cash flows and the grossed-up loans (i.e., acquisition cost plus the at-purchase allowance). Credit-related changes in expected cash flows are generally recognized by adjusting the allowance and other changes are accounted for by adjusting the accretable yield.

³⁰⁴ Let B_0 denote the book value of the loan immediately after its origination. Note that B_0 is equal to the present value of all promised coupons and principal payments at the effective rate (this is by definition). That is, $B_0 = C \times \rho^{-1} + C \times \rho^{-2} + \dots + C \times \rho^{-n+1} + (F + C) \times \rho^{-n}$ where C is the interest payment, ρ is one plus the effective rate, F is the principal amount, and n is the number of interest periods. Under the effective rate method, B_1 (i.e., book value at the end of the first interest period) is calculated as follows: $B_1 = B_0 \times \rho - C$. Thus, $B_1 = (C \times \rho^{-1} + C \times \rho^{-2} + \dots + C \times \rho^{-n+1} + (F + C) \times \rho^{-n}) \times \rho - C = C \times \rho^{-1} + C \times \rho^{-2} + \dots + C \times \rho^{-n+2} + (F + C) \times \rho^{-n+1}$. That is, B_1 is equal to the present value of all remaining cash flows, discounted using the original yield. The proof for B_2 through B_n follows the same steps.

The *allowance for loan losses* measures management's estimate of the amount of loans held for investment that the firm will be unable to collect. Until 2019, the allowance for loan losses reflected incurred losses, defined as probable losses triggered by events that have already occurred, even if the specific incidence of those losses were not yet known to the firm. An example of such event is a downturn in the economy that has caused layoff of many employees and is therefore likely to increase the rate of default on loans. In contrast, forecasts of losses due to expected future events (e.g., an expected downturn in the economy) were not included in the allowance because the underlying event has not yet occurred. This accounting treatment has changed recently. Starting 2020 (ASC 326, the current expected credit loss or CECL model), the allowance should reflect all losses expected over the contractual life of the loan, considering historical loss experience, current conditions, and reasonable and supportable forecasts of future economic conditions. Unlike the previous standard, this generally requires recognition of allowance at origination or acquisition of the loans, with credit loss expense recognized in the income statement.³⁰⁵

There are several additional accounts and disclosures related to loans receivable besides the allowance. *Charge-offs* are loans identified as uncollectible, which are removed from loans receivable and reduce the allowance. The *provision for loan losses*, which is recognized as an expense in the income statement, is measured as the sum of net charge-offs and the change in the allowance during the period due to operating activities (i.e., excluding the effects of loan sales or transfer to held for sale, M&A, divestitures, translation adjustments and other non-operating activities). Banks and other companies with significant lending activities also disclose measures of loan quality, including *classified loans*, *delinquent loans* (30+, 60+, or 90+), *impaired loans*, *nonaccrual loans*, *restructured loans*, and *nonperforming loans* (NPL = nonaccrual + restructured).

Mortgage banks and other financial institutions that originate loans often sell or securitize them to free up regulatory capital, to recognize gains, or for other reasons. *Sold or securitized loans* are removed from the balance sheet (derecognized) if and only if the company (transferor) has surrendered control.³⁰⁶ If control is not surrendered, the transaction is accounted for as secured borrowing: cash and debt are increased by the amount borrowed; loans receivables are unchanged; and the company provides footnote disclosure regarding the transaction and the restrictions on loans receivables. If control is surrendered, the transaction is accounted for as a sale: cash is increased; the loans and any related account (e.g., allowance) are removed from the balance sheet (derecognized); retained or acquired interests, if any, are recognized at fair value;

³⁰⁵ For purchased credit-deteriorated loans, no credit loss expense is recognized at acquisition; instead, the loans are grossed-up by an allowance equal to the present value of expected credit losses. One method for calculating the allowance is to discount expected credit losses at the rate that equates future expected cash flows with the purchase price.

³⁰⁶ Control is considered surrendered if all following conditions are met (a) the transferred loans have been legally isolated from the company and its creditors; (b) the transferee has the right to pledge or exchange the loans; and (c) the transferor does not maintain effective control over the transferred loans. The third condition is satisfied if there is no agreement that (1) both entitles and obligates the transferor to repurchase or redeem the loans before their maturity (e.g., repos), (2) gives the transferor the right to reacquire specific loans, or (3) gives the transferee the right to sell the loans back to the transferor at price favorable to the transferee. Note that these conditions may be satisfied even if the transferor retains or acquires some interests, services the loans, or provides limited recourse.

recourse obligations, if any, are recognized at fair value; servicing assets or liabilities, if any, are recognized at fair value; and a gain or loss is recognized (a plug number).

Mortgage servicing rights (MSRs) are recognized when loans are sold or securitized with servicing retained by the company, and they may also be purchased from other entities. MSRs are initially recognized at fair value. Subsequently, residential loan MSRs are carried at fair value, while MSRs related to commercial mortgage loans are measured at lower of cost or market (LOCOM). For MSRs carried at fair value, changes in fair value are reported in income in the period in which the change occurs. MSRs measured at LOCOM are amortized in proportion to, and over the period of, estimated net servicing income. The amortization of MSRs is periodically adjusted to reflect changes in prepayment speeds as well as other factors. MSRs accounted for at LOCOM are periodically evaluated for impairment based on their fair value, measured by strata based on the predominant risk characteristics of the underlying loans, such as investor and product type. If, by individual stratum, the carrying amount of the MSRs exceeds fair value, a valuation allowance is established. The valuation allowance is adjusted as the fair value changes with changes recognized in income.

Unlike U.S. GAAP, under **IFRS** there is no distinction in accounting treatment between securities and loans. IFRS 9 specifies three major classifications for debt instruments: amortized cost (AC), fair value through profit or loss (FV-PL) and fair value through other comprehensive income (FV-OCI). The classification is based on both the entity's business model for managing the financial assets and the characteristics of the financial asset's contractual cash flows.

The *AC* classification should be used if the entity holds the financial asset to collect the contractual cash flows, which are solely payments of the principal amount and interest (referred to as "*SPPI*"). "Principal" is the fair value of the instrument at initial recognition, and "interest" is the return within a basic lending arrangement, which typically consists of consideration for the time value of money, credit risk, and possibly other basic lending risks such as liquidity risk, as well as a profit margin. Any interest income, foreign exchange gains/losses and impairments are recognized in profit or loss. Financial assets that meet the criteria to be classified AC may, at initial recognition, be designated as measured at FV-PL if doing so eliminates or significantly reduces a measurement or recognition inconsistency that would otherwise arise from measuring assets or liabilities or recognizing the gains and losses on them on different bases.

The *FV-OCI* classification should be used if the entity has a dual business model – it holds the loan to collect the contractual cash flows (which have to be *SPPI*) as well as possibly to sell it. Changes in fair value of FV-OCI debt instruments are recognized in OCI. Any interest income, foreign exchange gains/losses and impairments are recognized immediately in profit or loss. Fair value changes that have been recognized in OCI are recycled to profit or loss upon disposal of the debt instrument. Like the AC classification, and under the same conditions, financial assets that meet the criteria to be classified FV-OCI may be designated as measured at FV-PL.

The *FV-PL* classification is the residual category, which applies if the requirements to be classified as AC or FV-OCI are not met. FV-PL is typically used if the instruments are held for trading or the entity's business model is to manage the financial asset on a fair value basis, that

is, to realize the asset through sales as opposed to holding the asset to collect contractual cash flows.

Like U.S. GAAP, *interest income* is measured using the effective interest rate method. However, unlike U.S. GAAP, the effective interest rate is computed on the basis of cash flows expected to be received over the expected life of the loan, considering the loan's contractual terms (e.g., prepayment, call, and similar provisions) but not expected credit losses. If cash flow estimates are revised, book value is adjusted to the present value of the future estimated cash flows, discounted at the original effective interest rate, with the resulting adjustment recognized in income.

Impairment recognition is based on a forward-looking expected credit loss (ECL) model. The model specifies two alternative measurement bases: 12-month ECLs, and Lifetime ECLs. 12-month ECLs (Stage 1) applies to all AC and FV-OCI financial assets as long as they are not credit-impaired and there is no significant deterioration in credit quality. Lifetime ECLs (Stages 2 and 3) applies when a significant increase in credit risk has occurred on an individual or collective basis. If financial assets are acquired or become credit-impaired (Stage 3), interest income is calculated by applying the effective interest rate to the amortized cost (net of the impairment allowance) rather than to the gross carrying amount. ECL are probability-weighted values, which can be significant even if all cash flows are likely to be collected. 12-month ECL are essentially calculated as the product of ECL and the probability of default in the next 12 months. The definition of a default event is as used for internal credit risk management purposes, but generally no later than the loan becoming 90 days past due.

Key ratios used to evaluate earnings quality related to loans receivables include: allowance/loans ratio (allowance ratio, Section 3.2.1); problem loans/loans ratios, where problem loans may include different categories such as non-performing loans, 90+ past due loans, 30+ past due, etc. (problem receivables ratio, Section 3.2.4); provision/net charge-offs ratio (provision/WO, Section 3.2.5), allowance/problem loans ratios (allowance/problem receivables, Section 3.2.6), provision/average loans, and net charge-offs/average loans.

Table 5.12A describes **earnings quality issues**, red flags and analyses related to loans receivables.

Table 5.12A: Earnings quality – loans receivable

Earnings quality issue	Explanation	Red flag or analysis
Manipulating loan loss accruals	- Because measuring allowances for credit losses and related expenses involves substantial discretion, it is relatively easy for firms to “manage” these accounts.³⁰⁷ - The level of discretion involved in calculating the allowance and provision likely increased significantly following the adoption of the CECL (ECL) model in 2020 (2018) under U.S. GAAP (IFRS). - Although the concern is typically that the allowance is understated, in some cases companies overstate the allowance to facilitate earnings overstatement in subsequent periods.	- Low or decreasing values of [provision / net charge-offs] or [allowance / problem loans] may indicate insufficient provisioning, since the denominators of these ratios are relatively objective measures of credit losses. “Problem loans” can be measured using classified loans, delinquent loans (30+, 60+, or 90+), impaired loans, nonaccrual loans, restructured loans, nonperforming loans (NPL = nonaccrual + restructured), or adjusted NPL (= NPL + 90+; e.g., Calomiris and Nissim 2014). - Low or decreasing value for [allowance / gross loans] or [provision / average loans], although such trend may also be due to improved credit risk. - To rule out alternative explanations (primarily that changes in the above ratios are due to changes in borrowers’ credit profile), it is important to evaluate changes in the composition of the loan portfolio (e.g., consumer versus commercial, maturity, credit ratings), loan yields, and other relevant metrics.
Transitory component of the provision for loan losses	- Estimating incurred credit losses (pre-CECL) and expected credit losses (post CECL) involves substantial assumptions and estimates. - As new information is received over-time, companies adjust these estimates, with the effect recognized in earnings. Because such adjustments represent unexpected events (at least under CECL), they have a transitory effect on earnings. - Moreover, to the extent that adjustments are related to loans that existed at the beginning of the year, the earnings effect is generally unrelated to current operations. - A good example is the release of provisions in the immediate years following the financial crisis, which substantially increased reported earnings of U.S. banks.	Low correlation between the provision for loan losses and net charge-offs.
Loan growth reducing reported earnings	Under CECL, life-time expected credit losses are recognized as credit loss expense at origination or acquisition (non-credit-deteriorated loans).	Significant loan growth, especially of high credit risk loans.

³⁰⁷ Example of *manipulating loan loss accruals* (SEC AAER No. 3327): Managers of United Commercial Bank concealed losses on loans and other assets from the bank’s auditors, causing the bank’s public holding company UCBH Holdings, Inc. (UCBH) to understate 2008 operating losses by at least \$65 million. During December 2008 and the first three months of 2009 as the company prepared its 2008 financial statements, the bank’s managers were aware of significant losses on several large loans. Among other things, these executives allegedly learned about dramatically reduced property appraisals and worthless collateral securing the loans, yet they repeatedly hid this information from UCBH’s auditors and investors thereby delaying the proper recording of loan losses.

Earnings quality issue	Explanation	Red flag or analysis
Increased earnings volatility	Under CECL, earnings volatility is likely to increase both because (1) the volatility over time of life-time expected losses is greater than that of incurred credit losses, and (2) credit-related increases in expected credit losses on purchased credit-deteriorated loans are now included in earnings while previously they were accounted for as adjustment to the accretable yield if the revised expected cash flows exceeded those expected at loan acquisition.	- Significant high credit risk loans - Significant acquired loans
Misclassifying purchased loans as credit-deteriorated	Under CECL, no credit loss is recognized when purchasing credit-deteriorated loans (loans that have experienced a more-than-insignificant deterioration in credit quality since origination); instead, the loans are grossed up by an allowance. In contrast, for other acquired loans, life-time expected credit losses are recognized at acquisition as a credit loss expense.³⁰⁸	Significant purchased credit-deteriorated loans
Deteriorating credit quality of borrowers	While not a violation of GAAP, deterioration of borrowers' credit quality implies lower earnings sustainability.	- High or increasing values of [net charge-offs / average loans] or [problem loans / gross loans] - High or increasing value of [allowance / gross loans] or [provision for loan losses / interest and fee income on loans], especially if it is unlikely that the company is attempting to understate earnings. - Combining different measures may yield a more accurate estimate.³⁰⁹
Overstating gains from selling or securitizing loans	This is achieved by manipulating fair value estimates of retained/acquired interests, servicing rights or obligations, or recourse obligations.	- Large or increasing scale of loans' sale or securitization - Substantial gains, retained interests, servicing rights, or recourse obligations related to the sale or securitization of loans - Large or increasing ratio of gains from sale or securitization of loans to loans sold or securitized - Large impact of securitization transactions on regulatory capital
Derecognizing loans when there is no transfer of control	Firms may improperly derecognize loans sold or securitized when there is no transfer of control, in order to recognize gains and increases equity and capital ratios.³¹⁰	

³⁰⁸ Prior to CECL, misclassifying acquired loans as credit-impaired had no immediate effect on earnings (because either way there was no immediate earnings effect), but it enabled companies to manipulate subsequent earnings by adjusting expected cash flows. Under CECL, only credit-related changes in expected cash flows are recognized, while under the previous standard all changes in expected cash flows (including changes due to variable rate loans and prepayments) were considered in adjusting the accretable yield.

³⁰⁹ Harris et al. (2018) develop a structured predictor of one-year-ahead expected rate of credit losses that combines various measures of credit risk disclosed by banks using coefficients estimated from cross-sectional analysis of the prior period relationship between realized credit losses and those measure. They show that the predictor substantially outperforms other measures of realized or expected credit losses in predicting one-year-ahead realized credit losses. They also show that their measure is a better predictor of the provision for loan losses than analyst provision forecasts and is incrementally useful beyond other credit risk metrics in predicting bank failure up to one year ahead.

³¹⁰ Example of **improper derecognition of loans** (SEC Litigation Release No. 20227): From 2000 until 2005, Doral Financial Corporation “sold” more than \$4 billion worth of non-conforming mortgages to First BanCorp and recognized income from these sales and derecognized the loans. These transactions were not true sales under GAAP because

Earnings quality issue	Explanation	Red flag or analysis
Manipulating the subsequent reporting of assets or liabilities recognized in loan sale or securitization	The subsequent reporting of the assets and liabilities recognized when loans are sold or securitized—including mortgage servicing rights (MSR), retained interests, and recourse obligations—often involves significant discretion. Firm may exploit this discretion to manipulate earnings.³¹¹	
Manipulating the estimated fair value of loans	- Firms are required to disclose the estimated fair value of most financial instruments, including loans receivables, on a quarterly basis. - In addition, some firms use the fair value option in accounting for some or all of their loan portfolio. - Other situation where fair value or changes in fair value are recognized include loans held for sale and hedged loans in a fair value hedge. - Firms may exploit the discretion involved in measuring the fair value of loans to manipulate the estimate (e.g., Nissim 2003).	Examine the difference between the fair and book values of loans (i.e., the net unrealized gain/loss) in recent years. Are the levels of and changes in net unrealized gain/loss consistent with the levels of and changes in interest rates and in the portfolio's credit quality considering relevant characteristics of the loan portfolio (e.g., composition, maturity, interest and prepayment provisions)?
Book value significantly different from fair value	- When estimating the value of banks, some analysts use the book value of loans as a proxy for their fair value. - The book value of loans receivable is equal to the present value of all remaining interest and principal payments, discounted at the effective (historical) rate. - Thus, significant changes in risk free rates, credit spreads, or borrowers' credit profile imply that the fair value of loans (which is equal to the present value of remaining cash flows discounted at current interest rates) may be significantly different from book value.³¹²	- Large difference between the book and disclosed fair values of debt - Effective interest rate that is substantially different from current market yields on loans with similar credit rating, maturity, and interest rate provisions.

senior management of Doral agreed orally and in emails to extend the recourse provision beyond the 24-month period included in the written agreements to recourse for the duration of the mortgages.

³¹¹ Example of *manipulating the valuation of MSRs* (SEC AAER No. 4174): “MSRs are assets that represent the economic value of residential mortgage servicing rights retained by Fulton after the underlying loans are sold (e.g., for securitization). As of yearend 2016, Fulton maintained a portfolio of MSRs with a fair value of approximately \$38.2 million. Fulton evaluates its MSR portfolio for impairment on a quarterly basis and establishes a valuation allowance if and to the extent the carrying value of the MSR portfolio exceeds its estimated fair value (i.e., if the asset is impaired). ... The MSR valuation allowance is established through a charge against Fulton's earnings. If subsequent valuations indicate that the MSRs are no longer impaired, Fulton is required by GAAP to reduce the valuation allowance [and increase earnings].” According to the AAER, in Q4 2016 Fulton management received a third-party valuation of the MSRs indicated that a valuation allowance previously recognized should be reserved in full. Yet in Q4 2016 and Q1 2017 Fulton did not reverse the entire valuation allowance because EPS was above consensus estimates. Instead they reversed the allowance in Q2 2017 to avoid missing the consensus EPS estimate.

³¹² One result of using the effective interest rate method to measure interest income is that the amortized cost of investments is on average lower than their fair value. The unrealized gains are due to the (typically) positive slope of the term structure of interest rates, which in turn implies that the market yield on a given bond trends down over time. To understand this rather complicated point, consider the following example. Assume that the one-year spot rate is 5% and the expected value of next year's spot rate is also 5%, but there is high uncertainty regarding what the spot rate will be. This uncertainty causes the forward rate for next year to be higher than 5%, say 10% (that is, a 5% liquidity

Earnings quality issue	Explanation	Red flag or analysis
Unsustainable interest income	- Interest income is measured as the product of book value and the effective (historical) interest rate. - If recent, current and/or expected interest rates are significantly different from past interest rates (that the effective rate reflects), interest income is likely to change when loans mature and new ones are originated.	- Systematic changes over time in interest rates that are strongly correlated with the yield on the loan portfolio. For example, a declining trend in the Moody's Baa rate implies that the effective rate (and therefore interest income) is likely to decline over time. - Effective interest rate substantially different from current market yields on loans with similar credit rating, maturity, and interest rate provisions. - A large difference between the book and disclosed fair values of loans. (This implies that current interest rates are different from the effective rate, because fair (book) value is equal to the present value of remaining cash flows discounted at the current (historical) interest rate.)

premium). Thus, a \$1,000 zero coupon note with two years to maturity would sell for \$865.8 ($= 1,000 / [1.05 \times 1.1]$). The effective yield is 7.47% ($= [1,000 / 865.8]^{0.5} - 1$), and so interest income for the first year would be \$64.68 ($= 865.8 \times 7.47\%$) and the book value at the end of the first year would be \$930.48 ($= 865.8 + 64.68$). But, on average, the spot rate next year will be 5%, which implies a fair value for the bond of \$952.38 ($= 1,000 / 1.05$), that is, an unrealized gain of \$21.9 ($= 952.38 - 930.48$). This gain is due to the understatement of interest income in year 1. Interest income should have been \$86.58 ($= 865.8 \times 10\%$) in the first year, reflecting compensation for both the time value of money and the liquidity risk, which by the end of year 1 is resolved. Instead, the effective rate method recognizes a portion of year 1's liquidity premium in year 2.

5.13 Investment in debt securities

Investments in debt securities are a significant asset category for many firms, especially financial institutions. For insurance companies, they often account for the majority of reported assets, and for most banks investments in debt securities are the second largest asset category (behind loans). Nonfinancial companies with excess amount of cash typically invest that cash in debt securities, and for highly profitable companies these investments can account for much of their balance sheet. Thus, understanding the accounting treatment for investments in debt securities is important when evaluating both financial and nonfinancial firms.

The accounting treatment varies depending on the classification of the investment. Under ASC 320, investments in debt securities may be classified as held-to-maturity if the firm has the intent and ability to hold the securities until they mature.³¹³ Other investments in debt securities are classified as either available-for-sale or trading securities. Trading securities are bought and held principally for the purpose of selling them in the near term in order to profit from short-term price movements. Available-for-sale is a residual classification, including all investments in debt securities other than those classified as either held-to-maturity or trading. In practice, most investments in bonds are classified as available-for-sale.

Held-to-maturity (HTM) securities are carried on the balance sheet at historical cost, adjusted for the cumulative amortization of any at-purchase **discount** (securities' par value in excess of purchase price) or **premium** (purchase price in excess of par value). The periodic amortization is equal to the difference between interest income and interest receipts, where interest income is calculated as the product of the at-purchase yield and the investment's book value at the beginning of the period. The at-purchase yield is the internal rate of return given the purchase price and the contractual future interest and principal payments. This method of calculating interest income and amortizing any discount or premium—referred to as the **effective interest rate method**—results in an investment's book value which is equal to the present value of the remaining contractual payments discounted using the historical at-purchase yield.³¹⁴ Because the investment's fair value is equal to the present value of the remaining contractual payments discounted at the current market yield, differences between the fair and book values are due to yield changes; yield increases result in unrealized losses while yield decreases give rise to gains.³¹⁵

³¹³ If the security can be prepaid or settled in such a way that the holder would not recover substantially all of its recorded investment (e.g., interest only strips), the security cannot be classified as held-to-maturity.

³¹⁴ Let B_0 denote the book value of the investment immediately after its purchase. Note that B_0 is equal to the purchase price, which in turn is equal to the present value of all promised coupons and principal payments using the at-purchase yield (this is by definition). That is, $B_0 = C \times \rho^{-1} + C \times \rho^{-2} + \dots + C \times \rho^{-n+1} + (F + C) \times \rho^{-n}$ where C is the coupon, ρ is one plus the at-purchase yield, F is the principal amount, and n is the number of interest periods. Under the effective rate method, B_1 (i.e., book value at the end of the first interest period) is calculated as follows: $B_1 = B_0 \times \rho - C$. Thus, $B_1 = (C \times \rho^{-1} + C \times \rho^{-2} + \dots + C \times \rho^{-n+1} + (F + C) \times \rho^{-n}) \times \rho - C = C \times \rho^{-1} + C \times \rho^{-2} + \dots + C \times \rho^{-n+2} + (F + C) \times \rho^{-n+1}$. That is, B_1 is equal to the present value of all remaining cash flows, discounted using the at-purchase yield. The proof for B_2 through B_n follows the same steps.

³¹⁵ Yield changes are due to changes in risk free rates, prepayment expectations, credit risk (e.g., as measured by credit rating), or credit spreads (for a given level of credit risk or credit rating). Yield changes may also result from the passage of time. To see how the passage of time may cause yield changes, note that a bond's yield is essentially

Trading securities are carried at fair value with realized and unrealized gains and losses reported in the income statement. Interest income is calculated the same way as interest on held-to-maturity securities: the product of the at-purchase yield and the amortized cost at the beginning of the period. This classification is uncommon and is used primarily by large financial institutions.

Available-for-sale (AFS) securities are reported on the balance sheet at fair value, with unrealized gains and losses excluded from earnings and reported, net of deferred taxes, as a component of shareholders' equity (accumulated other comprehensive income). Interest income is calculated the same way as interest on held-to-maturity and trading securities: the product of the at-purchase yield and the amortized cost at the beginning of the period.

Realized gains and losses on held-to-maturity and available-for-sale securities are reported in income and are calculated as the difference between the selling price and the amortized cost at the time of sale. In addition, impairments are generally treated as realized losses, although in some cases they are reported in other comprehensive income (discussed next).

AFS securities are assessed for **impairment** (referred to as other-than-temporary until 2019) if their fair value is less than the amortized cost. An impairment is recognized if either: (a) the firm intends to sell the security before recovery of amortized cost, (b) there is a greater than 50% probability that the entity will be required to sell the security before recovery of amortized cost, or (c) the entity is not likely to recover the entire amortized cost. An impairment loss is measured as the entire difference between the fair value and amortized cost, but if the reason for impairment is (c), the non-credit portion of the impairment is recognized in OCI instead of in earnings.³¹⁶ For securities that are written down because of (a) or (b), the difference between the new amortized cost basis and the cash flows expected to be collected are accreted as interest income. If the cash flows expected to be collected increase significantly, or if actual cash flows are significantly greater than cash flows previously expected, the changes are accounted for as a prospective adjustment to the yield; reversals of impairment losses previously charged through earnings are prohibited.

Effective 2020 (ASC 326), impairment recognition for HTM debt securities has changed significantly (previously HTM impairments were accounted for similar to AFS impairments).

a weighted average of the yields of the different contractual payments. These yields are determined primarily by the term-structure of interest rates. When the term structure has a positive slope, the yields of the different cash flows increase with maturity. Thus, as time passes, the yields of the different cash flows, and therefore the overall bond's yield, decrease due to the shortening of maturity. An opposite effect occurs when the term structure is inverted. Due to the maturity premium, the term structure is typically upward-sloping. Thus, bond yields usually decrease over time, resulting in unrealized investment gains. This feature of the effective rate method is also relevant for other financial assets and liabilities, including loans, time deposits, and debt.

³¹⁶ One approach to measure the credit portion of the loss is to discount expected losses at the original effective rate. Since 2020 (ASC 326), an allowance for credit losses should be recognized when the present value of cash flows expected to be collected from AFS debt securities is less than the security's amortized cost basis. The allowance for credit losses is limited by the difference between the debt security's fair value and its amortized cost basis. If the measurement of credit losses increases or decreases, the entity adjusts the allowance, with corresponding gains or losses recorded in net income.

Under the new standard, an estimate of current expected credit losses should be recognized as an allowance (a contra asset) immediately upon acquisition of HTM debt securities, and it should be adjusted as of the end of each subsequent reporting period, with corresponding gains or losses recorded in net income. The expected credit losses should reflect the losses expected over the contractual life of the asset and consider historical loss experience, current conditions, and reasonable and supportable forecasts.

In the ***cash flow statement***, all interest receipts are included in cash from operations. Cash flows from purchasing, selling, and maturity of available-for-sale and held-to-maturity securities are included in cash from investing activities. Cash flows from purchasing and selling trading securities are reported in cash from operating activities.

	Classification	Balance sheet	Income Statement	Cash flow statement
Held-to-maturity	Intent and ability to hold the securities until they mature	Amortized cost, net of impairments; current / noncurrent assets, based on maturity	Interest income; realized gains and losses; impairments and recoveries	<u>Operating:</u> Interest receipts <u>Investing:</u> purchase, sale and maturity
Trading	Bought and held for the purpose of selling them in the near term in order to profit from short-term price movements	Fair value; current assets	Interest income; realized and unrealized gains and losses	<u>Operating:</u> Interest receipts, purchase, sale and maturity
Available-for-sale	All other	Fair value; unrealized gains and losses reported, net of deferred taxes, in shareholders' equity; current / noncurrent assets, based on maturity and planned use	Interest income; realized gains and losses; impairments	<u>Operating:</u> Interest receipts <u>Investing:</u> purchase, sale and maturity

Unlike U.S. GAAP, ***IFRS*** makes no distinction in accounting treatment between securities and other debt instruments (e.g., loans). Therefore, the accounting for investments in debt securities under IFRS is as described in Section 5.12, “Loans receivable and related accounts.”

Table 5.13A describes ***earnings quality issues***, red flags and analyses related to investment in debt securities.

Table 5.13A: Earnings quality – investment in debt securities

Earnings quality issue	Explanation	Red flag or analysis
Gains trading	- Unrealized gains and losses on debt securities other than those classified as trading or accounted for under the fair value option are generally excluded from reported income. - Firms may manipulate reported income by selectively realizing gains or losses, either by timing securities sales or “cherry picking” securities. - For example, to increase reported income in a particular period, a firm may sell securities with unrealized gains or refrain from selling securities with unrealized losses. - This form of earnings management is very common, especially in the financial sector (e.g., Nissim 2013b). Firms engage in such activities also due to tax and regulatory capital considerations (e.g., Ellul et al. 2015).	- Significant net realized gains and a large decline in net unrealized gains (losses) that is inconsistent with market returns on similar instruments during the period. - For example, a firm that started a given year with \$200 of unrealized gains and \$250 of unrealized losses, ended the year with unrealized gains of \$50 and unrealized losses of \$370, and reported net realized gains of \$100, is likely to have selectively realized gains to increase reported income, especially if the decline in net unrealized gains (losses) is inconsistent with market returns on similar instruments during the year. - When estimating recurring earnings, exclude securities gains and losses.
Reclassifying Securities	- Firms may manage earnings or book value by changing the classification of securities from one category to another. For example, a company may reclassify securities with unrealized gains from available-for-sale to trading, thereby triggering the recognition of the unrealized gains. - This form of earnings management, however, is rather limited. Most transfers are either disallowed or are permitted only under rare circumstances. In addition, reclassifications out of the held-to-maturity classification could result in the entire portfolio of held-to-maturity investments being transferred out of this category.	- Gains or losses resulting from reclassification of securities. - When estimating recurring earnings, exclude gains and losses from reclassifying securities.
Manipulating fair value estimates	- Most bond trading takes place in over-the-counter markets, through a decentralized network of dealers and brokers. In addition, trading volume in fixed-maturity securities other than U.S. government securities is relatively low. - Therefore, fair value estimates for debt securities are often derived from models or other methods that involve substantial discretion. - Managers may exploit this discretion to manipulate the estimates, or they may make estimation error.³¹⁷	- Significant investments in long-term, illiquid or low credit quality instruments, whose fair value is designated level 2 or 3. - For example, the disclosed fair value of US Treasury securities is likely to be a precise measure of their value. In contrast, the estimated fair value of illiquid high-yield corporate bonds may deviate significantly from the intrinsic (“true”) value.

³¹⁷ Example of *manipulating fair value estimates* (SEC AAER No. 3296): Morgan Keegan managed funds that held securities backed by subprime mortgages. As the market for such securities deteriorated in the first half of 2007, Morgan Keegan utilized practices which were not reasonably designed to determine that the securities fair values were accurately calculated. In addition, managers of Morgan Keegan engaged in actions that delayed the recognition of declines in the securities’ fair value as a result of the deteriorating market.

Earnings quality issue	Explanation	Red flag or analysis
Manipulating impairments	- Recognizing impairment charges on AFS and HTM investments involves significant discretion that companies may exploit to manipulate earnings. (Effective 2020, impairment recognition for AFS and HTM follow different models, but both involve discretion.) - Companies may manipulate impairment not just by adjusting the fair value estimate, but also by designating the loss as temporary (or not).³¹⁸ - Impairment reversals recognized in earnings (HTM or IFRS' AC or FV-OCI classifications). Even if free of manipulation, their earnings effect is transitory.	- Limited or no recognition of impairment losses in spite of deteriorating market conditions or portfolio characteristics (e.g., credit profile, magnitude and duration of the difference between fair value and amortized cost). - Significant investments in long-term, illiquid or low credit quality instruments, whose fair value is designated level 2 or 3. - Reversal of previously recognized impairments included in income. - Nature of loss - credit quality or interest rate changes? This is relevant because credit-related losses on high yield securities are less likely to be recovered compared to interest rate-related losses of fixed-rate securities.
Unrealized gains or losses recognized in income	- For debt instruments classified as trading or accounted for under the fair value option, earnings and equity include unrealized gains or losses. - These gains/losses are transitory in nature and primarily reflect unexpected changes in interest rates or in credit spreads.	- Significant investments accounted for at FV through income, especially if they are in volatile instruments. - Significant gains or losses included in income
Book value significantly different from fair value	- When estimating the value of firms, some analysts use the book value of investments in debt securities as a proxy for their fair value. - Most investments in debt securities are reported at fair value, but some are reported at amortized cost. - The amortized cost of investment in debt securities is equal to the present value of all remaining interest and principal payments, discounted at the effective (historical) rate. - Thus, significant changes in risk free rates, credit spreads, or borrowers' credit profile imply that the fair value of investments in debt securities (which is equal to the present value of remaining cash flows discounted at current interest rates) may be significantly different from amortized cost.	- A large difference between the book and disclosed fair values of investments in debt securities - Effective interest rate that is substantially different from current market yields on debt securities with similar credit rating, maturity, and interest rate provisions.

³¹⁸ Managers can avoid recognizing an OTTI loss on investment either by (1) using the discretion over fair value measurements to inflate fair values above amortized cost or (2) arguing that the decline in fair value is temporary. Using security-level disclosures in the insurance industry to employ within-security analyses, Song (2021b) finds that insurers engaging Big 4 and leading auditors in the insurance industry are more (less) likely to use non-fair value (fair value) discretion to avoid OTTI losses. The results are consistent with these auditors having a comparative advantage in auditing fair value measurements versus non-fair value discretion due to their increased access to fair-value-related resources at the national level.

Earnings quality issue	Explanation	Red flag or analysis
Unsustainable interest income	- Interest income is generally measured as the product of amortized cost and the effective (historical) interest rate. - If recent, current and/or expected interest rates are significantly different from past interest rates (which the effective rate reflects), interest income is likely to change when securities mature and new ones are acquired. - This concern is particularly relevant for life insurance companies and other firms with significant holdings of debt securities.	- Systematic changes over time in interest rates that are strongly correlated with the yield on the debt securities. For example, a declining trend in the Moody's Baa rate implies that the effective rate (and therefore interest income) is likely to decline over time. - Effective interest rate substantially different from current market yields on debt securities with similar credit rating, maturity, and interest rate provisions. - A large difference between the amortized cost and disclosed fair values of debt securities. (This implies that current interest rates are different from the effective rate, because fair (amortized cost) value is equal to the present value of remaining cash flows discounted at the current (historical) interest rate.)
Limited disclosure on interest rate risk	- U.S. GAAP require limited disclosure regarding the interest rate risk of investments in fixed income securities. - In most cases the only information provided is about maturity distribution—the amounts due in one year or less, one-to-five years, five-to ten years, and more than ten years. - This information provides some indication regarding interest rate risk; for example, long maturity generally implies high duration and therefore high interest rate risk, and evenly spread cash flows imply high convexity and therefore low interest rate risk. However, interest rate risk also depends on interest rate provisions (e.g., fixed versus floating) and embedded options (e.g., ceiling, floors, collars, call or prepayment provisions). Unfortunately, little if any information is typically provided on these factors.	Examine the composition of the securities portfolio and the remaining maturity distribution.

5.14 Derivatives

Derivatives are instruments that derive their value from underlying asset prices, indices, reference rates, other variables, or a combination of these factors. For example, stock options derive their value from the price of the underlying stock, interest rate swaps derive their value from the underlying interest rates, and F/X forward contracts derive their value from the exchange rate. Derivatives may be privately negotiated contracts, which are usually referred to as over the counter (OTC) derivatives, or they may be listed and traded on an exchange.

Common derivatives include:

Option – the right to buy from (call option) or sell to (put option) the option writer an asset at a specified price within a defined time period.

Forward – a contract that commits counterparties to purchase (the contract buyer) or sell (the contract seller) an asset at a specified price within a defined time period.

Future – a standardized forward contract that is traded on an organized exchange.

Interest rate swap – an agreement under which two counterparties agree to exchange one type of interest rate cash flow for another. In a typical arrangement, one party periodically pays a fixed amount of interest, in exchange for which that party receives variable payments computed using a published index such as the Libor.

Credit default swap (CDS) – an agreement under which the protection buyer of the CDS makes a series of payments (CDS fee or spread) to the protection seller and, in exchange, receives a payoff if a credit instrument (typically a bond or loan) experiences a credit event (bankruptcy, failure to pay, or other event as specified in the agreement).

Total return swap – an agreement under which one party makes payments based on a set rate or fee, either fixed or variable, while the other party makes payments based on the return of an underlying asset, which includes both the income it generates and any capital gain or loss (if there is a loss, the party receiving the total return has to pay). The underlying asset, referred to as the reference asset, is usually an equity index, a stock, a basket of loans, or bonds. The asset is owned by the party receiving the rate or fee.³¹⁹

Derivatives are commonly used by firms to manage risk, speculate, or for market-making (large financial institutions). Both financial and nonfinancial firms use derivatives to hedge risks. For example,

- A bank may use a pay-fixed, receive-floating interest rate swap to hedge against fluctuations in the fair value of fixed rate loan receivables.
- A nonfinancial firm may use a pay-fixed, receive-floating interest rate swap to hedge against fluctuations in interest payments on short-term or floating rate debt.
- A firm may use forward currency contracts to hedge the cash flows associated with future foreign currency transactions (e.g., export sales, import purchase of raw material) or to hedge the values of or cash flows associated with F/X-denominated monetary assets or liabilities.

³¹⁹ This arrangement is often provided by banks to their prime brokerage clients (typically hedge funds) and is similar to a margin transaction. Total return swaps offer several advantages compared to margin transactions, including lower regulatory capital requirement (an advantage from the perspective of the bank) and lack of transparency over positions (from the perspective of the hedge fund). The risks associated with these arrangements were demonstrated in March 2021, with the Archegos Capital episode.

- A multinational corporation may use foreign exchange derivatives to manage foreign currency exposure of the net investment in non-U.S. operations.
- A life insurer may use S&P 500 puts to hedge exposure to changes in the value of minimum benefit guarantees on variable annuity contracts.
- An oil producer may use oil futures to hedge its revenue.
- An airline may use oil futures to hedge fuel costs.
- A food manufacturer may use futures to hedge the cost of soybeans.
- A bank may use credit default swaps to hedge the credit exposure of loans or other financial instruments.
- A property-casualty insurer may use credit derivatives to hedge exposures to reinsurers.

Some firms use derivatives to speculate or to generate profits from fees or spreads. While these activities are typically associated with hedge funds and wall street banks, respectively, they are occasionally conducted by non-financial firms. Derivatives are particularly useful for speculation because they provide significant exposure with little or no investment. Another form of speculation is to generate premiums by selling options. Besides speculation, financial firms use derivatives to satisfy customer demand and to hedge positions entered into in market-making activities. These activities are a significant source of profits for large financial institutions.

Under U.S. GAAP, a derivative is defined as a financial instrument that (1) has one or more *underlyings* and one or more *notional amounts* or payment provisions (notional amount is the quantity of the underlying to which the contract applies); (2) has an initial net investment smaller than would be required for other instruments with a similar response to the underlying; and (3) requires or permits net settlement or de facto net settlement.³²⁰ The underlying of a derivative is an asset, basket of assets, index, or another instrument, such that the value of the derivative depends on the value of that underlying. For example, the underlying of a stock option is the stock price, and the notional amount is the number of shares that can be bought when the option is exercised (typically 100). Other examples include currency forwards (underlying is the exchange rate and notional is the amount of currency), commodity futures (underlying is the commodity price and notional is the number of commodity units), and interest rate swap (underlying is the interest rate index and notional is the dollar amount).

All derivatives are recognized as either assets or liabilities on the balance sheet and are measured at fair value.³²¹ The accounting treatment for derivatives' gains and losses depends on whether the derivatives have been designated and qualify as part of a hedging relationship, and further, on the type of hedging relationship. A derivative that is designated and qualifies as a hedging instrument must be categorized either as a fair value hedge (a hedge of changes in the fair value

³²⁰ De facto net settlement is achieved if there is a mechanism that facilitates net settlement (e.g. exchange, assignment) or if the asset is readily convertible to cash (e.g. publicly traded securities), so that exposure at settlement is limited to the value of the derivative. For example, an option to buy 100 shares of a non-listed stock with no net settlement satisfies the first two criteria (it has an underlying—the stock—and a notional amount—100 shares—and the net investment is smaller than the price of 100 shares), but it requires delivery of a non-liquid underlying and is therefore not considered a derivative under U.S. GAAP.

³²¹ Companies may elect to exclude from the scope of the derivative standard contracts to purchase or sell nonfinancial items that will be purchased, sold, or used in the normal course of business.

of existing assets, liabilities, or firm commitments³²²), a cash flow hedge (a hedge of the variability of future cash flows), or a hedge of a net investment in foreign operations. For each of the three hedge designations, gains and losses on the derivative and hedged item are reported in earnings in the same period. For fair value hedges the changes in fair value are recognized in income in the period of change. For the other two hedge designations, changes in the derivative's fair value are recognized in income in the same period or periods in which the hedged transaction affects earnings, which is generally after the change in the derivative's fair value. This is achieved by initially recognizing the unrealized gain or loss on the derivative in other comprehensive income, and subsequently recycling it through the income statement. With no hedge designation, derivative gains and losses are immediately reported in earnings.

	Classification	Balance sheet	Income Statement	Examples
Fair value hedge	Hedge of changes in the fair value of existing assets, liabilities or firm commitments	Derivative at fair value; hedged item is adjusted for offsetting gain or loss	Realized and unrealized gains/losses on the derivative; offsetting gain or loss on the hedged item	Fixed rate loan receivables; fixed rate debt payable; commitment to a future transaction denominated in a foreign currency (e.g., purchase of inventory)
Cash flow hedge	Hedge exposure to variability in the cash flows of a recognized asset or liability, or of a forecasted transaction	Derivative at fair value; unrealized gains and losses reported, net of deferred taxes, in shareholders' equity	Gains/losses recognized in the same period/s as the hedged item; ineffective portion of hedge is recognized immediately	Floating rate debt payable; forecasted transaction denominated in a foreign currency (e.g., purchase of inventory)
Net investment hedge	Hedge of the foreign currency exposure of a net investment in a foreign operation	Derivative at fair value; unrealized gains and losses reported, net of deferred taxes, in shareholders' equity	Gains/losses recognized on disposal of investment; ineffective portion of hedge is recognized immediately	
Other	All other	Derivative at fair value	Realized and unrealized gains/losses are recognized immediately	

To qualify for hedge accounting, the hedge must be “highly effective” as assessed at inception (prospectively) and at least every three months (prospectively and retrospectively). **Hedge effectiveness** means that changes in the derivative's fair value or cash flow (depending on the type of hedge) should offset changes in the fair value or cash flow of the hedged item. GAAP does not specify a single method for assessing hedge effectiveness; firms should adopt methods

³²² “Firm commitment” is a binding agreement with an unrelated party that specifies all significant terms of the transaction and includes a nontrivial disincentive for nonperformance.

consistent with their risk management strategies and prepare detailed documentation of the effectiveness test.³²³

Derivatives embedded in other financial instruments (e.g., calls, puts, floor, ceiling, cap, indexing, or other embedded options) that are not clearly and closely related to the economic characteristics and risks of the host contract (e.g., a debt instrument with variable payments linked to an equity market benchmark) must be separately accounted for as a derivative. See [Section 5.11](#) for further discussion of embedded derivatives.

IFRS is similar to U.S. GAAP, but there are many differences in details. For example,

- In general, more instruments qualify for derivative treatment under IFRS, as no “net settlement” requirement exists in the IFRS definition of derivatives.
- The shortcut method, the critical-terms-match method, and the terminal value method for assessing hedge effectiveness are not permitted under IFRS.
- Unlike U.S. GAAP, there is no requirement to check hedge effectiveness retrospectively.
- There are differences in the identification, bifurcation requirements, and measurement of embedded derivatives.

Table 5.14A describes *earnings quality issues*, red flags and analyses related to derivatives.

³²³ Examples of such methods include: the shortcut method, the critical-terms-match method, the dollar offset method, and regression analysis). The shortcut method assumes no ineffectiveness (and, hence, bypass the effectiveness test); it is allowed for certain fair value or cash flow hedges of interest rate risk using interest rate swaps when certain stringent criteria are met (e.g., zero fair value for the swap at inception, a perfect or almost perfect match of terms with the hedged instrument). As its name suggests, the critical-terms-match method can be used (in some cases) if the hedging instrument and the entire hedged item are the same. For example, hedging a commitment to purchase equipment for 5,000 Euros on February 15, 2020 using a forward contract to buy 5,000 Euros on that date. The dollar offset method compares the change in the derivative’s fair value or cash flow (depending on the type of hedge) to that of the hedged item, and considers the hedge effective if the ratio of the two falls within the bounds of -0.80 to -1.25. When using regression analysis to test the strength of the hedging relationship, the regression coefficient of determination (R-square) serves as the primary measure of hedge effectiveness. A hedge is considered effective if changes in the derivative’s fair value or cash flow explain a high proportion of the total variation in the fair value or cash flow of the hedged item (typically an R-square of at least 80% is required).

Table 5.14A: Earnings quality – derivatives

Earnings quality issue	Explanation	Red flag or analysis
Off-balance sheet risk	• Like securities and other financial instruments, market risks associated with derivatives depend on the derivatives' notional amounts. • However, unlike other financial instruments for which book value is close to the notional amount (e.g., debt securities, loans), the book value of derivatives—which is equal to their fair value—is typically a fraction of the notional amount. • Thus, the balance sheet fails to reflect the market risks associated with derivative transactions. For example, a receive-fixed/pay-floating 5-year interest rate swap with a notional amount of \$100 million exposes the firm to a similar interest rate risk as a five-year fixed rate bond with a book value of \$100 million, and yet it has a zero-book value at the time of inception. • On the balance sheet, many companies—especially financial institutions—net derivative gains and losses against each other when they have a master netting agreement with the counterparty. In many cases, they also net collateral against derivative positions. Such net reporting further reduces the extent to which the balance sheet reflects derivative-related exposures.	• Examine the notional amounts and composition of derivatives • The market risks associated with a given amount of notional exposure vary significantly across derivatives. • For example, the fair value volatility of a swap is significantly larger than that of a forward contract with the same notional amount, because a swap is essentially a portfolio of forward contracts. • Examine disclosure regarding the gross book value of derivatives and collateral. (As discussed in the “explanation” column, on the balance sheet many companies report some positions net; still, they are required to provide footnote disclosure on the gross book values.)
High risk assets	• For most derivatives, book value (which is equal to fair value) reflects expected realization of risk. • Derivatives in a gain position represent an on-balance sheet risk as the value of derivative assets may decline. Given the high volatility of the fair value of derivatives, these assets are particularly risky. • Purchased options are paid for at the time of purchase and present no off-balance sheet risk (the risk is limited to the book value of the investment). Still, the fair value of options is highly volatile. • For OTC derivatives, credit risk is also relevant.	• Significant derivative assets. • Credit quality of counterparties to derivative assets and the effects of risk mitigation provisions (e.g., collateral, offsets, guarantees).

Earnings quality issue	Explanation	Red flag or analysis
Low precision of fair value estimates	- Due to the unavailability of prices from liquid markets for most derivatives, as well as their leverage and option characteristics, the potential for large valuation errors is higher for derivatives compared to other financial instruments.³²⁴ - This is especially true for non-standardized derivatives. - Firms may use the discretion in measuring fair value to manage earnings.³²⁵	- Examine the notional amounts and composition of derivatives - Futures and exchange-traded options have available market prices and trivial credit risk (the exchange acts as the counterparty to each contract). - OTC derivatives (swaps, forward contracts, options) often have non-trivial credit risk, and estimating their fair value involves significant discretion.
Artificial volatility – unrecognized fair value hedges	- When both the hedged item and the hedging derivative are marked-to-market, the balance sheet and income statement appropriately reflect net value and change in value, respectively. - However, when the hedged item is reported at an amount other than fair value (or not reported at all), book value and earnings are distorted, and the information content of the financial statements is reduced.³²⁶ - This distortion results primarily from the stringent requirements to qualify for hedge accounting, which often prevent firms from recognizing offsetting changes in the value of hedged items.³²⁷ - Under U.S. GAAP, firms can account for many hedged items using the fair value option, effectively allowing for fair value hedge accounting treatment even when the requirements for hedge accounting are not satisfied.	- Significant derivatives not accounted for as hedges that are used to hedge the value of recognized assets or liabilities or firm commitments. - This issue is especially relevant for financial services firms.

³²⁴ Example of *potential measurement error in fair value estimates* (from the “Critical Accounting Estimates” section in JPMorgan 2019 10-K): “The Firm uses various methodologies and assumptions in the determination of fair value. The use of methodologies or assumptions different than those used by the Firm could result in a different estimate of fair value at the reporting date.”

³²⁵ For example, according to “Infinity Q Diversified Alpha Fund Plan of Distribution of Assets,” submitted to the SEC on June 7, 2021, “Infinity Q’s Chief Investment Officer had been adjusting certain parameters ... that impacted the valuation of certain of the Bilateral OTC [derivatives] Positions ... [An independent third-party valuation consultant] concluded that the valuations applied to most of the Fund’s Bilateral OTC Positions were materially overstated as of February 18, 2021, and likely were overstated each trading day for several months before February 18, 2021.”

³²⁶ Example of *artificial volatility due to unrecognized fair value hedges* (from JPMorgan 2019 10-K): “The credit derivatives used in credit portfolio management activities do not qualify for hedge accounting under U.S. GAAP; these derivatives are reported at fair value, with gains and losses recognized in principal transactions revenue. In contrast, the loans and lending-related commitments being risk-managed are accounted for on an accrual basis. This asymmetry in accounting treatment, between loans and lending-related commitments and the credit derivatives used in credit portfolio management activities, causes earnings volatility that is not representative, in the Firm’s view, of the true changes in value of the Firm’s overall credit exposure.”

³²⁷ Ranasinghe et al. (2022) note “a hedging derivative the value of which changes 75 cents in the opposite direction for every one dollar change in the price of the hedged item would substantially (albeit imperfectly) offset the underlying price risk, but would not qualify as an effective hedge for hedge accounting purposes. Moreover, even highly effective hedges might be disqualified from hedge accounting in the absence of formal documentation of the hedging relationship and the entity’s risk management objectives and strategy (SFAS NO. 133, ¶20a). In these instances, the accounting effect could arguably outweigh the economic effect resulting in a net increase in income volatility.”

Earnings quality issue	Explanation	Red flag or analysis
Cash flow hedges and change in firm value	- For cash flow hedges, whether using hedge accounting increases or decreases the accuracy with which earnings measure change in firm value depends on the particulars of the case. - For example, when derivatives are used to hedge floating rate interest payments, changes in the fair value of the derivatives are not offset by changes in the fair value of the hedged item, which is not sensitive to changes in interest rate (e.g., a floating rate loan). So hedge accounting results in earnings that exclude a net gain or loss, while not using hedge accounting results in earnings that reflect the change in firm value (although they include a transitory gain or loss). - In contrast, when derivatives are used to hedge anticipated sales by an oil and gas production company, changes in the fair value of the derivatives are likely offset by changes in the present value of future operating cash flows. So hedge accounting results in earnings that exclude artificial volatility, while not using hedge accounting results in earnings that effectively include an error component.	- Significant derivatives used to hedge floating interest rate exposure accounted for as cash flow hedges. - Significant derivatives used to hedge cash flows other than floating interest payments not accounted for as hedges. - Still, from the perspective of earnings sustainability, using hedge accounting is preferred in both cases because even if the derivative gains or losses are not offset by changes in the fair value of other items (i.e., floating interest rate hedges), they are transitory in nature.
Transitory earnings	- When derivatives are not used for hedging, the related unrealized and realized gains and losses are recognized in income. - Such gains and losses are transitory in nature and therefore reduce earnings sustainability.	- Significant derivatives not accounted for as hedges. - Significant gains or losses on derivatives not accounted for as hedges
Improper use of hedge accounting	Companies have significant discretion in designating and documenting hedge relationships, and they may exploit the discretion to account for speculative positions as hedging.³²⁸	Significant derivatives accounted for as hedges.
Discretionary hedge classification	- The same derivative position can often be classified as either a fair value hedge or a cash flow hedge. - For example, a bank that has fixed rate loans and variable rate debt can classify an interest rate swap in which it receives variable interest and pays fixed interest as either a fair value hedge of the loan portfolio or cash flow hedge of the debt. - These two alternatives differ in terms of the impact on equity book value. The cash flow hedge classification results in higher book value volatility because changes in the derivative fair value are included in comprehensive income. (For fair value hedges, changes in the derivative fair value are offset by changes in the fair value of the hedged item.)	

³²⁸ Example of *improper use of hedge accounting* (SEC AAER No. 3033): Fannie Mae allegedly disregarded the requirements of SFAS 133 and qualified transactions for the “short-cut” method based on erroneous interpretations and an unjustified reliance on materiality. By failing to comply with the requirements of SFAS 133, Fannie Mae failed to qualify for hedge accounting. This failure led to the issuance of materially false and misleading financial statements for the periods covering the first quarter 2001 to the second quarter 2004, with cumulative overstatement of net income close to \$11 billion.

Earnings quality issue	Explanation	Red flag or analysis
Unrecognized embedded derivatives	• Standalone derivatives are always reported at fair value. • In contrast, embedded derivatives typically remain off-balance sheet. • Thus, the same economic exposure may be reflected differently in the financial statements, depending on whether the derivatives are free-standing or embedded in non-derivative hosts. • For example, a floating rate loan and a separate purchased cap contract may create a similar exposure to that of a floating rate loan with an embedded cap, and yet the embedded cap will in most cases be considered “clearly and closely related” to the host loan and therefore be effectively ignored. • Some firms may take advantage of this accounting treatment to avoid fair valuing derivatives by deliberately embedding them in non-derivative hosts.	• Significant embedded options that are not bifurcated.

5.15 Passive investments in equity securities

Under ASC 321 (effective 2018), passive investments in equity securities (generally ownership < 20%) are measured at fair value, with changes in fair value recognized in net income. An entity may elect to measure equity securities that do not have readily determinable fair values at cost, less impairment, adjusted for subsequent observable price changes in orderly transactions for identical or similar investments of the same entity (referred to as “adjusted cost” below).

For investments accounted for under the “adjusted cost” method, the firm is required to perform a qualitative assessment of **impairment** each reporting period. If qualitative indicators suggest that the investment is potentially impaired, the firm has to estimate the investment’s fair value and recognize impairment loss if the fair value is less than book value. Examples of indicators of impairment include: a significant deterioration in the investee’s earnings, cash flows, credit rating, asset quality, or business prospects; or significant adverse changes in the investee’s economic, regulatory or technological environment.

IFRS is similar to U.S. GAAP, except

- Under IFRS, an entity may make an irrevocable election to measure non-derivative equity instruments that are not held for trading at FV-OCI. If FV-OCI is elected, gains or losses recognized in OCI are not recycled (i.e., reclassified to earnings) upon sale.
- Unlike U.S. GAAP, there is no exception from fair value measurement for instruments that have no readily determinable fair value.

Table 5.15A describes **earnings quality issues**, red flags and analyses related to passive investments in equity securities.

Table 5.15: Earnings quality – passive investments in equity securities

Earnings quality issue	Explanation	Red flag or analysis
Transitory gains or losses	Gains or losses from marking to market investments add volatility and make reported earnings a poor proxy for economic performance and sustainable profitability.³²⁹	- Large unrealized gains included in earnings - Significant investments in equity securities that are measured at fair value
Low quality or manipulated fair value estimates of thinly traded securities or private companies	- Measuring fair value in such cases involves significant discretion, which companies may exploit to manipulate earnings. - Error or manipulation can also be due to delayed or selective recognition of changes in fair value.³³⁰	- Fair value estimates of investments in equity securities designated level 2 or 3 - Significant investments in private companies that are measured at fair value
Failing to recognize impairments	Companies have substantial discretion in deciding whether indicators of impairment exist and, if so, in estimating fair value. They may exploit this discretion to manipulate the recognition of impairment losses.	- Significant investments in private companies that are reported at “adjusted cost” - No impairment or small impairment recognized when available information suggests material impairment (e.g., deterioration in economic conditions)
Gains trading	- For investments in private companies that are accounted for at “adjusted cost,” firms may manipulate reported income by selectively realizing gains or losses. - For example, to increase reported income, a firm may sell investments with unrealized gains or refrain from selling investments with unrealized losses.	- Large realized gains from selling investments - Significant investments in private companies that are measured at “adjusted cost”

³²⁹ “I must first tell you about a new accounting rule – a generally accepted accounting principle (GAAP) – that in *future* quarterly and annual reports will severely distort Berkshire’s net income figures and very often mislead commentators and investors. The new rule says that the net change in *unrealized* investment gains and losses in stocks we hold must be included in all net income figures we report to you. That requirement will produce some truly wild and capricious swings in our GAAP bottom-line. Berkshire owns \$170 billion of marketable stocks (not including our shares of Kraft Heinz), and the value of these holdings can easily swing by \$10 billion or more within a quarterly reporting period. Including gyrations of that magnitude in reported net income will swamp the truly important numbers that describe our operating performance. For analytical purposes, Berkshire’s ‘bottom-line’ will be useless.” *Warren Buffett’s 2017 Letter to Berkshire Hathaway Shareholders*.

³³⁰ Fischer et al. (2021) provide evidence that mutual funds’ valuations of private companies are much stickier than that of publicly traded companies. In more than a third of the quarterly observations of private companies, valuations are unchanged from the prior quarter – compared to only 0.1% for publicly traded companies, and for 16% of the observations of private companies, valuations are unchanged for at least a year after a fund’s initial investment. The authors also find that changes in the valuation of private companies are *timed* to improve funds’ performance rankings, but they find no evidence that the valuations associated with changes are biased to improve rankings. In addition, changes in reported fair values often follow large macroeconomic and firm specific events, and are highly correlated across funds and fund families. Changes are also more likely around large negative market fluctuations than large positive market fluctuations, suggesting that funds perceive that reporting risks associated with fair value accounting are asymmetric in nature.

5.16 Equity method investments

Under ASC 323, investments in common stock or in “in-substance common stock” of affiliates over which the company has significant influence (“associates” under IFRS terminology) are accounted for using the equity method.³³¹ **Significant influence** is defined as the power to participate in, but not control, the affiliate’s operating and financial policies. A 20% to 50% interest in voting rights leads to a presumption of significant influence. However, a company may have (not have) significant influence over an affiliate and so should (should not) use the equity method even if it owns less (more) than 20% of the voting stock of the affiliate, but in such cases significant influence (lack of significant influence) must be demonstrated. Indicators of significant influence include representation on the affiliate’s board, participation in policy-making processes, material transactions between the investor and investee, interchange of management personnel, provision of essential technical information, and extent of ownership in relation to the concentration of other shareholdings.³³² In some cases companies use the equity method with respect to investments in which they have a majority voting interest but still lack control (e.g., when minority investors have “substantive participation rights” or when the entity is a VIE and the company is not the primary beneficiary, see Section 5.18).

Under the equity method, the investment is originally recorded at acquisition cost and is subsequently adjusted for changes in the company’s share in the investee’s equity (hence the name “equity method”). Each period, the investment account is increased (decreased) by the company’s proportionate share in the investee’s earnings (loss) and other comprehensive income, and it is reduced by dividends received from the investee.³³³ The company reports its share in the investee’s earnings in the income statement as a single amount (“**equity method earnings**,” typically reported either between operating income and pretax income or between the income tax expense and income from continuing operations); the share in other comprehensive income is reported in the statement of comprehensive income.

³³¹ ASC 323-10-15-13 defines in-substance common stock as “an investment in an entity that has risk and reward characteristics that are substantially similar to that entity’s common stock”. If any one of the following characteristics indicates that the investment is not substantially similar to an investment in that entity’s common stock, the investment is not in-substance common stock: a. Subordination. If an investment has a substantive liquidation preference over common stock, it is not substantially similar to the common stock. b. Risks and rewards of ownership. If an investment is not expected to participate in the earnings (and losses) and capital appreciation (and depreciation) in a manner that is substantially similar to common stock, the investment is not substantially similar to common stock. c. Obligation to transfer value. An investment is not substantially similar to common stock if the investee is expected to transfer substantive value to the investor and the common shareholders do not participate in a similar manner (e.g., a mandatory redemption provision).

³³² The equity method applies not only to investments in corporations but also to investments in general and limited partnerships, limited liability companies, and joint ventures. An interest in a general partnership usually provides an investor with the ability to exercise significant influence over the operating and financial policies of the investee and is therefore generally accounted for under the equity method. Similarly, investments in limited partnerships (or corporations that are the functional equivalents of limited partnerships) should generally be accounted for under the equity method unless the investor’s interest is minor (typically less than 3-5 percent).

³³³ Investee losses that bring the investment account to a negative balance are recognized only if the investor has an obligation to fund losses, or if the investee is expected to return to profitability imminently.

The share in earnings is based on the investee's reported income, adjusted for the amortization of some **basis differences** (i.e., differences between the fair and book values of the investee's assets and liabilities on the investment acquisition date). Differences due to land, goodwill, and indefinite lives intangible assets (e.g., some trademarks) are not amortized, but differences due to finite life assets are amortized over the assets' useful lives. For example, a difference between the fair and book values of inventory is typically recognized in income in the year subsequent to the investment acquisition, while differences between the fair and book values of buildings are amortized over the buildings' useful lives. The amortization is included in the "equity method earnings" line item rather than being reported separately.

Adjustments are also required with respect to profit or loss from **transactions between the company and the investee** to the extent that the related assets are still held by the companies at the end of the period. Specifically, profit or loss embedded in an asset that is still held by the acquiring company at the end of the period (e.g., inventory that the investee purchased from the company) is generally eliminated to the extent of the company's interest in the investee.³³⁴

A series of operating losses of the investee, insufficient earnings capacity to justify the carrying amount, a fair value lower than book value, or other factors may indicate the existence of other-than-temporary impairment. To evaluate whether an **impairment** (i.e., fair value below book value) is other-than temporary, the investor should consider the length of time and extent to which the fair value has been less than book value, the financial condition of the investee, and the intent and ability to retain the investment for a sufficient period to recover the loss. When an other-than-temporary impairment exists, it is measured as the excess of the investment's carrying amount over its fair value.

The investor should not separately test the investee's assets for impairment. However, if the investee recognizes impairment losses, in addition to recognizing its share in the impairment (which is part of the share in the investee's net income), the investor should consider the effect, if any, of the impairment on the investor's basis difference in the assets giving rise to the investee's impairment charge. For example, a basis difference that related to an asset on which the investee recognizes an impairment loss should likely be fully expensed.

The investor's net income includes its share in the investee's earnings independent of whether the investee distributed or retained those earnings. In contrast, the investor's cash from operations includes only **dividends** received. Thus, when calculating cash from operations using the indirect approach, the difference between the share in the investee's earnings and the dividends received during the period is deducted from net income. If dividends received are larger than the share in earnings, the difference is added to net income.

For investments in publicly traded entities, the **value of the investment** based on the quoted market price should be disclosed.

³³⁴ Another, less common, adjustment relates to interest capitalization. The investor is required to capitalize interest cost incurred to fund its equity method investment if the investee has activities in progress necessary to commence its planned principal operations, and those activities include the use of funds to acquire assets that qualify for interest capitalization (see the discussion of interest capitalization in the Section 5.4).

The equity method is not allowed for *income tax purposes*; instead income is recognized upon receipt of dividends. This book-tax difference is generally considered temporary, and so it creates a deferred tax liability or asset (depending on whether the cumulative difference between the share in earnings and dividends received is positive or negative, respectively). For investments in U.S. corporations, any future tax effect is typically small due to the dividend received deduction.³³⁵

IFRS

IFRS is similar to U.S. GAAP, except

- The existence and effect of potential voting rights that are currently exercisable or convertible (e.g., warrants, convertible bonds) are considered when assessing whether an investor has significant influence. In contrast, under U.S. GAAP potential voting rights are generally disregarded in determining significant influence.
- When an investor ceases to have significant influence over the investee/associate, IFRS requires the retained interest to be initially measured at fair value and the gain or loss to be calculated not only on the portion sold but also on the retained interest in the investment. Under U.S. GAAP, the retained interest in the investee is initially measured at its proportionate carrying amount, then it is accounted for in accordance with other GAAP.
- Under IFRS, investments are assessed for impairment if there is “objective evidence” that one or more events occurring after the initial recognition of the asset (“a loss event”) has had an impact on the estimated future cash flows of the net investment in the associate. If a loss event has occurred, the impairment loss is measured as the excess of the investment’s carrying amount over the recoverable amount (i.e., higher of its (1) value in use or (2) fair value less costs to sell).
- Impairment losses previously recorded are reversed in future periods if the impairment conditions no longer exist, while under U.S. GAAP Other-than-temporary impairments recognized are not reversed in future periods.
- Under IFRS, the accounting policies of equity method associates must be the same as those of the investor. Under U.S. GAAP the only requirement is that the investee should also apply U.S. GAAP.
- Under IFRS, the financial statements of an investor and its equity method associates are prepared as of the same date. When the end of the reporting period differs for the investor and the equity method associate, the equity method associate prepares (for the use of the investor) the financial statements as of the same date as the financial statements of the parent unless it is impracticable to do so. When it is impracticable to prepare financial statements as of the same date, the difference between the end of the reporting period of the parent and the equity method associate cannot exceed three months in any circumstance. When there are different reporting dates, the financial statements of the equity method associate are required to be adjusted for the effects of significant transactions or events. Under U.S. GAAP, the

³³⁵ Dividends received from other U.S. corporations provide a tax deduction equal to a specified percentage of the dividends received (the percentage deduction depends on the percentage of ownership, ranging from a 50% deduction of the dividend received up to a 100% deduction). Since TCJA, dividends from foreign corporations can also be deducted, but under different rules. In most cases, corporations can deduct 100% of the foreign-source portion of dividends from foreign corporations in which they have at least 10% ownership.

investor and the equity method investee are permitted to have different year ends of up to three months. The effects of significant events occurring between the reporting dates of the investor and the equity method investee are disclosed in the financial statements.

Earnings quality

Table 5.16A describes earnings quality issues, red flags and analyses related to equity method investments.

Table 5.16A: Earnings quality – equity method investments

Earnings quality issue	Explanation	Red flag or analysis
Improperly avoiding the equity method for investments in loss-generating companies	- Companies may improperly avoid the equity method for investments in loss generating companies, or they may improperly use the equity method for investments in profitable companies or to avoid the fair value method (required for passive investments in public companies since 2018, see Section 5.15). - A 20% to 50% interest in voting rights leads to a presumption of significant influence, which in turn requires using the equity method. However, this presumption should be overcome if additional factors suggest otherwise (e.g., representation on the board; see summary of GAAP above). In some cases, firms may be able to exploit the discretion involved in evaluating these factors to improperly avoid or use the equity method.³³⁶ - Firms may reduce ownership in low profitability or loss firms below 20% to avoid using the equity method (e.g., Nelson et al. 2003). - The equity method is used in accounting for investments in common stock or “in-substance common stock.” Companies have discretion in evaluating whether an investment is “in-substance common stock,” and they may use this discretion to avoid or use the equity method.³³⁷	Significant investments in equity securities accounted for using the adjusted cost method (i.e., cost less impairment +/- observable price changes)
Transitory items included in equity method earnings	- Equity earnings include share in transitory income items of the investees.³³⁸ - Thus, estimating the investor’s “recurring earnings” requires evaluating the sustainability of equity method earnings.	- Disclosures in the MD&A, footnotes, or other sources indicating that equity methods earnings contain transitory or volatile items. - Equity method earnings, or implied ROE of equity method investees, substantially different from prior year values. - Implied ROE of equity method investees substantially different from the industry’s average ROE.

³³⁶ Example of *improperly avoiding the equity method* (AAER No. 2386): Sun improperly accounted for its investment in SunChamp during the period 2000-2002. Beginning in 2000, Sun transferred portions of its SunChamp ownership to outside investors to, among other things, reduce its ownership below 20% and thus stop recording SunChamp losses in its financial statements. However, payments by the outside investors were primarily in the form of non-recourse promissory notes, which meant that Sun retained most of the risk (and potential losses) associated with the investment.

³³⁷ The following is from a comment letter sent by the SEC to Emmis Communications Corporation in 2012. “We understand from the second paragraph of page 13 [of the Form 10-Q] that you retained substantial influence over Merlin Media LLC. We note from the third paragraph of page 26 that your preferred equity interests in Merlin Media LLC are non-redeemable perpetual equity interests that are also junior to \$87 million of non-redeemable perpetual preferred interests held by other investors and junior to \$60 million of senior secured notes issued to an affiliate of Merlin Holdings. We also note that distributions on “Merlin Media’s common and preferred interests are made when declared by Merlin Media’s board of managers.” Explain to us your consideration of whether or not your preferred equity interests in Merlin Media LLC are in substance common stock. Please address the accounting guidance of ASC 323-10-15-13 through ASC 323-10-15-19 and tell us why you believe it is appropriate to use the cost method to account for your investment in Merlin Media LLC non-redeemable perpetual equity interests.”

³³⁸ Example of *transitory items included in equity method earnings* (Coca-Cola 2010 annual report): “In 2010, the Company recorded a net charge of \$66 million in equity income (loss) — net. This net charge primarily represents the Company’s proportionate share of unusual tax charges, asset impairments, restructuring charges and transaction costs

Earnings quality issue	Explanation	Red flag or analysis
Failure to eliminate profits from intercompany transactions	Profit or loss from transactions between the company and the investee that is reflected in the company's earnings must be eliminated to the extent that the related assets are still held by the companies at the end of the period.	Significant transactions between the company and investees
Manipulating the attribution or amortization of basis differences	- The difference between the investment acquisition cost and the proportionate book value acquired is attributed to differences between the fair and book values of the investee's assets and liabilities, and it is subsequently amortized consistent with that attribution and the estimated useful lives of the related assets and liabilities. - By manipulating the price attribution or the estimated useful lives of the assets or liabilities, companies may increase reported equity method earnings in subsequent years.	Recently acquired equity method investments with implied ROE substantially higher than the industry's cost of equity capital.
Failing to recognize impairment	Companies have substantial discretion in measuring impairment of the investment account or of unamortized basis differences, and they may use this discretion to manipulate impairment recognition.³³⁹	Consistently low implied ROE of equity method investments and no impairment being recognized
Limited disclosure	Companies may conduct significant activities through equity method investees that are effectively controlled by the company. These activities are not transparent, as relatively little information is typically provided on equity method investments (e.g., Bauman 2003, Lee et al. 2013).	Significant equity method investments

recorded by equity method investees. The unusual tax charges primarily relate to an additional tax liability recorded by Coca-Cola Hellenic Bottling Company S.A. as a result of the Extraordinary Social Contribution Tax levied by the Greek government.”

³³⁹ Example of **failure to recognize impairment** (SEC AAER No. 1270): For its fiscal year ended June 30, 1995, and the quarters ended December 31, 1994 through March 31, 1996, Firstmark improperly valued its investment in a start-up resale company at cost. Because the resale company had become worthless, Firstmark should have written off the investment in the quarter ended December 31, 1994.

Earnings quality issue	Explanation	Red flag or analysis
Equity method investments in valuation	• When using DCF, EV/EBITDA multiples, or other entity level methods to estimate equity value, one must separately estimate the value of equity method investments (EMI) and add it to the value of operations. • In most cases, limited information is available about EMI, often just the total book value of the investments and the associated earnings, which in turn reflect the proportionate share in the book values and earnings of the affiliates (+/- adjustments, as explained in the GAAP part of this section). • While uncommon, market values or fair value disclosures may be available for some affiliates. In addition, in some cases there is sufficient information to derive a value estimate for select holdings. • Most analysts measure the value of EMI using book value (often because they net it against debt in measuring “net debt,” which is almost always measured using book value), while some analysts apply a multiple or a capitalization factor to equity method earnings.³⁴⁰ • Given book value and earnings, fair value can be estimated using one or a combination of the following approaches: book value (BV), capitalized earnings (earnings divided by the cost of equity capital), industry multiple of earnings, industry multiple of book value, and conditional (on return on equity, or ROE) industry multiple of book value. • Nissim (2021g) finds that the BV and capitalized earnings approaches yield estimates that substantially understate value for most EMIs. The ranking from best to worst performer is as follows: conditional BV multiple, earnings multiple, BV multiple, capitalized earnings, and BV. Still, the three multiple-based estimates provide incremental information relative to each other.	• If market, fair or estimated values are available for some affiliates, and the number of shares owned by the company is known, the fair value of those investments can be calculated. Any remaining investments can then be valued using one or a combination of the other methods. • The value of EMI can be estimated using the average of estimates derived using industry multiples of earnings and book value. Nissim (2021g) suggests a more structured approach to estimating the value of EMI. • In selecting the peers and estimating the price multiple, consider the industry, size, profitability, risk, and growth of the investees. While detailed information is typically unavailable, profitability can be estimated by dividing equity method earnings by the average balance of EMI; risk can be evaluated by considering the volatility of profitability measures over time; growth can be estimated by examining past growth in equity method earnings and in EMI (note, however, that earnings growth is valuable only if it results from improved profitability or incremental investments that earn a return in excess of the cost of capital).

³⁴⁰ Interestingly, inconsistent with the practice of using book value as a proxy for the value of equity method investments, when analysts base their equity value estimates on EPS or book value multiples—which is fairly common—they effectively use the same earnings or book value multiple for the net investment in operations and equity method investments.

5.17 Business combinations

A business combination is a transaction or other event in which an acquirer obtains control over one or more businesses.³⁴¹ In some business combinations the acquirer obtains direct control of the target's assets. These include statutory merger (the target company ceases to exist as a separate company), statutory consolidation (a new corporation absorbs both companies and one of the two companies is identified as the acquirer), and asset acquisition (the acquirer buys an operation from another company). In other cases, referred to as stock acquisitions, the acquirer obtains control over the assets and activities of the target by acquiring the majority of its voting stock, and each firm continues to exist as a separate legal entity.

The motives for mergers and acquisitions vary by the nature of the business combination (conglomerate, horizontal, vertical).³⁴² They include *operating synergies* such as economies of scale (production, distribution, management), economies of scope, market power, and removal of inefficient management. These synergies lead to cost savings (e.g., elimination of duplicate operations) and improved growth opportunities (e.g., cross-selling, more complete offerings, pricing power). *Financial synergies* include the benefits of diversification, size, debt capacity, and tax benefits. These synergies reduce the cost of capital (lower idiosyncratic risk, larger size, higher leverage) and the present value of income taxes (utilization of net operating loss, capital loss, or tax credit; increased interest tax shield; reduction in double taxation of financial income; income shifting via transfer pricing or other transactions). Premiums paid in mergers and acquisitions are typically large (about 30% on average), suggesting significant synergies. However, in many cases expected synergies are not realized, leading to negative stock returns and goodwill impairment charges.

If direct control of the target or its assets is obtained (statutory merger, statutory consolidation, or asset acquisition), the assets and related activities are reported on the acquirer's books. In contrast, for stock acquisition, the acquirer's books include only an investment account. To allow the financial statements of acquirers to reflect all the assets and activities controlled, whether directly or indirectly, stock acquirers are required to prepare consolidated financial statements. Consolidated financial statements are prepared by aggregating the acquirer and target financial statements and applying adjustments. The adjustments depend primarily on the initial accounting for the business combination. I therefore discuss business combinations first and then consolidation (in the Section 5.18).

Accounting for business combinations involves (1) identifying the acquirer; (2) determining the acquisition date; (3) measuring and recognizing the identifiable assets acquired, the liabilities assumed, and any noncontrolling interest in the acquiree; and (4) measuring and recognizing goodwill or a gain from a bargain purchase.

³⁴¹ A business is defined as “an integrated set of activities and assets that is capable of being conducted and managed for the purpose of providing a return in the form of dividends, lower costs, or other economic benefits directly to investors or other owners, members, or participants.” (ASC 805).

³⁴² An acquisition can be horizontal (a firm acquires another firm in the same industry), vertical (a firm acquires another firm in a different stage—backward or forward—of the production process), or conglomerate (combination of two firms in unrelated industries).

Until 2001, two methods were used to account for business combinations: the *purchase method* and the *pooling of interests method*.³⁴³ Since 2001, firms are no longer allowed to use the pooling method for new business combinations, but they continue to use this method when consolidating entities that were acquired prior to 2001 in pooling transactions. In 2007, the FASB made significant changes to the purchase method (referred to as the *acquisition method* under the revised standard; SFAS 141R and 160, codified in ASC 810), which apply to business combinations consummated after 2008. Firms continue to use the purchase method when consolidating entities that were acquired prior to 2008. The discussion below focuses on the acquisition method, which is the required method for all business combinations consummated after 2008.

When a business combination occurs, almost all assets and liabilities of the acquired entity are recognized on the acquirer's balance sheet at fair value, including goodwill.³⁴⁴ **Goodwill** is measured as the excess of the total fair value of (1) assets transferred (cash and other assets), (2) incurred liabilities to the previous owners, (3) equity interests issued, (4) contingent consideration, (5) previously held equity interests in the target, and (6) noncontrolling interests, over the fair value of the business' net identifiable assets at acquisition.³⁴⁵ Thus, even if the acquirer does not purchase all the acquiree's outstanding stock, all acquired assets and liabilities—including goodwill—are fully marked-to-market, and the noncontrolling interests are reported at fair value on the acquisition date. When the calculated goodwill is negative (so-called "**bargain purchase**"), a gain is recognized to balance the balance sheet (after verifying that the fair value allocation is appropriate).

When an acquisition occurs in stages (i.e., successive share purchases), the identifiable assets and liabilities are recognized at full fair value when control is obtained, and a gain or loss is

³⁴³ The choice of combination method prior to 2001 was not discretionary. Several specific conditions had to be met for a transaction to be reported as pooling of interests. Two important requirements were: the acquirer must issue voting common shares in exchange for at least 90% of the voting common stock of the acquiree, and the acquisition must occur in a single transaction. Transactions that did not meet one or more of the criteria were accounted for using the purchase method. The presumption of pooling was that the two firms have combined their operations but are otherwise operating as before, with the stockholders of the two firms becoming stockholders in the combined entity. Accordingly, the acquiree's assets and liabilities were measured based on their book values; there was no write-up of assets or recognition of goodwill. In contrast, under the purchase method, the acquiree's assets and liabilities were generally measured based on their estimated fair value at the business combination date. If the amount that paid by the acquirer was larger than the fair value of net identifiable assets (i.e., identifiable assets minus identifiable liabilities), the excess was reported as goodwill.

³⁴⁴ Depending on the asset, its intended use, the availability of market prices, and the cash flows expected to be generated by the asset, fair value is determined using one of the following methods: market price, replacement cost, net realizable value, net realizable value minus normal profit (inventory), present value of expected cash flows, or appraisal. For property, plant and equipment, fair value is generally estimated using replacement cost, adjusted for differences between the acquired asset and similar assets for which cost information is available. However, if replacement cost is greater than the present value of cash flows expected to be generated by the asset, the asset should be recorded at that present value. Also, if the asset is expected to be sold, it should be recorded at its net realizable value.

³⁴⁵ Under the purchase method, in contrast, goodwill was measured as the excess of the total of the purchase price and transaction costs over the product of the proportion of the target's shares acquired and the estimated fair values of the target's net identifiable assets.

recognized in income for the difference between the fair value and the carrying amount of the previously held equity interest in the target (*step acquisition gain*).

Contingent considerations (“*earnouts*”) are initially measured at fair value. For liability-type contingent consideration (e.g., a promise to pay an additional amount if an earnings target is achieved), subsequent changes in fair value are recognized in income. Contingent consideration classified as equity (e.g., a promise to issue shares to the sellers if an earnings target is achieved), is not remeasured.³⁴⁶

Preacquisition *contingent assets and liabilities* (e.g., pending lawsuits, warranty liabilities) are recognized at fair value. If fair value cannot be estimated, the contingent asset or liability is accounted for the same as existing contingencies (see Section 5.6). Other exceptions to the principle of recognizing assets and liabilities at fair value include deferred tax assets and liabilities, indemnification assets, employee benefits, reacquired rights, share-based payment awards and non-current assets held for sale.³⁴⁷ *Indemnification assets* are measured based on the recognized amount of the related contingent liabilities, less any contractual limitations and net of allowance for uncollectable amounts. Acquired non-current assets classified as *held for sale* are recognized at fair value less costs to sell.

Adjustments made to the fair value allocation within the *measurement period* reflect additional information about facts and circumstances that existed at the date of acquisition. Such adjustments are recognized in income in the period identified (not retrospectively), but the prior year component is disclosed.³⁴⁸ The measurement period is defined as the period during which

³⁴⁶ Almost all earnouts are liability-classified (more than 95%; e.g., Cadman et al. 2014, Ferguson et al. 2021). Earnouts are used for various reasons, including (1) to mitigate the effects of asymmetric information and valuation gap between the buyer and seller (e.g., Jansen 2020); (2) to defer income taxes paid by the seller; (3) to align the interests of the seller and buyer (e.g., to reduce the likelihood that the seller will engage in activities that may hurt the buyer); (4) to retain target management (e.g., Cadman et al. 2014); (5) to serve as a source of financing (by delaying a portion of the payment, e.g., Bates et al. 2018); (6) to generate a hedging gain if the acquired business performs below expectations (when the acquired business fails to achieve earnout performance hurdles, the acquiring firm’s earnout liability decreases, resulting in a fair value gain that offsets the negative impact of the target’s performance, e.g., Ferguson et al. 2021); and (7) to overstate reported earnings (the seller may overstate the disposal gain by overstating earnout assets, and the buyer may recognize subsequent gains by reversing overstated earnout liabilities). Evidence provided by Ferguson et al. (2021) suggests that ability to overstate subsequent earnings is an especially important motivation for using earnouts.

³⁴⁷ Another (future) exception is revenue contracts. Under current GAAP, an acquirer generally recognizes contract assets and contract liabilities arising from revenue contracts with customers at fair value on the acquisition date. However, starting 2023, ASU 2021-08 requires entities to apply Topic 606 to recognize and measure contract assets and contract liabilities in a business combination. The new standard allows for early adoption, and some companies are likely to take advantage of this option because it will generally increase reported earnings and simplify the measurement of acquired contract assets and contract liabilities. The reason for the expected increase in earnings is that the fair value of contract liabilities (i.e., the cost to settle deferred revenue) is substantially smaller than the amount recognized under ASC 606 (i.e., the amount received from the customer, which includes an embedded profit). A larger recognized contract liability implies larger subsequent revenue and earnings when or as the liability is settled.

³⁴⁸ For example, assume an acquirer acquires a target on September 30, 2019. The acquirer seeks an independent appraisal for an item of PP&E, and the appraisal is not complete by the time it issues the financial statements for the year ending December 31, 2019. In the 2019 annual financial statements, the acquirer recognizes a provisional fair value for the asset of \$30,000. At the acquisition date, the item of PP&E has a remaining useful life of five years and

changes may be reported as corrections to the initial acquisition entry. It ends when no additional information can be obtained concerning estimated values as of the acquisition date, but no longer than one year after the acquisition date.

Additional provisions of the acquisition method are as follows. ***In-process research and development*** (IPR&D) is measured at fair value and capitalized as an indefinite-lived intangible asset. Upon completion (abandonment) of project, IPR&D is accounted for as a finite-lived intangible asset (expensed immediately). A ***restructuring liability*** is recognized only when it is an existing liability of the acquiree at the acquisition date. ***Assets that an acquirer does not intend to use*** are recorded at fair value, reflecting the asset's highest and best use. ***Equity securities issued*** in a business combination are measured at fair value at the acquisition date. ***Transaction costs*** of the acquirer are expensed as incurred.

IFRS and U.S. GAAP for business combinations are essentially converged. Of the few remaining differences, the following are somewhat significant. Under IFRS,

- Noncontrolling interests can be measured either at the proportionate share of identifiable net assets acquired or at fair value (i.e., including related goodwill, as required under U.S. GAAP).
- Adjustments to the acquisition accounting during the “measurement period” are made by retrospective application to the period in which the acquisition occurred.

Earnings quality

Table 5.17A describes ***earnings quality issues***, red flags and analyses related to business combinations. Additional discussion is included in [Section 5.5 Intangible assets and related expenses](#), as intangible assets are recognized primarily in business combinations.

no salvage value. Five months after the acquisition date, the acquirer receives the independent appraisal which estimates the asset's acquisition-date fair value at \$40,000. Upon receiving the appraisal, the acquirer increases PP&E by \$10,000 and lowers goodwill by the same amount. In 2020, the acquirer recognizes depreciation of 8,500 ($= 40,000 / 5 + [10,000 / 5] \times [3 / 12]$), and in the footnotes discloses that the \$500 relates to 2019.

Table 5.17: Earnings quality – business combinations

Earnings quality issue	Explanation	Red flag or analysis
Managing fair value estimates	- Fair value estimates are required for almost all assets acquired and liabilities assumed as well as for noncontrolling interests, prior equity holdings, contingent consideration, and other items. - Near-future earnings may be increased by understating the fair values of soon to-be-expensed assets or by overstating liabilities (e.g., liability-classified contingent consideration or earnouts; Ferguson et al. 2021).³⁴⁹ Such manipulation of the so-called purchase price allocation typically increases goodwill or indefinite-life intangible assets (see discussion in Section 5.5). - Current income may be increased by overstating bargain purchase gains or gains from step acquisitions. - The likelihood of having to recognize a portion of the eventual earnout payments in operating cash flows can be reduced by overstating liability-classified contingent consideration. To the extent that the eventual payments are larger than the initially recognized earnout liability, the difference is included in operating rather than financing cash flows.	- High magnitude of goodwill or indefinite-lives intangibles - Significant contingent consideration liabilities - Gains or losses from changes in contingent consideration - Bargain purchase gains or gains from step acquisitions (typically included in “other income” in the income statements but disclosed elsewhere in the report) - Changes in fair value estimates made during the measurement period
Creating or overstating reserves in business combinations and subsequently releasing them into income	- This is related to the previous point (“managing fair value estimates”), except that some reserves (i.e., estimated liabilities) may be measured at amounts different from fair values (e.g., restructuring liabilities, loss contingencies). - The creation of the reserve is not reported in income but is rather absorbed in goodwill. - Current GAAP attempts to limit this type of manipulation (e.g., by disallowing the recognition of a restructuring liability unless the acquiree initiated a restructuring program prior to the acquisition), but it is not likely to fully prevent it.	Large increases in “other liabilities” in the year of business combination, followed by significant declines in subsequent periods

³⁴⁹ Example of **manipulation of earnouts** (AAER No. 3775): Swisher made adjustments to its accounting for earnouts in order to achieve targeted results in the third and fourth quarters of 2011. An earnout is a contractual obligation whereby the purchaser of a business agrees to pay the seller additional future consideration based on the acquired business achieving certain future financial goals. The appropriate accounting treatment for an earnout, also referred to as “contingent consideration,” is to reflect it at fair value on the balance sheet at the time of acquisition. Changes in the fair value of the earnout that are a result of additional information about facts and circumstances that existed at the acquisition date, but are obtained after that date, are recorded as measurement period adjustments. In one instance, Swisher posted a \$1 million earnout liability in January 2011, which could potentially require payments over three years if gross margin targets on specified contracts were realized. The targets were not realistic, based on the historical performance of the specified contracts, suggesting that the earnout lacked substance and that the initial valuation was not recorded at fair value and was thus not in accordance with GAAP. By the end of the third quarter of 2011, Swisher was well short of meeting its Adjusted EBITDA targets and determined that since the acquiree had not been achieving its gross margin targets for the past quarter, Swisher would adjust the earnout accrual downward by \$500,000, thus increasing earnings for the quarter. Such an adjustment was not in accordance with GAAP because there was no new information post acquisition justifying the adjustment. A change in fair value resulting from information existing at the acquisition date should have resulted in a retrospective change to the provisional balance sheet amount recorded to goodwill and the earnout accrual. Swisher, having no new information since the acquisition date, to achieve targeted Adjusted EBITDA, nevertheless reduced the earnout accrual by 50% of its original value. Swisher continued to reduce this earnout accrual (and other similarly established earnout accruals) in the fourth quarter of 2011.

Earnings quality issue	Explanation	Red flag or analysis
Counterintuitive income effect of earnouts	• Even if contingent consideration liabilities (earnouts) are not overstated, their recognition may lead to an overstatement of near-term earnings. • Earnouts have a counterintuitive effect of generating accounting gains when the acquired business performs below expectations (which leads to a decline in the contingent consideration liability and recognition of the associated gain). If the negative impact of the target's performance is not fully reflected in same period earnings (for example, if the fair value of the earnout reflects performance over multiple years), earnings would be overstated.³⁵⁰	• Significant contingent consideration liabilities • Recognized gains from adjusting contingent consideration liabilities
Overstated margins	• Companies that engage in business combinations report higher margins than those that grow organically. This is due to two reasons: understated expensing (see “managing fair value estimates” above), and expost success. • When companies grow organically, unsuccessful projects reduce reported earnings. In contrast, when company grow through acquisitions, they buy businesses that result from successful projects. Of course, they pay a premium for that, but the premium is generally included in goodwill, which is not subject to amortization.	• Significant M&A activity • Large amount of reported goodwill or indefinite life intangibles
Accounting for asset acquisitions as business combinations or vice versa	• Asset acquisition accounting does not allow for the recognition of in-process R&D (the related fair value is expensed), bargain purchase gains, or goodwill; in general, it requires allocating the total of the consideration transferred and fair value of liabilities assumed to the acquired assets based on their relative fair value. • In addition, under asset acquisition accounting, contingent consideration is recognized only if probable and estimable, and subsequent changes in the recognized amount are accounted for by adjusting the asset cost. • While business combination accounting allows for more flexibility and ability to manage earnings, one advantage of asset acquisition accounting is that, unlike business combinations, transaction costs to acquire assets are generally capitalized. • Firms may structure or interpret transactions to qualify for either business combination or asset acquisition accounting (depending on the particular of the case) to maximize financial reporting benefits. This issue is especially relevant in the real estate and pharmaceutical industries.	• Information about the acquisition suggests that the accounting treatment is inconsistent with the nature of the transaction, especially if there are reporting benefits (e.g., the recognition of bargain purchase gain).
Improperly capitalizing transaction costs	• Transactions costs should be expensed, but companies may effectively capitalize some costs by designating them as related to the issuance of capital to fund the M&A.	• Relatively small expensed transaction costs in periods of significant M&A that is at least partially funded by issuing new capital.

³⁵⁰ The following example demonstrates this issue. Assume the target is a perpetuity business. The seller expects annual income of \$100 with 100% probability, while the buyer expects \$50 with 50% probability and \$100 with 50% probability. The discount rate is 10%. They agree on a payment of \$500 at the time of acquisition and another payment next year, equal to $\max(X-50, 0) \times 10$, where X is the target's annual earnings. The buyer recognizes earnout liability of \$250 (50% probability of having to pay 50×10). If the seller generates \$50 income the following year, the buyer's earnings from the target will be \$25 below its expectations of \$75 ($=50\% \times 50 + 50\% \times 100$), but this will be much more than offset by the \$250 gain from the elimination of the earnout liability.

Earnings quality issue	Explanation	Red flag or analysis
Disguising losses as measurement period adjustments	- During the measurement period, changes in the initial fair value measurements of identifiable assets and liabilities have an offsetting effect on goodwill. In contrast, a decline (increase) in the fair value of assets (liabilities) due to post-acquisition events triggers the relevant impairment (expense) model. - Firms may improperly characterize declines in asset values or increases in liability values subsequent to the acquisition as measurement periods adjustments. While there is some anecdotal evidence that suggest such manipulation (e.g., GE measurement period adjustment following the Alstom acquisition), Kubic (2021b) finds limited empirical support.	Significant measurement period adjustments that result increases in goodwill.
Time-series comparability	- As explained in Section 5.18 below (“Consolidation-related distortions in M&A years”), the consolidation process distorts the time-series of reported metrics (e.g., profitability ratios). This follows because in the year of acquisition reported earnings and cash flow reflect partial-year activity of the acquired company (from the acquisition date), while the balance sheet reflects all assets and liabilities of the acquired company. - To mitigate these effects, and to be able to measure growth rates from comparable operations, some analysts prepare estimated proforma financial statements assuming the target has always been under the acquirer’s control. - In many cases, the proforma financial statements suggest a decline in profitability even if the economic performance of the combined entity has not declined. This is due primarily to the mark up of the target’s assets and its impact on subsequent reported expenses.	- When comparing post- to pre-M&A performance, estimate and undo the effects of asset mark-up on the balance sheet and income statement. - Until 2023 (prior to the adoption of ASU 2021-8), there may also be significant effects on contract liabilities and subsequent revenue (see Section 5.18).

5.18 Consolidation

Reported financial statements include the accounts of all subsidiaries and affiliates in which the company holds a controlling financial interest as of the financial statement date. Normally a controlling financial interest reflects direct or indirect ownership of a majority of the voting interests (generally common stock).³⁵¹ However, companies also consolidate **variable interest entities** (“**VIE**”) if they are the “**primary beneficiary**,” that is, if they possess both the power to direct the activities of the VIE that most significantly affect its economic performance, and either (a) are obligated to absorb losses that could be significant to the VIE or (b) hold the right to receive benefits from the VIE that could be significant to the VIE.

To identify the subsidiaries and affiliates that should be consolidated, firms are required to first identify and evaluate VIEs (and consolidate those for which they are the “primary beneficiary”), and then use the voting interest model (i.e., >50%) with respect to non-VIE entities in which they hold ownership interests. **Variable interests** are financial interests in an entity that vary with the performance or value of the entity; they include equity claims, subordinated debt, guarantees, derivatives, commitments, royalties, and other interests. Intuitively, an entity is considered a VIE if its equity investors as a group do not absorb a significant portion of the variability in its value or lack the ability to control the entity. For example, an entity with little equity that was able to borrow significant amounts due to guarantees provided by another entity is likely to be considered a VIE. More precisely, a VIE has one or both of the following characteristics:

- The amount of equity investment at risk is insufficient for the entity to finance its activities without additional subordinated financial support (e.g., non-common equity, subordinated debt, guarantees); and
- As a group, the holders of the equity investment at risk lack any one of the following three characteristics:
 1. The power, through voting rights or similar rights, to direct the activities of the entity that most significantly impact the entity’s economic performance,
 2. The obligation to absorb the expected losses of the entity. (The investors do not have that obligation if they are directly or indirectly protected from the expected losses or are guaranteed a return by the entity itself or by other parties involved with the entity.)
 3. The right to receive the expected residual returns of the entity. (The investors do not have that right if their return is capped by the entity’s governing documents or arrangements with other variable interest holders or the entity.)

Another situation that results in VIE designation is when substantially all of the entity’s activities (for example, providing financing or buying assets) either involve or are conducted on behalf of an investor that has disproportionately few voting rights (the “anti-abuse provision”).

³⁵¹ One exception is that noncontrolling rights (whether granted by contract or by law) that would allow a noncontrolling shareholder to effectively participate in either of the following corporate actions are considered *substantive participating rights* and would overcome the presumption that the investor with a majority voting interest shall consolidate its investee: (a) selecting, terminating, and setting the compensation of management responsible for implementing the investee’s policies and procedures; and (b) establishing operating and capital decisions of the investee, including budgets, in the ordinary course of business.

VIEs are typically special purpose entities with little equity whose activities are backed by sponsors, which are often the “primary beneficiary.” Sponsors and other non-equity variable interest holders may provide support in the form of subordinated debt, guarantees, commitments to engage in future exchanges, or other forms. VIEs are often used in securitizations, leases, R&D, joint ventures, and other transactions.

The **consolidation procedure** involves combining all line items across parent and subsidiary: revenues, expenses, gains, and losses in the income statement; cash flows in the cash flow statement; and assets and liabilities on the balance sheet. In the year of acquisition, subsidiary transactions are included in the consolidated income and cash flow statements only from the acquisition date. In addition, as discussed below, the consolidated amounts are adjusted with respect to the effects of inter-company transactions and any remaining fair-book differences from the time of business combination.

To prepare consolidated financial statements, the financial statements of **foreign subsidiaries** are first translated to the U.S. dollar. The translation procedure used for most subsidiaries is as follows. Assets and liabilities of foreign subsidiaries with a functional currency other than the U.S. dollar are translated into U.S. dollars using year-end exchange rates.³⁵² Revenues, expenses and cash flows are generally translated at the average exchange rates in effect during the year. Foreign currency translation gains and losses are included as a component of accumulated other comprehensive income (AOCI).³⁵³

The objective of the consolidated financial statements is to present transactions between the group of companies and the outside world. Thus, **inter-company accounts** (receivables and payables) **and transactions** (revenue and expenses, collections, and payments), which inflate the consolidated financial statements, are eliminated in the consolidation process. Unrealized profits and losses from transactions between the companies (e.g., inflation of inventory due to inter-company sales) are also generally eliminated in the consolidation process.

As described in the previous section, assets and liabilities acquired in a business combination should initially be measured at fair value as of the acquisition date. However, these adjustments

³⁵² “Functional currency” is the currency of the primary economic environment in which the firm operates; normally, that is the currency of the environment in which an entity primarily generates and expends cash.

³⁵³ The activities of subsidiaries whose functional currency is the U.S. dollar, or that operate in highly inflationary environments (generally cumulative three-year inflation > 100%; few countries in the current environment), are reflected in the consolidated financial statements as if they were foreign currency transactions, assets, and liabilities of the parent company. Foreign currency transactions (e.g., purchase of an item of PP&E paid for in euros) are accounted for at exchange rates prevailing at the date of the transactions. Monetary assets and liabilities denominated in foreign currencies (e.g., a JPY-denominated receivable from a Japanese customer) are remeasured into the U.S. dollar by using the exchange rate prevailing on the date of the balance sheet. Gains and losses resulting from the settlement of foreign currency transactions (e.g., paying a CNY-denominated payable at an exchange rate different from the time the payable was recognized or last remeasured), and from the remeasurement of monetary assets and liabilities denominated in foreign currencies, are recognized in the income statement. Non-monetary assets and liabilities (e.g., inventories, PP&E) denominated in foreign currencies are remeasured using the foreign exchange rate prevailing at the date of the transaction, with related expenses (e.g., depreciation) measured accordingly. Non-monetary assets and liabilities denominated in foreign currencies that are stated at fair value are remeasured into the U.S. dollar at foreign exchange rates prevailing at the dates the fair value was determined.

are often not “pushed down” to the acquired company’s books.³⁵⁴ Thus, in addition to adding together the financial statements’ line items of the parent and subsidiary, the following adjustments are made:

- The unamortized fair-book differences related to assets and liabilities of the subsidiary are added to the book value-based amounts,
- Revenues, expenses, gains and losses of the subsidiary are adjusted for the effects of differences between the fair and book values of assets and liabilities at the time of combination (for example, depreciation is increased if PP&E was written up, cost of goods sold is increased if inventory was marked up), and
- The adjusted assets are tested for impairment, primarily goodwill and indefinite-life intangibles.

If the parent does not fully own the subsidiary, the non-controlling interests are reported on the balance sheet as a separate component of shareholders’ equity, and earnings attributed to noncontrolling interests are presented as an allocation of net income (similar to preferred dividends).

Consistent with the classification of noncontrolling interest as equity, losses attributable to noncontrolling interests are allocated to the noncontrolling interests even if this causes the non-controlling interests to be in a deficit position. In addition, changes in the parent’s ownership interest in the subsidiary that do not result in a loss of control are accounted for similar to treasury stock transactions (i.e., equity is adjusted and no gain or loss is recognized). In contrast, changes that result in loss of control trigger the recognition of a gain or loss equal to the difference between the fair value of the consideration received (including the fair value of any remaining ownership interest in the subsidiary) and the book value of the subsidiary’s net assets attributable to the controlling interest.

IFRS is similar to U.S. GAAP, except

- There is no distinction between variable interest entities and other entities.³⁵⁵ Consolidation decision with respect to all entities is based on a “power-to-direct” model, which is similar to the variable interest model used under U.S. GAAP. Under IFRS, an investor controls an investee if it is exposed to variable returns from its involvement with the investee, and it has the ability to affect those returns through its power over the investee. Thus, for example, entities holding less than a majority of voting rights may still consolidate if they have de facto control (e.g., if other interests are widely dispersed). In addition, potential voting rights (e.g., options, convertible bonds) that currently are exercisable are considered in assessing

³⁵⁴ Pushdown accounting involves adjusting the acquired company’s standalone financial statements to reflect the acquirer’s accounting basis (i.e., stepping up the target’s net assets to fair value and recognizing goodwill), and balancing the balance sheet by adjusting additional paid in capital (APIC also absorbs the balances of retained earnings and AOCI). ASU 2014-17 made push down accounting optional for all companies upon change-in-control event. If elected, pushdown accounting must be applied as of the acquisition date. The decision to apply pushdown accounting to a specific change in control event is irrevocable. IFRS prohibits pushdown accounting. The advantages of pushdown accounting include (1) reporting assets and liabilities at fair value, and (2) adopting consistent accounting policies for both the parent and subsidiary. The downside is the negative impact on earnings associated with stepping up the target’s net assets.

³⁵⁵ There is a distinction between structured and non-structured entities, but a similar model is used for both types.

control, while under U.S. GAAP such rights are not considered in assessing control over non-variable interest entities.

- When the parent and subsidiary reporting dates are different, adjustments are made for the effects of significant transactions and events between the two dates. Under U.S. GAAP adjustments are not required.
- Parent and subsidiary must follow uniform accounting policies. U.S. GAAP do not require such conformity.
- Under IAS 29, non-monetary assets and liabilities stated at historical cost, equity and income statements of subsidiaries operating in hyperinflationary economies are restated for changes in the general purchasing power of the local currency, applying a general price index. The remeasured accounts are then converted into U.S. dollar at the period closing exchange rate.

Earnings quality

Table 5.18A describes ***earnings quality issues***, red flags and analyses related to consolidation.

Table 5.18A: Earnings quality – consolidation

Earnings quality issue	Explanation	Red flag or analysis
Failing to consolidate controlled entities	- Consolidated financial statements reflect the earnings or loss of controlled subsidiaries and VIEs in which the company is the primary beneficiary. Thus, firms that invest in start-ups or other entities which are expected to report losses in the near term have an incentive to avoid consolidation. - Firms may also be reluctant to consolidate profitable entities, especially variable interest entities, if those entities have substantial debt or problematic assets or liabilities.³⁵⁶	Significant unconsolidated VIEs or investments in companies over which the entity has effective control
Consolidating uncontrolled entities	In some cases, firms may consolidate uncontrolled entities to manipulate reported earnings and/or the balance sheet.³⁵⁷	Disclosures or other information that suggest lack of control over consolidated profitable entities.
Improper consolidation start date	- When preparing consolidated financial statements, firms are required to consolidate revenue and earnings of acquired subsidiaries from the date of effective control. - Firms may manage the start date of consolidation. For example, they may consolidate revenue and earnings of acquired subsidiaries earned before obtaining control.³⁵⁸	
Improper elimination of the effects of intercompany transactions	- Intercompany transactions may inflate the assets, equity, revenue or income of the consolidated entity. Therefore, consolidation requires the elimination or reversal of the effects of intercompany transactions. Firms may not properly eliminate the effects of such transactions.³⁵⁹ - Some gains or losses related to intercompany transactions should not be eliminated. For example, foreign currency gains or losses on intercompany loans where repayment is foreseeable should be recognized in income. Firms may manipulate the recognition of such gains or losses by arguing that the loans represent a long-term investment (in which case the gain or loss should be included in AOCI) rather than a temporary investment, or vice versa. SEC AAER No. 4185 provides an example.	Significant transactions between the company and subsidiaries or among subsidiaries

³⁵⁶ Example of **avoiding consolidation** (SEC AAER No. 2433): In connection with its adoption in 2003 of FASB Interpretation No. 46 (FIN 46R), Fannie Mae failed to consolidate certain trusts used in connection with securitization transactions that were required to be consolidated on the balance sheet of the Company. The Company's failure resulted in an understatement in the assets and liabilities recorded on its balance sheet for any portion of the trusts owned by third parties. The consolidation will also result in the reclassification of security positions from securities to the actual assets held by the trust (principally loans or Fannie Mae MBS).

³⁵⁷ Example of **consolidation of uncontrolled entities** (SEC AAER No. 2530): During 2001 and 2002, Whitemark, a developer of residential communities, overstated its assets and income by consolidating the financial statements of entities that it held options to purchase but did not control.

³⁵⁸ Example of **improper consolidation start date** (SEC AAER No. 1774): In 1999 Teltran International Group, a telecommunications company, consolidated the financial statements of a subsidiary before acquiring effective control.

³⁵⁹ Example of **failure to eliminate the effects of intercompany transactions** (SEC AAER No. 1234): In the 1997 10-K, Inamed failed to properly account for its intercompany transfers of inventory and the concomitant elimination of intercompany profit, resulting in approximately a \$1.2 million overstatement of inventories and gross profit.

Earnings quality issue	Explanation	Red flag or analysis
Low earnings quality of subsidiaries	Some subsidiaries may operate in environments that are more conducive to earnings management (e.g., private firms, lower quality auditor, different locations), enabling companies to “push” earnings management down to subsidiaries (e.g., Bonacchi et al. 2018).	
Tunneling	Managers may opportunistically shift earnings from not-wholly-owned subsidiaries to the parent or to wholly owned subsidiaries to expropriate value from minority shareholders or to overstate consolidated net income (e.g., Baek et al. 2006, Jiang et al. 2010, Luo et al. 2019).	- Significant transactions between the company and subsidiaries or among subsidiaries - Low implied ROE on noncontrolling interests compared to the parent ROE
Consolidation-related distortions in M&A years	- Revenue, expenses, and cash flows of acquired companies are consolidated from the date the acquirer obtains control. - Therefore, in the year of acquisition reported earnings and cash flow measures reflect partial-year activity of the acquired company. The balance sheet, in contrast, reflects all assets and liabilities of the acquired company. - To help understand these effects, public companies are required to provide select information about the income statement effects of the acquisition. Some companies do not provide the required disclosures.³⁶⁰	Adjust earnings and cash flow measure to reflect pre-acquisition activity. This is importance when measuring growth rates or when comparing these items to balance sheet data. The required information is often included in the notes, MD&A, 8-K filings, or other disclosures.
Loss-of-control gains or losses	- Changes in ownership of controlled entities that do not result in loss-of-control are accounted for similar to treasury stock transactions (i.e., equity is adjusted and no gain or loss is recognized). In contrast, changes that result in loss-of-control trigger the recognition of a gain or loss equal to the difference between the fair value of the consideration received (including the fair value of any remaining ownership interest in the subsidiary) and the book value of the subsidiary’s net assets attributable to the controlling interest. - This accounting treatment allows companies to manipulate income by structuring subsidiary disposal transactions. For example, firms may understate loss-of-control losses by disposing of loss investments in steps (losses prior to the loss-of-control step reduce additional paid in capital), or they may overstate loss-of-control gains by reducing ownership below 50% (to recognize the gain) while maintaining effective control.	Remove any loss-of-control gains or losses when measuring performance.

³⁶⁰ The following quote is from a recent SEC comment letter. “Please tell us your consideration of [not] disclosing the following information to enable users of your financial statements to evaluate the nature and financial effect of the acquisition in accordance with ASC 805-10-50-2(h): (1) The amounts of revenue and earnings of the acquiree since the acquisition date included in the consolidated income statement for the reporting period; and (2) The revenue and earnings of the combined entity for the current reporting period as though the acquisition date for the business combination that occurred during the year had been as of the beginning of the annual reporting period.”

Earnings quality issue	Explanation	Red flag or analysis
Non-controlling interest in valuation	- Most valuation methods require a separate estimate of the value of non-controlling interests (NCI) to derive an estimate of value per share.³⁶¹ - In most cases, limited information is available about NCI, often just the total book value of the claims and the associated earnings, which in turn reflect the proportionate share in the book values and earnings of the subsidiaries (+/- adjustments, as explained in the GAAP part of this section). - While uncommon, market values may be available for some subsidiaries. In addition, in some cases there is sufficient information to derive a value estimate for select subsidiaries. - Most analysts measure the value of NCI using book value (often because they include it in “net debt,” which is almost always measured using book value), while some analysts apply a multiple or a capitalization factor to NCI earnings.³⁶² - Given book value and earnings, fair value can be estimated using one or a combination of the following approaches: book value (BV), capitalized earnings (earnings divided by the cost of equity capital), industry multiple of earnings, industry multiple of book value, and conditional (on return on equity, or ROE) industry multiple of book value. - Nissim (2021g) finds that the BV and capitalized earnings approaches yield estimates that substantially understate value for most NCI. The ranking from best to worst performer is as follows: conditional BV multiple, earnings multiple, BV multiple, capitalized earnings, and BV. Still, the three multiple-based estimates provide incremental information relative to each other.	- If market or estimated values are available for some subsidiaries, and the number of shares not owned by the company is known, the fair value of those claims can be estimated. Any remaining NCI can then be valued using one or a combination of the other methods. - The value of NCI can be estimated using the average of estimates derived using industry multiples of earnings and book value. Nissim (2021g) suggests a more structured approach to estimating the value of NCI. - In selecting the peers and estimating the price multiple, consider the industry, size, profitability, risk, and growth of the subsidiaries. While detailed information is typically unavailable, profitability can be estimated by dividing NCI earnings by the average balance of NCI; risk can be evaluated by considering the volatility of profitability measures over time; growth can be estimated by examining past growth in NCI earnings and in NCI (note, however, that earnings growth is valuable only if it results from improved profitability or incremental investments that earn a return in excess of the cost of capital).

³⁶¹ In some models the value of non-controlling interest is accounted for implicitly (e.g., when value per share is estimated by applying a multiple to EPS or to book value per share). However, in most methods (DCF, EV/EBITDA multiples, total equity flow), one must separately estimate the value of non-controlling interests and subtract it from the value of total equity to get the value of the parent equity.

³⁶² Interestingly, inconsistent with the practice of using book value as a proxy for the value of NCI, when analysts base their equity value estimates on EPS or book value per share multiples—which is fairly common—they effectively use the same earnings or book value multiple for the parent equity and for NCI.

5.19 Equity

Shareholders' equity is composed of parent company equity and non-controlling interests. Parent company equity consists of common stock, preferred stock (if issued), additional paid in capital, treasury stock, retained earnings, and accumulated other comprehensive income (AOCI).

Firms must issue common stock and may issue preferred stock. On the balance sheet, common and preferred stock are reported separately at the par or stated value of issued shares (i.e., the number of issued shares multiplied by the par value per share).

The amount paid by shareholders is usually larger than the par or stated value of issued shares. Firms credit this difference to a shareholders' equity account called ***additional paid in capital*** (APIC) or capital surplus. APIC is also affected by treasury stock transactions, option transactions, and some changes in noncontrolling interests.

When a company purchases its own shares, it reduces cash and equity by the amount paid. Equity is typically reduced by increasing a contra-equity account called ***treasury stock***. When treasury stock shares are reissued, the firm increases net assets and equity by the fair value of the net assets received or shares issued, whichever is more readily determinable. Treasury stock is reduced by the acquisition cost of the reissued shares, and the difference between the proceeds and the acquisition cost (i.e., the gain or loss from reissuance) generally increases or reduces additional paid in capital. That is, no gain or loss is recognized in the income statement. As a general rule, issuance, repurchase, or retirement of shares or options does not give rise to accounting gains or losses—under GAAP, firms cannot recognize income from transactions in their own equity.

Retained earnings represent the excess of cumulative net income over cumulative dividends since the formation of the company. That is, retained earnings measure the increase in net assets (assets minus liabilities) due to earnings activities since the formation of the company, minus assets that have been paid out as dividends.

Some revaluations of assets, liabilities and derivatives do not pass through the income statement and thus do not affect retained earnings. Instead, other equity accounts—referred to as ***accumulated other comprehensive income*** accounts—are adjusted. Their balances reflect the cumulative effect of the related revaluations, net of deferred taxes. The primary AOCI accounts are:

- *Unrealized holding gains/losses on available-for-sale securities* – investment in securities classified as available-for-sale are marked-to-market on each balance sheet date, but the unrealized gain/loss is not included in income.
- *Cumulative foreign currency translation adjustment* – assets and liabilities of most foreign subsidiaries are reported on the consolidated balance sheet based on current exchange rates. That is, fluctuations in exchange rates effectively cause revaluation of assets and liabilities, which bypass the income statement.
- *Unrealized gains/losses on some derivative positions* – under current U.S. GAAP, all derivatives are reported on the balance sheet at estimated fair value. Unrealized gains/losses on derivatives that hedge exposures to variable cash flows (e.g., forecasted foreign exchange

transactions, interest rate exposure of floating rate debt) or to changes in the book value of investment in foreign operations due to exchange rate fluctuations are included in accumulated other comprehensive income. These gains/losses are subsequently reclassified into earnings when the hedged item affects earnings.

- *Funding status of pension and OPEB plans* – under current U.S. GAAP, firms are required to recognize the funded status of defined benefit pension and OPB plans as assets or liabilities on the balance sheet, with corresponding adjustments to accumulated other comprehensive income.

Similar to other revaluations, firms are required to recognize deferred income tax liabilities or assets for future tax consequences of comprehensive income revaluations. Like the revaluations, these deferred taxes do not pass through the income statement; instead, the taxes are netted against the related accumulated other comprehensive income accounts.

The book value of common equity is equal to total shareholders' equity minus the book values of noncontrolling interests and preferred stock. **Book value per share** is the ratio of the book value of common equity to the number of shares outstanding. The book value of preferred stock equals the par value of issued preferred stock (i.e., the balance of the account "preferred stock"), minus preferred treasury stock, plus additional paid in capital from preferred stock transactions, and minus preferred dividends in arrears. Since firms report only the total of additional paid in capital, and preferred shares are usually issued close to par, analysts typically assume that all additional paid in capital is from common stock transactions. Any noncontrolling interests are typically clearly identified on the face of the balance sheet and so are easy to identify.

Certain securities with (non-mandatory) redemption features that are (1) outside the control of the issuer and (2) would otherwise be classified as equity are presented as **temporary equity**. Examples include redeemable preferred shares, redeemable NCI and bifurcated redemption features that satisfy the above two criteria.³⁶³ Mandatory redeemable shares are generally classified as liabilities.

IFRS use broader definitions of what qualifies as or requires treatment as a financial liability. Some instruments that under U.S. GAAP are treated as equity/mezzanine equity are treated as financial liabilities under IFRS. Puttable or contingently redeemable shares (features sometimes requested by private equity investors) that may qualify for equity or temporary equity treatment under U.S. GAAP may result in liability classification under IFRS.

For hybrid instruments (e.g., debt with equity conversion options), IFRS generally require split accounting of the equity conversion feature and the debt host. In contrast, under U.S. GAAP, split accounting is required only in some cases, and a singular accounting model is followed in others.

³⁶³ An example of bifurcated redemption feature that may be classified as temporary equity is the conversion feature of convertible bonds that may be settled in cash at the holder's option.

Earnings quality

Table 5.19A describes earnings quality issues, red flags and analyses related to equity.

Table 5.19A: Earnings quality – equity

Earnings quality issue	Explanation	Red flag or analysis
Unrecognized gains and losses from equity transactions	• Treasury stock transactions generally do not result in recognized gains/losses, even though these transactions often generate significant economic gains/losses for existing shareholders (such gains (losses) are generally credited (debited) to additional paid in capital). • For example, if management times treasury stock transactions so that it buys shares when price is below intrinsic value and sells when price is above intrinsic value, these transactions generate unrecognized gains for existing shareholders (e.g., Brav et al. 2005, Dittmar and Field 2015).	• Does it appear that the company is creating or destroying value for shareholders through share transactions? • Compare the actual average price paid in repurchases with the average market price for the same stock over various horizons
Significant other comprehensive income	• Accumulated other comprehensive income reflects revaluations of assets and liabilities (e.g., unrealized gains on available-for-sale securities) which are yet to be recognized in earnings. • Therefore, a decline in accumulated other comprehensive income may indicate that (1) earnings include realized gains that were earned in prior years, or (2) earnings exclude current period losses (which instead reduced AOCI).	• How significant is other comprehensive income? • Are changes in AOCI due to realization of previously recognized other comprehensive income?
Valuation of equity claims other than common	• Estimating the value of common equity using an estimate of total equity value requires estimating and subtracting the value of equity claims other than common. These include non-controlling interests, preferred stock, and contingent claims. • For a discussion of how to estimate the value of non-controlling interest (preferred stock), see Section 5.18 (5.21). The “red flag or analysis” section to the right describes a simple approach for estimating the value of non-controlling interests.	• The value of preferred stock can be estimated using the median of the following three measures: (1) the most recently reported book value (quarterly or annual); (2) the present value of preferred dividends, estimated using a perpetuity model and a discount rate equal to the 30-year Treasury rate plus Moody’s Baa-Aaa credit spread at the end of the month; and (3) the present value of preferred dividends discounted at the industry cost of equity capital. • The fair value of preferred stock is likely to be between the two perpetuity model estimates, as the risk premium of preferred stock is likely to be between that of debt and common equity. The book value of preferred stock is above (below) their fair value if the cost of preferred stock (i.e., long-term risk-free rate plus risk premium) has increased (declined) since the issuance of the preferreds.

5.20 Share-based payments

Share-based payments (**SBP**) are payments made in equity instruments or in amounts that are based, at least in part, on the entity's stock price. They include stock options, restricted stock, restricted stock units (**RSU**),³⁶⁴ stock appreciation rights (**SAR**) and other forms of phantom stock.³⁶⁵ SBP are often granted to employees as part of a compensation package (referred to as share-based compensation, or **SBC**). Motivation for granting SBC awards include: to attract or retain employees, to align stockholder and employee interests, to conserve cash, or to increase non-GAAP or "street" earnings.³⁶⁶ In addition, some firms issue stock, options, or other share-based payments to nonemployees in exchange for goods or services.

Goods acquired or services received in a SBP transaction with nonemployees are recognized when the entity obtains the goods or receives the services. Starting 2020 (ASU 2018-07), the accounting for SBP to nonemployees and employees is substantially aligned. However, even under the previous standard, the differences were relatively insignificant. I next describe the accounting for SBP to employees, which are much more common than SBP to nonemployees.

Share-based payments are classified as either equity or liability. **Equity-classified SBP** include arrangements such as stock options, restricted stock, and stock-settled RSU. **Liability-classified SBP** include arrangements that are settled in cash such as SAR, arrangements that provide the employee with the choice of settlement is cash, most cases of share-based payments settled in redeemable shares, and awards based on fixed monetary amounts settled in a variable number of shares. Most awards are equity-classified, probably because they conserve cash and offer financial reporting benefits (lower reported leverage, lower and smoothed expense).³⁶⁷ Restricted stock and stock-settled RSUs have replaced stock options as the primary form of share-based compensation. The equity/liability classification impacts not just the balance sheet presentation but also how the awards are accounted for in the income statement. As discussed below, the total expense for equity awards is fixed at the grant-date fair value, whereas the expense for liability awards is remeasured each quarter at the current fair value until settlement.

³⁶⁴ An RSU is a grant valued in terms of company stock, but company stock is not issued at the time of the grant. After the recipient of a unit satisfies the vesting requirement, the company distributes shares or the cash equivalent of the number of shares used to value the unit. Plan rules may allow or require that the distribution be deferred to a later date. Vesting requirements may be met by the passage of time or by either company or individual performance. If the recipient does not meet the requirements the company set forth prior to the end of the vesting period, the units are typically forfeited to the company. Depending on plan rules, the participant or company may be allowed to choose whether to settle in stock or cash.

³⁶⁵ SAR are similar to options except that the employees are not required to pay the options' exercise price, but just receive the amount of the increase in cash or stock.

³⁶⁶ Many companies report non-GAAP earnings metrics that exclude the SBC expense (e.g., Ciesielski and Henry 2017), and some analysts similarly exclude the SBC expense from their earnings forecast (e.g., Brown et al. 2012).

³⁶⁷ As explained below, equity-classified awards are expensed based on their grant date fair value, which in expectations is lower than the value at settlement. Because there is no true-up of the grant cost, reported earnings are smoother. In addition, companies might manipulate the estimated fair value of the awards to overstate earnings (especially feasible with ESOs), without having a subsequent reversal effect. On the other hand, some companies prefer liability-classified awards to avoid dilution from issuing shares.

SBC awards are generally expensed over the vesting period, but the pattern and amount expensed may depend on the *vesting conditions*. There are three types of vesting conditions: service, performance, and market. With *service conditions* (most common), the award vests if the employee provides an agreed upon period of service, typically between three to five years (the vesting period).³⁶⁸ In contrast, awards with *performance conditions* vest if the company or employee reach a specified performance target. For example, an award may vest if a specified sales target is achieved, upon completing an IPO, or in the event of a change in control. Performance conditions may refer to the company (e.g., EBITDA) or to the employee (e.g., sales by the employee). Awards with *market conditions* are linked to the value of the company's stock. For example, an award may vest if a company's stock price reaches \$50, or if total shareholder return exceeds the company's peer group index by 5%.

Equity-classified awards

Equity-classified grants to employees are measured based on the *grant date* fair value, where the grant date is usually at the beginning of the requisite service period.³⁶⁹ For restricted stock and stock-settled RSU, fair value is estimated using the stock market price, reduced by present value of dividends if the award is not dividend-protected (RSUs); for employee stock options (*ESOs*), stock-settled SARs and similar instruments, fair value is estimated using option pricing models adjusted for the unique characteristics of the instruments.³⁷⁰

The grant date fair value of the award is expensed over the employees' requisite service period. While changes in the fair value of the instruments (e.g., ESOs) are ignored, the SBC expense is adjusted to exclude amounts related to awards that are expected to be forfeited or for actual forfeiture (an accounting choice).³⁷¹ Thus, total compensation cost recognized over the requisite

³⁶⁸ Options typically expire between 7 and 10 years from the time of grant. For example, a stock option may vest 4 years from the time of grant and expire 10 years from grant.

³⁶⁹ Specifically, the grant date is the date on which all the following criteria are met: (1) The employer and employee have reached a mutual understanding of the awards key terms and conditions (e.g., exercise price, the option term, any performance conditions or targets that need to be achieved to earn the award); (2) The award has been formally approved by all required parties (e.g., Board approval if the Board is required to approve the award); (3) The company is obligated to issue the shares if the employee provides the required service and any other conditions in the award are met (e.g., performance targets); and (4) The employee is exposed to movements in the value of the market price of the company's stock.

³⁷⁰ The models used in estimating the fair value of options are various versions of the Black-Scholes-Merton formula and lattice models. A lattice model is a model that produces an estimated fair value for options based on assumed changes in the underlying stock price over successive periods of time. The most popular lattice model is the binomial model, which assumes two possible stock price movements each period. The Black-Scholes-Merton (BSM) formula is a closed-form model, that is, it uses an equation to produce a fair value estimate. Similar to lattice models, the BSM model recognizes the dependency of the option payoff on the stock price and estimates the fair value of the option based on the value of a dynamic portfolio which takes positions in the stock and a risk-free bond and replicates the option payoffs. This model is less flexible than lattice models, and it assumes continuous price movements and rebalancing. In addition, unlike the lattice model, which uses a suboptimal exercise factor to calculate the expected term (that is, the expected term is an output), under the Black-Scholes-Merton option-pricing formula the expected term is a required input.

³⁷¹ If the company elects to recognize the SBC expense based on expected forfeitures, at the grant date it estimates the number of share options expected to vest and reduce the amount to be expensed accordingly. The cumulative effect of subsequent changes in that estimate is recognized in the period of change.

service period should be the grant-date fair value of all instruments that vest. For awards with performance conditions, expense begins when the performance target is likely to be met, with a catch-up adjustment if needed. Compensation cost is reversed if it becomes unlikely that the performance condition will be achieved. For awards with market conditions, the grant date fair value estimate—and therefore the expense—incorporates the estimated probability that the market condition is going to be achieved, and it is recognized even if the targets are not met and the employee does not end up earning the award.

While the income statement effects of options and restricted stock awards are similar, the balance sheet effects are somewhat different. The granting of options has no immediate balance sheet effect, and in subsequent periods retained earnings are reduced (as the expense is recognized) and additional paid in capital (APIC) is increased. In contrast, the granting of restricted stock results in an immediate increase in common stock (par value) and APIC (the difference between fair and par value), and an offsetting increase in unearned compensation, which is a contra equity account similar to treasury stock. Subsequently, as the expense is recognized, retained earnings and unearned compensation are gradually reduced.

Awards often have **graded vesting**. For example, a company may award share options that vest according to a graded schedule of 25 percent for the first year of service, 25 percent for the second year, and the remaining 50 percent for the third year. Awards with graded vesting may be accounted for as separate share-based payment arrangements or recognized ratably over the longest vesting tranche (less conservative choice).

Modifications of equity-classified instruments that increase the value of the award result in the recognition of incremental compensation cost equal to the excess of the fair value of the modified award over the fair value of the original award immediately before the modification. Examples of modifications include a repricing of share-based payments awards (e.g., changing the exercise price of ESOs), or a change in performance conditions (e.g., revised revenue target).

When options **expire**, no accounting record is made. When options are **exercised**, cash and equity are increased by the exercise price. If the firm issues treasury stock shares, treasury stock (a contra-equity account) is reduced by the acquisition cost of the reissued shares, and the difference between the exercise price and the acquisition cost is generally credited or debited to APIC.³⁷² If new shares are issued, common stock is increased by the par value of the shares and the difference between the exercise price and par value is credited to APIC.

Liability-classified awards

The cost of employee services received in exchange for a liability-classified award is initially measured at fair value and is expensed over the requisite service period. The fair value of the award is remeasured at each reporting date through the settlement date, with the cumulative effect of the change in fair value recognized as an adjustment to the compensation cost. The cumulative effect of change in fair value is measured as follows: (new fair value - previous fair

³⁷² APIC cannot be debited by an amount greater than the net credits from prior treasury reissuance transaction. Any excess amount is debited to retained earnings.

value) $\times$ proportion of requisite services provided to date. The settlement date may be after the end of the service period, in which case compensation expense each subsequent period is determined by reporting the full change in fair value as an adjustment to compensation expense.

Income taxes

For tax purposes, stock-based compensation is typically deducted long after the book expense, and the amount deducted is different from that expensed. When an entity recognizes the cost of an award, it also recognizes a related deferred tax asset, both of which are based on the grant-date fair value of the award.³⁷³ The amount of the deferred tax asset recorded typically differs from the tax saved when a “non-qualified” option is exercised or a restricted stock or stock unit vests, because the deduction is based on the market price of the underlying share at the exercise or vesting date (less any exercise price paid by the employee) without regard to the amount of compensation cost previously recognized.³⁷⁴ Thus, when the tax deduction occurs, there is either an excess tax benefit (if the deduction exceeds the cumulative compensation expense for the award) or a “shortfall” (if the deduction is less than the cumulative expense). Since 2017 (ASU 2016-09), any ***excess tax benefit or shortfall*** is recognized in the income tax expense and all taxes related to SBC are reported in the operating section of the cash flow statement.

Excess tax benefits or shortfalls are often significant and are typically quite volatile over time. They are due to several factors, including the difference between realized and expected stock returns, differences between expected and actual deductions due to restrictions on SBC deductions, and the effects of stock price volatility and exercise price discounting on the options’ fair value. Thus, the inclusion of excess tax benefits/shortfalls in the income tax expense implies that they can induce significant volatility into the effective tax rate. Another SBC-related effect on the effective tax rate is that the TCJA 2017 tax reform significantly increased the portion of stock-based compensation that is not tax deductible.

Excess tax benefits/shortfalls are generally not relevant for liability-classified awards. For these awards, the deduction and the cumulative expense (on which the deferred tax asset is based) are equal, because the cumulative expense is adjusted for changes in the value of the liability through its settlement. Excess tax benefits/shortfalls are also not relevant for incentive stock options, because these awards have no income tax consequences to the company (the employees’ tax basis in the stock is set equal to the exercise price and the company gets no tax deduction).

³⁷³ The deferred tax asset is equal to the product of the cumulative expense to date and the enacted tax rate expected to apply during the period in which an entity expects to realize the asset.

³⁷⁴ “Non-qualified” refers to the tax status. When non-qualified stock options are exercised, the difference between the stock price and exercise price is added to the employees’ taxable income and deducted from the company’s taxable income. In contrast, incentive (qualified) stock options have no income tax consequences—the employees’ tax basis in the stock is set equal to the exercise price and the company gets no tax deduction. Option grants have to satisfy several restrictive conditions to receive a qualified status.

IFRS

IFRS is similar to U.S. GAAP, except

- Awards with graded vesting features are measured as multiple awards, with compensation expense recognized on an accelerated basis as vesting occurs. In contrast, U.S. GAAP give entities the choice of whether to measure such awards individually and amortize them on a straight-line basis or as multiple awards. Most companies measure the award individually, which results in delayed expense recognition relative to IFRS.
- For share-based payment awards that were originally not expected to vest but are now expected to vest as a result of a modification, compensation cost is the higher of the modified award's fair value or the grant-date fair value of the original award. U.S. GAAP is more restrictive: compensation cost is based on the modified award's fair value.
- Transactions are generally measured based on their grant date value and are classified as equity if they are equity settled or as a liability if they are cash settled. The classification rules are less detailed than U.S. GAAP and may result in a different classification. In addition, U.S. GAAP include specific exceptions to liability classification for some arrangements that include a cash settlement feature.

Earnings quality

Table 5.20A describes earnings quality issues, red flags and analyses related to share-based compensation.

Table 5.20A: Earnings quality – share-based compensation

Earnings quality issue	Explanation	Red flag or analysis
Manipulating assumptions or estimates underlying the calculation or recognition of SBC	- Depending on the type of grant (e.g., option, restricted stock), assumptions and estimates may include stock price volatility (+), expected option lives (+), expected dividend yield (-), risk free interest rate (+), the proportion of the award expected to vest (+), and whether performance targets will be met (for awards with performance conditions).³⁷⁵ - Importantly, unlike other forms of earnings management where total expense must ultimately equal cash flow, there is no such true-up mechanism for options, so any manipulation is permanent (except the forfeiture rate, which is true-up).	- Volatility used in valuing ESOs is significantly smaller than implied volatility or historical volatility³⁷⁶ - Expected option lives significantly smaller than estimates used by peers - Expected dividend yield significantly higher than current yield - Expected forfeiture rates significantly larger than historical rates - Did the company make significant changes in expected forfeiture rates or in other assumptions?
Excess tax benefits/shortfalls inducing volatility into earnings and the ETR	Excess tax benefits/shortfalls, which since 2017 are included in the income tax expense, are often quite volatile over time. This volatility creates significant transitory earnings and makes the effective tax rate a “noisy” proxy for future tax rates.	- Significant negative effect of SBC on the effective tax rate - Did the company’s stock price increase or decrease substantially since over the last year? If so, what are the implications for future excess tax benefits?
Backdating grants to understate equity-classified SBC	Many companies have been accused of looking back over a window of time and picked grant dates for options that coincided with dates of historically low closing prices for the company’s common stock, resulting in grants of in-the-money options.³⁷⁷	Compare the average exercise price of options granted during the year with the average stock price during the year.
Timing or manipulating disclosures to understate equity-classified SBC	For example, a firm may manage earnings downward or disclose other bad news immediately prior to the granting of equity-classified SBC (e.g., Aboody and Kasznik 2000, McAnally et al. 2008).³⁷⁸ To the extent that such disclosures temporarily reduce the grant date stock price, the options’ estimated value and hence the reported ESO expense will be understated.	Compare the average exercise price of options granted during the year with the average stock price during the year.

³⁷⁵ Example of *manipulating SBC-related estimates* (SEC AAER No. 4094): In Q4 2016, “PPG records an initial accrual for performance-based Restricted Stock Units (“RSUs”) based on a methodology related to performance factors and adjusts the accrual over the vesting period. In January 2017, several days into the Q4 2016 closing process, Officer A, acting without a reasonable basis, reduced an input to the performance factor methodology in order to adjust the accrual, resulting in an inappropriate reduction of the accrual by \$6.8 million for Q4 2016.”

³⁷⁶ For example, Bartov et al. (2007) show that firms understate the ESO expense by opportunistically shifting weights between implied and historical volatilities when estimating the stock price volatility parameter.

³⁷⁷ Example of *backdating options* (SEC AAER No. 2754): From at least 1994 through 2005, McGuire looked back over a window of time and picked grant dates for UnitedHealth options that coincided with dates of historically low quarterly closing prices for the company’s common stock, resulting in grants of in-the-money options. ... McGuire signed and approved backdated documents falsely indicating that the options had actually been granted on these earlier dates when UnitedHealth’s stock price was at or near these low points. These inaccurate documents caused the company to understate compensation expenses for stock options, and were routinely provided to the company’s external auditors in connection with their audits and reviews of UnitedHealth’s financial statements.

³⁷⁸ Relatedly, Cheng and Lo (2006) find that firms increase bad news forecasts before executive share purchases.

Earnings quality issue	Explanation	Red flag or analysis
Timing grants of equity-classified SBC to understate the expense	For example, a firm may grant options at times when stock price appears to be temporarily depressed (Yermack 1997).	Compare the average exercise price of options granted during the year with the average stock price during the year.
SBC in valuation	- SBC is essentially a substitute for cash compensation. For example, if the company discontinues granting SBC, it will have to increase cash compensation. - A useful way to think about future SBC is as follows: each future year the company will issue new shares at an amount equal to the future SBC and use the cash flow from the issuance to pay compensation to employees. - Therefore, free cash flow forecasts should reflect future SBC costs (see “Red flags and analysis”). Equivalently, one may define a separate tax-adjusted SBC flow and subtract it from free cash flow to yield an adjusted flow measure to be discounted. - In addition to considering <i>future</i> SBC in measuring free cash flow, deriving an estimate of the value per currently outstanding common share requires one to subtract from the present value of (adjusted) free cash flow an estimate of the after-tax value of <i>past</i> SBC grants that are not yet reflected in outstanding common shares. These include outstanding options, unvested restricted stock, and restricted stock units. The tax adjustment is needed because for most SBC grants, the tax deduction is received when the company issues the shares. - To avoid double counting of future SBC expense, one should add to the present value of free cash flow the amount associated with past SBC grants that is yet to be expensed in the future, times one minus the tax rate. The tax adjustment is needed because the impact of future SBC on free cash flow is reduced by the associated tax saving.	- When predicting future EBIT and free cash flow, one should include the outflow related to SBC in operating expenses as if it is a cash outflow, generally forecasting that SBC will grow with revenue (like other expenses). - To estimate value per outstanding common share, subtract from the present value of free cash flows an estimate of the after-tax value of past SBC grants that are not yet reflected in outstanding shares, and add the after-tax value of any related expense that is yet to be recognized as part of future SBC expense (to avoid double counting).

5.21 Earnings per share

Earnings per share is the amount of earnings attributed to each share of common stock outstanding. Conceptually, it is merely net income divided by the number of common shares outstanding: $EPS = \frac{\text{Net income}}{\text{Common shares outstanding}}$. However, this calculation assumes that all shares were outstanding throughout the year and that there are no other claims on net income besides those associated with outstanding common shares. These assumptions often do not hold. Due to treasury stock transactions (share buybacks and reissuance) and new shares issuance, outstanding shares often vary during the year. Because income is earned during the year, and the capital associated with outstanding shares helps generate earnings only from their issuance date, net income should be divided by the time-weighted average number of shares outstanding during the year.³⁷⁹ In addition, many firms have noncontrolling interests and/or outstanding preferred shares, with corresponding claims on net income. Accordingly, noncontrolling interest in income and preferred dividends should be subtracted from consolidated net income. The resulting ratio is termed **Basic EPS**:

$$\text{Basic EPS} = \frac{\text{Net income available to common shareholders}}{\text{Weighted average common shares outstanding}} \quad 380$$

Public companies are required to report their Basic EPS on the face of the income statement.

Basic EPS fails to reflect the dilution of EPS that may result from existing securities that can be exercised or converted into common stock. Examples include stock options, stock rights, stock warrants, convertible bonds, and convertible preferred stock. Dilution may also result from unvested restricted stock, unvested restricted stock units (RSUs), and contingently issuable common shares. Public firms with potentially dilutive securities are required to report diluted EPS in addition to basic EPS. **Diluted EPS** is a conservative measure of EPS reflecting the potential dilution that would have resulted from (hypothetical) conversion, exercise, and other contingent issuance of dilutive securities. Basic and diluted EPS are presented for both continuing operations and net income, for each class of common shares.

Diluted EPS is calculated as follows:

$$\text{Diluted EPS} = \frac{\text{Net income available to common shareholders} + \text{adjustments}}{\text{Weighted average common shares outstanding} \pm \text{adjustments}}$$

with the following adjustments:

- For dilutive convertible securities (convertibles preferred stock, convertible bonds), the number of shares is increased by the additional shares that would have resulted from

³⁷⁹ For example, if on January 1, 2020, there were 200 shares outstanding, and on August 31, 2020, the company bought back 60 shares, then weighted-average share outstanding are $180 (= 200 - 60 \times (4/12))$, or $200 \times (8/12) + 140 \times (4/12)$.

³⁸⁰ Shares outstanding used in calculating basic EPS is adjusted to exclude nonvested restricted stock and include vested restricted stock units. In addition, contingently issuable common shares are included in basic EPS from the date on which all necessary conditions are satisfied.

conversion, and income is increased by the related preferred dividends or after-tax interest expense.³⁸¹ This calculation is referred to as the “*if-converted method*.”

- For equity contracts (options, rights, warrants) and for unvested RSUs and unvested restricted stock, the number of shares is increased by the additional shares that would have resulted from exercise or vesting, and it is reduced by the number of shares that could have been purchased using the proceeds from the exercise or vesting, assuming the shares were repurchased at the average market price during the period (the “*treasury stock method*”).³⁸² “Proceeds” for the purpose of this calculation include (1) the amount received from the hypothetical exercise of options, and (2) the average balance during the year of the unrecognized expense associated with the award. If the equity contracts were issued during the year, the related shares are weighted by the fraction of the year from the issuance date.
- Contingently issuable common shares are included in diluted EPS based on the number of shares that would be issuable if the reporting date were the end of the contingency period.

Potential common shares are included in the calculation of diluted EPS only if they reduce EPS from continuing operations. Dilutive EPS is calculated using an iterative process, starting by adding the most dilutive securities and recalculating diluted EPS after each dilutive series is added until all dilutive securities (relative to the most recent diluted EPS calculation) are included.

U.S. GAAP and **IFRS** related to EPS are similar. There are a few specific, narrow application differences.

Earnings quality

Table 5.21A describes earnings quality issues, red flags and analyses related to EPS.

³⁸¹ If the convertibles were issued during the year, the related shares are weighted by the fraction of the year from the issuance date. In some cases, the conversion rate of a dilutive security may change over time, or the contract may be settled in either cash or shares. U.S. GAAP provides guidance regarding which conversion rate should be used in such cases.

³⁸² The formula for calculating incremental shares: $\text{Incremental shares} = [(\text{average market price} - \text{proceeds from exercise or vesting}) / \text{average market price}] \times \text{shares from exercise or vesting}$.

Table 5.21A: Earnings quality – EPS

Earnings quality issue	Explanation	Red flag or analysis
Share transactions distorting reported EPS	• Firms often use stock repurchases to manage earnings per share (e.g., Bens et al. 2003, Brav et al. 2005, Hribar et al. 2006). • To the extent that the earnings-price ratio is larger than the after-tax return on cash holdings or the after-tax cost of borrowing, firms may increase reported EPS by repurchasing shares. (The relevant benchmark is either the return on cash or the cost of borrowing, depending on whether the repurchases are funded with cash holdings or borrowed funds, respectively.) • Conversely, if the earnings-price ratio is lower than the after-tax return on cash holdings or the cost of borrowing, firms may increase reported EPS by reissuing treasury shares and either invest the proceeds in interest-bearing instruments or pay back debt.	• To evaluate whether the firm used treasury stock transactions to inflate EPS, one may start by examining the magnitude of treasury stock transactions during the period. If there were substantial treasury stock transactions, the impact on EPS may be significant. • Compare the percentage change in EPS with that of net income. If the increase in EPS is larger, it may be due to treasury stock transactions. • Compare the earnings-price ratio to the after-tax cost of borrowing and to the after-tax return on cash holdings. Relatively high earnings-price ratios indicate the potential for inflating EPS by repurchasing shares.
Diluted EPS understates potential dilution from outstanding options	• Diluted EPS does not reflect the time value of options. Potential dilution from at- and out-of-the-money options is not reflected in diluted EPS at all, and for in-the-money options, diluted EPS does not reflect the additional dilution that may result if the stock price increases. • Time value increases with time to maturity and stock price volatility, and generally decreases with the extent to which the options are in the money.	• Significant options, especially with high time value

Earnings quality issue	Explanation	Red flag or analysis
Diluted EPS measures dilution from convertibles with substantial error	• Unlike the options-related adjustments, which completely ignores the time value of options, the convertibles-related adjustments indirectly incorporate the time value of the conversion option. Specifically, convertibles with high time value at issuance are likely to pay a relatively low interest rate (convertible bonds) or low dividend yield (convertible preferred stock) due to the value of the conversion option. Because these payments are added back to net income when calculating diluted EPS, a low interest rate or low dividend yield implies that the increase in the EPS numerator only slightly offsets the impact of the increase in the denominator (the addition of the hypothetical shares from conversion). Thus, the time value of the conversion feature reduces diluted EPS. • Still, in most cases diluted EPS fails to properly capture economic dilution from convertibles, primarily because it ignores the change in the stock price since the issuance of the convertibles (unlike the options-related adjustment). • Changes in the stock price are the most important determinant of economic dilution – they affect both the likelihood of conversion and extent of dilution from conversion. • An increase in the likelihood of conversion relative to the time of issuance generally (e.g., due to an unexpected increase in stock price) implies that Diluted EPS is overstated because it fails to reflect the increase in expected dilution.	• Significant convertibles • Cumulative stock returns since issuance of the convertibles that are substantially different from expected returns • Diluted EPS is not significantly smaller than Basic EPS in spite of significant convertibles with high value for the conversion features (e.g., current market yield is significantly smaller than the yield on straight debt).

Earnings quality issue	Explanation	Red flag or analysis
Contingent claims in valuation	• EPS-related information is often used to estimate the value of contingent claims, including ESOs, other warrants, and the conversion feature of convertibles bonds and convertible preferred stock.	• To estimate the value of contingent claims, first measure the extent of dilution of common stockholders' claims from dilutive securities ("dilution factor" minus one), and then multiply it by the market value of common equity. • The dilution factor can be estimated using two ratios of EPS-related quantities: (1) weighted average diluted shares divided by weighted average basic shares, and, if diluted EPS is positive, (2) Basic EPS divided by Diluted EPS. • These ratios measure potential dilution with significant error. To mitigate measurement error, and to err on the conservative side, measure the dilution factor as the minimum value of the two estimates, calculated using the most recently reported annual data. • Both ratios fail to capture the time value of options, as they only account for the extent to which options are in the money (intrinsic value). • The shares-based ratio may overstate dilution from convertibles because it ignores the increase in earnings (and therefore in common equity value) that would result if the bonds or preferred stock are converted to common stock. (In contrast, the EPS-based calculation accounts for the earnings effect of dilutive convertibles by increasing the numerator of diluted EPS.) • Both approaches—but especially the EPS-based one—often yield volatile estimates.

5.22 Insurance accounting

[Note: This section is highly incomplete]

This section covers accounting issues unique to insurance operations. They are relevant when evaluating insurance companies as well as companies with insurance captives, which are quite common across most industries. Insurance companies also engage in activities other than insurance, primarily related to investing, which are covered in other sections of this monograph (see Table 5.22A below).

Insurance accounting relates to different activities (e.g., underwriting, reserving, revenue recognition), and it generally varies across insurance products. Accordingly, this section starts with a review of activities and organization of insurance companies (Section 5.22.1), followed by a description of primary insurance products (5.22.2). It then discusses insurance reserves and related expenses (5.22.3), insurance revenue (5.22.4), deferred policy acquisition costs (5.22.5), reinsurance accounting (5.22.6), separate accounts (5.22.7), disclosures (5.22.8), key ratios used for evaluating insurance operations and reporting quality (5.22.9), and finally specific earnings quality issues and related analysis (5.22.10).

Table 5.22A: Primary line items of insurance companies

Financial statement line-item	Section
Investment in debt securities	5.13
Loan receivables and related accounts (including mortgages and policy loans)	5.12, 3.2
Passive investment in equity securities	5.15
Investments in real estate	5.4
Derivatives	5.14
Insurance reserves and related expenses	5.22.4
Deferred policy acquisition costs	5.22.5
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5.22.1 Activities and organization of insurance companies

Insurance provides economic protection from identified risks occurring or discovered within a specified period. Insurance is a unique product in that the ultimate cost is often unknown until long after the coverage period, while the revenue is derived from premium payments by policyholders that are received before or during the coverage period. Another unique feature of insurance is that, while most other products and services provide or are expected to provide ex-post benefits, insurance provides ex-post benefits only if low probability events occur.

Insurance contracts are classified as either property and casualty (P&C) or life and health (L&H). P&C insurance contracts provide protection against (a) damage to or loss of property caused by various perils, such as fire, damage or theft, (b) legal liability resulting from injuries to other persons or damage to their property, (c) losses resulting from various sources of business

interruption, and (d) losses due to accident or illness. L&H insurance contracts pay off in lump sums or annuities upon the insured's death, disability, or retirement. Some insurance policies, primarily health-related policies, have both P&C and L&H characteristics and can therefore be classified as either P&C or L&H.

Most insurance companies specialize in either P&C or L&H insurance, but some have significant operations in both segments. In addition, while many insurers underwrite reinsurance policies (insurance sold to insurers), some focus on reinsurance as their core activity. Insurers increasingly offer products and services that involve little or no insurance protection, such as investment products and fee-based services. The industry also includes companies that provide insurance brokerage services (sourcing of insurance contracts on behalf of customers).³⁸³

The primary purpose of the insurance business is the spreading of risks. Because the risks associated with different policies are not perfectly correlated, the total risk of a portfolio of policies is smaller than the sum of the policies' risks. Thus, insurance functions as a mechanism to diversify risks, similar to the role of mutual funds in diversifying investment risks. In fact, because insurers accumulate substantial funds in conducting their business, they also diversify investment risks for their stakeholders by investing in diversified portfolios.

The activities of insurance companies include underwriting insurance policies (including determining the acceptability of risks, the coverage terms, and the premium), billing and collecting premiums, and investigating and settling claims made under policies. Other activities include investing the accumulated funds and managing the portfolio.

Two difficulties facing insurers in their underwriting activities are adverse selection and moral hazard. **Adverse selection** in insurance is the tendency of individuals and companies with higher-than-average potential for claims to seek to obtain insurance coverage to a greater degree than low risk individuals or companies. For example, people with severe health problems have strong incentives to buy health insurance, and companies employing workers in dangerous occupations may be particularly inclined to buy workers' compensation coverage. To combat adverse selection, insurers engage in selective underwriting and adjust premiums for risk factors (e.g., setting high life insurance premiums for smokers). **Moral hazard** in insurance relates to the tendency of insureds to engage in more risky activities than they would if they had no insurance. It also refers to the possibility that insureds may deliberately cause an insured event or pretend that such an event occurred to obtain insurance payments. Moral hazard concerns are mitigated through selective underwriting (e.g., moral individuals, thriving business, occupied properties), insurance deductibles, policy exclusions, contingent pricing, and other methods.

³⁸³ Reflecting this variation in activities, the Global Industry Classification (GIC) system classifies insurance companies as follows. Life and Health Insurers – companies providing primarily life, disability, indemnity or supplemental health insurance; this category excludes managed health care companies, which are included in the Health Care sector; examples include MetLife Inc. (MET), Prudential Financial (PRU), and AFLAC Inc. (AFL). Property and Casualty Insurers – companies providing primarily property and casualty insurance; examples include Allstate Corp. (ALL), The Travelers Companies Inc. (TRV), and The Chubb Corporation (CB). Multi-line Insurers – companies with diversified interests in life, health, property and casualty insurance; e.g., American International Group Inc. (AIG), Hartford Financial Services Group Inc. (HIG), and Assurant Inc. (AIZ). Reinsurers – companies providing primarily reinsurance; e.g., Reinsurance Group of America Inc. (RGA), Everest Re Group Ltd. (RE), and Arch Capital Group Ltd. (ACGL). Insurance Brokers – companies providing insurance and reinsurance brokerage services; e.g., AON Corporation (AON), Marsh & McLennan (MMC), and Willis Towers Watson (WLTW).

Investing activities are particularly important for L&H insurers; for many L&H insurers, the spread between the return on investments and the interest cost of insurance liabilities is the primary source of income. Investment income is also significant for P&C insurers. P&C insurers accumulate substantial funds due to the time gap between the receipt of premiums and payment of claims, and they invest and manage these funds to generate investment income. This income contributes to earnings and so affects the pricing of insurance policies.

The time gap between the receipt of premiums and payment of claims, which creates the so-called *float*, consists of four components. The first is the time interval between the receipt of premium and the occurrence of insured events. In most cases this component is relatively small, because the duration of P&C policies is usually short, six-months to a year. This component of the float is reflected in the financial statements in the balance of the unearned premium liability. The other three components, which vary in importance across P&C lines, relate to the gap between the occurrence of insured events and the subsequent payments. Some insured losses are discovered many years after the event (e.g., exposure to asbestos), and in many cases the claim settlement process extends over several years (e.g., medical malpractice litigation). Also, in some cases insurance payments are made over extended periods of time (e.g., workers' compensation). These three components of the float are reflected in the financial statements in the balance of the reserve for losses and loss adjustment expenses, which insurers are required to accrue when insured events occur. Accordingly, the analysis of the float often focuses on unearned premium (first source of float) and, primarily, the loss reserve (other three sources of float).

P&C contracts involve greater uncertainty than L&H contracts because both the frequency and magnitude of P&C claims are more volatile than L&H claims. P&C losses are highly sensitive to catastrophic events such as hurricanes, earthquakes and terrorism acts, events which typically have limited effect on L&H claims. In addition, the required payment for P&C insurance claims depends on the insured's loss (subject to limits), while for L&H insurance it is often the face value of the policy.

Because P&C reserves involve greater uncertainty than L&H liabilities, P&C insurers hold larger equity cushions and generally invest in less risky assets compared to L&H insurers. They also reinsure significant portions of their exposure, issue insurance-linked securities, and arrange contingent capital facilities. In addition, because the timing of P&C claim payments is less predictable and generally nearer than that of L&H benefit payments, P&C insurers invest in more liquid and shorter maturity (and therefore less interest rate sensitive) assets, particularly securities. In contrast, L&H insurers often invest significant amounts in long term mortgages and in risky securities.

Some insurers obtain thrift or banking charters and use the charters to cross-sell related products to insurance clients. L&H insurers often use thrift or banking charters to provide trust services which complement life insurance and retirement and estate planning activities. For example, life insurance policies can be used to fund trusts, retirement funds may be direct deposited into checking accounts, and certificates of deposit may be incorporated into asset diversification plans for retirement or estate planning purposes. P&C insurers use thrift or banking charters for

retail activities such as home mortgages and auto loans, which complement the auto and homeowner lines of insurance offered.

Insurance companies are also classified based on their form of ownership, where the primary forms are stock and mutual companies. **Mutual insurers**, which are owned by their participating policyholders, can issue debentures and similar financial instruments but not common stock. Stock companies are owned by stockholders and can issue debentures, common stock, and a wide variety of related financial instruments. Most insurers are stock companies. Examples of mutual insurers include NY Life, Massachusetts Mutual Life, and State Farm (P&C). A relatively new, hybrid form of ownership involves a mutual company converting into a mutual holding company with a subsidiary stock company that can issue stock to the public. This form of ownership is allowed in only some states and is uncommon. Two examples are Liberty Mutual Holding Company (P&C) and Pacific Mutual Holding Company (L&H).

One strategic choice that insurers face is whether to diversify across products, lines, and businesses, or focus on core businesses. Scope economies can originate from cost complementarities (including the sharing of inputs such as customer lists and managerial expertise), earnings diversification (which permits the firm to operate with higher leverage ratios), and revenue complementarities (“one-stop shopping” opportunities for consumers that reduce search costs). On the other hand, operating a conglomerate may increase management and coordination costs, exacerbate principal-agent conflicts, and create cross-subsidization among subsidiaries due to inefficient internal capital markets. A related decision that many insurers face is the degree of geographic diversification.

Growth and diversification can be achieved organically or through business combinations. Merger and acquisition activity in the insurance industry has been very significant for many years. Similar to other industries, the motivations for M&A transactions in the insurance industry are to increase geographical reach and product range in order to benefit from scale and scope economies, and to obtain financial synergies including benefits due to diversification, size, debt capacity and tax effects.

Insurance in the U.S. is **regulated** at the state level. The states have enacted extensive regulatory laws with the primary objective of protecting policyholders, both in terms of the solvency of insurance companies and the availability and fair pricing of insurance policies. To this end, regulators use information from standardized quarterly and annual statements, prepared under Statutory Accounting Principles (**SAP**), that insurers file with each state in which they are licensed as well as with the National Association of Insurance Commissioners (NAIC). The NAIC codified SAP in the Accounting Practices and Procedures Manual. The insurance laws and regulations of the states require insurance companies domiciled in the states to comply with the guidance provided in that manual except as prescribed or permitted by state law. SAP generally reflects a liquidating rather than going concern basis of accounting, which underlies GAAP.³⁸⁴

³⁸⁴ For example, SAP requires that deferred policy acquisition costs be expensed immediately instead of matched against the premiums as they are earned and recognized in income. Additional differences between SAP and GAAP include the exclusion of some GAAP assets from the SAP balance sheet (non-admitted assets, e.g., office furniture, vehicles, premium balances that are 90+ days past due, advances to agents). Some assets are partially non-admitted, that is, they are subject to a cap (e.g., deferred tax assets). The rationale for the exclusion of non-admitted assets is

5.22.2 Insurance products

This section describes the primary products and services offered by insurers: first P&C products, then L&H products, and finally other, non-insurance services.

P&C policies

P&C insurers offer insurance products in many different lines; the primary ones are:

Automobile – coverage for personal injury (Personal Injury Protection or PIP, un/under-insured motorist bodily injury), automobile damage sustained by the insured (collision, comprehensive, un/under-insured motorist property damage), and liability to third parties for losses caused by the insured (bodily injury liability, property damage liability).

Homeowners insurance – covers the house and other structures on the property, as well as personal possessions inside the house, against a wide variety of perils including windstorms, fire and theft. Homeowners insurance also covers additional living expenses (the cost of living elsewhere while the house is being restored after a disaster) and accidental injuries caused to third parties and/or their property. Coverage for flood and earthquake damage is excluded.

Workers' compensation – coverage for benefit payments to employees for work-related injuries, deaths and diseases, regardless of fault.

Commercial multiple peril – package coverage including most property and liability coverage except workers' compensation, automobile insurance, and surety bonds.

Professional liability – covers physicians, surgeons, dentists, hospitals, engineers, architects, accountants, attorneys, directors, and other professionals from liability arising from error or misconduct in providing or failing to provide professional service.

Fire and allied lines – coverage for fire, windstorm, hail, and water damage (but not floods).
Inland marine – coverage for property that may be transported from one place to another, as well as bridges, tunnels and other instrumentalities of transportation.

Ocean marine – coverage for ships, cargos, and freight.

that they generally cannot be used to pay claims. Reserves: P&C reserves are generally calculated similarly for SAP and GAAP, but L&H reserves are calculated differently. SAP generally uses statutory tables or formulas to determine L&H reserves, while GAAP measures L&H liabilities based on discretionary estimates. Investments: Under SAP, debt securities are reported at amortized cost or at the lower of amortized cost and fair value, depending on their designation by the NAIC. For some debt securities that are reported at amortized cost, L&H insurers maintain a corresponding formula-driven asset valuation reserve. Under GAAP, investments in debt securities are reported at amortized cost if management has the intent and ability to hold them to maturity, and at fair value otherwise; no valuation allowance is maintained for securities (see Section 5.12).

Accident and health – cover loss by sickness or accidental bodily injury, including disability income insurance and accidental death and dismemberment insurance.

Fidelity insurance – protects employers for loss due to embezzlement or misappropriation of funds by an employee.

Surety insurance – a three-party agreement in which the insurer agrees to pay a second party or make complete an obligation in response to the default, acts, or omissions of an insured.

L&H policies

Traditional life policies provide primarily death benefits, although many contracts have significant saving elements or contain living benefit clauses. The products offered by life insurers also include life-contingent annuities as well as pure investment contracts. Health insurance contracts provide reimbursements for medical expenses or income in the case of disability.

Life contracts

There are many variants of life insurance contracts. Some contracts—including term and whole life—are used exclusively or primarily to provide protection against premature death. Others—such as endowment and universal life—combine protection against premature death with a type of savings vehicle. Life insurance contracts include:

Term insurance – provides protection for a fixed term (e.g., 1, 5, or 15 years). If death occurs during the policy's term, a fixed amount is paid to the beneficiary. There are no other benefits or cash value build-up.

Guaranteed renewable term insurance – can be renewed without proof of insurability (but often at much higher rates), while under other types of term insurance the insured must once again undergo an underwriting process (e.g., a medical examination).

Whole life – provides for the payment of the face value of the policy upon death of the insured, regardless of when it may occur. Premium payments are typically level during the insured's life. Because life risk increases with age, whole life contracts involve overpayment of premiums in the early years and underpayment in the latter years, and so accumulate cash value that may be borrowed against.

Endowment insurance – the face value of the policy is paid to the insured or beneficiaries either at the end of the contract period or upon the insured's death.

Universal life – a flexible premium policy that combines insurance protection with a type of savings vehicle (cash value account), which typically earns a money market rate of interest. Death benefits can be changed during the life of the policy within limits, generally subject to a medical examination. The cash value account is reduced periodically by mortality and

administrative charges, and the policy lapses if the account balance is not sufficient to cover the charges.

Variable life – contracts that allow the insured to invest the premiums in one or more underlying portfolios offering different levels of risk and growth potentials, which are usually held in separate accounts. Unlike whole life, the cash value of the policy is not guaranteed, and poor investment performance can lead to a reduced cash value, a lower death benefit, and possible lapse of the policy without value. Some life contracts combine fixed and variable features.

Variable universal life – a universal life policy that allows for flexibility in investing the premiums (see variable life).

Annuities

Annuities are either life-contingent or period-certain (i.e., annuities with specified periods of payment). Annuities can also be classified as either fixed versus variable, immediate versus deferred, or qualified versus non-qualified. Annuity contracts also differ in the guarantees that they offer.

Life-contingent annuity – a contract that pays a periodic benefit over the remaining life of a person (the annuitant) or the lives of two or more persons (joint and Survivor life). Life-contingent annuities are essentially the reverse of life insurance. These contracts expose the insurer to longevity risk, which can be used to offset the mortality risk exposure of life insurance.

Fixed annuity – an annuity whose premiums paid earn a pre-determined rate of return (during the accumulation phase) and which pays predetermined income amounts (during the distribution phase).

Variable annuity – an annuity whose value or income payments vary according to the performance of investment funds that are selected by the contract owner from a list offered by the insurer (typically separate accounts). Some annuity contracts combine fixed and variable features.

Deferred annuity – annuity during the accumulation stage or when payments are not scheduled to start in the near term.

Immediate annuity – an annuity designed to begin making payments right away or within a short time after purchase.

Qualified annuity – an annuity used in connection with employer-sponsored plans such as 401(k) plans, defined benefit plans, or section 403(b) plans. These annuities are referred to as “qualified” because contributions are generally deductible to the employer and taxed to the employees only when received (at retirement).

Non-qualified annuity – an annuity that is not part of a qualified retirement plan, and which is therefore purchased with after-tax dollars (see definition of a qualified annuity).

Deposit-type contracts

As noted above, some annuities are period-certain, and so do not subject the insurer to a significant insurance risk of contractholder mortality or morbidity. Additional investment products that insurers sell include *Guaranteed Investment Contracts (GICs)* and *supplementary contracts without life contingencies* as well as other deposit-type contracts.

Accident and health

Accident and health insurance contracts are generally classified as either medical indemnity contracts or disability income contracts. These policies include:

Medical indemnity contracts – provide benefits for medical expenses.

Disability income contracts – provide periodic benefit payments for a fixed period or for life in the event the insured is unable to work due to disability resulting from illness or injury.

Other products and services

Insurance companies also provide services that do not involve significant elements of insurance or investment risks. For example, L&H insurers often generate fees from services such as group plan administrative, investment advisory, and back-office services. In addition, life insurance entities commonly offer products through noninsurance subsidiaries, such as finance companies, broker-dealer operations, mutual funds, unit trusts, joint ventures, mortgage banks, and real estate trusts. Accounting for these activities is covered in other sections of Chapter 5.

5.22.3 Insurance reserves and related expenses

The most significant liabilities for most insurers are insurance reserves. Insurance reserves include the liability for future policy benefits (life and health insurance), loss/claim and loss/claim adjustment expenses reserve (property and casualty and life and health), and policyholders' account balances (life and health insurance).

The reserves reported by life and health (L&H) insurers consist primarily of future policy benefits, while the reserves of property and casualty (P&C) insurers consist primarily of the loss/claim reserve. Still, L&H insurers report significant claim reserves, and P&C insurers report substantial benefit reserves. The reserves for benefits reported by P&C insurers are due to L&H operations, as some P&C insurers provide L&H coverage (mostly health-related) in addition to P&C insurance. The claim reserves reported by L&H insurers relate to claims stemming from L&H operations as well as to P&C operations.

This section describes US GAAP for insurance reserves and related expenses, first the loss/claim reserve (hereafter referred to as the loss reserve), then the reserve for future policy benefits, and finally the liability for policyholders' accounts.

Loss reserves and related expenses

Loss reserves represent estimated future payments to settle claims related to insured events that have occurred by the balance sheet date. P&C insurers typically refer to this liability as the loss reserve, while L&H insurers refer to it as the liability for policy and contract claims. In both cases, the liability includes estimates of claim expenses (e.g., adjustment and litigation costs) in addition to expected claim payments.

The loss reserve represents the estimated liability for P&C claims that have been reported to the insurer but not yet settled as well as claims incurred but not reported. It is generally estimated based upon the insurer's historical experience and actuarial assumptions that consider the effects of current developments, anticipated trends, and risk management programs (some common methods are described below). The reserve is reported net of anticipated salvage and subrogation. Adjustments to the loss reserve are included in income in the period in which the estimates are changed.

Similarly, the liability for policy and contract claims measures the estimated ultimate cost of settling claims related to incurred but not reported death, disability and long-term care as well as claims that have been reported but not yet settled. Unlike for P&C insurance, expected payments to settle reported L&H claims generally involve low uncertainty and the related reserves are estimated on a case-by-case basis. In contrast, similar to P&C insurance, estimates for the development of incurred but not reported claims are derived from actuarial analyses of historical patterns of claims and claim development for each line of business. Adjustments to these estimates are recognized in policyholder benefits and claims expense in the period in which the estimates are changed.

While claim reserves are reported by both P&C and L&H insurers, their economic significance and the subjectivity involved in their measurement is substantially higher for P&C insurers. Accordingly, the remainder of this section focuses on loss reserves.

Reported loss reserves are affected by two offsetting accounting distortions: an anti-conservative provision of FASB Interpretation No. 14 that requires that the minimum value of equally likely outcomes of a probable loss contingency be accrued as a liability, and the practice of reporting most loss reserves undiscounted. Of these two distortions, the lack of discounting typically dominates. Only few loss reserves are reported discounted, the primary ones being settled workers' compensation claims and loss reserve for financial guarantee insurance. The loss reserve is reported undiscounted also under SAP, but for tax purposes the reserve and related expense are discounted.

The overstatement of loss reserves due to the lack of discounting should increase with the time span between the incidence of a loss and the settlement of the claim (settlement period or "tail"). However, because the uncertainty regarding ultimate losses increases with the settlement period (see below), the understatement of loss reserves due to minimum value measurement of equally likely outcomes (FASB Interpretation No. 14) increases with the tail.

The “losses and loss expenses” line item reported in the income statement is equal to the periodic change in the loss reserve, plus payments during the year for claims and claim settlement expenses, minus the corresponding reinsurance recoveries. Equivalently, it is equal to estimated costs to settle claims related to insurance coverage during the year, plus the change in the estimated cost to settle claims relating to insurance coverage in prior years, minus the corresponding reinsurance recoveries.

P&C insurers use various approaches to estimate the loss reserve. These methods rely on the premise that past experience, adjusted for the effects of current developments and likely trends, is an appropriate basis for predicting future outcomes. Most actuarial methods estimate ultimate losses for each cohort of claims such as an accident year/line component, and the cohort’s loss reserve is calculated by subtracting the paid-to-date losses from the estimated ultimate losses. The overall loss reserve is calculated by summing the cohorts’ loss reserves.

A common approach used for estimating ultimate losses for each cohort of claims is the paid loss development factor method (also called the chain ladder method). This method assumes that the losses yet to emerge for an accident year are proportional to the cumulative losses paid so far. The basic premise is that cumulative paid losses for a given cohort of claims (e.g., accident year / product line) will grow in a stable, predictable pattern from year-to-year, based on the age of the cohort. Age-to-age growth factors, called “link ratios,” are calculated based on the development of cumulative paid losses in prior years. For example, if cumulative paid losses for a product line ABC for accident year 2007 were \$1,200 as of December 31, 2017 (12 months after the start of that accident year) and then grew to \$1,440 as of December 31, 2018 (24 months after the start), the link ratio for that accident year from 12 to 24 months would be 1.20. This link ratio may be used to project loss development for the current accident year. For example, if cumulative paid losses for accident year 2018 (the current year) were \$1,500 as of December 31, 2018, we can project that overall losses will be \$1,800 ($1,500 \times 1.2$) and so estimate the loss reserve at \$300. This calculation assumes that no further losses will be paid after 2009, and it uses one historical development (from year 2017 to 2018) to project future developments. A more accurate calculation can be obtained by also considering prior years. For example, if cumulative paid losses for accident year 2016 were \$1,000 as of December 31, 2016, then grew to \$1,300 as of December 31, 2017, and finally grew to \$1,430 as of December 31, 2018, the 12-to-24 month link ratio may be projected to be 1.25 (average of 1.2 and 1.3) and the 24-to-36 month ratio may be projected to be 1.1. Accordingly, overall losses for accident year 2018 will be projected to be \$2,062.5 ($1,500 \times 1.25 \times 1.1$). Continuing with the above example, if additional losses are expected to be paid after 2020 (i.e., more than two years after the 2008 accident year), additional link ratios using prior year data would have to be calculated and applied. For example, if payments are expected to end at 60 months, then the ultimate indication for an accident year with cumulative losses at 12 months equals those losses times a 12-to-24 month link ratio, times a 24-to-36 month link ratio, times a 36-to-48 month link ratio, times a 48-to-60 month link ratio. The accuracy of the link ratios may be improved by (1) considering additional prior years, (2) assigning greater weights in measuring the link ratios to accident years with high claim frequency, (3) adjusting the link ratios for past and expected changes in loss experience, and (4) fitting a smooth pattern.

Variants of the paid loss development factor method approach and other methods used for estimating ultimate losses for each cohort of claims include the case incurred loss development factor method, reported claim development method, frequency/severity value method, expected loss ratio method, Bornheutter-Ferguson method, and ground-up analysis.³⁸⁵

Liability for future policy benefits

A liability for future policy benefits is recognized with respect to L&H coverage. It represents the present value of future benefits to be paid to or on behalf of policyholders, including related expenses, less the present value of expected future net premiums. Net premiums are calculated by subtracting from each gross premium payment an estimate of the embedded underwriting profit. In other words, net premiums are equal to the portion of gross premiums required to provide for all benefits and expenses. Future benefit and expense payments are estimated based

³⁸⁵ The case incurred loss development factor method—a variant of the loss development factor method—is based on the growth in cumulative case incurred losses (i.e., the sum of accident-year paid losses plus accident-year case reserves) rather than accident-year paid losses. The basic premise of the method is that cumulative case incurred losses for a given cohort of claims will grow in a stable, predictable pattern from year-to-year, based on the age of the cohort. For lines of business such as medical malpractice, in which it will likely be several years between the time a claim is incurred and when it is paid, there will be no paid losses in the earlier development periods of an accident year on which to base age-to-age factors. Therefore, for such lines of business it is more appropriate to use case-incurred losses when calculating age-to-age factors. The reported claim development method is used to estimate ultimate claim counts for a given cohort of claims such as an accident year/product line component. If the reported-to-date counts are then subtracted from the estimated ultimate counts, the result is an indication of the “Incurred But Not Reported” (IBNR) counts. The approach is the same as the “loss development method,” but based on the growth in cumulative claim counts rather than losses. The basic premise of the method is that cumulative claim counts for a given cohort of claims will grow in a stable, predictable pattern from year-to-year, based on the age of the cohort. Under The frequency/severity value method (also called the average value method or average cost per claim method), the loss reserve is calculated as the product of known or estimated ultimate claim counts and an estimate of the average cost per claim. Estimated ultimate claim counts are frequently based on a claim count development method (see above). Average claim costs are often estimated by fitting historical severity data to an observed trend. Generally, this method works best for high frequency, low severity classes of business, where ultimate claim counts are known or reliably estimable and average values are expected to be fairly predictable from one year to the next. The expected loss ratio method uses loss ratios for prior accident years, adjusted to reflect recent loss trends, the current risk environment, changes in the book of business and changes in the pricing and underwriting, to determine the appropriate expected loss ratio for a given accident year. The expected loss ratio for each accident year is multiplied by the earned premiums for that year to calculate estimated ultimate losses. The Bornheutter-Ferguson method is a combination of an expected loss ratio method and the loss development factor method. It requires an estimate of the expected loss ratio for each accident year, the total premium for each accident year, and the expected loss development factors. Under this method, the loss reserve (A) is estimated by multiplying expected total losses under the expected loss ratio method (B) by the proportion of losses that has not been paid yet as estimated using the loss development method (C). Specifically, $B = \text{expected loss ratio} \times \text{earned premium}$, $C = 1 - 1 / \text{the product of the remaining link ratios}$, and $A = B \times C$. Ultimate losses are estimated as the total of losses incurred to date and the estimated reserve. The technique is most useful when actual reported losses for an accident year are a poor indicator of future incurred but not reported (IBNR) losses for the same accident year, as is often the case when there is a low frequency of loss but a very high potential severity. Under the ground up analysis method, ultimate claim costs for a given cohort of claims such as an accident year / product line component are calculated by analyzing the exposure at an individual insured level and estimating the ultimate losses for those insureds using deterministic or stochastic scenarios and/or simulations. The total losses for the cohort are the sum of the losses for each individual insured. In practice, the method is sometimes simplified by performing the individual insured analysis only for the larger insureds, with the costs for the smaller insureds estimated via sampling approaches (extrapolated to the rest of the smaller insured population) or aggregate approaches (using assumptions consistent with the ground-up larger insured analysis).

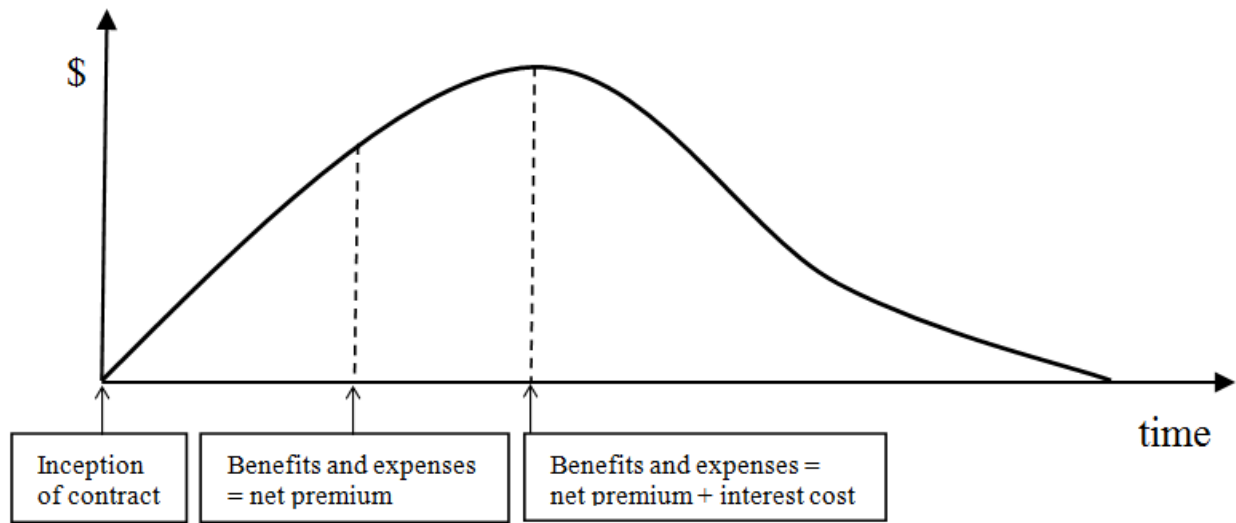
on assumptions regarding expected mortality, morbidity, terminations and expenses, applicable at the time the insurance contracts are made. The discount rate is the net investment yield that the insurer expects to earn on the premiums at the inception of the contract; it is estimated considering actual yields, trends in yields, portfolio mix and maturities, and investment expenses.

The liability for future policy benefits also includes a *provision for the risk of adverse deviation*. This provision allows for possible unfavorable deviations from assumptions regarding investment yields, mortality, morbidity, terminations, expenses, and other assumptions used in calculating the liability. This concept is referred to as risk load when used by P&C insurers.

At the inception of the contract—before any premium is received—the present value of the net premiums is equal to the present value of the benefits and expenses, where the “best-estimate assumptions” are changed to incorporate the risk of adverse deviation. For example, expected gross premiums are reduced for the risk of unexpected terminations or mortality, expected benefits and expenses are increased or shifted closer for the risk of unexpected or early payments, and the discount rate is reduced to allow for unexpectedly low investment returns. The net premiums are then calculated by reducing the gross premiums to the amounts that result in the present value equality between the net premiums and payments.

Original assumptions are used in subsequent accounting periods to measure the liability for future policy benefits (referred to as the “lock-in concept”), unless a *premium deficiency* exists. Each period, net premiums, benefits and expenses for the period are dropped from the present value calculation, and the present value is recalculated with all remaining cash flows becoming one period closer. Because expected net premiums are larger than expected benefits and expenses in the early years of most life insurance policies, the liability (which is initially zero) increases over time. The liability continues to increase even when payments for benefits and expenses exceed the net premiums as long as that excess is smaller than the interest cost component (the increase in the present value of expected net payments due to the passage of time). However, from some point on, the excess of the benefits and expenses over the net premiums becomes larger than the interest cost and the liability starts to decline. Exhibit 5.22a demonstrates this pattern.

Exhibit 5.22a Liability for future policy benefits over time



A premium deficiency is recognized if there is a probable loss on a block of insurance contracts, grouped consistent with how policies are marketed, serviced, and measured. A loss may result from unfavorable actual experience with respect to investment yields, mortality, morbidity, terminations or expenses, or from changes in expectations regarding future levels of these factors. A premium deficiency is calculated as the excess of the revised estimate of the liability over the difference between the recognized liability and deferred policy acquisition costs, where the revised liability is derived using assumptions that reflect current estimates of investment yields, mortality, morbidity, terminations and expenses. Unlike the original liability, the revised liability does not include a provision for the risk of adverse deviation, and it is calculated by discounting gross, not net, premiums.

The rationale of the premium deficiency calculation is that the revised liability represents the net economic cost associated with the block of insurance contracts, while the difference between the recognized liability and deferred policy acquisition costs represents the net recognized cost (DAC represent costs incurred in acquiring the policies that have not yet been recognized). A probable loss exists if the expected economic cost is greater than the net recognized cost. Such losses should be uncommon due to two provisions in the premium deficiency calculation, which reduce the revised liability compared to the recognized one: the revised liability does not include a provision for the risk of adverse deviation, and the discounted future benefits are reduced by the gross, not net, premiums. Thus, premium deficiencies are recognized only for blocks that suffer a substantial decline in profitability.

A premium deficiency is charged to income, with a corresponding reduction in DAC or an increase in the liability for future policy benefits. If a premium deficiency does occur, subsequent measurements of the liability are based on the revised assumptions. Insurers are required to periodically evaluate whether there is a premium deficiency.

Insurers have substantial discretion in recognizing premium deficiency. The criteria regarding when and how deficiency should be tested and measured leave much space for interpretation,

which some insurers may exploit to manipulate income. For example, due to offsetting within blocks, grouping many policies in conducting deficiency evaluation reduces the likelihood and expected amount of deficiency compared to using small blocks. Moreover, to measure the deficiency, the insurer has to re-estimate all the inputs to the reserve calculation discussed above (except the provision for adverse risk deviation), which are highly discretionary. Again, some insurers may exploit this flexibility to manipulate income.

The *policyholders' benefits expense* is calculated as the total of benefit payments during the period and the change in the liability for future policy benefits. Unlike P&C reserves, which generally measure undiscounted amounts, the liability for future policy benefits reports the present value of future payments, which implies that changes in the liability are also due to interest cost. Thus, the policyholders' benefits expense includes an interest charge on the beginning-of-year liability in addition to the cost of insurance coverage for the year.

The above discussion describes the basic accounting treatment for the liability for future policy benefits and the related expense. In practice, there are some implementation and reporting differences across products and companies. For example, for traditional participating life insurance products, insurers calculate the liability for future policy benefits using the mortality and interest rate assumptions applied in calculating the policies' guaranteed cash surrender values. In addition, the reported liability for future policy benefits often includes liabilities for guaranteed benefits related to nontraditional life and annuity contracts (discussed below) and certain unearned revenues. Some L&H insurers include in the liability for future policy benefits the liability for unpaid claims and claim adjustment expenses.

As discussed below (in the separate accounts subsection), variable annuity contracts for which investment income and investment gains and losses accrue directly to, and investment risk is borne by, the contractholder, are reported as a separate account liability. However, insurers often provide various guarantees to variable annuity contractholders, and obligations under these guarantees are generally included in the liability for future policy benefits. For example, an insurer may guarantee a value of no less than total deposits made to the contract less any partial withdrawals, or total deposits less any partial withdrawals plus a minimum return, or the highest contract value on specified dates minus any withdrawals. These guarantees may relate to benefits that are payable in the event of death (guaranteed minimum death benefits or "GMDB"), annuitization (guaranteed minimum income benefits or "GMIB"), at specified dates during the accumulation period (guaranteed minimum accumulation benefits or "GMAB"), or at withdrawal (guaranteed minimum withdrawal benefits or "GMWB"). In addition, some variable life, variable universal life and universal life contracts guarantee to the contractholder a death benefit even when there is insufficient value to cover monthly mortality and expense charges, whereas otherwise the contract would typically lapse ("no lapse guarantee").

Liabilities for the above guarantees, which are generally included in the liability for future policy benefits, are measured and accounted for as follows. GMDB and GMIB liabilities are measured by accruing expected payments under these guarantees, with the related changes in the liabilities included in policyholders' benefits expense. In contrast, GMAB, GMWB and similar guarantees are considered embedded derivatives that require bifurcation under SFAS No. 133 and are

recorded at fair value. Changes in the fair value of these derivatives, along with any related fees, are recorded in realized investment gains (losses).

Starting 2023 (ASU 2018-12, *Targeted Improvements to the Accounting for Long-Duration Contracts*), but with early application allowed, the measurement of the liability for future policy benefits will change as follows. Insurers will be required to (1) review and, if there is a change, update the assumptions used to measure cash flows at least annually and (2) update the discount rate assumption at each reporting date. The provision for risk of adverse deviation and premium deficiency (or loss recognition) testing are eliminated. The change in the liability estimate as a result of updating cash flow assumptions is required to be recognized in net income. The change in the liability estimate as a result of updating the discount rate assumption is required to be recognized in other comprehensive income. The amendments require that an insurance entity discount expected future cash flows at an upper-medium grade (low-credit-risk) fixed-income instrument yield that maximizes the use of observable market inputs.

Policyholder account balances

Policyholder account balances represent an accumulation of account deposits plus credited interest less withdrawals, expenses and mortality charges (when applicable). This liability account also includes amounts that have been assessed to compensate the insurer for services to be performed over future periods, and any amounts previously assessed against policyholders that are refundable on termination of the contract. Policyholder accounts are primarily associated with universal life policies and general account investment products. Also included in this liability are policyholder dividends due and unpaid on participating policies and policyholder dividends left on deposit. Policyholder account balances exclude annuities with life contingencies (included in the liability for future policy benefits) and separate accounts variable life and annuities (reported as separate account liabilities).

Certain market-based options or guarantees associated with deposit (or account balance) contracts share common risk characteristics that expose an insurance entity to capital market risk, but two different measurement models exist (a fair value model and an insurance accrual model).

ASU 2018-12, which is effective starting 2023 but with early application allowed, requires insurers to measure all market risk benefits associated with deposit (or account balance) contracts at fair value. The portion of any change in fair value attributable to a change in the instrument-specific credit risk is required to be recognized in other comprehensive income.

5.22.4 Revenue recognition

Insurers' revenues consist of premiums, investment income, fees, realized investment gains and losses, and other income. Premiums represent the majority of reported revenues for most insurers. Investment income is typically the second largest category and is particularly significant for life insurers. Fees are generated in insurance operations (for example, universal life, annuities) as well as asset management and other activities. Realized investment gains and losses are small on average (over time or across insurers) due to offsetting gains and losses, but their magnitude for a given insurer/quarter observation is often quite significant. This chapter

describes US revenue recognition principles for each category, the accounting for related balance sheet accruals, and ratios used to analyze revenue quality.

The accounting treatment for traditional insurance policies depends on their duration, with different revenue recognition methods used for short- and long-duration contracts. I next describe revenue recognition practices by product line.

Premium earned from P&C, nonguaranteed short-term life, and health and disability contracts

These contracts are generally considered short-duration and are accordingly accounted for as follows. Premiums are recognized as revenue in proportion to the amount of insurance protection provided, which in most cases entails straight-line recognition over the contract period. However, for some contracts the amount of protection provided varies over the contract term, or the period of risk differs from the contract period.³⁸⁶ In such cases, premiums are recognized as revenue over the period of risk in proportion to the amount of insurance protection provided.

If premiums are subject to adjustment (for example, retrospectively rated insurance contracts for which the premium is determined based on claim experience), the estimated ultimate premium is recognized as revenue over the period of the contract. If the ultimate premium cannot be reasonably estimated, the cost recovery method or the deposit method may be used until the ultimate premium becomes reasonably estimable.

Premium earned from traditional life (other than unguaranteed short term), some annuities with life contingencies, and title insurance

Premiums from these contracts are generally recognized as revenue when due from policyholders. When premiums are due over a significantly shorter period than the period over which benefits are provided, a portion of the profit is deferred and recognized over subsequent periods. The amount deferred and the subsequent recognition pattern is in constant relationship to insurance in-force or, for annuities, the amount of expected future policy benefit payments.

Fees and charges on investment and universal life-type contracts

For investment contracts (including deferred annuities) and universal life-type policies, the amounts collected from policyholders are considered deposits and are not included in revenue. Instead, general account deposits are credited to policyholders' account balances, and separate account investments (most variable life and annuities) are credited to separate account liabilities. Fee income for universal life-type contracts consists of charges for policy administration, cost of insurance charges for mortality, and surrender charges assessed against policyholders' account balances. Revenues from annuities consist of surrender charges, mortality and expense risk charges, administration fees, and other fees for various benefit guarantees. These charges are

³⁸⁶ For example, for financial guarantee contracts the amount of insurance protection often declines according to a predetermined schedule.

recognized as revenue in the period in which services are provided. Investment management fees for AUM and separate account assets are recognized when earned.

5.22.5 Deferred policy acquisition costs (DAC) and related expenses

Deferred policy acquisition costs (DAC) are incurred in connection with acquiring or renewing insurance contracts. They are comprised of the costs necessary to sell and issue a policy such as broker and agent commissions, underwriters' salaries and benefits, and inspection and examination costs. Under GAAP, only costs related directly to successful acquisition of new or renewal contracts can be capitalized as DAC; all other acquisition-related costs must be expensed as incurred. Advertising costs may only be included in DAC if they met the capitalization criteria of direct-response advertising, including the ability to demonstrate the future benefits.

DAC are paid early in the policy term while the benefits—premiums revenue—are realized over the policy term. Under the GAAP matching concept, costs are expensed in the same period in which the corresponding revenue is earned. Therefore, DAC is capitalized and amortized over the estimated life of the policy.

When contracts are replaced internally, the related DAC is immediately written off to expense if the contract modification substantially changes the contract, and any new deferrable expenses associated with the replacement are deferred. If the contract modification does not substantially change the contract, the existing DAC asset remains in place and any acquisition costs associated with the modification are immediately expensed.

P&C companies typically issue 6 month or 12-month policies, and so their DAC represent a small portion of assets on the balance sheet. In contrast, life insurance companies issue policies that are expected to remain in force for many years, and so their DAC typically represent a significant portion of reported assets. Still, DAC amortization as a percentage of revenue is larger for P&C insurers compared to L&H insurers, because average DAC duration is significantly longer for P&C insurers.

L&H insurers often report DAC combined with an intangible asset called *Value of Business Acquired* (VOBA) or "*present value of future profits*." VOBA reflects the estimated fair value of in-force contracts in a life insurance company acquisition, that is, the value of the right to receive future cash flows from the business in-force. VOBA is based on actuarially determined projections, by each block of business, of future policy and contract charges, premiums, mortality and morbidity, separate account performance, surrenders, operating expenses, investment returns and other factors.

Amortization

Accounting for the amortization of DAC and VOBA is rather complex. Four alternative methods are used, depending on the type of underlying policies. DAC for most P&C policies, nonguaranteed short duration term life policies, and health and disability contracts is amortized in proportion to the premium revenue recognized, which is generally on a straight-line basis over

the applicable contract term or reinsurance treaty. DAC and VOBA related to long duration traditional life contracts (e.g., guaranteed renewable term insurance, whole life insurance) is amortized over the premium paying period in proportion to the present value of actual and expected future gross premiums. The present value of expected premiums is based upon the premium requirement of each policy and assumptions for mortality, morbidity, persistency, and investment returns at policy issuance or acquisition that include provisions for adverse deviation and are consistent with the assumptions used to calculate the liability for future policyholder benefit. These assumptions are not revised after policy issuance or acquisition unless the DAC or VOBA balance is deemed to be unrecoverable from future expected profits. Absent a premium deficiency, variability in amortization after policy issuance or acquisition is caused only by variability in premium volumes. DAC and VOBA related to universal life, deferred annuity contracts, and other investment-type products are amortized through earnings in proportion to the present value of estimated gross profits (EGPs) from projected investment, mortality and expense margins, and surrender charges over the estimated lives of the contracts. Significant assumptions in the development of EGPs include investment returns, surrender and lapse rates, rider utilization, interest spreads, and mortality margins. The present value is calculated using the interest rate that accrues to policyholder balances. The amortization is reduced by imputed interest on the DAC or VOBA balance based on rates in effect at inception or acquisition of the contracts. The EGPs are updated each period, and the cumulative DAC and VOBA amortization is re-estimated and adjusted by a cumulative charge or credit to current income. Finally, DAC and VOBA related to participating, dividend-paying traditional contracts are accounted for similarly to the EGF approach discussed above, except that (1) gross margins are used instead of gross profits (unlike gross profits, gross margins are net of policyholder dividends), and (2) the discount rate used is the expected investment return rather than the credited rate.

ASU 2018-12, which is effective starting 2023 but with early application allowed, simplifies the amortization of deferred acquisition costs and other balances amortized in proportion to premiums, gross profits, or gross margins and require that those balances be amortized on a constant level basis over the expected term of the related contracts.

Impairment

In addition to periodic amortization, DAC may be written down due to a premium deficiency. For short duration contracts, a premium deficiency is recognized if the expected cost of future coverage exceeds the related unearned premiums, where the cost of future coverage includes future losses, future dividends to policyholders, unamortized acquisition costs, and future maintenance costs. Premium deficiencies of short duration policies are first charged to DAC and then, if there is still a deficiency, are recognized as an additional liability. For long-duration contract, insurers have the option of accruing any premium deficiency as additional liability instead of recognizing DAC impairment.

Starting 2023 (ASU 2018-12), but with early application allowed, deferred acquisition costs are required to be written off for unexpected contract terminations but are not subject to an impairment test.

5.22.6 Reinsurance accounting

Reinsurance is the transfer, with indemnification, of all or part of the underwriting risk from one insurer to another for a portion of the premium or other consideration. Reinsurance contracts are either proportional (e.g., quota-share contracts), where the primary underwriter and the reinsurer proportionately share all insured losses from the first dollar, or non-proportional (e.g., excess-of-loss contracts).

The primary purpose of reinsurance is risk management. For example, excess-of-loss agreements enable the primary insurer to retain losses that are relatively predictable, while sharing large and infrequent losses with the reinsurer. Other objectives of reinsurance include: to reduce the strain on the insurer's capital, to be able to provide coverage for large exposures, and to obtain informal consulting services from reinsurers in areas of underwriting, marketing, and pricing.

Reinsurance reduces the strain on regulatory capital both by reducing exposure and increasing surplus. Reinsurance with admitted reinsurers reduces regulatory capital requirements and, under SAP, the commission received from the reinsurer is recognized in the period in which it is paid, thus increasing statutory income and capital.

While reinsurance is used extensively in P&C insurance, it is less common in L&H. Reinsurance has significant limitations as a risk transfer mechanism, primarily with respect to longevity risk. Due to the systematic nature of longevity risk, reinsurance treaties covering this risk are usually expensive. In addition, many life insurance companies are reluctant to buy long-term reinsurance coverage because of substantial credit risk. In any case, the large size of the global longevity risk exposure means that the insurance industry is limited in its ability to absorb this risk. These limitations have led to recent developments in capital market solutions for hedging longevity risk, such as mortality catastrophe bonds and long-term longevity bonds (e.g.,).

Reinsurance contracts that indemnify the ceding enterprise against loss or liability relating to insurance risk are accounted for using reinsurance accounting. Other contracts with reinsurers are generally accounted for as deposits. Reinsurance contracts indemnify the ceding enterprise against loss or liability relating to insurance risk if there is a reasonable possibility that the reinsurer may realize significant loss from assuming insurance risk. However, if substantially all of the insurance risk relating to the reinsured portions of the underlying insurance contracts has been assumed by the reinsurer, the transaction should be accounted for using reinsurance accounting even if the reinsurer is not exposed to a reasonable possibility of significant loss.

Making the determination of whether the reinsurer is exposed to the reasonable possibility of significant loss requires an understanding of the reinsurance contract and other contracts or agreements between the ceding enterprise and the reinsurer, including an evaluation of all contractual features that (1) limit the amount of insurance risk to which the reinsurer is subject (such as experience refunds, cancellation provisions, adjustable features, or additions of profitable lines of business to the reinsurance contract) or (2) delay the timely reimbursement of claims by the reinsurer (such as through payment schedules or accumulating retentions from multiple years).

For short-term contracts, SFAS 113 provides the following guidance for the ceding enterprise's evaluation of whether it is reasonably possible for a reinsurer to realize a significant loss from the transaction. First, the evaluation should be based on the present value of all cash flows between the ceding and assuming enterprises under reasonably possible outcomes, without regard to how the individual cash flows are characterized. Second, the same interest rate should be used to compute the present value of cash flows for each reasonably possible outcome tested. Third, the significance of a loss should be evaluated by comparing the present value of all cash flows with the present value of the amounts paid or deemed to have been paid to the reinsurer.

The alternative to reinsurance accounting, which is generally used when the reinsurer is not exposed to a reasonable possibility of significant loss, is ***deposit accounting***; that is, amounts paid to the reinsurer are recorded like bank deposits, and interest income is accrued using the effective interest rate, which is calculated using estimates of the amount and timing of future payments by the reinsurer. While deposit accounting is simple, reinsurance accounting is quite complicated. The remainder of this section discusses reinsurance accounting.

Reinsurance contracts that are legal replacements of one insurer by another (often referred to as assumption and novation) extinguish the ceding enterprise's liability to the policyholder, and therefore result in derecognition of related assets and liabilities and gain or loss recognition. However, such contracts are rare. In essentially all reinsurance transactions, the ceding enterprise is not relieved of the legal liability to its policyholder, and accordingly the related assets and liabilities remain on the ceding enterprise's balance sheet and no gain is recognized (in some cases a loss may be recognized, as discussed below). Instead, the amount paid to the reinsurer relating to the unexpired portion of reinsured contracts (prepaid reinsurance premiums) is reported as an asset. In addition, to the extent that the insurer is expected to indemnify the ceding enterprise for recognized liabilities (retroactive reinsurance of short duration contracts or reinsurance of existing in-force blocks of long-duration contracts), an asset representing estimated reinsurance recoverable is recognized.

For short duration reinsurance contracts, prepaid reinsurance premiums are amortized over the remaining contract period in proportion to the amount of insurance protection provided. If the total cost of a reinsurance contract is subject to adjustment that can be reasonably estimated, the basis for amortization is the estimated ultimate amount to be paid. For long duration contracts, prepaid reinsurance premiums are amortized over the remaining life of the underlying reinsured contracts. Receivables due from reinsurers for covered paid claims and for expected future recoveries related to recognized liabilities are accrued and measured using assumptions consistent with those used in estimating the liabilities relating to the underlying reinsured contracts. A provision for estimated uncollectible reinsurance accounts is recorded based on periodic evaluations of balances recoverable from reinsurers, the financial condition of the reinsurers, coverage disputes, and other relevant factors. The amounts of earned premiums ceded and recoveries recognized under reinsurance contracts are netted against the related income statement items (premium revenue and benefits and claims expense, respectively) and are disclosed in the footnotes to the financial statements.

While reinsurance transactions involve primarily prospective coverage, some provide for or include retroactive coverage. Retroactive reinsurance is reinsurance in which an assuming

enterprise agrees to reimburse a ceding enterprise for liabilities incurred as a result of past insurable events covered under contracts subject to the reinsurance. Because loss reserves are reported undiscounted, amounts paid in retroactive reinsurance transactions are normally smaller than the related liabilities. In such cases, reinsurance receivables are increased to reflect the difference and the resulting gain is deferred and amortized over the estimated remaining settlement period. If the amounts and timing of the reinsurance recoveries can be reasonably estimated, the deferred gain is amortized using the effective interest rate inherent in the amount paid to the reinsurer and the estimated amounts and timing of recoveries from the reinsurer. Otherwise, the proportion of actual recoveries to total estimated recoveries determines the amount of amortization. If the amounts paid for retroactive reinsurance exceed the recorded liabilities relating to the underlying reinsured contracts, the ceding enterprise increases the related liabilities or reduces the reinsurance receivable or both at the time the reinsurance contract is entered into, and the excess is charged to earnings. Any subsequent revisions in the estimates are recognized in the period of the change by adjusting the related assets and liabilities to the amounts that would have reported had the new information been available at the inception of the reinsurance transaction.

For reinsurance of existing in-force blocks of long-duration contracts, the difference between the amounts paid and the liabilities ceded related to the underlying contracts is considered the net cost of reinsurance at the inception of the contract and is recorded as an adjustment to DAC. Thus, unlike retroactive reinsurance of short duration contracts, any loss (or gain) associated with the reinsurance of existing in-force blocks of long-duration contracts is recognized gradually through the amortization of the adjusted DAC.

5.22.7 Separate accounts

Contract assets and liabilities that are legally insulated from the insurer's general account assets and liabilities are reported separately on the balance sheet. Separate account assets are subject to general account claims only to the extent that the value of such assets exceeds the separate account liabilities. The performance of investments in separate accounts, net of contract fees and assessments, is passed through to the contractholders. Separate accounts are used primarily for variable universal life contracts and variable deferred annuity contracts. Separate account assets are diversified funds—similar to mutual funds—which are managed by the insurance company. Contractholders select portfolios consisting of those funds, and their claims on the investments are reflected in the balance of separate account liabilities.

Separate account assets are reported on the balance sheet at fair value. Separate account liabilities are generally reported at the same amount, because the contractholders own these assets and the income (or loss) that they generate. Because insurers have limited or no exposure to separate account assets and liabilities, these accounts generally do not affect required regulatory capital. For the same reason, some analysts reformulate the balance sheet to exclude separate account assets and liabilities.

Unlike the balance sheet, the income statement does not report investment income, gains or losses on separate accounts. Instead, it reports the revenues earned on separate accounts, which include investment management fees, mortality and other risk charges, policy administration

fees, and surrender charges. Although the investment performance of separate accounts is omitted from the income statement, it is relevant for evaluating the insurer's prospects. In particular, high investment returns increase account balances, which in turn boost fee income, decrease the value of minimum benefit guarantees, and may attract additional investments. The opposite occurs when returns are negative or lower than expected.

5.22.8 Disclosures

Loss reserve

Due to the large magnitude of the loss reserve, its discretionary nature and inherent uncertainty, as well as managers' incentives to manipulate it, P&C insurers are required to provide detailed disclosures regarding loss reserving. These disclosures include information on paid losses and adjustments made to previous reserve estimates for each of the previous nine years (schedule of loss reserve development) as well as related reconciliations, payments, and other information. They can be used to evaluate the reliability of loss reserve estimates as well as to evaluate the length of the tail. For example, insurers that report positive adjustments to the reserve year after year are more likely to understate losses related to current coverage.

Long-duration contracts

Currently, there are limited requirements to disclose information about long-duration contracts. ASU 2018-12, which is effective starting 2023 but with early application allowed, requires insurers to provide disaggregated rollforwards of beginning to ending balances of the liability for future policy benefits, policyholder account balances, market risk benefits, separate account liabilities, and deferred acquisition costs. The amendments also require that an insurance entity disclose information about significant inputs, judgments, assumptions, and methods used in measurement, including changes in those inputs, judgments, and assumptions, and the effect of those changes on measurement.

5.22.9 Key ratios

Key ratios used for evaluating insurance operations and reporting quality include the loss ratio, loss expense ratio, underwriting expense ratio, policyholder dividend ratio, combined ratio, net investment income ratio, operating ratio, loss development ratio, ...

Loss and loss expense ratios

$$\text{Loss ratio} = \frac{\text{Losses}}{\text{Net premium earned}}$$

$$\text{Loss expense ratio} = \frac{\text{Loss expenses}}{\text{Net premium earned}}$$

These ratios are used when evaluating the profitability of insurers (inverse relationship), especially P&C insurers. The loss ratio and loss expense ratio are often aggregated together and

referred to as the loss and loss expense ratio or simply as the loss ratio. Conceptually, the loss and loss expense ratio indicates the average cost of insurance protection per each dollar of net premiums earned during the period. However, it often contains significant error, because losses and loss expenses also include adjustments to the previous year balance of the loss reserve (due to changes in loss estimates as well as to accrued interest on discounted reserves such as settled workers' compensation). In addition, unlike the premiums, which reflect current dollars, losses and loss expenses generally measure undiscounted future payments. This causes an overstatement of the loss and loss expense ratio, particularly for long tail liability lines. Therefore, a potentially more informative measure of current profitability can be calculated by (1) "undoing" the impact of changes in estimates and discount amortization related to prior year reserves from the losses and loss expenses, and (2) discounting losses and loss expenses related to current period coverage. This can be done using loss development disclosures.

Underwriting expense ratio

$$\text{Underwriting expense ratio} = \frac{\text{Underwriting expenses}}{\text{Net premium earned}}$$

The underwriting expense ratio is used when evaluating the profitability of insurers (inverse relationship), especially P&C insurers. It measures operational efficiency in underwriting. Specifically, this ratio represents the percentage of a company's net premiums earned that went toward underwriting expenses such as commissions to agents and brokers, state and municipal taxes, salaries, employee benefits, and other operating costs. When measured using SAP data, the underwriting expense ratio is calculated as the ratio of underwriting expenses to net premiums written, because SAP treat policy acquisition costs as an expense rather than amortizable cost.

Different lines of business have intrinsically differing underwriting expense ratios. For example, boiler and machinery insurance, which requires a corps of skilled inspectors, is a high expense ratio line. In contrast, underwriting expense ratios for group health insurance are quite low. Because (1) the underwriting expense ratio is an important determinant of overall profitability, and (2) insurers attempt to set premium rates at levels adequate to generate profits, differences in the underwriting expense ratio across business lines imply opposite differences in the loss ratio. This correlation, however, is far from perfect. High underwriting expense ratio may be offset by a long tail, which allows insurers to generate significant investment income. And, of course, realized profitability is generally different from expectations.

Policyholder dividend ratio

$$\text{Underwriting expense ratio} = \frac{\text{Underwriting expenses}}{\text{Net premium earned}}$$

The policyholder dividend ratio is used when evaluating the profitability of insurers (inverse relationship). For most insurers it is insignificant.

Combined ratio

Combined ratio

$$= \text{Loss ratio} + \text{loss expense ratio} + \text{underwriting expense ratio} \\ + \text{policyholder dividend ratio}$$

The combined ratio and its components measure the underwriting profitability of P&C insurance companies. It reflects both the cost of protection and the cost of generating and maintaining the business. When the combined ratio is under 100%, underwriting results are considered profitable; when the combined ratio is over 100%, underwriting results are considered unprofitable. However, the combined ratio understates true underwriting profitability because losses and loss expenses are generally reported undiscounted. Stated differently, the combined ratio does not reflect the investment profits that insurers generate on the float. The operating ratio, which is discussed next, attempts to address this deficiency.

The policyholder dividend ratio is typically insignificant. The loss ratio is the most significant element, and it is also quite volatile. In contrast, the loss expense ratio and the underwriting expense ratio are generally quite stable.

Net Investment income ratio

$$\text{Net investment income ratio} = \frac{\text{Net investment income}}{\text{Net premium earned}}$$

Where net investment income is the excess of investment income over investment expenses. The net investment income ratio measures the income contribution of the float. Because the float results from insurance activities, this component of income should also be considered when evaluating the profitability of insurance operations.

Operating ratio

$$\text{Operating ratio} = \text{Combined ratio} - \text{net investment income ratio}$$

The operating ratio measures a company's overall operational profitability from underwriting and investment activities. This ratio excludes other operating income and expenses, capital gains and losses, and income taxes. An operating ratio greater than 100% suggests that the company is unable to generate profits from its underwriting and investment activities.

However, the net investment income ratio—and accordingly the operating ratio—often provide a poor indication of current profitability. Net investment income is earned primarily on funds obtained in prior years. Thus, for growing companies, net investment income understates the contribution of the current float, and vice versa for insurers experiencing a decline in the insurance book. Changes in the average tail of the policies or in investment opportunities add further noise. Therefore, a better approach for evaluating the income contribution of the float is to estimate the extent to which current losses and loss expenses are overstated (see discussion of the loss ratio above).

Reserve development ratio

$$\text{Reserve development ratio} = \frac{\text{Reserve development}}{\text{Beginning of period loss reserve}}$$

Where reserve development is the current year adjustment to the prior year's reserve. Inferences made using this ratio are typically based on its time-series properties, such as the average value, trend, or standard deviation over recent years.

The primary expense recognized by P&C insurers is "losses and loss expenses." Measuring this expense involves significant uncertainty and discretion, which often results in a large measurement error. Over time, as losses are paid and new information is obtained, insurers revise the estimate of total incurred losses, and this adjustment (called "reserve development") is included in the reported losses and loss expenses. Because the adjustment is both unrelated to current coverage and quite volatile, some analysts exclude it from the losses and loss expenses when analyzing underwriting profitability. Still, considering the time-series properties of the reserve development ratio is informative. To the extent that measurement error in loss reserving is correlated over time, past adjustments to the loss reserve inform on the precision of the reported cost of current coverage. For example, compared to other insurers, an insurer with a sequence of positive adjustments to the reserve may be more likely to understate the losses and loss expenses associated with current coverage, and an insurer with a history of large adjustments (positive and negative) may be more likely to have large error in the reported cost of current coverage. Moreover, even if loss recognition for current coverage is adequate, to the extent that adjustments of inadequate past reserves are applied gradually, examining the time-series of the reserve development ratio may help predict future development with respect to past coverage, which will be included in the future reported losses and loss expenses.

The reserve development ratio can be calculated using either information from the Loss Reserve Development schedule or from the footnote disclosure of the Reconciliation of Claim and Claim Adjustment Expense Reserves. The latter includes information on L&H claim reserve development in addition to P&C loss reserve development.

5.22.10 Earnings quality

Table 5.22B describes earnings quality issues, red flags and analyses related to insurance operations.

Table 5.22B: Earnings quality – insurance operations [To be completed]

Earnings quality issue	Explanation	Red flag or analysis
Issues related to investment in debt securities	• See Section 5.13 • Debt securities constitute the largest asset category for most insurance companies • Manipulation of impairment losses is especially important for insurance companies, in part due to regulatory capital implications.³⁸⁷ • Unintended measurement error in fair value estimates (and consequently impairment) may also have significant effects, given the size, illiquidity, and other characteristics of these investments.³⁸⁸	• See Section 5.13
Issues related to loan receivables and related accounts	• See Sections 5.12 and 3.2	• See Sections 5.12 and 3.2
Issues related to passive investments in equity securities	• See Section 5.15	• See Section 5.15
Issues related to investments in real estate	• See Section 5.4	• See Section 5.4
Issues related to derivatives	• See Section 5.14	• See Section 5.14

³⁸⁷ For example, Dong et al. (2021) examine the impact of a 2009 change in statutory accounting rules that reduced the regulatory capital of life insurers by increasing required policy liabilities for variable annuities. They find that affected insurers record less timely other-than-temporary impairments of investment securities after the shock.

³⁸⁸ For example, Khan et al. (2019) hypothesize that recurring fair value measurement requires firms to invest in information and control systems to assess relevant economic conditions, and that these systems discipline insurers' OTT impairments. Exploiting statutory requirements that PC (life) insurers measure securities with NAIC designations from 3 to 5 at fair value (amortized cost) and disclose security-level accounting information, they predict and find that PC insurers record timelier OTT impairments of the same NAMBS with NAIC designations of 3 to 5 than life insurers. Song (2021a) examines the effect of auditors' industry specialization at the asset level. Focusing on insurance companies whose assets comprise investment in financial securities across a wide range of industries, he provides evidence that audit firms' specialization in a security's industry is associated with a higher quality of the security's fair value estimate, especially for securities with higher estimation uncertainty.

Earnings quality issue	Explanation	Red flag or analysis
Loss reserve – manipulation	• Estimating the loss reserve involves significant discretion, which some insurers exploit to “manage” income and capital. • The loss reserve is relatively easy to manipulate due to the considerable uncertainty and subjectivity inherent in its estimation. • Insurers’ incentives to manipulate the reserve are related to its effects on income taxes, financial reporting and, primarily, regulatory metrics that are used to monitor insurers’ solvency (surplus, risk-based capital, IRIS ratios) and evaluate the reasonableness of premium rates.³⁸⁹ • Insurance companies are typically inclined to understate the reserve. Under-reserving boosts reported policyholder surplus, which affects underwriting capacity. Understating the loss reserve also improves many of the IRIS ratios and enables insurers to justify competitive premium rates.³⁹⁰ • In some cases, insurers may be inclined to overstate the reserve, either to reduce the present value of income tax payments, to smooth reported income in highly profitable years, to justify high premium rates, or to signal high earnings quality.	• Reserve development ratios in recent years are mostly positive and significant, especially if this is not the case for peers. (An insurer with a sequence of positive adjustments to the reserve may be more likely to understate the losses and loss expenses associated with current coverage.) • Loss reserve appears too low • Significant reinsurance transactions.³⁹¹

³⁸⁹ For example, Gaver and Paterson (2004) find that insurers manage loss reserves to avoid violating Insurance Regulatory Information System (IRIS) ratio bounds, which are used by regulators for solvency assessment. In their sample, almost two-thirds of the firms that would violate four or more IRIS ratios (which would trigger regulatory intervention) successfully adjust reserves to reduce the reported number of violations to less than four. Grace and Leverty (2009) find that P&C insurers that face stringent rate regulation understate the reserve less than other insurers to reduce the cost of regulatory rate suppression. Gaver and Paterson (1999) find that financially healthy P&C insurers tend to overstate reserves to reduce their tax liability. Beaver et al. (2003) find that the understatement of the loss reserve is decreasing with the profitability of P&C insurers, especially when earnings are near zero or are relatively small. Petroni (1992) finds that managers of financially weak insurers bias downward their estimates of claim loss reserves relative to other insurers, and that managers of insurers close to receiving regulatory attention understate reserve estimates to an even larger degree.

³⁹⁰ The following is an example of an alleged understatement of the loss reserve. Bancinsurance Corporation, an Ohio insurance company, participated in a bail and immigration bond program as a reinsurer during the period 2001 through 2004. In AAER No. 3069, the SEC alleges that shortly before Bancinsurance filed its Form 10-K for fiscal year 2003 it was notified that there were more than \$1 million in reinsurance claims under the Program. These claims represented 2003 losses and were therefore required to be reflected in Bancinsurance’s fiscal 2003 financial statements. However, Bancinsurance did not report these claims in the 2003 10-K.

³⁹¹ According to AAER No. 3108, AIG and General re Corporation (“Gen Re”) engaged in the following fraud. Concerns about analysts’ reaction to its declining loss reserves prompted AIG to solicit Gen Re’s help in structuring a transaction that would transfer \$500 million of loss reserves to AIG through a reinsurance arrangement. The transaction was purportedly a retrocession contract under which Gen Re would cede to AIG all or part of a reinsurance risk it previously assumed. On the face of the contract AIG appeared to assume \$100 million of risk over and above the \$500 million in premiums Gen Re was obligated to pay, but this extra \$100 million of risk was pure fiction added to make it appear that the contracts transferred risk to AIG. In fact, AIG assumed no risk and Gen Re incurred no premium liability. Of the \$500 million in premiums set forth in the contracts, \$490 million was on a “funds withheld” basis (i.e., the money was never paid to AIG but was retained by Gen Re). Gen Re was supposed to pay the remaining \$10 million to AIG according to the contracts, but AIG “prefunded” the \$10 million to Gen Re in what amounted to a round trip of cash in a side deal that was not reflected in the contracts. The contracts became the vehicle for improperly adding loss reserves and premium receivables to AIG’s financial statements. By accounting for the contracts as if they were real reinsurance, AIG inflated its loss reserves and premiums its 2000 and 2001 balance sheet by up to \$500 million.

Earnings quality issue	Explanation	Red flag or analysis
Loss reserve – no discounting	- Most loss reserves are reported undiscounted. The few exceptions include settled workers' compensation claims and loss reserve for financial guarantee insurance. - The loss reserve is reported undiscounted also under SAP, but for tax purposes the reserve and related expense are discounted.³⁹²	To estimate the magnitude of overstatement due to lack of discounting, gross up the related deferred tax asset.
Loss reserve – anti-conservative provision	FASB Interpretation No. 14 requires that the <i>minimum</i> value of equally likely outcomes of a probable loss contingency be accrued as a liability. This generally implies that the reserve is understated, especially when there is significant uncertainty.	Because the uncertainty regarding ultimate losses increases with the length of the settlement period (see next item), the understatement of loss reserves due to minimum value measurement of equally likely outcomes increases with the tail.
Loss reserve – uncertainty and measurement error	- Factors that contribute to the inherent uncertainty in estimating loss reserves include changes in the inflation rate for goods and services related to covered damages such as medical care and home repair costs; changes in the judicial interpretation of policy provisions relating to the determination of coverage; changes in the general attitude of juries in the determination of liability and damages; legislative actions; changes in the medical condition of claimants; changes in the estimates of the number and/or severity of claims that have been incurred but not reported as of the date of the financial statements; and changes in the claim handling procedures. - These factors—and therefore uncertainty, measurement error, and understatement of the reserve (see previous item)—are generally increasing with the length of the tail.	- Long tail - An insurer with a history of large adjustments (positive and negative) may be more likely to have large error in the reported cost of current coverage. - P&C contracts involve greater uncertainty than L&H contracts because both the frequency and magnitude of P&C claims are more volatile than L&H claims. P&C losses are highly sensitive to catastrophic events such as hurricanes, earthquakes and terrorism acts, events which typically have limited effect on L&H claims. In addition, the required payment for P&C insurance claims depends on the insured's loss (subject to limits), while for L&H insurance it is often the face value of the policy.
Loss and loss adjustment expenses including transitory component	- Losses and loss expenses are equal to estimated costs to settle claims related to insurance coverage during the year, plus the change in the estimated cost to settle claims relating to insurance coverage in prior years (reserve development), minus the corresponding reinsurance recoveries. - The impact of changes in estimates (reserve development) is typically volatile.	- Significant reserve development ratio for the current year. - In some cases, adjustments of inadequate past reserves are applied gradually, so the impact of reserve development on reported income may not be completely transitory. Examining the time-series of the reserve development ratio may help evaluate the persistence of this effect. Such correlation may also be due to explicit discounting (Nelson 2000) and to the effect of FASB interpretation 14; discussed above), as uncertainty over losses declines over time.

³⁹² The overstatement of loss reserves due to the lack of discounting should increase with the time span between the incidence of a loss and the settlement of the claim (settlement period or “tail”). However, this may not always be the case. Nelson (2000) finds that the understatement of loss reserves relative to subsequent payments increases with the length of the settlement period. That is, it appears that some insurers are effectively discounting the reserve for the time value of money by understating the undiscounted losses.

Earnings quality issue	Explanation	Red flag or analysis
Manipulation of DAC and related expenses	Earnings quality abuses related to DAC include the capitalization of operating expenses as DAC, insufficient amortization of DAC (for example, by overstating the persistence rate of life insurance policies), and failure to write down DAC when there is a premium deficiency. All three forms of manipulation increase equity and, for growing insurers, increase income.³⁹³	Excessive DAC and low DAC amortization rate relative to peers.
Reinsurance-related manipulations	- Accounting for reinsurance requires extensive use of assumptions and estimates and has significant effects on the financial statements. Not surprisingly, therefore, some insurers engage in problematic accounting practices related to reinsurance. These abuses often involve circular transactions and side agreements.³⁹⁴ - Transactions with reinsurance companies are often motivated by regulatory capital considerations and in some cases involve captive reinsurance companies.³⁹⁵	Significant reinsurance transactions and related accounts, especially when they are associated with low or declining loss ratios.

³⁹³ For example, in AAER No. 2413, the SEC alleges that three officers of New England Financial (NEF), an insurance subsidiary of MetLife, engaged in a scheme to hide certain NEF expenses in an effort to make NEF appear more efficient than it actually was. The complaint alleges that the defendants hid certain non-commission expenses by reclassifying them as commission expenses in NEF's internal books and records. This scheme resulted in the improper reclassification of over \$100 million in NEF expenses as DAC during the period 2000 to 2003.

³⁹⁴ According to AAER No. 2909, Converium Holding AG ("Converium"), a global reinsurance company, engaged in a fraudulent scheme to improperly inflate its financial performance through the use of finite reinsurance transactions. The scheme began in 1999, when Converium was a business unit of Zurich Financial Services ("Zurich"), operating under the name Zurich Re. Zurich, and later Converium, designed five reinsurance transactions that created the appearance of risk transfer in order to benefit from reinsurance accounting. Three of the five transactions were entered into prior to the December 2001 IPO of Converium and affected the financial statements Converium included in the IPO prospectus. In two of the three pre-IPO transactions, Zurich purchased reinsurance from Inter-Ocean, which, in turn, ceded these liabilities to a Zurich entity. Zurich's use of Inter-Ocean as an intermediary in the transaction helped obscure the transactions' circular structure and the fact that Zurich had merely moved the risk from one Zurich entity to another. For the third transaction, Zurich ceded the risk to a third-party reinsurer but simultaneously entered into an undisclosed side agreement with the reinsurer pursuant to which Zurich agreed to hold the reinsurer harmless for any losses the reinsurer realized under the reinsurance contracts. Because the ultimate risk under the reinsurance contracts remained with Zurich, these transactions should not have been accounted for as reinsurance. As a result of these transactions, Converium understated its reported loss before taxes by approximately \$100 million (67%) in 2000 and by approximately \$3 million (1%) in 2001. In addition, the transactions had the effect of artificially decreasing Converium's reported loss ratios for certain reporting segments in some periods. Following its IPO, Converium entered into two additional reinsurance agreements for which risk transfer was negated by undisclosed side agreements. Effectively, these side agreements protected the reinsurer against losses suffered under the reinsurance contract and placed all risk of loss on a Zurich or Converium entity.

³⁹⁵ For example, Dong et al. (2021) examine the impact of a 2009 change in statutory accounting rules that reduced the regulatory capital of life insurers by increasing required policy liabilities for variable annuities. They find that affected insurers, especially those that were more capital constrained or subject to less stringent state insurance regulation, reacted to the SAP change by ceding insurance to unauthorized captive (subsidiary) reinsurers subject to lax regulation. These transactions, which are referred to as shadow insurance, reduce insurers reserve and increase their regulatory capital due to the reserve credits that they provide.

5.23 Bank accounting

[Note: This section is highly incomplete]

Accounting for banking operations and related earnings quality issues and analysis are discussed in many sections of this monograph. This section describes items that are not covered in other sections. Table 5.23A lists key financial statement line items and the sections in which they are discussed. Section 5.23.1 below describes primary banking activities, while Section 5.23.2 describes the accounting treatment for items not covered in other sections of Chapter 5. Sections 23.2.3 describes earnings quality issues, red flags and analyses related to banking operations.

Table 5.23A: Banking-related line items

Financial statement line-item	Section
Loan receivables and related accounts	5.12, 3.2
Investment in debt securities	5.13
Derivatives	5.14
Federal funds and repurchase agreements	5.23.2
Trading assets and trading liabilities	5.23.2, 5.13
Deposits	5.23.2
Other real estate loans	5.23.2

5.23.1 Bank activities

Bank holding companies (BHCs) engage in different types of activities, including obtaining and maintaining deposits; generating, acquiring and servicing loans; investing in securities; trading a wide range of financial instruments on exchanges and in over the counter (OTC) markets; borrowing; providing fee-based financial services (e.g., fiduciary, advisory, underwriting, brokerage, acting as counterparties for clients, and other dealing activities); and selling and securitizing financial assets. These activities are interrelated. BHCs compete in the market to obtain noninterest or low-interest bearing deposits (“core deposits”) and invest these funds in loans and other financial assets, with the spread earned being the primary source of income for most BHCs, primarily small ones. They also generate noninterest income from traditional fees related to deposits, loans, and fiduciary activities, as well as from other sources, such as trading, securities brokerage, investment banking, asset management, servicing, insurance, securitization, and loan sales. In addition, many BHCs engage in the “carry trade,” that is, they obtain short-term funds (e.g., federal funds, repos, commercial paper, brokered deposits) and invest these funds in longer term instruments, primarily securities. This activity typically generates profits due to the “liquidity premium,” and it is value-creating if, compared to other investors, banks have a greater ability to absorb interest rate risk. These activities are reflected in financial reports, including balance sheets and income statements.

To be discussed: Interactions among activities (cross-selling, synergies, diversification); the impact of bank attributes, such as size and capital, on their ability to create value in the different activities.

5.23.2 Banking related items not covered in other sections

Federal funds, repurchase agreements, and securities lending

Federal funds sold are immediately available funds lent to other financial institutions under agreements or contracts that have an original maturity of one business day or roll over under a continuing contract. These transactions may be secured or unsecured or may involve an agreement to resell loans or other instruments that are not securities. *Federal funds purchased* are the corresponding liability reported by the borrower.

Securities purchased under agreements to resell (reverse repos) are funds lent under agreements to resell securities or participations in pools of securities. That is, the BHC “purchases” from the borrower securities which are effectively used as collateral for the loan. At maturity, the BHC “sells” back identical or substantially identical securities for an amount specified or determined in the agreement. These transactions typically have maturities ranging from overnight to up to a year. Securities purchased under agreements to resell are reported on the balance sheet at the amount the securities will be ultimately repurchased, including accrued interest. *Securities sold under agreements to repurchase (repos)* are the corresponding liability reported by the borrower.

Securities loaned (borrowed) are similar to repos (reverse repos) except that the transaction is motivated by the security borrower’s need for obtaining the security (for short selling) rather than by the security seller’s need for funds. Security lending activities are related to transactions supporting trading and client activities.

Trading assets and trading liabilities

BHCs report “trading assets” on the balance sheet if they (a) regularly underwrite or deal in securities, derivatives, commodities or other assets; (b) acquire or take positions in such items principally with the intent to resell in order to profit from short-term price movements; or (c) acquire or take positions in such items as an accommodation to customers or for other trading purposes.

Trading assets include securities as well as other assets (e.g., loans, commercial paper, banker acceptances, certificates of deposits, derivatives in gain position). Accounting for trading securities is discussed in Section 5.13. Other trading assets are accounted for similarly. Specifically, trading assets are carried at fair value, with realized and unrealized gains and losses reported in the income statement as part of trading revenue. Interest income on trading assets is reported separately and is measured using the effective interest rate method.

Trading liabilities include liability for short positions and revaluation losses on derivative contracts. Liability for short positions results from sales of assets that the BHC does not own. Revaluation losses on derivative contracts are liabilities resulting from marking-to-market of derivative contracts held for trading purposes. Trading liabilities are reported on the balance sheet at fair value, with unrealized gains/losses recognized in earnings. Interest expense on trading account liabilities is reported as a reduction of interest revenues from trading activities.

Deposits

On the liability side, banks create value primarily by obtaining and maintaining deposits that carry low or zero interest (core deposits). The nonpecuniary benefits to depositors that are associated with deposits, along with the brick-and-mortar costs of producing deposits, explain why in a competitive market deposits will not pay an interest rate equal to other debt instruments. Deposits contribute to bank earnings and value creation by reducing banks' financing costs, as well as by potentially creating "cross-selling" opportunities, which allow banks to generate earnings from selling non-deposit services to depositors. So long as those contributions to earnings offset the incremental brick-and-mortar costs (non-interest expenses) of attracting deposits, attracting low-interest deposits will make a net contribution to earnings.

Core deposits consist of demand deposits and other noninterest-bearing deposits as well as most interest-bearing deposits. Interest-bearing core deposits include NOW, ATS, and other interest-bearing transaction accounts, money market deposits and other savings accounts, and time deposits of less than \$100,000. Noninterest-bearing deposits may be particularly valuable if the cost to maintain them is not significantly greater than that for interest-bearing deposits.

Deposits with no stated maturities are reported on the balance sheet at the amount payable on demand. Time deposits are reported at the amount deposited plus accrued interest, which in turn is equal to the present value of the promised cash flows discounted at the contractual (historical) yields.

In most cases, the book value of deposits overstates the economic liability attached to deposits. The contribution of deposits to bank value increases with the spread between market borrowing rates and the average interest rate on deposits, since this spread reflects the impact of deposits on net interest income (compared to the alternative of funding earning assets with capital market borrowings). The value contribution of deposits also increases with service charges, cross selling opportunities, and the stability of deposits, and it decreases with non-interest costs of servicing the deposit and the forgone interest on required reserves associated with offering the deposit (prior to the elimination of all reserve requirement as of March 26, 2020).

The value creation associated with current and future deposits is referred to as the *core deposit intangible*. The core deposits intangible is equal to the present value of net interest savings in future periods due to the use of core deposits instead of borrowed money to fund assets, plus the value added from cross-selling services to depositors, and minus the present value of cash outflows required to obtain and maintain core deposits. The core deposit intangible is recognized on the balance sheet only when the branches giving rise to this asset were purchased from other banks. Organically developed core deposit intangibles are never recognized. When recognized, the core deposit intangible is amortized to earnings over a period selected by the bank.

Firms are required to disclose fair value estimates for financial instruments, including deposits. However, for deposits with no defined maturities, the disclosed fair value is the amount payable on demand (i.e., the book value). This is an important limitation of current fair value disclosures. For most banks, the economic liability attached to core deposits is considerably smaller than the

amount payable on demand because the cost of these liabilities is typically below market interest rates. (The overstatement of the liability is one component of the core deposit intangible; the other is the value associated with future deposits).

Most deposits are federally insured, and so there is essentially no credit risk for the depositor. For depositors, the fair value of insured deposits is equal to the present value of the promised cash flows discounted at the risk-free rate. However, for the bank, the value of the liability is smaller. The credit enhancement of deposits is supplied by the federal government, not by the bank. While banks pay an FDIC insurance premium, the amount they pay is smaller than the economic benefit. To estimate the value of deposit liabilities, therefore, one should calculate the present value of net cash flows to depositors using a discount rate that reflects the bank's credit risk, similar to the valuation of regular uninsured debt instruments. The cash flows should include principal and interest payments as well as servicing costs and other cash outflows (e.g., the FDIC insurance premium), which are required to maintain and service the deposits. To the extent that deposit-taking activities generate cash inflows (e.g., deposit fees), those cash flows should be netted against the cash outflows.

For most time deposits, estimation of fair value is straightforward since prepayment risk is relatively low (due to significant early withdrawal penalties and short maturity). In contrast, the pricing of deposits with no defined maturity is quite difficult. Customers deposit and withdraw funds from core deposits on a routine basis, but typically maintain an average positive balance with the bank. Thus, for core deposits, it is more appropriate to value existing deposits together with the value added from future deposits—that is, the core deposit intangible. This requires estimates of the impact of factors such as (1) competition from other financial instruments or other products (e.g., strong stock market performance may promote depositors to divert funds from deposits to mutual funds or stocks); (2) demographic characteristics of the investor base (e.g., young people are more likely to invest in other products); (3) technological improvements (that can reduce the cost of servicing deposits, but may also create alternative investment products for depositors); and (4) cost of servicing the deposits (e.g., federal deposit insurance premium, marketing costs, cost of holding supporting non-earning assets). Extrapolations from historical experience may be problematic.

Other real estate owned

Other real estate owned consists of two categories: real estate acquired in satisfaction of debts previously contracted, and “other OREO.” The latter category includes real estate acquired and held for investment, and real estate originally acquired for expansion or previously used for operations, which is no longer used for these purposes.

Foreclosed real estate received in full or partial satisfaction of a loan is initially recorded at fair value less estimated cost to sell the property. When foreclosed real estate is received in full satisfaction of a loan, the amount, if any, by which the recorded amount of the loan exceeds the fair value less selling cost, is charged to the allowance for loan and lease losses (part of net charge-offs). If the fair value less selling cost exceeds the loan's recorded amount, the excess is reported as a recovery (up to the amount of previous charge-off), with any remaining amount reported in earnings.

After foreclosure, each individual foreclosed real estate asset must be carried at the lower of cost or fair value less selling cost as of the reporting date. This determination is made on an asset-by-asset basis. If the fair value less selling cost is smaller than the cost of the asset, the deficiency is recognized as a valuation allowance against the asset which is created through a charge to expense. The valuation allowance is subsequently increased or decreased (but not below zero) through charges or credits to expense for changes in the asset's fair value or estimated selling costs.

5.23.3 Earnings quality

Table 5.23B describes earnings quality issues, red flags and analyses related to banking operations.

Table 5.23B: Earnings quality – banking [To be completed]

Earnings quality issue	Explanation	Red flag or analysis
Issues related to loan receivables and related accounts	See Sections 5.12 and 3.2	See Sections 5.12 and 3.2
Issues related to investment in debt securities	See Section 5.13	See Section 5.13
Issues related to derivatives	See Section 5.14	See Section 5.14
Issues related to trading assets and liabilities	See Section 5.13, especially earnings quality issue “Manipulating fair value estimates”	See Section 5.13, especially earnings quality issue “Manipulating fair value estimates”
Omission of the core deposit intangible	The core deposit intangible is recognized only when acquired. For many banks it is a significant economic asset.	- Relative size of core deposits - Average interest rate on deposits
Understated disclosed fair value of deposits	For deposits with no stated maturity (most core deposits), the disclosed fair value is equal to the amount payable on demand, which overstates their fair value.	- Relative size of core deposits - Average interest rate on deposits
Fair value not reflecting cash realization value	- This may be the case if (1) the reported fair value is manipulated, (2) management makes estimation errors, or (3) it is difficult to realize the fair value. - The cash realization likelihood of the assets or liabilities depends on the type of financial instrument, the liquidity of the market for that instrument, and the size of the position. Even if there is a liquid market for a given security, if the position is large relative to the daily volume then the market’s price may not actually reflect the cash that can be realized on sale. Additionally, in times of stress, supply-demand imbalances can be created by market dynamics that may not be reflective of the fundamental values of the instruments.	Nature of the instruments reported at fair value and the size of the positions

6. Earnings Quality and Valuation

This chapter discusses the role of earnings quality in valuation, both relative and fundamental. Relative valuation specifies the value of the firm as a function of selected fundamentals and their average pricing across peer companies, while fundamental valuation involves discounting expected values of fundamentals such as free cash flow, dividends, or residual income. As discussed below, both methods are common in practice. The chapter also describes earnings quality implications for sensitivity and scenario analyses, which are important parts of valuation analysis. Relative valuation is discussed in Section 6.1, followed by fundamental valuation (6.2), sensitivity analysis (6.3), and scenario analysis (6.4).

Surveys of analysts and other valuation professionals (described below) report that the two most common valuation approaches are DCF and earnings multiples, especially Enterprise Value (EV)/EBITDA and P/EPS. Fundamental valuation models other than DCF (e.g., the dividend discount model, residual income) are uncommon in practice. Sell-side analysts are more likely to use relative valuation (versus fundamental valuation) compared to buy-side analysts and other valuation professionals. Relatedly, DCF-like methods (e.g., NPV, IRR) are much more common than P/E in capital budgeting (e.g., Graham and Harvey 2001). Most analysts use two or three valuation models. There is substantial variation in the estimation of inputs to the DCF model, and analysts often commit substantial errors when using this model. Analysts and other valuation professionals consider cash flow uncertainty and difficulties in estimating WACC as major impediments to using DCF. At the same time, using DCF is important especially under these circumstances (i.e., for companies that are different from their peers and have high levels of uncertainty about their cash flows and risks), and proper implementation of DCF results in more accurate value estimates compared to relative valuation. DCF valuation implies high sophistication; accordingly, to make their research credible to buy-side clients, analysts often use DCF for conveying their insight, even when they rely on other approaches to determine target prices or investment recommendations. There is variation in the choice of models used across industries and valuation objectives. The following is a short review of this literature.

Mukhlynina and Nyborg (2020) survey 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They find that about 3/4 of respondents use both multiples and DCF “almost always or always,” and respondents with a preference for multiples or DCF are evenly divided in the population. They also report that the most important detriment to using DCF is cash flow uncertainty followed by uncertainty about the cost of capital.

Using a survey of 1,980 analysts (both sell- and buy-side), primarily from developed markets (especially the U.S.), Pinto et al. (2019) report the following findings related to equity valuation practices: (1) 92.8% use a market multiple approach while 78.8% use a discounted value approach; (2) when using multiples, the most common ones are P/E (88.1%) followed by EV multiples (76.7%); (3) EBITDA is by the far the most common fundamental used in EV multiple valuation; and (4) 86.8% (35.1%) of the analysts that use the discounted value approach indicated that they use the DCF (DD) model, and 20.5% use the residual income approach.

Brown et al. (2015b) conduct a survey of 365 sell-side U.S. analysts and report average rating of 4.42 (out of 6) for P/E multiples, compared to 4.37 / 1.76 / 1.14 / 1.34 for the cash flow / dividend / residual income / EVA models, respectively. In contrast, Brown et al. (2016) survey 344 buy-side U.S. analysts and report that these analysts are much more likely to use cash flow models (4.34 out of 6) compared to price-earnings multiples (3.43), with unspecified proprietary models receiving an average rating of 3.97.

Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees. They find that almost all survey respondents use the DCF model along with some version of relative valuation—primarily EV/EBITDA and P/E. Other forms of relative and fundamental valuation are much less common. Most analysts use two or three valuation methods. Respondents also indicated that DCF is much more difficult to implement than relative valuation. The top three difficulties in implementing valuation are DCF-related—estimating discount rates (41%) and terminal values (39%), and difficulties in checking business plans (29%); defining the peer groups when using comparables ranked four (27%). The estimation methods for almost all inputs in the DCF model, including beta, the equity market risk premium, leverage, cost of debt, and terminal value, vary widely across the respondents.

Asquith et al. (2005) catalog the complete contents of *Institutional Investor* All-American analyst reports. They find no correlation between the valuation methodology used by analysts and either the market's reaction to a report's release or to their accuracy in predicting price targets. Most analysts use a simple earnings multiple valuation model. Only a minority use net present value or any of the other discounted cash flow approaches.

Demirakos et al. (2004) examines the valuation methodologies contained in 104 analysts' reports on 26 large U.K.-listed companies from the beverages, electronics, and pharmaceuticals sectors. They find that (1) the use of valuation by comparatives is higher in the beverages sector than in electronics or pharmaceuticals; (2) analysts typically choose either a PE model or an explicit multiperiod DCF valuation model as their dominant valuation model; (3) none of the analysts use the price to cash flow as their dominant valuation model; and (4) some analysts who construct explicit multiperiod valuation models still adopt a comparative valuation model as their preferred model.

Demirakos et al. (2010) investigate whether the choice of valuation model affects the forecast accuracy of sell-side analysts' target prices. They find that DCF valuation outperforms relative valuation in complex valuation settings (high-risk firms, small firms, loss-making firms, firms with extreme negative or positive sales growth, firms with a limited number of industry peers, bear market).

Using textual analysis for a large sample of analyst reports, Tan and Yu (2021) find that analysts are more likely to use a DCF model and to discuss more cash flow and discount rate information for firms with more uncertainty, especially under heightened aggregate economic uncertainty and bearish market sentiment. The market reactions to target price changes based on a DCF model are stronger, particularly when the analysts present more cash flow and discount rate discussions.

Imam et al. (2008) interview sell- and buy-side UK investment analysts and analyze the content of equity research reports for FTSE-100 companies. They report that technical difficulties in implementing DCF cause analysts to rely upon valuation multiples and subjective judgement of whether the market price “feels right.” However, to make the research credible to buy-side clients, analysts often use DCF for conveying their insight, even though they rarely relied on it to determine target prices and investment recommendations.

Green et al. (2016) investigate the number of and reasons for errors and questionable judgments that sell-side equity analysts make in constructing and executing DCF. For a sample of 120 DCF models detailed in reports issued by U.S. brokers, they estimate that analysts make a median of three theory-related and/or execution errors and four questionable economic judgments per DCF. These errors often have significant effect on the estimated value.

Allee et al (2020) survey 172 valuation specialists, which provide valuations related to litigation, taxes, and purchases/sales of a business. They report that valuation specialists prefer the DCF model.

Richardson et al. (2010) survey CFA members and professors teaching FSA to MBAs. They report that practitioners prefer earnings multiples (74% frequency) over the free cash flow model (59%) and are unlikely to use the residual income method. In contrast, academics prefer residual income valuation over other methods.

Using M&A advisors’ fairness opinion valuation data in SDC Platinum, for deals announced from 2000 to 2020 (2,300 deals), Shaffer (2021) document the following results. The five most common fundamentals used in relative valuation are, in order, EBITDA (32%), Net Income (25%), Revenue (22%), Book Equity (9%), and EBIT (6%). Of those, only 1% are indicated as “adjusted” metrics. All cash-flow metrics combined comprise only 1.8%. Industry-specific measures (e.g., Daily Production, Proved Reserves, etc.) comprise only 1.5%. Book Equity is used primarily in the financial services, insurance, and real-estate industries. Unlike analysts, M&A advisors rarely use forward multiples (25% of the total), instead using current period or trailing multiples, suggesting that advisors are conservative and defensive in this setting, eschewing many potentially relevant, but more disputable, metrics. M&A advisors use enterprise value (EV) multiples—especially EBITDA-based—more frequently than direct equity value multiples, and this has increased significantly over the past two decades. Advisors typically draw the “comps” for their multiples from trading firms (66%), rather than other transactions (34%).

6.1 Relative valuation

Earnings quality plays a critical role in relative valuation. In price multiple valuation, equity value is typically estimated by applying a multiple to an earnings construct (e.g., EPS, EBITDA); high earnings sustainability implies that price multiple valuation is likely to yield precise value estimates because current earnings are a good proxy for future earnings (e.g., Liu et al. 2002, 2007; Nissim 2019a). This section provides a review of relative valuation (subsection 6.1.1), followed by a discussion of implementations issues (subsections 6.1.2 through 6.1.5).

6.1.1 Review of relative valuation

Relative valuation is typically implemented using *price multiples*, with value estimated as the product of one of the firm's fundamentals (e.g., earnings, cash flow, revenue, book value) and the average ratio of price to that fundamental for a group of similar companies (same industry, size, leverage, etc.). The average multiple is calculated using the mean, median, or harmonic mean across the peer companies. In some cases, different weights are applied to different peers, depending on the degree of similarity (e.g., as measured using size or sub-industry membership). In many cases, discretionary adjustments are made to the calculated multiple to account for differences in relevant value drivers across the companies (for example, growth, risk, payout, earnings quality).

Another relative valuation approach, which is less common, is to use *conditional price multiples*. This approach explicitly adjusts observed multiples (for example, the price-to-book ratio) for differences in relevant value drivers (for example, return on equity or ROE). In effect, the conditional price multiple approach is the multivariate counterpart of price multiple valuation—it is based on the same rationale as price multiples but uses several fundamentals simultaneously. While quite common when valuing financial firms, conditional valuation is relatively uncommon outside the financial sector. When used outside the financial sector, the approach typically involves conditioning P/E on forecasted earnings growth.

Three important assumptions underlying price multiple valuation are: (1) value is proportional to the fundamental used; (2) a similar proportionality holds for “comparable” companies (i.e., companies from the same industry and/or similar characteristics such as size, leverage, and expected growth); and (3) the comparable firms are, on average, fairly priced. In most cases, these assumptions are at best a reasonable approximation, with the precision of valuation depending on the extent to which (1) the fundamental chosen captures value-relevant information and is linearly related to value, (2) the “comparables” are indeed comparable, and (3) the comparables' stock prices are close to their intrinsic (“true”) values.

Price multiple valuation offers several advantages: it is simple and easy to implement; it uses market information directly; it values a company relative to its peers; and, when properly implemented, it produces reasonable valuations. However, in contrast to the premise of price multiple valuation, the value/fundamental relationship is typically nonlinear, and value is determined by more than one fundamental. There are also important implementation issues. Estimates can only be calculated for firms with positive value for the fundamental, which often rules out potential fundamentals, especially cash flows. Moreover, real comparables are rarely available, and compromise choices result in biased valuations. Error in the multiples also results from inefficient market pricing of comparables or from temporary shocks to the fundamental. For example, a company with abnormally strong performance in the valuation period is likely to have a low price-to-fundamental ratio due to expected mean-reversion in the fundamental. As discussed below, some of these concerns can be mitigated by proper implementation, including in selecting peers (comparables), in selecting and measuring the fundamentals and value construct, and in measuring the multiples (these are not independent choices; for example, the comparability of peers depends on the fundamental chosen).

Price multiple valuation can be implemented at either the equity or entity level. Equity multiples are typically implemented at the per share level, mostly EPS but in some cases book value per share. Entity multiples are typically implemented at the total level. They are used to estimate enterprise value (EV), which is then allocated to the different claimholders as in DCF valuation (discussed below). By far, EV/EBITDA are the most common entity value multiples. EBIT, sales, NOPAT and capital EV multiples are used in some cases. Cash flow price-multiples are uncommon—they perform poorly in valuation and often cannot be calculated due to negative cash flow.

While sell-side analysts often use price multiples as the primary method of valuation, buy-side analysts and other valuation specialists use price multiples mostly as a check on the plausibility of the DCF valuation. Other uses of price multiples include:

- To estimate the value of businesses or geographic segments in sum-of-the-parts valuation
- To calculate the terminal value or as a check on the reasonableness of the terminal value (“exit multiple” or “terminal multiple”)
- To estimate the value of equity method investments or noncontrolling interests (Nissim 2021g)
- To derive price-based forecasts (expected return, implied cost of capital, implied growth, implied future profitability).

The next four subsections discuss implementation issues.

6.1.2 Selecting and defining the fundamental and value measure

Firm value is equal to the present value of future cash flows, so good candidates for price multiple valuation are fundamentals that are strongly related to future cash flows. Research in accounting and finance demonstrates that earnings perform better than cash flow in predicting future cash flows, and, accordingly, earnings multiples generate more precise valuations than cash flow multiples. Consistent with this evidence, analysts use earnings multiples much more often than cash flow multiples (e.g., Demirakos et al. 2004). (A related disadvantage of cash flow multiples is that cash flows are often negative, making it impossible to implement price multiple valuation.)

Recurring versus net income

The strength of the relationship between earnings and future cash flows, and hence the precision of earnings-based price multiple valuation, should increase when one removes from earnings items that are transitory in nature such as gains and losses, restructuring charges, impairment charges, or other “special items.” Accordingly, earnings-based price multiple valuations are typically calculated using measures of “core” or “recurring” income. Still, using estimates of recurring income instead of net income in price multiple valuation does not guarantee better performance. Nonrecurring items are difficult to measure (see Nissim 2021c), and firms may use discretionary nonrecurring items such as gains from selling investments to smooth shocks to recurring earnings (e.g., Nissim 2013b). In other cases, “smoothing” rather than removing special items may yield more accurate valuations (Nissim 2021d).

Instead of explicitly adjusting reported earnings to exclude non-recurring items, which are often reported below operating income, one may move up the income statement. Shaffer and Lee (2021) find that M&A advisors' use of enterprise value multiples (instead of equity value multiples) is not systematically driven by the target's capital structure but rather by non-recurring items. M&A advisors almost never use explicitly "adjusted" bottom-line earnings measures due to concerns over litigation risk (discretionary adjustments are more difficult to defend). In lieu of adjusting bottom-line net income, M&A advisors respond to non-recurring items by using EBITDA, which excludes many non-recurring items. Given that EBITDA flows to both equity- and debtholders, it is compared to enterprise value (in a multiple from) rather than to equity value.

Analysts' forecasts

A more direct approach for improving the accuracy of price multiple valuation is to use analysts' earnings forecasts instead of attempting to remove transitory items from reported income. The rationale for this approach is that price reflects expectations regarding future, not past, earnings. Indeed, when used in price multiple valuation, reported earnings serve as a proxy for future earnings. Compared with reported earnings, analysts' earnings forecasts provide a more direct estimate of future earnings and, since they reflect a larger information set, are likely to be more accurate. Another advantage of forecasts is that they exclude the impact of unexpected transitory shocks to recurring items (for example, unexpected revenue from an unusually large transaction) in addition to one-time items (for example, gains or losses from selling assets). Forecasts are also better aligned with the value of capital at year end (explained below). On the other hand, using analysts' forecasts exposes the analysis to potential biases (for example, long-term upward bias, short-term downward bias), and forecasts may not fully reflect the implications of reported earnings for future earnings (see Section 2.11.9). In addition, near-term forecasts may reflect expected transitory items, although this limitation can be mitigated by using forecasts for years 2 or 3.³⁹⁶ In some cases, forecasts may not be available for the subject company or for some peers, or they may be stale. Still, most analysts use forecasted rather than reported earnings when conducting price multiple valuation (e.g., Pinto et al. 2019, Mukhlynina and Nyborg 2020).³⁹⁷

Matching

The informativeness of earnings regarding firm value also depends on the quality of matching in the income statement, or the extent to which reported expenses reflect the costs incurred in generating reported revenue. When expenses are poorly matched against revenue—for example, due to the immediate expensing of advertising outlays—earnings measure current performance with error and so provide poor indication of future cash flows and value. This problem is quite pervasive and results primarily from conservative accounting principles. It mostly arises in the

³⁹⁶ Liu et al. (2002) examine the valuation performance of a comprehensive list of value drivers. They find that forward earnings perform the best, and performance improves if the forecast horizon lengthens (1-year to 2-year to 3-year out EPS forecast).

³⁹⁷ For example, Mukhlynina and Nyborg (2020) survey 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that respondents favor using 12-month forward estimates of earnings (mean 3.13 in a scale of 0 to 4) over trailing (2.53) and 24-month (2.04).

context of internally developed intangibles, including brands, R&D, information technology, human capital, intellectual property, startup costs, and similar resources. Under US GAAP, expenditures made to develop these economic assets are expensed as incurred rather than being capitalized and amortized in subsequent years when the benefits are realized.

Matching distortions can be mitigated by attempting to correct the accounting—for example, by capitalizing and amortizing startup costs, R&D outlays, or expenditures made to develop the brand. However, the information required to make explicit adjustments is often unavailable. Instead, analysts mitigate the effects of such distortions by considering growth and other characteristics that are correlated with the matching distortion when conducting valuation (see section “6.1.3 Relevant characteristics” below). Growth is typically the most important proxy for the impact of matching distortions on reported earnings because the extent to which unreported amortization of previously expensed R&D and other economic investments (which biases earnings upward) offsets the currently expensed economic investments (which biases earnings downward) depends primarily on the company’s growth. For example, in steady state, the two distortions are approximately equal and so earnings are unbiased.

EBITDA

Other limitations of accrual accounting include historical cost accounting and earnings management. Revenue reflects current prices, but many expenses—particularly depreciation and amortization—are measured at historical cost. Given that the timing of asset purchases varies across companies, reported earnings may deviate from economic earnings to a varying degree in the cross-section, reducing the precision of price-multiple valuation. Similarly, there may be cross-sectional variation in the extent to which earnings are manipulated or “managed,” for example by overstating the useful life of depreciable assets or by capitalizing operating expenditures.

One approach to mitigate some of the limitations of accrual accounting, which is very common in practice, is to use EBITDA multiples (Nissim 2019a). EBITDA avoids the distortions of depreciation, including historical cost accounting, manipulation of cost estimates or asset designations (especially in M&A), arbitrary depreciation and amortization (D&A) assumptions, differential effects of organic versus acquired (M&A) growth on D&A, the effects of impairment on subsequent D&A, and the impact of interest capitalization on D&A (see Sections 5.4 and 5.5).

Still using EBITDA involves several issues:

- Companies with similar economic profitability may report substantially different EBITDA depending on characteristics such as capital intensity (versus labor and intangible intensities), the cash cycle (reflecting working capital intensity), whether they invest organically or through M&A,³⁹⁸ the extent of leasing (versus borrowing and purchasing assets), lease accounting (operating versus finance), and the effective tax rate.

³⁹⁸ For example, if a company develops a new technology, its EBITDA will be reduced by R&D expense during the development years. In contrast, if the company acquires a business that already developed that technology, EBITDA will not reflect the cost of developing the technology. In both cases, though, EBITDA will reflect the benefits from the new technology.

- For manufacturing companies, EBITDA estimates often contain significant error because the depreciation addback from the cash flow statement—which is used in measuring EBITDA—is different from depreciation expensed due to the capitalization of depreciation into inventory (see Nissim 2019c).
- While EBITDA may be less sensitive to some D&A-related accounting distortions, it is still subject to other distortions (e.g., expensing of organic investments in intangibles and earnings management activities such as channel stuffing). In particular, EBITDA is more sensitive than EBIT to a common form of earnings management: excess capitalization of expenditures into PP&E and intangible assets, which are subject to D&A (see Sections 5.4 and 5.5). Excess capitalization shifts EBIT from future periods to the current period, but it does not change the total amount of EBIT recognized over the company's life, as any amount capitalized would have to be subsequently depreciated or otherwise expensed. In contrast, because it excludes D&A, EBITDA is permanently increased by excess capitalization.

Therefore, if EBITDA multiples are used, it is important to either adjust EBITDA for accounting distortions (e.g., exclude rent expense, subtract the estimated change in depreciation capitalized into inventory, subtract the estimated amount of excess capitalization) and/or consider capital intensity, leasing, and effective tax rates when selecting peers and when adjusting the multiple for differences across the subject and peer companies.³⁹⁹ Empirically, even without such adjustments (other than limiting peers to be from the same GIC industry), Nissim (2019a) shows that EBITDA multiples perform substantially better than (at least as good as) EBIT and EBITA in terms of explaining enterprise value (predicting stock return).

Indeed, research indicates that EV/EBITDA multiples are very common in practice. For example, Mukhlynina and Nyborg (2020) survey 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that by far the most popular multiple is EV/EBITDA, with 84% stating they use this multiple always or almost always when they use multiples. Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees. They find that the most used price multiple is EV/EBITDA, followed closely by P/E. Using a survey of 1,980 analysts (both sell- and buy-side), primarily from developed markets (especially the U.S.), Pinto et al. (2019) report when using multiples, the most common ones are P/E (88.1%) followed by EV multiples (76.7%), and EBITDA is by the far the most common fundamental used in EV multiple valuation.

Sum-of-the-part valuation

EBITDA multiples are often the method of choice when conducting sum-of-the-parts valuation (e.g., Chlomou and Demirakos 2020). When implementing this method, it may be warranted to adjust the allocation of EBITDA to the different segments. To achieve higher equity valuations, conglomerates may transfer profits from segments operating in industries with lower valuation multiples to those with higher multiples. If companies engage in such manipulation, segments

³⁹⁹ Alternatively, one can use inflation-adjusted NOPAT multiples instead of EBITDA multiples, where inflation-adjusted NOPAT is measured after-tax and after applying adjustment to correct distortions induced by historical cost accounting.

with relatively high (low) valuations should report abnormally high (low) profits. You (2014) confirm this prediction and further show that the relation is stronger for firms with more dispersed segment valuations. The paper also demonstrates that the simple sum-of-the-parts valuation with multiples tends to overestimate the enterprise values for conglomerates and that the measurement errors increase with segment valuation dispersion.

Book value

Another approach to deal with the impact of accounting distortions and other factors that reduce earnings persistence is to use different choices of value/fundamental depending on the company's characteristics. Mukhlynina and Nyborg (2020) report that the most important characteristic that affect this choice is industry membership, followed by earnings margin stability and capital intensity. Perhaps the best example is the financial sector. For financial services firms, book value multiples (relative to equity or tangible equity) generally perform well and are at least as common as earnings multiples (e.g., Nissim 2013b, Calomiris and Nissim 2014). This follows because the characteristics of these firms make book value a good proxy for future earnings:

- The book values of major assets and liabilities are relatively close to fair values (investments in securities, loans receivable, debt, derivatives, ...)
- Unrecognized intangibles are relatively small, in part because the financial sector is highly competitive
- Activities are constrained by the book value of equity or related quantities, making book equity a useful proxy for future activities/earnings. For example, most financial institutions are required by regulators to maintain minimum equity capital at levels commensurate with the size and risk of their activities, assets, and liabilities.

Empirically, valuations of financial services firms based on book value multiples are relatively precise and are not dominated by estimates calculated using earnings multiples (e.g., Nissim 2013b, Calomiris and Nissim 2014). Still, book value cannot fully capture intrinsic equity value. It does not reflect the value associated with unrecognized relationship assets and fee-generating activities, which for some financial firms are significant. Fortunately, the value impact of these assets and activities is reflected in earnings. Thus, a valuation method that simultaneously extracts information from both book value and earnings should be preferable to univariate price multiples. Conditional multiple valuation, is described in a separate section below, represents one such approach.

Outside the financial sector, book value multiples (relative to equity, net capital, or net operating assets) are not commonly used, but they may still provide relevant insights. Two important trends have likely increased the relative informativeness of book value versus earnings over time: (1) increased economic volatility associated with the shift to intangible-intensive economy (e.g., McKinsey & Company 2021), and (2) the changing focus of accounting regulation from the income statement to the balance sheet (e.g., fair value accounting, recognizing the funding status of pension and OPEB, the asset-liability approach to measuring deferred taxes, impairment tests).

Book value multiples offer additional advantages. Compared to earnings, book value is likely to be negative. In addition, for book value multiples there is less need to use forecasts, so the issues of forecasting bias, availability and staleness are muted. Book value information may be particularly useful when combined with earnings information. One approach to do so is to use conditional price multiples – for example, market-to-book ratio of net operating assets regressed on RNOA.

Time and period

Another issue that arises in implementing relative valuation is whether to measure the fundamental using annual, quarterly, or trailing twelve-months (TTM) information. Compared to quarterly and TTM data, annual data are more detailed, more accurate, and are subject to audit (see Section 4.5.3), but they are generally less timely. Moreover, because companies often differ in their fiscal year end, annual metrics may not be comparable across companies (e.g., the most recent annual information for two companies may relate to periods that are 11 months apart). Quarterly data reflect the most recent information, but they are affected by seasonality and they can be quite volatile. Accordingly, most analysts and valuation professionals use TTM or next twelve-month data (e.g., Mukhlynina and Nyborg 2020).

Earnings-investment alignment

Multiples of flow metrics—such as P/E or EV/EBITDA—compare price at the end of the period (P or EV) with a flow (EPS or EBITDA) that is generated during the period. If the amount of capital that generated that flow remained unchanged during the period, then the comparison is valid. However, if that capital changed during the period, the multiple is measured with error. Consider two identical companies—A and B—that have the same invested capital, generate the same EBITDA, and have the same enterprise value (EV). If immediately before the end of the year company B issues debt or equity and invests the funds in operating assets, its EV will increase by the investment, but EBITDA will not be affected because the new investment had no opportunity to contribute to current year operations. So, if one uses Company A’s EV/EBITDA multiple to value Company B, the estimated EV will understate the true EV by the new capital. This distortion is mitigated if one uses P/EPS multiples, because EPS is calculated as follows:

$$\text{Basic EPS} = \frac{\text{Net income available to common shareholders (net income)}}{\text{Weighted average common shares outstanding (WA shares)}}$$

That is, net income is divided by the *weighted average* (by time) number of shares outstanding during the year rather than by the number of shares outstanding at the end of the year. This calculation recognizes that income is earned throughout the year, and outstanding shares help generate earnings only from their issuance date.⁴⁰⁰

⁴⁰⁰ For example, if a company reported net income of \$500 for 2016, had 230 shares at the beginning of the year, and issued 30 shares on May 1, 2016, its weighted average shares outstanding for 2016 is 250 (= 230 + (8/12) × 30) and Basic EPS is \$2 (= 500 / 250).

In contrast, multiples based on sales, EBITDA, or other total flow measures (as opposed to per share) ignore this issue, effectively assuming that the level of capital remained unchanged throughout the year. This may result in a significant valuation error if the rate of change in invested capital varies across the subject and peer companies. It is therefore important to adjust flow fundamentals (e.g., EBITDA, sales) for changes in the investment that generated the flow during the year. This can be done using the same logic that underlies the calculation of EPS and P/EPS multiples:

$$\begin{aligned}\frac{P}{EPS} &= \frac{P \times \text{Outstanding shares}}{EPS \times \text{WA shares}} \div \frac{\text{Outstanding shares}}{\text{WA shares}} \\ &= \frac{MV \text{ of equity (MVE)}}{\text{Net income} \times \text{Shares Growth Factor}} = \frac{MV \text{ of equity (MVE)}}{\text{Adjusted net income}}\end{aligned}$$

That is,

$$\text{Adjusted net income} = \text{Net income} \times \text{Shares Growth Factor}$$

The same logic can be used to adjust EBITDA or other fundamentals that are generated by total capital (e.g., sales):

$$\text{Adjusted EBITDA} = \text{EBITDA} \times \text{Shares Growth Factor}$$

Where

$$\begin{aligned}\text{Capital Growth Factor} \\ &= (1 - w_D) \times \text{Shares Growth Factor} + w_D \times \text{Debt Growth Factor}\end{aligned}$$

$$w_D = \frac{\frac{\text{Average debt during the year}}{MVE}}{\frac{\text{Average debt during the year}}{MVE} + \text{Shares Growth Factor}}$$

And

$$\text{Debt Growth Factor} = \frac{\text{Debt at end of year}}{\text{Average debt during the year}}$$

Given the average [EV /Adjusted EBITDA] ratio across the peers, the subject company's enterprise value is calculated as the product of that multiple and the subject firm's adjusted EBITDA. If the subject company is private, the weight (w_D) can be calculated using an iterative process that replaces the estimated value of equity for MVE until convergence is reached.

Note that this issue is avoided when using forecasts, because forecasts reflect expected profits to be earned using all year-end capital.

Diluted versus basic shares

Price multiple valuation is often conducted at the per share level. In measuring earnings or book value per share, one can either use outstanding common shares or also consider potentially

dilutive securities. Employee stock options, convertible bonds, convertible preferred stock, and other securities that may be exercised or converted into common shares may dilute the claims of existing common shares on earnings and book value and should therefore be incorporated in the valuation. However, estimating potential dilution from contingent claims is difficult, and noisy adjustments may reduce rather than increase the informativeness of fundamentals. For example, Nissim (2013b) finds that using diluted instead of outstanding shares improves earnings-based valuations of insurance companies but not book value-based estimates.

For earnings per share, companies are required to disclose an estimate of potential dilution due to some options and convertibles (see Section 5.21). However, this calculation only considers the extent to which outstanding options are in the money (that is, there is no recognition of the time value of options).⁴⁰¹ Similarly, convertibles are included in the calculation if the ratio of their reported cost to the incremental common shares that would have resulted from a hypothetical conversion is smaller than EPS assuming no conversion.⁴⁰² This adjustment is at best weakly related to economic dilution as it ignores the current stock price, which is an important determinant of economic dilution (see earnings quality issue “Diluted EPS measures dilution from convertibles with substantial error” in Section 5.21).

Unlike earnings per share, companies are not required to report diluted book value per share. Still, they are required to disclose some information about potentially dilutive securities, which can be used to estimate the likelihood and extent of book value dilution. A simple approach for estimating diluted book value per share is to divide book value by the product of outstanding shares and the ratio of shares used in the calculation of Diluted EPS to shares used in the calculation of Basic EPS.

For enterprise value multiples (e.g., EV/EBITDA), dilution can be accounted for by including the estimated value of contingent claims in enterprise value (e.g., Nissim 2019a). See earnings quality issue “Contingent claims in valuation” in Section 5.21 for a simple approach for estimating the value of contingent claims.

Fundamental-value consistency

A common error in price multiple valuation is to use fundamentals and value measures that do not correspond well to each other. The fundamental may omit some flows whose value is reflected in the price measure or include flows whose value is excluded from the price measure. For example, enterprise value often reflects the value of investments in associates, but the related equity method income is excluded from revenue and, depending on how EBITDA is measured, may also be excluded from EBITDA. Therefore, when conducting price multiple valuation, it is important to maintain fundamental-value consistency. For instance, if the fundamental excludes

⁴⁰¹ Specifically, the EPS denominator is (1) increased by the number of shares that would have resulted from exercise of dilutive options and (2) reduced by the (smaller) number of shares that could have been repurchased using the proceeds from the hypothetical exercise of the options.

⁴⁰² The reported cost of convertible bonds is equal to the product of the related interest expense and one minus the tax rate. The reported cost of convertible preferred stock is the related preferred dividend.

equity method income, the value measure should exclude the value of investments in associates (e.g., subtract the estimated fair value of investments in associates from enterprise value).

To define consistent value/fundamental ratios, it is important to understand the following relationships:

$$\text{NOA} = \text{Net operating assets} = \text{operating assets} - \text{operating liabilities}$$

$$\text{Capital} = \text{NOA} + \text{net other nonoperating assets},$$

where net other nonoperating assets include investments in associates, real estate not used in operations, assets and liabilities of discontinued operations, and other illiquid assets that neither contribute to operating profit nor represent fixed claims, net of non-debt liabilities whose cost is excluded from NOPAT (e.g., some litigation-related obligations, pension, and OPB; see Nissim 2021c).

$$\text{EV} = \text{Enterprise value} = \text{Market value of capital} = \text{market value of equity} + \text{value of net debt}$$

$$\text{Core EV} = \text{EV} - \text{value of net other assets}$$

$$\text{EBIAT} = \text{EBITDA} - \text{Income tax on EBITDA}$$

Given that NOPAT and the flows from which it is derived—including EBITDA and EBIT (NOPAT is equal to $\text{EBIT} \times (1 - t)$)—exclude income from net other nonoperating assets (by the way the latter are defined), the following multiples generally maintain fundamental-price consistency: Core EV/EBITDA, Core EV/EBIT, Core EV/NOPAT, Core EV/NOA, and EV/Capital. Of these ratios, EBITDA multiples are particularly common.

While often used in practice, revenue multiples are problematic, both because revenue is typically a poor proxy for future free cash flows, and it is generated by operating assets, not by NOA, capital, or equity.

6.1.3 Relevant characteristics

Using simple algebraic manipulations of the net equity flow and residual income models (these models are described in Section 6.2.6 below), one can identify the determinants of P/E and P/BV, respectively (see Nissim 2013b). The P/E ratio depends on expected earnings growth, earnings quality, payout, and cost of equity, while the P/BV depends on expected ROE, earnings growth, earnings quality, payout, and cost of equity. Determinants of other value-to-fundamental ratios may be similarly derived. Table 6.1.3A identify the key determinants of common price ratios.

Table 6.1.3A: Relevant characterizes

Multiple	Relevant characteristics (+/-)*
Price / earnings	Earnings growth (+), earnings quality (+), earnings retention (-), equity risk (-), LT interest rates (-)
Price / book value	ROE, (+), earnings growth (+), earnings quality (+), earnings retention (-), equity risk (-), LT interest rates (-)
Core EV / NOPAT	NOPAT growth (+), NOPAT quality (+), free cash flow conversion (FCF/NOPAT; +), operating risk (-), LT interest rates (-)
Core EV / EBITDA	EBITDA growth (+), EBITDA quality (+), capex intensity (-), free cash flow conversion (+), tax rate (-), operating risk (-), LT interest rates (-)
Core EV / revenue	Revenue growth (+), operating profit margin (NOPAT/revenue; +), NOPAT quality (+), free cash flow conversion (+), operating risk (-), LT interest rates (-)
Core EV / NOA	RNOA (+), NOPAT growth (+), NOPAT quality (+), free cash flow conversion (+), operating risk (-), LT interest rates (-)

* Sign of partial derivative, that is, holding other factors constant.

The relevant characteristics of each price ratio should be considered when selecting comparables (see Section 6.1.4 below), when assigning weights (explicitly or implicitly) to the comparables in calculating the multiple (Section 6.1.5), and when adjusting the multiple (Section 6.1.5). In fact, considering characteristics is also relevant when deciding which fundamental to use. If for a particular industry the relevant characteristics are relatively similar across companies, that fundamental is a good candidate for price multiple valuation. For example, the relevant characteristics of P/B are relatively stable across firms from the same financial industry (e.g., banks, P&C insurers), so P/B are often used when valuing these firms.

Alford (1992) examines the P/E valuation method when comparable firms are selected on the basis of industry, risk (measured by firm size), and earnings growth. The results suggest that the widespread procedure of selecting comparable firms by industry is relatively effective, where industry is defined by the first three SIC digits. Similar accuracy occurs when risk and earnings growth are used together to construct portfolios of comparable firms, although neither variable performs well by itself, and neither variable is marginally useful with industry. There is no support for the recommendation to control for differences in leverage—accuracy decreases when P/E multiples are adjusted for differences in leverage across comparable firms. Valuation accuracy is increasing in firm size, and the efficacy of selecting comparable firms on the basis of industry is greater for large firms than for small firms. That is, industry appears to be a good surrogate for the component of risk and earnings growth related to P/E multiples.

Bhojraj et al. (2002) use regression analysis of valuation multiples on profitability, growth, and risk characteristics to generate a “warranted multiple” for each firm, and then select firms whose warranted multiple is closest to that of the target firm as comparables. Using these firms to explain future valuation multiples, they show that comparable firms selected in this manner offer sharp improvements over comparable firms selected on the basis of other techniques, including industry and size matches.

Holthausen and Zmijewski (2012) examine the relevant value drivers for EBIT and EBITDA multiples. They show that, in addition to risk and growth, analysts doing market multiple

valuations need to take account of differences in variables such as cost structure, working capital, and capital expenditure requirements when assessing comparability. They also show that the degree to which different value drivers are important for assessing the comparability of companies differs across commonly used market multiples. For example, when using a multiple like EBITDA in which certain expenditures (such as capital investments, working capital investments, and some expenses) are not deducted in the calculation of the denominator, assessing comparability based on such expenditures is more important than when using a multiple like free cash flow that deducts that expenditure in calculating the denominator. As another example, since EBIT and EBITDA are before income taxes, using income tax cost structures to assess comparability is more important for enterprise value multiples based on these measures than for enterprise value multiples based on aftertax measures of income such as unlevered earnings or free cash flow.

Research in finance and accounting emphasize financial characteristics when implementing relative valuation. However, considering other business characteristics in addition to financial characteristics may improve valuation accuracy. Mizik and Jacobson (2009) develop and validate a conditional multiplier approach that incorporates brand characteristics (e.g., differentiation, relevance to the customer, esteem, knowledge, innovativeness; measured using surveys). Brand assets are not fully reflected in contemporaneous margins, and therefore valuation accuracy can be improved by incorporating information about the properties of the firm's brand asset directly into a valuation framework. The authors find that brand metrics have statistically significant associations with valuation multipliers and add incremental explanatory power to accounting variables in explaining valuation multipliers. Out-of-sample analysis shows a 16% improvement in the mean absolute error for predictions that take into account brand metrics compared with predictions based on accounting variables alone.

6.1.4 Selecting peers

Selecting the peer group is viewed by analysts as one of the most difficult tasks in valuation (e.g., Bancel and Mittoo 2014). As noted in the previous section, accurate valuation requires that the subject company and its peers have similar relevant characteristics. For example, when using P/E the companies should have similar earnings growth prospects, earnings quality, payout, and the cost of equity capital. One approach to achieve this is to explicitly consider relevant characteristics when selecting comparables. Another approach is to focus on industry membership, since firms operating in the same industry often have similar characteristics and similar sensitivities to macro factors. A related approach is to focus on comparables with similar operations and strategy. Practitioners often combine the three approaches—they limit the comparables to companies with similar operations from the same industry, and they consider relevant characteristics and strategic differences when selecting the comparables. Mukhlylina and Nyborg (2020) report that their survey respondents (valuation specialists) use eight comparables on average, predominantly picked from rivals in the same industry, and that size and expected growth are also important considerations when selecting comps. For a sample of about 4,000 M&A deals over the period 1995-2017, Eaton et al. (2021) report that nine comparable companies are used on average in fairness opinions.

An important trade-off when selecting comparables is bias versus variability. Using only the most similar comparables (same sub-industry, size, leverage, etc.) minimizes the likelihood of a systematic bias but, due to the small number of comparables, increases the variability of the estimated value. In contrast, when multiples are calculated using a large set of comparables, the effects of transitory shocks to the fundamentals and firm-specific deviations from intrinsic value are averaged out. However, the price-fundamental relationship may be systematically different from that of the target company, resulting in a biased valuation. When the number of truly comparable companies is small (as is often the case), the preferred approach is to include companies with dissimilar characteristics but consider those differences when estimating the warranted multiple. For example, an analyst may calculate an average price-earnings multiple of 15x but use a multiple of 17x to value the subject company if it has better growth prospects than its competitors.

While selecting peers from the same industry is standard practice, there are still implementation issues. There are several alternative classifications—Global Industry Classifications System (GICS), Standard Industrial Classification (SIC), North American Industry Classification System (NAICS), Industry Classification Benchmark (ICB), and Fama-French SIC-based industry classification—which one should be used? Bhojraj et al. (2003) compare four of these industry classifications schemes: SIC, NAICS, GICS, and the Fama-French algorithm. They find that GICS classifications are significantly better at explaining stock return comovements, as well as cross-sectional variations in valuation multiples, forecasted and realized growth rates, R&D expenditures, and various key financial ratios. The GICS advantage is consistent from year to year and is most pronounced among large firms. The other three methods differ little from each other in most applications. Hrazdil et al. (2013) confirm these results for a more comprehensive sample (in terms of both firms and time).

Most industry classifications have several levels—for example, sector, industry group, industry, subindustry—which level should be used? Research suggests that in most cases the “industry” levels are the optimal choices (e.g., Alford 1992, Bhojraj et al., 2003, Liu et al., 2002, 2007), but this evidence is based on large sample, non-contextual analysis. For example, the insurance industry includes both life insurance companies and property and casualty insurers. Yet the leverage, activities, and other characteristics of life insurance companies are more similar to those of diversified banks (e.g., generating spread income, managing assets) than to the characteristics of property-casualty insurers, suggesting that if there are too few life insurance companies one should select comparable from the diversified banks subindustry rather than from the P&C insurance subindustry.

While industry classifications are based on the similarity of activities or products, there are alternative methods for selecting peers based on these dimensions, including management’s mention of competitors or rivals, and based on management description of its business and products. Hoberg and Philips (2010, 2016) develop text-based network industry classifications based on how firms describe themselves in the business description section of their 10-Ks. Their approach essentially measures the degree of word commonality across each pair of companies, thus providing a continuous measure instead of the binary one-zero indication of industry classifications. Hoberg and Philips (2016) show that their product similarity score is significantly higher for rivals identified by managers as peer firms. Eaton et al. (2021) examines investment

banks' choice of peers for comparable companies analysis in M&A. They find that product market space—as measured using the Hoberg and Philips (2010) product similarity score—is amongst the most important factors in peer selection, but SIC codes do a poor job of categorizing related firms in this setting.

Lee et al. (2015) show that firms appearing in chronologically adjacent searches by the same individual (Search-Based Peers or SBPs) at the SEC's EDGAR website are fundamentally similar on multiple dimensions. Moreover, SBPs dominate GICS6 industry peers in explaining cross-sectional variations in base firms' out-of-sample: (a) stock returns, (b) valuation multiples, (c) growth rates, (d) R&D expenditures, (e) leverage, and (f) profitability ratios. SBPs are not constrained by standard industry classification, and are more dynamic, pliable, and concentrated. Co-search intensity captures the degree of similarity between firms.

Knudsen et al. (2017) use the sum of absolute rank differences (SARD) across proxies for profitability, growth, and risk to select peers for multiples-based valuation. They show that the SARD approach yields significantly more accurate valuation estimates than the industry approach, and it increases the accuracy of valuation estimates when used within industries. Their results also indicate that the selection variables should be tailored to both the multiple applied and the industry examined to ensure more accurate valuation estimates. For example, they show that the accuracy of EV/sales multiple valuation improves significantly if the EBIT margin is included as a selection variable when identifying peers. Finally, they note that their approach, which assumes that each selection variable is equally important (i.e., carried the same weight), may be improved by allowing for different weights.

Research suggests that some analysts and valuation specialists select peers strategically to bias the resulting value estimate. DeFranco et al. (2015) examine the peer companies used by sell-side equity analysts in their research reports. They find that analysts on average select peer companies with high valuations and that this effect varies systematically with analysts' incentives and ability. They also find that the selection of peers with high valuations is used in part to justify optimistically skewed target prices and stock recommendations. Vismara et al. (2015) compare the selection of peer firms made by investment banks as underwriters at the IPO with that done shortly thereafter as analysts. They find that 3 out of 7 comparable firms, on average, are changed. The peers published in the IPO prospectuses have higher valuations than those published in the post-IPO equity research reports of the same firm, especially if the underwriter is US-based. The authors argue that underwriters select comparable firms that make the issuer's shares look conservatively priced at the IPO, while this conflict of interest tends to fade afterwards. The upward bias in peer selection is larger for underwriters with greater market power, and lower for repeat players in the IPO market. A biased selection of peers results in higher underpricing and lower long run performance of IPOs. Eaton et al. (2021) examine investment banks' choice of peers for comparable analysis in M&A. They provide evidence consistent with target-firm advisors selecting peers with high valuation multiples to negotiate higher takeover prices. However, the extent of bias varies across deals. For example, in management buyout deals, which provide incentives for managers to negotiate a lower target price, banks choose peer firms with relatively low valuations. Similarly, Imperatore et al. (2021) show that target-sought fairness opinions used in M&A valuations employ lower-valued peers in deals featuring greater conflicts of interest between target management and outside shareholders

and when the target CEO is incentivized to successfully complete the deal. Furthermore, the selection of downward-biased peers reduces the likelihood of appraisal lawsuits, but it is also associated with lower premiums.

6.1.5 Calculating and adjusting the multiple

Location measure

To implement price multiple valuation, one has to calculate the average price/fundamental relationship across the firms. Research demonstrates that the harmonic mean performs significantly better than other location measures (e.g., mean, median) in pricing securities, and that the mean performs particularly poorly (e.g., Liu et al. 2002).⁴⁰³ Unlike the median, the harmonic mean uses the cardinal information in all observations, and, unlike the mean, outliers get relatively small weight (the median effectively ignores outliers, while the mean gives them equal weight; see the example below).

Example: Mean, median, or harmonic mean?

Company	Price Per Share	EPS	P/E
A	20	1.5	13.33
B	35	3.0	11.67
C	25	0.5	50.00
D	30	2.0	15.00

Simple mean	With C	Multiple = $\frac{1}{4} \times \left(\frac{20}{1.5} + \frac{35}{3.0} + \frac{25}{0.5} + \frac{30}{2.0} \right) = 22.5$
	Without C	Multiple = $\frac{1}{3} \times \left(\frac{20}{1.5} + \frac{35}{3.0} + \frac{30}{2.0} \right) = 13.33$
Median	With C	Multiple = $\frac{1}{2} \times \left(\frac{20}{1.5} + \frac{30}{2.0} \right) = 14.17$
	Without C	Multiple = $\frac{20}{1.5} = 13.33$
Harmonic mean	With C	Multiple = $\frac{1}{(1/4) \times [1.5/20 + 3.0/35 + 0.5/25 + 2.0/30]} = 16.7$
	Without C	Multiple = $\frac{1}{(1/3) \times [1.5/20 + 3.0/35 + 2.0/30]} = 13.19$

Outliers, tiering and weighting

Still, in some cases outliers should be assigned a larger or smaller weight (including potential elimination) than implied by the harmonic mean, depending on the extent to which those peers are similar to the subject company in terms of relevant characteristics. More generally, applying weights that depend on the similarity of each peer to the subject company and on whether the peer's value/fundamental ratio is an outlier should improve valuation accuracy. One approach to do so is to tier observations based on characteristics (e.g., give higher weights to firms from the same subindustry compared to other firms). Another approach is to specify weights that are inversely related to differences in characteristics (e.g., size). Given that it is impossible to

⁴⁰³ The harmonic mean of the ratio X/Y is defined as the inverse of the mean of Y/X. For example, the harmonic mean of P/E is the inverse of the mean of the earnings yield.

formalistically account for all differences in characteristics, the final multiple is often adjusted based on the difference between the subject characteristics and their average values across the peers. For example, one may use a P/E multiple of 17 when the average across the comparables is 15 because the subject company is perceived to have better growth prospects than the peers.

Yet another approach to adjust for differences in characteristics is to consider time-series benchmarks in addition to cross-sectional (peers, industry) ones, either through examination or standardization. This approach effectively uses the firm's average price multiple in prior periods to control for its characteristics (assuming that they remain relatively stable over time). For example, one may adjust the average P/E across the peers by multiplying it by the average value of [company P/E divided by the average peers' P/E] in recent years. The following is a quote for a recent analyst report: "Our price target reflects a P/E multiple of about XXX our 2021 EPS estimate, modestly below the peer group average target multiple. Our P/E multiple is derived after considering [the subject firm]'s historical multiple, including the multiple relative to the peer average multiple"⁴⁰⁴

Conditional price multiple

The primary disadvantage of price multiples is that they do not allow for simultaneous consideration of several fundamentals. This shortcoming is particularly relevant when valuing financial service firms or other companies whose book value contains significant value-relevant information incremental to earnings.⁴⁰⁵ One approach that facilitates simultaneous consideration of both earnings and book value is to use conditional price multiples, or price multiples that are conditioned on other fundamentals. For example, analysts often value financial services companies using book value multiples that are conditioned on ROE. This is achieved by regressing the price-to-book ratio on ROE and using the fitted value from the regression, evaluated at the subject company's ROE, as the price multiple. The fitted value, and accordingly the value estimate, depends on both earnings and book value. A similar approach can be used to value non-financial firms. For example, the intrinsic value of net operating assets can be estimated as the product of net operating assets and the fitted value from a regression of MVNOA/NOA on RNOA and other relevant characteristics across the peer companies, evaluated at the subject company characteristics.

Another advantage of conditional price multiple valuation is that it enables analysts to use a large set of comparables. In price multiple valuation, companies with dissimilar characteristics are typically ignored. In contrast, conditional valuation extracts information from the pricing of companies with dissimilar characteristics by explicitly controlling for differences in characteristics. However, conditional valuation has its own shortcomings. Errors in identifying and measuring the conditioning variables or in specifying the functional relationship may reduce precision (for example, the relationship may be non-linear). In addition, the inclusion of

⁴⁰⁴ A nice example of incorporating time-series benchmarks through standardization is the relative CAPE indicator (see <https://indices.barclays/IM/21/en/indices/static/about-cape-ratio.app>)

⁴⁰⁵ The following is an example for a recent analyst report on a large commercial bank: "Our price target is based on two methods: 1) a two-stage residual model, which values excess returns (ROE minus cost of equity multiplied by average equity) over a ten-year forecast and a terminal period; and 2) a regression of risk-adjusted ROEs to PBV multiples for a cross-section of commercial banks."

conditioning variables increases the number of estimated parameters, which in turn reduces the precision of the estimates.

6.2 Fundamental valuation

This section starts by reviewing the fundamental valuation approach (Section 6.2.1) and then describes the DCF model (Section 6.2.2), which is the most used fundamental valuation model. Section 6.2.3 elaborate on a primary component of DCF—the cost of capital. Section 6.2.4 describes alternative fundamental valuation models.

6.2.1 Review of fundamental valuation

The underlying principle of fundamental valuation is that the value of any asset or claim is the present value of the net cash flows that the asset is expected to generate or save. The present value of an expected cash flow is smaller than the expected amount due to the time value of money and the discount for risk. A risk premium is added to the discount rate to compensate for systematic volatility—that is, the extent to which the value of the asset covaries with the market. (In contrast, idiosyncratic volatility can be diversified away by holding a diversified portfolio and so it does not command a risk premium.) In general, stocks that provide a low return in “bad” economic times are considered risky, where the state of the economy is typically proxied for using the return on a market index such as the S&P 500.

Formally, the current value (V_0) of an asset that is expected to generate an uncertain stream of cash flows $C_1, C_2, \dots, C_T$ is

$$V_0 = \frac{E[C_1]}{(1+r)^1} + \frac{E[C_2]}{(1+r)^2} + \dots + \frac{E[C_T]}{(1+r)^T}$$

Where $E[.]$ is the expected value operator, namely the probability-weighted average of all the values that the variable can take, and r is the discount rate. The cash flows and the discount rate should be in the same currency, same basis (nominal or real), and same tax status (after/before tax). In addition, the interest rate component of the discount rate should have the same duration as the asset’s cash flows (interest rates typically increase with the duration of the cash flow), and the risk premium should be commensurate with the riskiness of the cash flows.

Due to the difficulty in measuring the expected value of future cash flows, most implementations of fundamental valuation use the most likely cash flows instead. Thus, if the distribution of each future cash flow is not symmetric around the most likely outcome, the value estimate is likely to be biased. This potential bias is a primary motivation for conducting scenario analysis (see Section 6.4 below).

As noted, the required rate of return is equal to the total of the risk-free rate and a premium that compensates investors for the riskiness of the cash flow stream. Theoretically, the **risk-free rate** should be measured using the weighted average yields to maturity on zero-coupon Treasury bonds (spot rates) with the same maturities as the cash flow stream, weights proportional to the ratio of the present value of each cash flow to the total value. Alternatively, one may use the

corresponding spot rates to discount each future cash flow. In practice, analysts use the same risk-free rate to discount all future cash flow, and usually select the 10-years Treasury rate (e.g., Bancel and Mittoo 2014). Given the low interest rates in recent years—which imply equity duration much longer than that of the 10-year Treasury rate—and the (typically) upward sloping yield curve, this approach implies that the risk-free rate is understated (see Nissim 2021a).

In general, there are two approaches for estimating the **risk premium**: (1) based on the riskiness of the cash flows that are being discounted, and (2) based on the risk premium required by the investors who receive the cash flows. Most implementation use the second approach. For example, the risk premium for discounting dividends is estimated using the risk premium required by equity investors rather than based on direct estimates of the riskiness of the dividends (of course, investors' required risk premium reflects their perception of the riskiness of the dividends).

The most common fundamental valuation method for non-financial companies involves discounting forecasted “free cash flows” at the weighted average cost of capital to obtain an estimate of the value of operations and the debt tax shield (the **discounted cash flow** or DCF model).⁴⁰⁶ If there are any nonoperating assets or liabilities (e.g., equity method investments or assets and liabilities of discontinued operations), their values are estimated separately and included in the enterprise value estimate. Then, an estimate of the value of net debt is subtracted to measure equity value. Net debt is debt minus financial assets, where financial assets are financial instruments unrelated to operations. The DCF method and its key inputs are discussed in Section 6.2.2 and 6.2.3.

Other variants of fundamental valuation focus on either cash flows to equity-holders (e.g., the **dividend discount model** and the **net equity flow model**) or use earnings constructs directly. A method which has gained acceptance in some circles is **residual income valuation**. Under the residual income framework, the value of any balance sheet item—asset, liability, or equity claim—is equal to the sum of its book value and the present value of expected residual income associated with that item, where residual income is calculated by subtracting the required return on the item from its forecasted earnings. These methods are discussed in Section 6.2.4.

Theoretically, to implement fundamental valuation one must predict all future cash flows. While near- to intermediate-term forecasts can often be made with some confidence, long-term forecasts and estimates of the cost of capital (the discount rate) are typically very imprecise. When estimating intrinsic value, the objective should be to emphasize what is “known” (i.e., near- to intermediate term forecasts) while introducing as little as possible noise about what is unknown (long-term forecasts, cost of capital). An extreme version of this principle is using the payback period criterion—which ignores cash flows after the recovery of the investment—when evaluating investments. A more suitable approach is to impose structure and use assumptions that minimize the valuation “noise” related to the unknowns, as explained in the following sections.

⁴⁰⁶ Two other approaches for incorporating the value of the debt tax shield, which are much less common, are to adjust free cash flows to include the tax savings from interest deductibility (the *capital cash flow model*), or to account for the value of the debt tax shield separately from the value of operations (the *adjusted present value model*). These methods are reviewed in Section 6.2.6.

6.2.2 Discounted cash flow (DCF) model

Under the DCF model, the total value of operations and the debt tax shield (often referred to as **core enterprise value**) is estimated by discounting after-tax free cash flows generated in operations (**FCFs**) using a discount rate that reflects the after-tax cost of funding the operations (weighted average cost of capital or **WACC**). The cost of debt used in measuring WACC ($r_d \times [1-t]$) is smaller than the required rate of return on debt (r_d) due to the interest tax shield. In contrast, equity flows are not tax deductible and so the cost of equity is the same as the required rate of return on equity.

Some implementations of DCF valuation calculate the present value of FCF separately for each segment of the entity (generally using different WACC and growth assumptions) and then sum the present value estimates across the segments.

The DCF model is appealing because it focuses on cash flows (which are more intuitive than earnings) and operations (the source of value creation). However, the DCF model also has several disadvantages. For many firms, near-term free cash flows are not representative of long-term free cash flows. This is especially true for growing companies, which often generate negative cash flows in the near-to-intermediate term. Thus, to implement DCF, one has to forecast the drivers of free cash flows for a relatively long explicit forecast period, especially when valuing companies at the growth stage of their life cycle.

The remainder of this section elaborates on different steps and components in implementing DCF, including definition of free cash flow, the typical template used in implementing DCF, steady-state profitability and growth, the terminal value, and finally, the steps need to calculate value per share from core enterprise value.

Defining free cash flow

As noted above, DCF valuation involves discounting free cash flows (FCFs), where FCF is defined as follows:

$$\text{FCF} = \text{Net operating profit after tax (NOPAT)} - \Delta \text{Net Operating Assets } (\Delta \text{NOA})$$

Net operating assets is equal to operating assets minus operating liabilities, that is, the net investment in operations. Thus, free cash flow measures operating profit not reinvested in operations, which is therefore “free” to be paid to the providers of capital.

If the company were to fully pay out NOPAT to the providers of capital, it would not be able to grow its revenue; ΔNOA is essentially an estimate of the net investment in operations required to grow sales as projected.

FCF is most often estimated as $\text{EBIT} \times (1 - t) - (\text{Capex} - \text{D\&A}) - \Delta \text{Working capital}$ (e.g., Green et al. 2016). However, in measuring FCF, all changes in net operating assets should be subtracted

from NOPAT, not just net capex and the change in working capital (see Nissim 2021c). Therefore, a generalization of the above calculation is:

$$\text{FCF} = \text{EBIT} \times (1 - t) - (\text{Capex} - \text{D\&A}) - \Delta \text{Working capital} - \text{other changes in NOA}$$

Where other changes in net operating assets (NOA) include cash paid to acquire business, changes in deferred tax assets or liabilities, changes in long-term deferred revenue, and other items.

Valuation template

Most DCF model include an historical period and two or three future periods. Using a survey of 1,980 analysts (both sell- and buy-side), primarily from developed markets (especially the U.S.), Pinto et al. (2019) report that most analysts use either two (43.8%) or three (40.5%) future periods.

The historical period typically covers at least five years, to capture a business cycle. Financial data and ratios for these years are a primary source of information for forecasting future financial statements. Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees and report that, when forecasting, analysts consider the firm's past performance and recent trends in the industry. Allee et al (2020) survey 172 valuation specialists, which provide valuations related to litigation, taxes, and purchases/sales of a business. They report that valuation specialists primarily rely on the firm's historical performance when forecasting the financial statements (4.41 rating), but also consider the performance of other firms in the same industry (3.4). Communications with management are also relevant for forecasting future earnings or cash flows.

Almost all models have an explicit forecast period (also called projections, planning, budget, or competitive advantage period). Many models have a convergence period, and all models have a terminal period (also called steady-state or constant growth period). The one-stage (constant growth) model is uncommon.

Mukhlynina and Nyborg (2020) conduct a survey of 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that the most common explicit forecast horizon is five years (55%), followed by ten years (21%) and eight years (13%). Using a sample of 120 DCF models detailed in reports issued by U.S. brokers, Green et al. (2016) report that the terminal period on average starts in year eight. The difference between the two surveys is possibly due to some analysts using a convergence period, which is also consistent with Pinto et al.'s (2019) findings that about 40% of analysts use a three-stage model.

In general, the explicit forecast period should span at least one business cycle (the average business cycle is between 5 and 6 years). It should also cover the maturation of existing projects or contracts and the expected duration of competitive advantage. For example, when modeling pharmaceutical companies with patented drugs, or other firms with significant barriers to entry, the period of competitive advantage—and therefore of explicit forecasts—is often long.

Industries with long-term contracted revenue streams, which entail long forecast horizon periods, include natural resources, satellite communications, and some utilities. In addition, if no convergence period is specified, the explicit forecast period should be relatively long for firms at early growth stages, for which it will likely take many years to reach steady state. On the other hand, the length of the explicit forecast period also depends on the availability of information, and for small, high-growth firms there is often relatively little information, and cash flows are highly unpredictable.

For each year in the explicit forecast period, analysts typically forecast condensed financial statements. When disclosing their models, analysts often present the following metrics (although they usually derive them from more detailed line-item forecasts):

- Revenue
- EBIT margin and the tax rate (to be able to convert revenue forecasts to NOPAT forecasts)
- Net operating assets – most people focus on net working capital (= working capital assets minus working capital liabilities) and net capex (capex minus depreciation); others forecast more complete measures of operating assets and operating liabilities.

Given these forecasts, free cash flow for each explicit forecast year can be calculated. Analysts often forecast additional items, including debt, financial assets, and other nonoperating items, which are not required for the DCF calculation. Yet these forecasts are important for checking the feasibility and plausibility of expected investments and growth (e.g., availability of capital), leverage (for WACC), and other forecasts and assumptions.

Calculating core enterprise value requires forecasting free cash flows in all future years. Most analysts assume that free cash flow will grow at a constant rate after the explicit forecast period, and so they estimate core enterprise value as the total present value of free cash flows during the explicit forecast years plus the present value of the terminal value. Still, as noted above, many analysts allow for a convergence period.

Having forecasted the financial statements for the explicit forecast years, the next step is to estimate the steady state values of the revenue growth rate and possibly other key ratios including EBIT margin, tax rate, and either capex/revenue and WC/revenue or operating assets turnover (revenue divided by operating assets or its inverse OA/revenue) and the operations funding ratio (net operating assets divided by operating assets or NOA/OA). See Section 2.8.5 as well as Nissim (2021b).

An estimate of the steady-state growth rate is required when calculating the terminal value using the constant growth formula, which is the most common approach (see below). The other steady state forecasts are not strictly required, but they are helpful:

- If the expected steady-state value of any of the key ratios (growth rate, EBIT margin, tax rate, and either capex/revenue and WC/revenue or OA/revenue and NOA/OA) is substantially different from its value at the end of the explicit forecast period, then the company is not likely to reach steady state at the end of the explicit forecast period. Therefore, the forecast period should be extended, or a convergence period should be introduced to allow for gradual convergence. For example, if the growth rate at the end of the explicit forecast period is substantially higher than the perpetual growth rate (as is often the

case) and no convergence period is allowed for, forecasted cash flows during the terminal period are likely to be understated.

- The length of the convergence period should increase in the magnitude of the differences between the steady-state values of the key ratios and their values at the end of the explicit forecast period. Convergence of key ratios to steady-state values is likely to be gradual. Using a short convergence period when there are substantial differences between steady-state values and values at the end of the explicit forecast period would result in “jumps” and therefore biased free cash flow forecasts.
- If a convergence period is introduced, the values of each of the five key ratios in each convergence year must be estimated to be able to calculate free cash flow in that year. A simple assumption is that each ratio will trend linearly from its value at the end of the explicit forecast period to the steady state value. An alternative approach, which does not require steady state estimates of the key ratios other than the growth rate, is to specify linear convergence for the growth rate in free cash flow. However, this approach is not recommended because the growth rate in free cash flow during the explicit forecast period—including at its end—can be quite volatile.

Steady-state profitability

The steady state forecasts of the key ratios—or their implied values in the terminal period—can be used to calculate the implied steady state value of operating profitability ($RNOA = NOPAT / \text{average NOA}$).⁴⁰⁷ This implied forecast can be compared to a separately derived estimate of steady-state RNOA (discussed below); if there is a significant difference between the two measures, the key ratios forecasts (e.g., EBIT margin, OA/revenue, ...) should be reevaluated. More generally, steady-state RNOA may be used to (1) evaluate the reasonableness of explicit or implied forecasts of NOPAT and net operating assets, (2) estimate the length of the “competitive advantage” period, (3) evaluate the reasonableness of the WACC calculation, (4) estimate steady-state growth, and (5) estimate or evaluate the terminal value. See Nissim (2021f). The following are three examples:

- Economic and accounting forces drive operating profitability toward WACC (see Section 2.8.4). Is the RNOA trend implied by the forecasts of NOPAT and NOA reasonable given the estimate of steady-state RNOA and the likely persistence of the forces that cause a difference between current and steady-state profitability?
- In steady state, economic profitability should approach WACC, so any excess of steady-state RNOA over WACC should be due to accounting distortions. Are accounting distortions large enough to explain the difference?⁴⁰⁸ If not, the WACC estimate and/or the estimate of steady-state profitability should be reevaluated.
- While the return on existing investments may deviate substantially from steady-state RNOA, the expected return on new investments is less likely to be substantially different from

⁴⁰⁷ The return on net operating assets (RNOA) is related to but not always the same as the return on invested capital or ROIC. If there are no assets and liabilities other than operating or financing, the two measures of profitability are identical. However, if there are nonoperating assets or liabilities other than financing (e.g., equity method investments, liabilities for unusual litigation), the two measures diverge. See Nissim (2021b).

⁴⁰⁸ For example, how significant is brand equity (which is generally omitted from the balance sheet) in the firm’s industry? How significant is the depreciation-related inflation bias?

steady-state RNOA. Is the trend in the return on incremental investments implied by the forecasts of NOPAT and NOA reasonable given the estimate of steady-state RNOA?

The above checks are important. For example, Hand et al. (2017) investigate the use and performance of residual income valuation methods by U.S. sell-side equity analysts. They find that RNOA-based residual income valuations are optimistic to the same degree as DCF valuations and contain RNOAs that increase to an economically unlikely terminal year median of 27 percent. Similarly, Green et al. (2016) examine a sample of 120 DCF models detailed in reports issued by U.S. brokers and find that a common mistake in valuation is to assume an unreasonable positive trend in profitability (ROE) and a steady-state profitability that is almost 50% larger than the near-term rate.

Finally, in some implementations of fundamental valuation—especially residual income variants—the terminal value is derived from estimates of steady-state profitability (e.g., Gebhardt et al. 2001).

There are several methods for estimating steady-state profitability. Nissim (2021f) describes and evaluates the following approaches:

- Past profitability – average RNOA over recent years (covering a full business cycle); for mature companies
- Forecasted profitability – average forecasted RNOA over the explicit forecast period
- Peer or industry profitability – average RNOA across peers over the business cycle
- Profitability components – steady-state profitability is calculated based on the steady-state values of its components, including profit margin, turnover, and operations funding ratio (see Nissim 2021b)
- Accounting distortions – steady-state RNOA is estimated based on WACC and the estimated impact of accounting distortions. The rationale for this approach is that economic forces (competition, entry and exit of firms, ...; see Section 2.8.4) should push economic profitability toward WACC, but accounting profitability can remain different from WACC even in the long run. For example, expensing of organic investments in intangibles implies that NOA understates net economic assets, leading to overstated steady-state RNOA (=NOPAT/average NOA).
- Price implied profitability – the average ratio of core enterprise value to net operating assets (essentially the market-to-book ratio of operations) across mature peers reflects expected long-term RNOA. To extract estimated long-term RNOA from average [Core EV / NOA], one must account for average WACC and average expected long-term growth (g). Specifically,

$$\text{Steady state RNOA} = g + [\text{Core EV/NOA}] \times (\text{WACC} - g).$$

Steady-state growth

The starting point for estimating firm-specific steady-state growth is the expected long-term growth rate of the economy in which the company operates. This is due to two reasons. First, because firms deliver the majority of value added in the economy, which in turn is equal to GDP,

growth in revenue and earnings over time should be similar to the GDP growth rate.⁴⁰⁹ Practitioners and academics recognize the role of GDP growth expectations in forecasting firms' revenue and earnings. For example, using a survey of 172 valuation specialists, which provide valuations related to litigation, taxes, and purchases/sales of a business, Allee et al (2020) report that when estimating long-term growth, valuation specialists most commonly use an economy-wide rate (e.g., GDP growth). Mukhlynina and Nyborg (2020) report that valuation professionals from the asset management industry most commonly use GDP growth in estimating firm-specific steady-state growth. Li et al. (2014) show that combining geographic segment sales disclosures and forecasts of country level GDP generates significant improvement in forecasting firm level profitability.

Another reason that is often mentioned for using GDP growth in specifying the steady-state growth assumption is that, on a theoretical level, firm-specific steady-state growth cannot exceed long-term nominal GDP growth; if it does, then at some future point the company will become bigger than the economy. In fact, in steady state most firms are likely to grow at rates lower than the economy because new entrants contribute to economic growth.⁴¹⁰ Indeed, surveys indicate that analysts and other valuation specialists often use perpetual growth rates that are substantially lower than nominal GDP growth. Mukhlynina and Nyborg (2020) survey of 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that the most popular choices of steady-state growth rate are 2% (2.29), inflation (2.16), and expected GDP growth (1.96). Using a sample of 120 DCF models detailed in reports issued by U.S. brokers, Green et al. (2016) report an average steady-state growth of 1.7%, but there is significant variation in this estimate.

Of course, models are merely approximations of reality, so the fact that firm-specific growth cannot indefinitely exceed economy-wide growth does not necessarily imply that specifying a growth rate larger than the economy-wide growth rate is always “wrong;” in some cases (e.g., small companies with high expected growth and high discount rate), doing so may actually improve valuation accuracy. Still, in most cases one should view economy-wide growth as an upper bound for the steady-state growth assumption.

There are two approaches for estimating long-term (LT) nominal GDP growth: based on economists' real growth and inflation forecasts, and using the LT risk-free interest rate. The interest rate approach is based on the rationale that interest rates and nominal growth share one determinant—expected inflation—and their other primary determinant—real interest and real growth, respectively—are correlated.⁴¹¹ Specifically, classic economic theory postulates that real interest rates inform on future real growth because they are affected by expectations regarding future growth. Nissim (2021e) explains these arguments and provides evidence that supports

⁴⁰⁹ The value added by firms is approximately equal to the total of pretax earnings, interest expense, and wages; that is, a metric between revenue and bottom-line earnings.

⁴¹⁰ Companies may be able to indefinitely grow their revenue at a rate equal to that of the economy, but this would likely require costly M&A, which would reduce free cash flow growth. When valuing firms, most analysts focus on existing businesses; that is, they exclude future M&A, effectively assuming that future acquisitions are zero NPV investments.

⁴¹¹ Interest rates may reflect an inflation risk premium in addition to expected inflation and real rates.

using the risk-free long-term interest rate as the basis for forecasting long-term economy-wide growth. Using the risk-free interest rate and various economists' forecasts, the study then develops a composite estimate of long-term GDP growth.

As noted above, forecasts of LT GDP growth provide the basis for estimating firm-specific steady-state growth. However, in many cases these estimates should be adjusted. For companies with significant international operations, the relevant economy is a mixture of local and global, so expected growth rates of foreign economies should also be considered. For truly global companies, the relevant economy is the world economy. Yet, for many small companies as well as for most companies operating in highly regulated industries (e.g., utilities, financial institutions), the relevant economy is local. In addition, steady-state growth is likely to be relatively low for high payout firms and for very large firms, as well as for companies operating in declining industries. In such cases, firm-specific steady-state growth can be estimated by subtracting $X\%$ from forecasted LT nominal GDP growth, where $X\%$ reflects the extent to which the company or its existing businesses are expected to decline relative to the overall economy.

As a nominal rate, the perpetual growth rate includes an expected inflation component. For multinational companies, expected inflation in foreign (local) currencies varies across the markets they operate in. Still, the expected inflation component of the company's overall perpetual growth rate should equal the expected inflation component of the domestic (home) currency, which is reflected in WACC. The reason is that differences in expected inflation across countries are generally offset by differences in expected appreciation or depreciation of the foreign currencies relative to the domestic currency used in measuring and discounting the free cash flows (the "relative purchasing power parity" theory). For example, sales growth measured in local currency in highly inflationary foreign operations is likely to translate to substantially lower growth measured in the home currency due to expected devaluation of the foreign currencies. The theory of relative purchasing power parity postulates that the expected devaluation will fully offset the difference in growth rates, implying that the growth rate measured in home currency should depend only on the expected inflation of the home currency.

Terminal value

The most common approach for estimating the terminal value (TV) is the constant growth model, under which the terminal value is calculated as the ratio of expected free cash flow in year $T+1$ (FCF_{T+1}) to $[WACC - g]$, where g is steady-state growth. A less common approach—referred to as the exit multiple method—is to apply a multiple to a key forecasted fundamental in year T , typically to EBITDA. Some analysts combine the two approaches—they use the constant growth formula to calculate TV, and they evaluate the reasonableness of the implied exit multiple (or multiples). Such triangulation is warranted given the significance and arbitrariness of the TV estimate.

Evidence on the importance of the terminal value, the difficulties in estimating it, and the use of exit multiples, is provided by several surveys of analysts and valuation specialists as well as by studies that examine the content of analyst reports. Bancel and Mittoo (2014) surveyed 365 European finance practitioners with CFAs or equivalent professional degrees in 2012. They report that "there is wide variation in how experts compute terminal value. Over half of

respondents (51%) rely on a normative terminal cash flow that grows [at a constant rate] until infinity, while 27% use a multiple, and 18% assume a decreasing terminal cash flow.” They also provide evidence on the difficulty in estimating terminal value. In response to the question “What are the major limitations of current valuation models?” estimating the terminal value was the second main limitation mentioned (39%) after estimating the discount rate (41%).

Mukhlynina and Nyborg (2020) conducted a survey of 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They find that while terminal values are calculated mostly using the Gordon growth model, exit multiples are also common. They also report that using the most common choices of forecasting horizon (5 years), WACC (10%), and perpetual growth rate (2%), imply a terminal value that is about 70% of total value.

Nissim (2019b) evaluates alternative price-multiple methods for estimating the terminal value term in DCF valuation. Consistent with common practice, exit multiples based on EBITDA dominate those based on either net operating profit after tax (NOPAT) or net operating assets (NOA). However, NOPAT and, especially, NOA provide incremental information about the terminal value beyond EBITDA. A simple average of the three estimates yields a considerably more accurate terminal value estimate than the EBITDA-based estimate. These results demonstrate the importance of considering balance sheet information when estimating or evaluating the terminal value. The study also shows that through-the-cycle multiples dominate current multiples in estimating terminal value. This finding indicates that the benefit from using average pricing over the business cycle, consistent with the long-term average nature of the forecasted fundamentals to which exit multiples are applied, is greater than the cost of ignoring the permanent nature of some changes in exit multiples (e.g., due to secular changes in interest rates).

Adjusting and discounting the cash flows

Theoretically, expected free cash flows should reflect the probability-weighted average of all possible outcomes, including bankruptcy. In practice, forecasted free cash flows assume that the company will remain a going concern, and thus they overstate expected cash flows. One approach to correct this bias is to adjust the forecasted FCFs (and terminal value) based on the probability of default and recovery rates (to debt and equity holders) in case of default. Default rates can be estimated based on the company’s debt rating and Moody’s and S&P estimates of default rates by credit rating for each future year (both Moody’s and S&P provide estimates for many subsequent years). If credit ratings are unavailable, they can be estimated (e.g., Nissim 2017). Overall recovery rates in case of bankruptcy can be estimated using the WACC leverage ratio and assuming that equityholders do not recover any value in default (i.e., 100% loss given default) and debtholders recover 40% of the debt face value (i.e., 60% loss given default).⁴¹²

⁴¹² This debt recovery estimate is based on Moody's data (Average Senior Unsecured Bond Recovery Rates by Year Prior to Default, 1982-2010), which indicate a recovery rate around 40% of face value for essentially all rating categories. Many other studies report a similar average recovery rate (e.g., “What Determines Creditor Recovery Rates?” By Nada Mora). While recovery rates vary across industries, Moody's states that “Moody’s credit ratings are opinions of relative expected credit losses, which are a function of both the probability of default and severity of default (LGD),” which implies that the ratings effectively adjust for differences in recovery rates across industries.

To calculate core enterprise value, the adjusted free cash flows and terminal value are discounted at the weighted average cost of capital or WACC (see Section 6.2.4 below). Analysts often assume that cash flows are received at the end of each fiscal year. However, cash is paid and received throughout the year, so assuming mid-year cash flow is likely to be closer to the actual timing of cash flows. This is important also because WACC varies across companies, so the impact of full year versus half year discounting on the difference between price and intrinsic value is not the same across companies.

Another discounting-related decision is selecting the date to which the cash flows are discounted to calculate core enterprise value (hereafter the *discounting date*). There are four common choices: the most recent fiscal year end for which financial statements are available (Year 0), the most recent fiscal quarter for which financial statements are available, end of Year 1, and end of Year 2. Year 1 is generally, but not always, the current fiscal year. For example, if one conducts a valuation analysis for a calendar year company in January 2020, Year 1 is fiscal year 2019 because Year 0 (the most recent year for which financial statements are available) is 2018. Each of the four choices (Year 0, 1 or 2, or the most recent quarter) has its advantages and disadvantages.

If the discounting date is the end of a forecast year (Year 1 or 2), the adjustments to core enterprise value to get value per share (e.g., adding excess cash and investments, subtracting debt and net retirement obligations, dividing by the number of shares) are based on forecasted quantities at the future discounting date. In contrast, if the discounting date is the end of the last fiscal year (Year 0), these quantities are known, implying that Year 0 is the preferred discounting date. However, this may not be the case. If the discounting date is the end of Year 0, nonoperating activities that created or destroyed value between that date and the current time are not accounted for. For example, if the company repurchased shares at the beginning of the current year at prices that were high relative to the current value, that loss (from the perspective of existing shareholders) will not be captured. In contrast, such effects are incorporated if the discounting date is a future date. Indeed, using Year 1 or even Year 2 is consistent with sell-side analysts' calculation of target price, which typically relates to a date at least twelve months ahead.

As noted, another alternative is to use an interim valuation date, generally the most recently reported quarter of half year. Relative to using Year 0, this approach has the advantage of using more recent information in getting to value per share from core enterprise value (e.g., adding the balance of excess cash as of the most recent quarter rather than the most recent fiscal year). However, quarterly information may not be as detailed as annual information (e.g., companies do not report the funded status of pension plans in quarterly reports), and the approach also requires dividing Year 1 cash flow between the amount already received and the portion that is yet to be received.⁴¹³

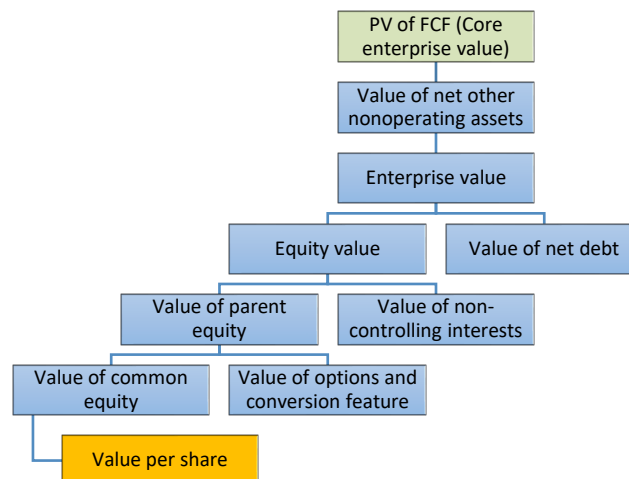
⁴¹³ One approach to estimate FCF to be received during the remaining portion of Year 1 is $\text{NOPAT}_1 \times [1 - \text{YTD Revenue}/\text{Revenue}_1] - (\text{NOA}_1 - \text{NOA}_{\text{LFQ}})$, where LFQ denotes last fiscal quarter. This amount should be assumed to be received at the midpoint between the end of LFQ and the end of Year 1.

The choice of valuation date may vary across companies and over time. For example, Year 2 may be the preferred choice if the current date is close to or after the end of year 1, while Year 0 may be the preferred choice if there is a lot of uncertainty about nonoperating items.

From core enterprise value to value per share

Given an estimate of core enterprise value, to measure equity value one needs to estimate and add the fair value of financial assets (e.g., excess cash, long-term investments in marketable securities) and other nonoperating assets (e.g., equity method investments, real estate not used in operations; see Nissim 2021c), and to subtract the fair value of debt and other nonoperating liabilities (e.g., related to unusual litigation). The resulting estimate of total equity value is then allocated to noncontrolling interests and contingent claims, with the residual amount attributed to existing common shares. Dividing the estimated value of common equity by existing common shares gives the value per share (see Exhibit 6.2a).

Exhibit 6.2a From core enterprise value to value per share



Thus, measuring the value of common equity may require estimates of the value of two types of minority interests: equity method investments (the company's significant minority stakes in affiliated entities), and noncontrolling interests (outside minority interests in the company's partially owned subsidiaries). In most cases little information is provided on these claims, and their value is accordingly estimated using book value. Nissim (2021g) develops an algorithm to estimate the value of minority interests using book value, earnings, and the average pricing of these fundamentals in the firm's industry. The study shows that valuing minority interests using the algorithm instead of book value results in statistically and economically significant improvement in the accuracy of the estimated value of common equity.

Measuring the value of net debt (i.e., debt minus financial assets) is generally straightforward. Common approaches include book value, disclosed fair value (in the notes to the financial

statements), market value,⁴¹⁴ or estimated fair value (e.g., by discounting contractual cash flows at current rates or by adjusting book value for the impact of changes in interest rates, credit spreads and the company's credit profile since the issuance of the debt instruments). Estimating the value of contingent claims is more complicated. Earnings quality issue "Contingent claims in valuation" in Section 5.21 describes an estimation approach based on EPS data.

The above calculations are done as of the discounting date, but using currently available information (forecasts, interest rates, etc.). As discussed in the previous section, the discounting date can be the end of Year 0 (the most recent year for which financial statements are available), Year 1, Year 2, or the most recent quarter for which financial statements are available. Either way, it is generally different from the current time. Therefore, to get the current value, the estimated value per share should be discounted or accredited to the current time using the cost of equity capital. Any actuals or expected dividends between the two dates, as well as any stock split or stock dividend, should also be accounted for. If the discounting date is before the current date, another potential adjustment is for any value creation or destruction due to nonoperating activities between the discounting date and the current date (for example, from buying back shares or selling an investment at a price different from current value). (In contrast, any value creation or destruction from operating activities should be captured by the discounted free cash flows because the free cash flow forecasts reflect current information).

6.2.3 Forecasting financial statements

This section discusses the forecasting of financial statements for the explicit forecast period, starting with a short description of the primary sources of information, and then the approaches used to forecast each of the key line items—revenue, cost of revenue, operating expenses, EBIT, income taxes, depreciation and amortization, capex, working capital, long-term operating assets and liabilities, and finally financial and other nonoperating items. The final subsection describes several checks that can be used to evaluate and adjust the forecasts.

Information for forecasting

Primary sources of information include:

- Historical and reformulated financial information
- Management Discussion and Analysis (MD&A) – see Item 7 in Section B.1 of Appendix B
- SEC filings (10-K, 10-Q, 8-K, S-1, ...) – see Appendix B
- Company disclosures (presentations, conference calls, press releases), usually available on the company's website
- Analysts' reports and forecasts – see Sections 2.11.9 and 4.6.2.
- Business media – see Section 4.6.5
- Information on peer companies, the industries in which the firm operates, and the economy – see Sections 4.9 and 4.10

⁴¹⁴ Some debt instruments are traded, and the fair value of other debt instruments can be estimated using matrix pricing. Some data providers make available fair value information on traded debt instruments (e.g., Bloomberg, FactSet). Bond prices are also available from <https://finra-markets.morningstar.com/BondCenter/Default.jsp>.

Historical financial information can be obtained from financial reports (company web site or SEC's Edgar) or from data providers/aggregators (e.g., Capital IQ, FactSet, Bloomberg). Conducting informative valuation analyses requires reformulating the financial statements to separate operating activities—the core of value creation—from financing and other nonoperating activities. It also requires distinguishing between recurring and transitory items in the income statement. Nissim (2021c) provides a step-by-step explanation of the reformulation process and describes how the reformulated financial statements can be measured using Compustat data items.

Revenue

Forecasting revenue is perhaps the most important step in valuation, both because of the economic significance of revenue and because it is the key driver of expenses, assets, and liabilities. Approaches used to forecast revenue or its growth rate include:

- Extrapolating from past growth rates (see Section 2.11.1)
- Time-series models (sophisticated extrapolation; see Section 2.11.2)
- Investment and asset growth: recognized and unrecognized assets (e.g., R&D; Sections 2.11.4 and 2.11.5)
- Contracted future revenue: deferred revenue, remaining performance obligations, orders backlog (Sections 3.1.2 and 3.1.3)
- Sales-generating units: stores, store square footage, drugs, airplanes, ships, ... (Sections 2.11.7 and 2.11.8)
- Firm characteristics: size, age, profitability, sustainable growth rate (Sections 2.11.6, 4.10.4 and 4.10.5)
- Analysts' forecasts & other info on the company, peers, industry & economy (Sections 2.11.9 and 4.6.2)
- Market size and market share forecasts
- Growth decomposition: price, organic volume, M&A, foreign currency (Sections 2.11.3 and 3.1.4)
- Segment disclosures and related analyses (Section 3.15)
- Non-financial metrics: customers, employees, patents, governance, ... (Sections 2.11.7, 2.11.8 and 4.10)
- Earnings quality indicators (discussed throughout the monograph)

Cost of revenue

Cost of revenue during the explicit forecasts period is typically forecasted at the segment/division/product level, consistent with the forecasting of revenue. However, unlike revenue, for which the various growth components (volume, price, foreign exchange, and M&A) are forecasted separately, the total cost of revenue is usually modeled as a percentage of the segment/division/product revenue. Still, some analysts predict cost components (e.g., labor, material, depreciation; typically modelled as a percentage of related revenue) and a small number forecast components of variation analysis (i.e., volume, cost, and productivity effects). When the explicit forecast period is relatively long, costs in the distant years are typically forecasted assuming a company level cost/revenue ratio ($= 1 - \text{gross margin}$), which may change during that period and converge toward a steady state value. Some analysts focus on predicting the operating

margin at the segment/division/product level, generally by extrapolating from past margins, and then “fill up” the cost and operating expense components.

Operating expenses

Operating expenses consist primarily of SG&A expenses but may also include separately reported R&D, startup costs or other items. In many models, SG&A and R&D expenses during the explicit forecasts period are forecasted at the segment/division/product level, consistent with the forecasting of cost of revenue. In other models, SG&A and R&D expenses are forecasted at the company level. When the explicit forecast period is relatively long, SG&A and R&D expenses in the distant years are forecasted assuming company level SG&A/revenue and R&D/revenue ratios, which are typically assumed to stabilize rather quickly. As discussed above, some models focus on predicting the operating margin at the segment/division/product level, generally by extrapolating from past margins, and then “fill up” the cost and operating expense components.

EBIT

Most analysts forecast EBIT by separately predicting its three components—revenue, cost of revenue, and operating expenses—as discussed above. Some analysts forecast revenue and the EBIT margin. Others conduct both analyses and compare the forecasted EBIT margin with the margin implied by the estimates of revenue, cost of revenue, and operating expenses; a significant difference between the two suggests that the cost and/or expense forecasts should be adjusted.

The EBIT margin is predicted based on its past levels and other relevant information. A key component of such information is whether and the extent to which the company has recognized special items (e.g., restructuring charges, goodwill impairment, asset write-downs, M&A costs; discussed below and in Section 2.5). More generally, effectively extrapolating from past margins and predicting future changes rely primarily on insights from the different types of earnings quality analysis discussed throughout the monograph. Other considerations include peer information, analysts’ forecasts, cost structure, growth, and macroeconomic conditions.

Special items

In recent years, “special items” (i.e., items considered unusual and/or non-recurring) have actually become very common. For example, using Compustat’s classification, each year since 2014 more than 80% of firms reported special items. Moreover, the magnitude of these items is substantial, reducing pretax margins from an average of 6.4% to 4.4%. Nissim (2021d) provides evidence on the implications of past and current levels of different types of special items for future profit margins. Key findings include the following.

First, while commonly treated as transitory items, none of the nine components of special items identified by Compustat (restructuring charges, goodwill impairment, asset write-downs, M&A costs, gains/losses on asset sale, gains/losses on extinguishment of debt, litigation & settlement, in-process R&D, and other) are completely transitory. The least transitory component is

restructuring charges, while the most transitory component is goodwill impairment. But even goodwill impairment shows some persistence—a company that reported goodwill impairment in the current year is more likely than other companies to also report goodwill impairment in the future.

Second, for most components of special items (SPI), as well as for their total, the average ratio to sales in recent years provides a much better indication of future ratios compared to the most recent level of the ratio. This result stands in sharp contrast to pre-SPI margin, for which the most recent level provides a better basis for forecasting future values. It implies that when forecasting special items, one should focus on their average level in recent years rather than on the most recent level.

Third, there are significant differences across special items not just in their persistence but also in the implications for future pre-SPI profitability. For example, while restructuring charges are the most persistent SPI component, they are also strongly correlated with future changes in pre-SPI margin (restructuring is associated with subsequent increases in pre-SPI margin)—so much so, that if one does not account for the positive implications of restructuring charges for future pre-SPI margin (for example, if one assumes constant expense ratios), treating restructuring charges as completely transitory may be the preferred approach. In contrast, if one predicts the pre-SPI margin in a way that reflects the expected benefits from the restructuring (for example, if the forecast is based on management guidance or if it reflects estimates of reduced labor costs or other restructuring-related savings), then the implications of past and current restructuring charges for future restructuring costs should be accounted for. If not, expected pretax margins will be significantly overstated. This is especially true when forecasting long-term profitability because the benefits from current restructuring activities are likely to decline over time.

One factor that complicates the extraction of information from past and current special items is mean reversion in profitability. For total SPI and for most SPI components, their correlation with future post-SPI margin is due not just to their persistence and direct implications for future pre-SPI profitability (e.g., cost savings due to restructuring), but also to mean reversion in pre-SPI profitability. SPI is correlated with pre-SPI margin (pre-SPI margin is typically lower than average when companies recognize SPI), and pre-SPI margin is correlated with future changes in pre-SPI margin due to mean reversion (low profitability is on average associated with subsequent improvement in profitability; e.g., Nissim and Penman 2001). There is significant variation across the SPI components in each of the three effects (persistence of SPI, direct effect on future pre-SPI profitability, and the mean reversion effect). Accordingly, the study provides different recommendations on how to forecast the net profitability effect of different types of SPI.

Peer companies

Considering past and forecasted margins of peer companies should help in forecasting the trend in the company's margin because, over time, competition tends to reduce differences in profitability across companies (see Section 2.8.4).

Analysts' forecasts

Analysts' reports are useful for forecasting margins for two reasons. For many companies, analysts provide forecasts of measures of operating profit (EBIT or EBITDA) in addition to revenue, which can be used to derive margin forecasts for the company and/or its peers. In addition, analysts provide quantitative and qualitative data on and analysis of the company, peers, industry & economy, which may be useful in deriving or adjusting own forecasts. See Sections 2.11.9 and 4.6.2 for further discussion of analysts' information.

Growth

Considering past and forecasted growth is relevant because of the interactions between growth and reported profitability. Organic growth often leads to a margin reduction in the near term, as startup costs, R&D expenditures, and other economic investments are expensed prior to revenue realization. Business combinations may lead to persistent declines in profit margin due to the mark-up of depreciable/expensed acquired assets. However, when companies buy businesses as a substitute for organic investments (e.g., in technology or in people), their margins are likely to be higher than those of other companies (see earnings quality issue "overstated margins" in Section 5.17).

Macroeconomic conditions

Macroeconomic conditions have significant margin effects, especially in periods of change and for cyclical companies. The following are a few examples; see Section 4.9 for a detailed discussion. Economic activity affects margins through its impact of revenue and therefore on the ratio of fixed costs to revenue (operating leverage). Inflation often increases current and near-term pretax margins because historical cost depreciation and FIFO cost of goods sold, unlike revenue, do not adjust immediately to inflation. However, increases in real corporate taxes partially offset this effect. Interest rates affect margins both because they determine the set of acceptable projects (e.g., high interest rates imply that only high profitability projects are selected) and because they affect economic investments, which in turn are negatively associated with current and near term reported profitability (the organic growth effect discussed above). Both effects imply a positive association between interest rates and EBIT margins.

Income taxes

Income taxes are forecasted by applying an estimate of the operating tax rate to pretax operating profit:

$$\text{Tax on operating profit} = \text{operating tax rate} \times \text{pre-tax operating profit (EBIT)}$$

The operating tax rate is typically projected based on the historical effective tax rate (i.e., the ratio of income tax expense to pretax income; see Section 2.6), with some adjustments applied. The tax rate is usually assumed to remain constant over time, but in some cases it is forecasted to change (e.g., due to expiration of special tax benefits or to expected changes in the mix of domestic and foreign income). The best source of information for predicting the operating tax

rate is the effective tax reconciliation (see Section 2.6). The reconciliation helps identify the effects of transitory and nonoperating items on the effective tax rate and thus facilitates the measurement of the tax rate on recurring operating profit. Undoing or at least smoothing out the impact of transitory items is important in part because the predicted operating profit (to which the tax rate is applied) generally excludes transitory items. When using effective tax rate information, it is important to examine several years of data because the effective tax rate can fluctuate significantly over time (e.g., due to transitory items such as goodwill impairment) or it may exhibit a trend (e.g., due to changes in income mix). See earnings quality issue “Income taxes in DCF valuation” in Section 5.8 for additional discussion.

Taxes on operating profit are often delayed due to accelerated depreciation, bonus depreciation, or other temporary differences (see Section 2.6 and 5.8). If one considers changes in the deferred tax liability in measuring free cash flow (e.g., an increase in the deferred tax liability reduces net operating assets and thus increases FCF), then temporary differences can be ignored when measuring the tax rate. However, if one measures FCF ignoring changes in net long-term operating assets other than capex and depreciation, the tax rate on operating profit should be reduced. For example, if the tax rate is 40%, but 25% of the income is delayed by many years for tax purposes due to accelerated tax depreciation, the economic tax rate on operating profit is significantly below 40%. If FCF is calculated using a 40% tax rate without recognizing that the actual FCF is larger (because the current tax rate is effectively $30\% = (1-0.25) \times 40\%$), estimated value will be understated. In contrast, using the current tax rate (30%) would overstate value because the delayed taxes will be paid eventually. The preferred solution? Use the 40% tax rate but adjust FCF for changes in the deferred tax liability. This will increase near term FCF and reduce far term FCF. The deferred tax liability can be predicted based on forecasted PP&E or forecasted revenue, as explained below.

Depreciation and amortization

Depreciation and amortization are included in cost of revenue, SG&A and R&D, which are forecasted as discussed above. Still, a separate forecast of D&A is needed to generate EBITDA and asset forecasts. Depreciation and amortization can be forecasted separately or combined. They are usually forecasted at the company level, but in some cases—when information is available (e.g., in the segment note)—they can be forecasted at the segment, division, or even product level.

Depreciation and amortization (D&A) forecasts are often derived combined, based on the total balance of PP&E and intangibles. When the required information is available, D&A rates and the related D&A forecasts should be derived separately, because the average lives of intangible assets may be significantly different from those of tangible fixed assets, and the forecasted mix of tangible versus intangible assets is likely to change. Most models predict net additions to fixed tangible assets, but net reductions in intangibles. This follows because intangible assets are generally recognized in business combinations, and most models do not forecast M&A activities.

Depreciation can be forecasted either as a percentage of sales, capex, or beginning-of-period gross PP&E. Depreciation should not be forecasted as a percentage of net PP&E, because this ratio declines as the firm matures. For example, if an asset is purchased for \$1,000 and

depreciates over ten years to zero salvage value, the depreciation rate relative to net book value is 10% ($=100/1,000$) in the first year, 20% ($=100/500$) in the sixth year, and 100% ($=100/100$) in the last year. In contrast, measured relative to the gross balance of PP&E, the depreciation rate is 10% in each of the ten years.

Although land and construction in progress are not subject to depreciation, they should not be excluded when calculating the depreciation rate relative to gross PP&E. The reason is that forecasted capex—which is added to PP&E—includes spending on land and construction in progress. In other words, while the information required to calculate past depreciable PP&E is typically available, when PP&E forecasts are derived by adding capex and deducting depreciation, future depreciable PP&E is unavailable.

Amortization can be forecasted either as a percentage of sales or finite-life intangible assets (i.e., excluding goodwill and indefinite life intangibles). In most cases amortization relates primarily or exclusively to intangible assets acquired in M&A. Because most models do not forecast M&A, when calculated as a percentage of finite life intangibles, amortization declines over the forecasting horizon.

Capital expenditures

Capex is usually forecasted at the company level, but in some cases—when information is available (e.g., in the segment note)—it can be forecasted at the segment, division, or even product level. Capex forecasts are calculated as a percentage of revenue or depreciation. In some cases, near terms forecasts are provided by management, either in the MD&A, investor presentations, or other disclosures. Some analysts calculate capex forecasts as the total of sustaining (maintenance) capex and expansion capex, where sustaining capex is generally modelled based on depreciation or inflation-adjusted depreciation.

While capex—especially sustaining capex—is often forecasted based on depreciation, extrapolating from the historical relationship between capex and depreciation is complicated by many factors, including inflation, changes in the relative magnitude of buying versus leasing, M&A, non-cash capex, assets impairment, and other factors (see Sections 3.4 and 5.4). When forecasting capex, therefore, it is important to consider trends in proxies for these activities and effects (e.g., ROU asset turnover, fixed assets turnover, intangible assets turnover, inflation rate, etc.).

Working capital assets

Working capital assets should generally be forecasted based on their relationship to next year's revenue, because most assets generate revenue after their acquisition (a few assets—such as accounts receivable—are related to same period revenue). Another advantage of relating assets to future revenue is due to M&A and fluctuations in organic growth. The relationship between assets at time 0 and revenue in year 0 may be distorted because assets of acquired companies (or from organic investments) are immediately added to the balance sheet, while revenue is consolidated only from the acquisition date. For example, if there was a big acquisition close to

the end of the most recent year (year 0), end-of-year assets are related to forecasted next year revenue, while current year revenue was derived from a subset of end-of-year assets.⁴¹⁵

How should the percentage of each working capital asset to next year revenue be measured? In general, it should be the most recent one. That is, the ratio of the asset at time 0 to forecasted revenue in year 1. That ratio should be applied to forecasted revenue in year 2 to get the forecasted asset at the end of year 1, and so on. However, if the ratio of revenue in year 1 to the asset in year 0 is significantly different from the median ratio in prior years, an adjustment should be applied. (The median rather than average ratio should be used to mitigate the effects of M&A and other transitory shocks in prior years).

Required liquid funds

Liquid funds—consisting of cash, cash equivalents and short-term investments— should be divided into “required” and “excess” balances, where “required liquid funds” is an estimate of the amount of cash needed for operations. That amount includes liquid funds needed (1) for daily operations, (2) to serve as a “buffer” due to risky operations, and (3) for investment in operating assets (including capex). Excess liquid funds should be classified as financial assets. Required liquid funds are related to sales, but the relationship depends on firm- and industry- characteristics (e.g., sales volatility, cost structure, availability and cost of operating credit, etc.). Accordingly, liquid funds required for operations should be forecasted as the product of next year revenue and an estimate of the minimum amount of cash needed for operations per dollar of revenue. See discussion above for the rationale of using next year revenue (as opposed to current revenue). See Nissim (2021c) for a suggested method of estimating the minimum amount of cash needed for operations per dollar of revenue.

Accounts and notes receivable

Most assets generate future revenue (e.g., PP&E, inventory). In contrast, accounts receivable are generated by same period sales. Therefore, theoretically, end-of period receivables should be modelled based on same period sales. However, the M&A/growth-related distortions discussed above suggest that, if there were recent M&A transaction or growth fluctuations, it may still be better to forecast receivables as a percentage of next year revenue.

When modelling receivables, it is important to distinguish between accounts receivable and other receivables, because accounts receivable are likely to have a more stable relationship with revenue. If the company reports note receivables from sales, they should be modeled similar to accounts receivables, possibly combined with accounts receivable.

Receivables are almost always reported net of allowance for uncollectible accounts, and in some cases are also net of other allowances (e.g., for expected returns, discounts, or other after-sale credits). Because gross receivables and the allowances may evolve differently over time, significant allowances should be modeled separately. To model the allowance for doubtful

⁴¹⁵ In theory, the relationship between next year revenue and current year assets may be distorted if next year revenue reflects future M&A activity. However, analysts rarely predict future M&A.

accounts, one should examine its relationship with gross receivables, past due receivables, and nonperforming receivables. Another relevant metric for evaluating and predicting the allowance is the ratio of bad debt expense to net write-off. See Sections 3.2 and 5.2.

Inventory

Many analysts forecast inventory by assuming a constant ratio to sales. This is problematic because variation over time in the gross margin affects the inventory/sales ratio. For example, if the gross margin declines, a larger dollar amount of inventory is needed to support the same level of sales. Unlike common practice, inventory should generally be modeled relative to COGS, not relative to sales. Inventory and COGS are both measured at cost, so their ratio is approximately equal to the ratio of the related numbers of units. In contrast, the inventory/sales ratio mixes quantity and price/cost effects.

Inventory is expected to generate future sales and should therefore be modelled relative to next period sales or (preferably) next period COGS. At the minimum, this alternative measure (inventory/next period COGS) should be examined. In selecting which approach to use, it may be helpful to compare measures of the stability of the alternative ratios over time (e.g., the coefficient of variation).

Other working capital assets

Other working capital assets may include prepaid expenses, income tax receivables, or other items. They should generally be forecasted based on their relationship with next year's revenue (see the beginning of the "Working capital assets" section above).

Working capital liabilities

Working capital liabilities should generally be forecasted based on their relationship to either next year's revenue or same period working capital assets, whichever relationship is more stable over time. For accounts payable and accrued expenses, a third relationship should also be evaluated (and used to forecast this liability if it is more stable than the relationships with revenue and working capital assets)—with next year cost and operating expenses (exclusive of D&A and SBC, which do not generate current liabilities). The rationale for using next year (instead of same period) revenue or costs & operating expenses is the same as that explained for working capital assets above. Also like working capital assets, if next year sales or costs are used to forecast the liability, the ratio should be the most recent one (i.e., year 0 liability divided by forecasted year 1 flow) unless it is significantly different from the median ratio in prior years, in which case an adjustment should be made. If the liability is forecasted based on its relationship to same period working capital assets, there should be greater emphasis on the median ratio (compared to the flow-based ratios).

Accounts payable and accrued expenses

Accounts payable are related to supplier/vendor costs and expenses and should therefore be modelled relative to these costs if the costs can be estimated reliably. Supplier/vendor-related

costs and expenses can be estimated by adding the change in inventory to the total of cost of revenue and operating expenses (excluding income taxes) and subtracting costs and operating expenses that do not generate accounts payable (depreciation and amortization, share based compensation, and possibly other items). Forecasting accounts payable relative to operating outlays (rather than relative to sales) is important especially when there is significant variation over time in margins and/or in inventory turnover. For example, if inventory turnover is forecasted to improve over time, the ratio of accounts payable to sales is likely to decline. Yet, in many cases estimates of relevant outlays are noisy, so using revenue instead may yield more precise forecasts. Another approach to forecast accounts payable is to recognize that this liability is related to working capital assets—particularly to inventory. Which approach should be used? One way to make this determination is to select the approach that is associated with the most stable relationship in recent years (e.g., compare the coefficient of variation of the ratios of accounts payable to either same period working capital assets, next period revenue, or next period cost and operating expenses).

Accrued expenses should be forecasted based on their relationship to either next year's revenue or same period working capital assets, whichever relationship is more stable over time. Accrued expenses are often reported combined with accounts payable, in which case they should be modeled combined with accounts payable using the same method as described above for accounts payable.

Deferred revenue

Deferred revenue should be forecasted based on its relationship to next year's revenue.

Other working capital liabilities

Other working capital liabilities include income taxes payable and possibly other items. They should be forecasted based on their relationship to either next year's revenue or same period working capital assets, whichever relationship is more stable over time.

Long-term operating assets

As noted at the beginning of the "Working capital assets" section above, operating assets should generally be forecasted based on their relationship to next year's revenue. In estimating the relationship between each long-term asset and revenue, the most recent ratio should be used, preferably from the most recent quarterly report (relative to next twelve-month revenue). Unlike working capital assets, past ratios are generally not relevant. The reason for the greater emphasis on recent information is that changes in ratios involving LT items are typically persistent. For example, an M&A typically leads to a relatively persistent decline in asset turnover ratios due to the marking-to-market of the assets of the acquired business.

PP&E

PP&E is often predicted by adding forecasted capex and subtracting forecasted depreciation. An alternative approach is to forecast PP&E based on its relationship to next year's revenue. If the

second approach is used either capex, depreciation or both should be modeled so that the forecasted change in PP&E is equal to the forecasted difference between capex and depreciation

Right of use assets

ROU asset should be forecasted based on its relationship to next year's revenue.

Intangible assets

Most analysts assume that both goodwill and indefinite lived intangible assets will remain constant. For finite-life intangibles, an often-made assumption is that they will be amortized at a constant rate without replacement. The reasons for these assumptions are that most intangible assets are recognized as a result of M&A, and most analysts do not forecast business combinations. This, however, implicitly assumes that the company will be able to maintain its operating profitability from existing investments indefinitely, an assumption that in many cases is not likely to hold. As noted above (forecasting EBIT) and explained in Section 5.17 (earnings quality issue "overstated margins"), to maintain their operating profitability, companies often acquire existing businesses. This allows them to avoid having to expense investments in internally generated intangible (including the losses that characterize the earlier years of businesses, which are typically offset by higher margins in the following years when scale is achieved), and instead recognize the acquired intangibles as assets. In such cases, assuming that intangible assets will grow with revenue would effectively adjust free cash flow downward, to implicitly account for the cost of maintaining profitability through business acquisitions. Alternatively, EBIT margin should be adjusted downward (see forecasting EBIT above).

Long-term operating liabilities

LT operating liabilities may include deferred taxes, operating lease liabilities, noncurrent restructuring liabilities, asset retirement obligations, some litigation liabilities, and possibly other items (see Nissim 2021c). LT operating liabilities should generally be forecasted based on their relationship to either subsequent period's revenue or same period total operating assets, whichever relationship was more stable in recent years.⁴¹⁶ The rationale for using next period (instead of same period) revenue is the same as explained for working capital assets above. Like LT operating assets the most recent ratio should be used because changes in ratios involving LT items are typically persistent.

⁴¹⁶ Deferred tax assets and liabilities should generally be modeled similar to other assets and liabilities because they related to other assets and liabilities. For example, for many companies the largest component of the deferred tax liability is due to temporary differences between the book and tax basis of fixed assets, which in turn is correlated with the book value of fixed assets. Some situations require separate modelling for different components of deferred taxes. For example, if PP&E is both large and expected to evolve differently from revenue, the PP&E-related portion of the deferred tax liability can be modeled based on forecasted PP&E, with other components of the deferred tax liability modeled based on revenue. Another situation is when there are significant Net Operating Losses (NOL) and related deferred tax assets and valuation allowance. In some cases, excluding these items from the DCF and accounting for them separately (as a nonoperating assets, like equity method investments) may be the preferred approach.

Operating assets and operating liabilities

Most analysts forecast operating assets and operating liabilities by separately predicting key line items as discussed above. Some analysts forecast total operating assets and total operating liabilities directly in addition to the line items and compare the forecasted totals with the implied totals across the line items; significant differences suggest that the line items forecasts should be reevaluated. Another, more common approach to obtain this insight is to simply examine the relationship between the implied totals and their presumed key drivers (revenue for operating assets, and revenue or operating assets for operating liabilities). Unreasonable trends (e.g., a strong negative trend in the ratio of forecasted operating assets to forecasted revenue) suggest that the line-item forecasts should be reevaluated. See “evaluating the forecasts” below.

For reasons discussed above, operating assets should generally be forecasted in relation to the following year’s revenue, emphasizing the most recent ratio (i.e., the ratio of forecasted revenue in year 1 to operating assets at time 0, or even forecasted revenue for the next twelve months divided by operating assets from the most recent quarterly report). Operating liabilities should either be forecasted similarly (i.e., in relation to next year’s revenue), or in relation to same period operating assets, whichever relationship appears more stable over time and also depending on the quality of the revenue forecast for next year.

Financial and other nonoperating items

Although not required for DCF valuation, forecasting financing and other nonoperating items, including debt, equity, excess cash, investments, and interest income and expense may be helpful. These forecasts can be used:

- As a plausibility check for operations-related forecasts (for example, if assumed capex requires significant external funds, the availability of which may be questionable). Relatedly, leverage often has substantial effects on operations (discussed below), and explicit modeling of leverage makes it more likely that these effects will be incorporated.
- As a check on the WACC leverage assumption (the implied forecasted leverage—with book equity adjusted to reflect expected market value—should be consistent with the leverage used in calculating WACC)
- To compare the modeler’s view with forecasts by sell-side analysts. The most widely available forecasts are of EPS, and to generate an EPS forecast one needs to forecast financing and other nonoperating items, as well as share count.
- To be able to generate a relative value estimate using a multiple of forward EPS, which is very common (see the beginning of Chapter 6). This is important both as a check on the DCF estimate of value per share and—related to the previous point—to summarize and understand differences between the modeler and other analysts in terms of near-term expected earnings (forward EPS) and their pricing (the multiple, which reflects perception of growth, risk, and other factors). Doing so requires forecasts of financial and other nonoperating items through the forward EPS year (for example, up to future year 3 if one uses EPS NTM2 multiples, i.e., EPS for the twelve months that start twelve months from now).
- To be able to get from the present value of free cash flows to intrinsic value per share when the present value is calculated as of a future date (see “From core enterprise value to value

per share” in Section 6.2.2 above). In such cases, forecasts of financial and other nonoperating items are needed through that future date.

In addition, forecasts of financing items are required when implementing equity flow models—such as the net equity flow or residual income models—which are commonly used to estimate the value of financial firms.

Yet, forecasting financial and other nonoperating items—including share count—may take time and effort, which at least in some cases may not be justified. The recommended approach, therefore, is to forecast these items with reasonable care for the near term (say up to year 3) and use simple assumptions afterwards (e.g., constant relationship to sales). In addition, more attention should be paid to these forecasts in circumstances where they are likely to be especially important (e.g., if financing is an important concern, or if the dominant valuation method used for the industry is forward EPS multiples).

Costs and benefits of leverage

The effects of leverage on operations include both costs and potential benefits. The cost of leverage include:

- Higher total and systematic volatility of shareholders’ profitability
- Negative effects on operating profitability and growth. High leverage may deter current and potential suppliers, employees, customers, and other operating counterparts from transacting with the firm, or induce them to demand better terms to the detriment of the firm. High leverage also reduces financial flexibility, which may cause managers to forgo profitable projects. Relatedly, “debt overhang” may cause managers to forgo profitable projects that require new capital if that capital inflow primarily benefits existing debtholders (by making their claims less risky)
- Higher agency costs between owners and debtholders – Managers may take actions that destroy overall firm value but increase shareholders’ value (the “wealth redistribution” hypothesis). For example, managers/shareholders may take on high risk projects (“asset substitution” hypothesis) or increase dividend payout. Debtholders anticipate and price this possibility.
- Higher likelihood of bankruptcy and associated costs, including litigation, accounting, etc. as well as the difference between the going concern value and exit value of the firm economic assets.
- Higher borrowing interest rates and lower credit rating
- Personal tax costs (compared to equity)

Some of the costs are (or should be) captured by WACC (e.g., the impact on volatility and borrowing rates), some are (or should be) captured by expected free cash flows (e.g., limited credit from suppliers due to concerns over liquidity reduces free cash flow), and some can only be captured by considering “bear” scenarios (e.g., the cost of financial distress) or even a bankruptcy scenario (see Section 6.4 for scenario analysis).

The potential benefits of leverage include

- The debt tax shield (e.g., Kemsley and Nissim 2002)

- Borrowing allows firms to increase the size of operations and obtain the related benefits (economies of scale and scope, diversification, ...). While firms may also be able to increase their size by issuing equity, the costs of equity financing may be excessive (e.g., dilution, information asymmetry, issuance costs)
- Lower agency costs between management and owners – having to service debt and monitoring activities by debtholders make management more discipline and less likely to waste cash flows (the “free cash flow hypothesis” or overinvestment hypothesis). In addition, debt increases managers relative ownership in the company and thus better align their interests with those of other shareholders (corporate control benefits)
- Higher shareholders’ profitability (ROE, EPS) on average

The debt tax shield is incorporated in the WACC calculation while the other two benefits should generally be captured by the forecasted FCFs.

Financial assets

Financial assets should be forecasted to grow by the change in cash implied by the forecasted changes in equity, liabilities, and assets other than cash. The total amount of assets can then be divided into current and LT portions based on the median ratio in prior years.

Interest expense and interest income

Interest expense and interest income are often forecasted using the historical effective interest rate on the related liability or asset. If the effective rate differs significantly from current or expected rates, the projections are systematically biased. When the liability (asset) that gives rise to the interest expense (income) is recycled, the interest rate may change substantially and predictably (for example, if the effective rate is substantially different from current forward rates). Therefore, it is important to consider current and expected interest rates (e.g., based on forward rates) in addition to the effective rate when forecasting interest expense and interest income. Over time, the effective rate is expected to converge toward market rates as the related instruments are repriced or replaced.

When measuring effective interest rates, interest flows should be compared to the total of all the assets or liabilities that generate them. For example, some analysts forecast interest income assuming that it is earned on investments rather than on cash plus investments (reported cash includes interest-earning cash equivalents). As a result, the historical interest rate appears too high. After calculating interest income, a portion of it should be allocated to NOPAT based on the ratio of average required liquid funds during the year to average interest-earning assets.

A common mistake when forecasting interest income or interest expense is to multiply the effective interest rate—which is measured relative to the average balance of the related asset or liability—by the balance at beginning or end of period (rather than by the average balance). Measuring effective interest rates using the average balance is the preferred approach, but it is important to maintain consistency when generating the forecasts.

Debt

Some analysts assume a constant debt level (dollar amount) and constant leverage ratio for WACC, while revenue is assumed to grow. This is a significant inconsistency, especially when forecasted growth is high. If debt level is constant and the company is growing, the leverage ratio will decline over time and WACC should therefore increase. A more reasonable assumption is to relate debt to next year revenue or to operating assets, whichever relationship is more stable over time. The total amount of debt can then be divided into current and LT debt based on the median ratio in prior years.

Other nonoperating assets and liabilities and equity

These items should generally be forecasted based on their relationship to either subsequent period's revenue or same period operating assets, whichever relationship is more stable over time.

Evaluating the forecasts

The discussion thus far has focused on forecasting line items (e.g., PP&E or cost of goods sold). However, in some cases more precise forecasts may be obtained by predicting total or net measures (e.g., total operating assets, NOPAT). In addition, evaluating the relationships among total or net forecasts may help evaluate the reasonableness of the forecasts. The following are key checks.

Revenue growth generally requires commensurate investments in operating assets or organic investments in intangible assets, which tend to lower margins

To grow their revenue, companies generally need to invest in either recognized assets (increasing operating assets) or unrecognized intangibles (lowering margins due to the immediate expensing of the investment).⁴¹⁷ This check can be performed by examining the trend in the ratio of operating assets to revenue over past and future (forecast) years and comparing it to the trend in the EBIT margin. Another approach is to examine the growth rate in revenue and compare it to the growth rate in operating assets and to the trend in EBIT margin.

⁴¹⁷ For many companies, the total value of intangible assets (often referred to as intellectual capital) substantially exceeds their tangible capital. Intellectual capital is developed by companies primarily by making organic investments, which are expensed as incurred and are therefore omitted from the balance sheet. Intellectual capital consists of human capital, relational capital, and structural capital. Human capital is the value that the employees of a business provide through the application of skills, know-how and expertise. It is Inherent in people and can leave the organization when people leave, if management fails to provide a setting where others can pick up their know-how. Relational capital is the value inherent in the company's relationships, including customer relationships, supplier relationships, relationship-based trademarks and trade names, licenses, and franchises. Structural capital is the supportive non-physical infrastructure, processes and databases of the organization that enable human capital to function. It includes process capital (techniques, procedures, and programs that implement and enhance the delivery of goods and services), innovation capital (intellectual property such as patents, trademarks and copyrights), and organizational capital (organizational structure, information system, proprietary software and databases, philosophy and culture).

Failure of this check is often due to the modelling of goodwill and other intangible assets. Most analysts assume that goodwill will not change, and other intangible assets will either remain constant or decrease over time (due to amortization). So, if intangible assets are substantial, and revenue is forecasted to grow, the revenue growth rate will significantly exceed the growth rate in operating assets. The solution is to adjust the explicit forecasts to either allow for growth in intangible assets (with the corresponding investment reducing free cash flow) or a decline in the margin.

A similar issue often arises when analysts assume that some tangible operating assets related to operations will remain constant while revenue will continue to grow. Examples include working capital assets other than inventory and receivables (e.g., prepaid expenses, operating cash, income tax receivable) and long-term operating assets other than fixed and intangible assets (e.g., deferred costs, long-term operating receivables, capitalized contract costs, deferred tax assets, restricted cash, regulatory assets of utility companies, inventory of film and programming rights, ...). And while essentially all models assume that capex and key working capital assets will grow with revenue, some assume that after several years these items will stabilize even if revenue continues to grow. A similar, offsetting bias occurs with operating liabilities (e.g., long-term unearned revenue or deferred taxes are assumed to remain unchanged), but in most cases this effect is smaller than the impact on operating assets.

NOPAT growth should generally be consistent with the growth rate in net operating assets

The rationale is similar to that of the previous check, with two differences. Unlike revenue, NOPAT captures the cost of organic investments in intangibles in addition to the benefits that they provide. In addition, net operating assets and NOPAT also capture the effects of operating liabilities. For example, outsourcing of production may lead to a reduction in net operating assets but also in NOPAT as the outsourcing partners will price their products to earn a return on their investments. In contrast, outsourcing does not necessarily lead to a reduction in revenue, so it distorts the relationship between revenue and operating assets. Still the benefits of this check are compromised by the more volatile nature of NOPAT and net operating assets (compared to revenue and operating assets, respectively). In addition, if operating profitability ($RNOA = NOPAT / \text{average NOA}$) is expected to change, the growth rate in NOPAT and NOA will diverge accordingly (see discussion of “steady-state profitability” in Section 6.2.2).

Another way to evaluate whether the NOPAT growth forecast is consistent with investments in net operating assets is to examine the cash conversion ratio (i.e., free cash flow divided by NOPAT). NOPAT growth generally requires that the cash conversion ratio be less than one. A cash conversion ratio of one implies that free cash flow is equal to NOPAT, that is, there is no reinvestment of profits in net operating assets (recall that $\text{free cash flow} = NOPAT - \text{change in net operating assets}$). As explained above, to grow NOPAT companies generally need to invest in net operating assets.⁴¹⁸

⁴¹⁸ This approach is not recommended. Past cash conversion ratios are typically poor proxies for future cash conversion ratios, in part due to M&A activities which reduce free cash flow. If it is still used, recalculating the cash conversion ratio excluding from FCF any M&A outflows is likely to yield a more informative ratio, especially because most analysts do not forecast future M&A.

If (1) the company had significant business acquisitions in prior years, and (2) the analyst does not predict business acquisitions, forecasted revenue growth rates should generally be lower than past growth rates.

High past revenue growth rates may lead analysts to predict high future growth rates. However, research suggests that, unlike profitability rates, revenue growth rates show little persistence (e.g., Nissim and Penman 2001). This is partially because high past growth rates are often due to large business acquisitions. Therefore, if past growth rates reflect growth from M&A activities in addition to organic growth, and no future acquisitions are forecasted (as is typically the case), future growth rates should generally be lower than past growth rates.

For mature companies, the forecasted levels of key profitability ratios (EBIT margin, OA/revenue, NOA/OA, RNOA) should not be significantly above their average levels in the past 5-10 years. This is especially true for long-term/terminal value forecasts.

Companies may be able to generate excess profitability for a limited number of years (for example, benefiting from investments in the prior cycle), but they are not likely to be able to generate excess profitability forever. This check is less relevant for growth companies because reported profitability is typically depressed during the growth stage in the company's life cycle.

If the analyst does not forecast business acquisitions (as is typically the case) and does not allow for growth in intangible assets in steady state, EBIT margin should generally be forecasted to decline, at least in the long run.

In the early years of a business, reported income is low or even negative, both because some economic investments are expensed (e.g., start-up costs, assembling work force, technology, advertising, etc.) and because revenue is low compared to fixed costs (it takes time to reach scale). These losses are offset by high reported income in the later years. In other words, reported income of mature companies is overstated in the sense that it includes the benefits from investments that have been expensed in the past. But these benefits are not permanent. To maintain high profitability, companies will either have to make new organic investments (e.g., start new businesses), which would reduce margins, or acquire businesses that already went through the low profit/loss stage.

Steady-state RNOA should generally be higher than WACC, with the difference related to the significance of fixed assets and unrecognized intangible assets. See "Steady-state profitability" in Section 6.2.2.

6.2.4 Cost of capital

Fundamental valuation models involve discounting expected flows to equity holders (dividends, net equity flows, or residual income) or to the providers of capital (free cash flow). These flows are discounted at the corresponding cost of capital—cost of equity in the case of equity flows, and the weighted average cost of capital (WACC) in the case of flows to the providers of capital.

This section discusses WACC and its components, which include the cost of equity (WACC is measured as the weighted average of the aftertax cost of debt and the cost of equity). The after-tax cost of debt equals the product of the pretax cost of debt and one minus the corporate tax rate that applies to interest deductions, because interest deductions provide a tax shield. Estimating WACC is considered by analysts as one of the most difficult tasks in valuation. For example, Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees. They find that main difficulties in valuation include estimating discount rates (41%) and terminal values (39%), and difficulties in checking business plans (29%) and defining peer groups when using comparables (27%).

WACC is calculated as the weighted average of after-tax costs because free cash flow is after tax. The weights should reflect expected long-term market values rather than (historical) book values. Similarly, the costs should reflect expected long-term market rates rather than historical rates. Indeed, to analytically derive the WACC version of the DCF model, one must assume that each of the following ratios is constant over time: the required rate of return on debt, the corporate tax rate that applies to interest deductions, the required rate of return on equity, and the leverage ratio measured using market values. These assumptions imply that WACC should be estimated using the expected long-term values of its components.

WACC should reflect all sources of capital that fund the operations that generate the free cash flow. However, capital may also fund net assets that do not contribute to free cash flow (e.g., equity method investments or real estate not used in operations). In such cases, WACC may measure the discount rate for free cash flow with significant error. For example, if capital funds risky investments in (leveraged) equity method investments in addition to operations, WACC—which reflects the riskiness of those investments in addition to that of operations—may overstate the discount rate.

Most companies issue debt and equity instruments (including hybrid instruments) with varying exposures, and therefore different costs. Theoretically, WACC should be measured as the weighted average of the costs of the different components, including common equity, non-controlling (minority) interest, options, convertible preferred equity, convertible bonds, preferred equity, redeemable preferred equity, long-term debt, and short-term debt. In practice, WACC is usually measured using aggregate debt and aggregate equity, because the cost of some components is particularly difficult to measure, and the weights and costs are likely to change over time. Accordingly, the costs of debt and equity should reflect the weighted average of the costs of their components (based on market values) with hybrid securities either accounted for separately or being decomposed into debt and equity components.

Leverage

The weights used in measuring WACC should reflect the expected long-term leverage ratio, not the current ratio. The current leverage, calculated using the market value of equity,⁴¹⁹ typically

⁴¹⁹ Theoretically, the leverage ratio used in measuring WACC should be based on the market values of both, equity and debt. In practice, the book value of debt is used instead. Using the book value of debt is problematic when it is significantly different from market value, as is likely to be the case when the effective interest rate is substantially

serves as the starting point and is adjusted based on examination of past leverage ratios, book-value leverage ratios, peer leverage ratios, and management plans (as disclosed in the MD&A discussion of leverage and capital, in investor presentations, or in other communications).⁴²⁰

The leverage ratio should generally be measured using gross debt. Measuring WACC using net debt implicitly assumes that the netted financial assets are identical to the issued debt in terms of interest rate, duration, credit risk, and other debt characteristics, so that they effectively “undo” the same amount of debt by funding it. This is never the case. In addition, financial assets are often relatively small (especially when the estimated amount of working capital cash is classified as operating) or are expected to become small over time, so their impact on long-term leverage (used in the WACC formula) can be ignored.⁴²¹

Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees. They find that WACC leverage is estimated based primarily on target market leverage, but also considering book and sector leverage ratios.

Pretax cost of debt

The pretax cost of debt is the debtholders’ required rate of return, that is, the discount rate that equates debt value and the present value of expected interest and principal payments. It is generally smaller than the yield-to-maturity, which is based on contractual cash flows. There are several approaches for measuring the required rate of return on debt, as explained next.

The most common approach for measuring the required rate of return on debt is to add a credit spread to the risk-free interest rate (e.g., Mukhlynina and Nyborg 2020). The risk-free rate is typically the same rate used in measuring the cost of equity capital (discussed below).⁴²² The

different from the current yield-to-maturity. In addition, although most debt instruments are not actively traded, the fair value of debt is often disclosed in the notes or can be estimated.

⁴²⁰ Past leverage ratios and book leverage ratios help identify transitory derivations from the long-term ratio, which are likely to reverse over time. Short-term deviations could result from large changes in stock prices, recent debt-financed acquisitions, unusual interest rates or term-structure (e.g., inversion), temporary accumulation of excess cash (when debt is measured net), and other factors. Leverage ratios of peers help identify the optimal leverage ratio because, in the long-run, differences across firms within the same industry tend to decline. For example, a new management team may adjust leverage toward the industry norm. Management discussion of leverage and capital should inform on management’s plans regarding leverage.

⁴²¹ If financial assets are expected to remain (or become) large, one should either use net debt in the WACC formula and adjust the cost of net debt upward (interest rates on financial assets are typically lower than interest rates on issued debt and so effectively increase the interest rate on net debt) or treat financial assets as a separate negative debt category in calculating WACC.

⁴²² Theoretically, the cost of debt used in measuring WACC should reflect the expected long-term weighted-average cost of all debt instruments, and many debt instruments have relatively short duration. Still, using the long-term interest rate independent of the maturity structure of actual debt may be justified for the following reasons. (1) It is consistent with the duration of the discounted free cash flows. Companies that issue short-term debt may pay a lower interest rate, but they are taking on interest rate risk (relative to the duration of FCFs), and this risk should not be ignored. Although this risk should be reflected in the cost of equity capital, in practice estimates of the cost of equity capital are not likely to fully reflect this risk. (2) WACC should reflect the average cost of debt in all future years, and long-term rates may better predict future short-term rates than current short-term rates. This is due to two reasons. First, under the expectations hypothesis, long-term interest rates reflect the expected value of future short-

credit spread can be estimated using credit default swap (CDS) spreads for the company or for similarly rated companies from the same sector and geographic area. When CDS spreads are unavailable, the credit spread can be estimated using as the difference between the yield to maturity on corporate bonds of similar rating and the corresponding risk-free rate. For unrated debt (unrated bonds, loans, finance leases), synthetic credit ratings can be estimated (e.g., Nissim 2017). If the credit rating is relatively low, the credit spread should be reduced by an estimate of the credit loss component of the spread (the credit spread includes a premium to cover expected credit losses in addition to the risk premium). This adjustment is needed because the required (expected) rate of return on debt is the discount rate that equates debt value and the PV of expected interest and principal payments. For high credit rating debt, expected cash flows are close to contractual cash flows so the required rate of return on debt can be measured using the current yield-to-maturity on similarly rated debt. However, for debt with considerable credit risk, expected cash flows are substantially smaller than the contractual cash flows, so the current yield to maturity overstates investors' expected return and should therefore be adjusted downward when measuring the required rate of return. This can be done by subtracting the historical annualized rate of credit losses on similarly rated debt from the yield to maturity.

Additional approaches to estimating debtholders' required rate of return include using the yield-to-maturity on traded debt with the same credit rating as that of the company, the effective interest rate on the firm's outstanding debt,⁴²³ and the CAPM approach.⁴²⁴

Mukhlynina and Nyborg (2020) survey 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that when calculating WACC, the cost of debt is estimated as the risk-free rate plus a spread, and the cost of equity is estimated using the CAPM (multifactor models are rarely used); (12) the risk-free rate is most commonly taken to be the yield on a long-term Treasury security;

Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees. They find that inconsistent with the leverage assumption (which is based primarily on target market leverage), the cost of debt is generally estimated based on current firm rating and leverage. In addition, most analysts use 5-10 years debt maturity, although many of them use the 10-years country sovereign rate for the risk-free rate.

term interest rates. For example, in the decade following the financial crisis short-term interest rates were very low but they were generally expected to increase, resulting in higher long-term interest rates. Similarly, a company's credit rating may be expected to change in the long-run, and such expected changes are not likely to be reflected in the pricing (interest rate) of short-term instruments.

⁴²³ The effective interest rate is the ratio of interest expense to average debt during the year. It is equal to the weighted average historical yield to maturity of the instruments included in the average balance of debt. This approach is theoretically incorrect because it reflects past rather than future interest rates. A refinement is to adjust the effective rate by adding an estimate of the difference between the current yield to maturity and the historical yield to maturity on similarly rated debt.

⁴²⁴ Under this approach the required rate of return on debt is estimated like the cost of equity capital, i.e., using the CAPM. This, however, can only be done when debt is actively traded, which is typically not the case. Alternatively, one can use rating-specific betas derived using bond indexes.

Tax rate

The tax rate used in measuring WACC is often different from that used in measuring NOPAT. It excludes the effects of operating items (such as R&D and investment tax credits) and reflects the expected long-term rate. (In contrast, the tax rate for measuring NOPAT is often predicted to change over the forecasting horizon until it reaches its steady-state level.) Compared to the operating tax rate, the tax rate used for measuring WACC is generally closer to the statutory tax rate. In addition, unlike operating profit, which is often deferred for tax purposes due to accelerated depreciation and other book-tax differences, interest expense is usually immediately deductible. If noncontrolling interest or preferred dividends are included in debt when calculating WACC, the tax rate should be adjusted downward because these instruments do not provide a tax shield. Like common equity, for these instruments the after-tax cost is the same as the pretax cost. See earnings quality issue “Income taxes in DCF valuation” in Section 5.8 for a discussion of how to estimate the tax rate for WACC.

The risk-free interest rate

The risk-free interest rate is used in estimating the pretax cost of debt (discussed above) as well as the cost of equity (discussed below).

A basic principle in fundamental valuation is that the discount rate used in calculating the present value of expected cash flows be consistent with the characteristics of the cash flows. For example, if the expected cash flows are nominal, denominated in USD, and net of corporate tax (as is typically the case in valuation of U.S. firms), the discount rate should also be nominal, reflect USD interest rates, and be net of corporate tax. Similarly, the discount rate should be commensurate with the time pattern and riskiness of the cash flows. Thus, if the cash flows are spread over many future years, the discount rate should be based on long-term interest rates, especially at times of low interest rates during which the effective duration of stocks is particularly high.⁴²⁵

Practitioners typically use the 10-year government yield as a proxy for the risk-free rate.⁴²⁶ While the average maturity of expected cash flows for most firms is substantially longer than that of the 10-year government bond, the effective duration of firms’ cash flows may still be similar to that of the 10-year government bond if both of the following conditions are satisfied: (1) risk free rates are relatively high (reducing the duration of future cash flows, especially the long-term tail), and (2) the premium for the riskiness of the firm’s cash flows is substantially higher than the credit spread on government bonds (so the difference between maturity and duration is larger for the firm’s cash flows compared to government bonds). These conditions may have held in the past for some U.S. firms. However, since the mid-80s the effective duration

⁴²⁵ Duration is the weighted-average time to the cash flows, where the weight applied to each cash flow is equal to the present value of that cash flow divided by the sum of the discounted cash flows.

⁴²⁶ Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees. They find that most analysts use the 10-years country sovereign rate for the risk-free rate. Mukhlynina and Nyborg (2020) survey 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that when calculating WACC, the risk-free rate is most commonly taken to be the yield on a long-term Treasury security.

of equities has been gradually increasing due to three trends: (1) the decline in long-term interest rates, (2) the decline in the market risk premium (see Nissim 2021a), and (3) the increase in intangible intensity.⁴²⁷ For example, if the cash flows of a firm that has an 8% cost of capital are expected to grow at an annual rate of 3% indefinitely, the duration of the cash flows is 22 years. In contrast, the duration of a 30-year Treasury bond that pays a coupon rate of 3% and sells at par is 20 years. Thus, when interest rates are relatively low (and durations are high), the “long-term risk-free interest rate” should be based on ultra-long government yields, such as the 30-year Treasury yield in the U.S.

While a 30-year government yield is available in the U.S. and other markets, in some countries the longest rate available is substantial shorter. In such cases, the long-term rate may be estimated using forward rates derived from the longest available interest rate. For example, Nissim (2021e) shows that the five-year forward five-year Treasury rate has been essentially identical to the 30-year Treasury rate in the U.S. throughout the last four decades.

Although commonly used in practice as proxies for risk-free interest rates, government yields overstate risk-free returns for two related reasons. First, the yield to maturity of any bond—including government bonds—overstates the expected return because it is calculated using the contractual rather than expected cash flows. While for some governments the probability of default is very low (e.g., U.S., Germany), implying that expected cash flows are only slightly lower than contractual cash flows, for others it is quite significant. Moreover, because government default is more likely in “bad” states of nature, government yields include a risk premium in addition to the bias that results from using contractual instead of expected cash flows in calculating the yields. Thus, to measure the truly risk-free interest rate one has to remove both the bias and risk premium components from government yields. Fortunately, CDS spreads on government bonds provide market-based proxies for the total of the two components (bias and premium), enabling one to estimate risk-free interest rates by removing the CDS spread from the bond yield (i.e., $R_f = (1 + Yield) / (1 + CDS) - 1$).

Cost of equity

The cost of equity capital is the rate of return required by equity investors given the expected pattern and risk of equity flows (dividends, share repurchases, other distributions). Unlike debt, no tax adjustment is applied to the cost of equity because equity flows are not tax deductible. The cost of equity capital is measured as the total of the risk-free rate for the duration of the equity flows (discussed above) and a risk premium, which reflects the riskiness of the equity flows and the pricing of that risk (discussed next).

There are at least three approaches for evaluating equity risk and estimating the cost of equity capital. The traditional and most common approach is to estimate the cost of equity capital based on the joint distribution of stock returns and market-wide risk factors, primarily the return on a proxy for the market portfolio—the so-called *Capital Asset Pricing Model (CAPM)*. Another

⁴²⁷ Investments in intangibles are expensed as incurred, depressing current earnings and increasing future earnings (relevant costs incurred in generating revenue—such as R&D, advertising, hiring, IT—are expensed before the revenue is recognized). The resulting increase in expected earnings growth lengthens equity duration (e.g., Dechow et al. 2004, 2021).

approach is to map fundamental risk factors (e.g., leverage, size, value ratios, industry membership, profitability) into an estimate of the cost of equity capital. This is done using models that extract information on the pricing of the fundamentals from risk measures such as historical beta (e.g., the predicted beta approach described below). A third approach is to reverse-engineer the cost of equity capital from market prices and earnings or cash flow forecasts. This approach is based on the premise that, when pricing equity securities, investors discount expected flows (e.g., dividends or earnings constructs) using required rates of return commensurate with the riskiness of those flows. Therefore, given price and estimates of expected flows to equity holders, one can invert an equity valuation model to obtain an estimate of the average required rate of return used by investors in valuing the stock. From the company's perspective, this estimate reflects the cost of equity capital and is accordingly referred to as the implied cost of equity capital. I focus here on the CAPM approach because it is by far the most common approach for estimating the cost of equity capital.⁴²⁸

The fundamental premise of the CAPM is that the risk of a stock can be decomposed into two components – systematic risk, which is related to the overall market, and non-systematic (idiosyncratic) risk, which is specific to the individual stock. According to the CAPM, idiosyncratic risk is not priced because its impact can be eliminated by holding a diversified portfolio. Systematic risk, in contrast, cannot be diversified away and therefore commands a risk premium. Under some stringent assumptions, systematic risk can be measured using the average sensitivity of the stock's return to the contemporaneous return on the market portfolio. This metric—called beta—is estimated using a time-series regression of the stock's return on a proxy for the market return such as the S&P 500 (the “market model”). Beta measures the stock's sensitivity to market movements; for example, $\beta=2$ implies that a 1% market return is on average associated with a 2% stock return. The risk premium is calculated as the product of beta and an estimate of the market risk premium; it reflects the average additional return (above the risk-free rate) that investors demand for holding stocks instead of Treasury bonds.

Although the intuition of the CAPM is appealing, it has important limitations. The CAPM is based on strong assumptions that do not hold in practice, and its empirical performance is quite poor.⁴²⁹ Over the years, as evidence contradicting the CAPM has accumulated, the market model

⁴²⁸ Mukhlynina and Nyborg (2020) survey 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that the cost of equity is usually estimated using CAPM and multifactor models are rarely used. Similarly, using a survey of 1,980 analysts (both sell- and buy-side), primarily from developed markets (especially the U.S.), Pinto et al. (2019) report that most analysts estimate the cost of equity capital using CAPM. Graham and Harvey (2001) survey 392 CFOs and report that more than 70% use the CAPM to estimate the cost of equity capital. When using multifactor models, additional factors considered include interest rates, foreign exchange, gdp, unexpected inflation, size, and other factors.

⁴²⁹ The CAPM is a one period model, under which risk-averse investors maximize the expected utility of their end-of-period wealth. The model assumes that stock returns are normally distributed or, alternatively, that investors care only about the mean and variance of returns. The CAPM further assumes that all investors face the same investment opportunities and agree on the joint distribution of payoffs (but they can differ in wealth and risk aversion), that markets are perfect (no transaction costs, no taxes, perfect competition), and that portfolio decisions can be made in isolation because non-financial income (“labor income”) is absent or is at least non-stochastic. Given these assumptions, investors should hold the same portfolio of risky assets, and adjust for risk aversion by optimally mixing this “fund” with risk-free borrowing or lending (“two-fund separation”). If everyone holds the same portfolio of risky assets and if markets clear, this portfolio must be the market portfolio of risky assets. In reality, the CAPM assumptions do not hold. There are substantial market frictions (transaction costs, personal taxes), and investors

has been extended to include additional risk factors such as unexpected inflation, unexpected changes in interest rates, and the returns on factor-mimicking portfolios (i.e., portfolios constructed by sorting on relevant characteristics such as size and book-to-market). Under these models, the risk premium is calculated as the sum of the products of the stock's sensitivity to each risk factor and the premium associated with that factor (multifactor models). A less sophisticated approach—but one which is more commonly used by practitioners—is to adjust a market model-based estimate of the risk premium for the incremental premium associated with small or otherwise risky companies, where the incremental premium is measured based on the average historical spread relative to the market model associated with that exposure. I next elaborate on the two primary components of the risk premium: beta, and the equity risk premium.

Historical beta

The primary approach used for estimating beta is to regress past stock returns on a proxy for the market return (“historical beta”).⁴³⁰ Historical beta estimates reflect historical operations and historical leverage, while WACC is used to discount future cash flows and should therefore reflect future operating risks and future leverage. Indeed, most analysts use the target leverage ratio when calculating WACC (e.g., Bancel and Mittoo 2014), but they typically do not apply a similar adjustment to beta. When using historical beta, one should examine the average leverage over the beta estimation period and compare it to the leverage used in measuring WACC. If the difference is large, historical beta should be adjusted. For example, if the leverage ratio used in estimating WACC is substantially smaller than average leverage during the beta estimation period, beta should be adjusted downward.

Other issues with historical beta are estimation error (beta is estimated using stochastic data) and the failure of the CAPM model to fully capture equity risk. In addition, for some firms the return history is too short to precisely estimate beta. As a result of these issues, the precision and out-of-sample predictability of market model betas are often poor. To address these concerns, some analysts adjust the period and intervals used in estimating beta, for example, by using relatively high frequency data and short period when estimating betas of firms that experience significant changes in operations or leverage. In addition, many analysts adjust estimated beta toward one. For example, the default Bloomberg measure of adjusts beta is $0.33 + 0.67 \times \text{historical beta}$, with historical beta estimated using weekly return over the last two years. Beta tends to revert toward the mean for both economic and statistical reasons: large deviations of measured beta from one (its “normal” level) are often due to transitory shocks or estimation error, or to extreme values of

have heterogeneous expectations and are not fully rational. In addition, stock return distributions are heavy-tailed, and investors care about higher moments of the return distribution in addition to the mean and variance. Studies have shown that negative co-skewness—that is, a tendency to perform particularly poorly when the market overall performs poorly—and kurtosis—a measure of the heaviness of the tails of a distribution—are both priced by investors. Other factors (besides the market factor), including both diversifiable and non-diversifiable exposures, have also been shown to be priced. In addition, contrary to the CAPM premise, many factors have been shown to predict stock returns (see Chapter 7).

⁴³⁰ In academic research, the market model regression is typically estimated using sixty monthly observations. In contrast, practitioners typically use weekly observations and two or three years of data (e.g., Bancel and Mittoo 2014, and Bloomberg adjusted beta)

beta determinants (e.g., leverage) which tend to revert toward mean values over time. More structured approaches to improve the precision and out-of-sample predictability of beta is to use leverage-adjusted industry beta or predicted beta, which are discussed below.

Another issue when implementing CAPM is which stock market to use – local or global? Theoretically, if the CAPM assumptions hold across borders, the world market portfolio should be used because all investors invest in that portfolio and care about the impact of each stock on the overall risk of that portfolio. However, because the CAPM assumptions do not hold, one should consider the portfolios held by the relevant investors (i.e., those that determine the price). If those investors invest primarily in a diversified global portfolio, the risk premium and beta should relate to the global market (e.g., FTSE Global All Cap, MSCI World), but if they invest primarily in the local stock market, the risk premium and beta should relate to that market (e.g., S&P 500 in the US, Nikkei 225 in Japan, FTSE 100 in the UK, ...). For most companies, price is determined by investors that hold primarily local portfolios, reflecting the so-called equity home bias (that is, the empirical phenomenon that investors' portfolios are concentrated in domestic equities to a much greater degree than justified by portfolio theory).⁴³¹ For these companies, the national stock market index should be used. This estimate still reflects some of the benefits of global diversification because foreign holdings lower the local market's overall risk premium (foreign investors charge less compensation for diversifiable local volatility compared to local investors). For companies whose investors are likely to be more globally diversified compared to other local firms—including cross-listed firms and large firms with global operations and global name recognition, estimating the CAPM risk premium relative to both the local and global market and using some weighted average of the two estimates may be the preferred approach. Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees. They report that most analysts estimate beta over a period of 1-3 years, and they use either a country index (47%), a European index (24%), a worldwide index (24%) or other (4%).

Leverage-adjusted industry beta

Leverage-adjusted industry beta is used especially when there is short stock return history or for companies that experienced significant operating and/or financial changes. This approach is also used when estimating the beta of private companies or when implementing the adjusted present value model (APV, see Section 6.2.5 below). Leverage-adjusted industry beta is calculated as follows: (1) historical betas are estimated for a set of firms from the same industry with sufficiently long return history; (2) each of the historical beta is “unlevered” using a formula that describes the theoretical effect of leverage on equity beta (discussed below);⁴³² (3) unlevered

⁴³¹ The equity home bias has been attributed to foreign exchange risk, differential information, differential taxation, regulation and capital restrictions, differential trading costs, behavioral biases, and other factors.

⁴³² To un-lever and re-lever beta, one needs to specify the leverage effect on beta. The standard formula is: $\beta_L = \beta_U \frac{E + D \times (1 - t)}{E}$, where β_L is levered beta, β_U is unlevered beta (beta of operations), E is the market value of equity, D

industry beta is calculated as the mean or median of the unlevered beta estimates; and (4) the stock's beta is estimated by levering up the industry beta using the firm's current or expected financial leverage.

Predicted beta

A more flexible approach for incorporating fundamentals in beta estimation is to calculate *predicted betas*. This is done using a procedure similar to that described above for the levering of industry beta, except that the adjustments are empirical rather than theoretical and incorporate additional fundamentals besides leverage. A simplified version of predicted beta calculations involves the following steps: (1) historical betas are estimated for a set of firms with sufficiently long return history; (2) historical beta is regressed on fundamental risk factors that are measured during the beta estimation period (e.g., industry membership, size, leverage, earnings variability); and (3) predicted beta is calculated for each firm using the coefficients from the previous step and the current or expected values of the characteristics. The predicted beta procedure offers several advantages. First, it allows one to estimate beta for private companies. Second, it mitigates the effects of measurement error in historical beta by providing for a regression residual to capture that error. Third, it informs on the sources of priced risk, as

is the market value of debt, and t is the corporate tax rate. To understand the intuition for this formula, note the following:

- The value of equity (E) is smaller than the value of operations because debt helps finance the operations. However, debt also provides a tax shield which increases the value of equity by $t \times D$ (see below). The value of operations, therefore, is equal to $E + D \times (1-t)$.
- Because β_L measures the systematic variability of stock returns, and E measures the value of equity, $\beta_L \times E$ reflects the systematic variability of equity value. Similarly, $\beta_U \times [E + D \times (1-t)]$ reflects the systematic variability of the value of operations.
- If debt value has no systematic variability, the variability of equity value is the same as the variability of the value of operations. Thus, $\beta_L \times E = \beta_U \times [E + D \times (1-t)]$, or $\beta_L = \beta_U \frac{E + D \times (1-t)}{E}$.

The result that debt increases the market value of equity by $t \times D$ is based on four assumptions: (1) all interest payments provide immediate tax shield, and the riskiness of the interest tax shield is the same as the risk of debt; (2) the level of debt is expected to remain constant; (3) the personal tax rate on interest income and equity flows (dividends and capital gains) are identical; and (4) leverage does not impose costs or bring benefits other than tax shield. None of these assumptions is likely to hold. Debt has a personal tax disadvantage compared to equity, and it induces financial distress costs. Dividend and capital gain taxes are lower than the tax rate on interest income, and capital gain taxes are paid when shares are sold. The financial distress costs associated with leverage further offset the value of the debt tax shield. The bottom line is that we don't really know how to measure the impact of debt on equity value, and any attempt to un-lever or re-lever beta is likely to generate significant error. An alternative formula: $\beta_L = \beta_U \frac{E + D}{E}$ is obtained if one assumes that any benefit from the tax deductibility of interest is offset by the personal tax disadvantage of debt and the costs of financial distress, or that the leverage ratio is expected to remain constant and the debt tax shield has the same risk as operations.

measured by the risk fundamentals. Fourth, it facilitates adjustments for future changes in the predicted risk metric due to changes in the fundamentals.

Equity risk premium

Given beta, the other component of the firm's risk premium is the market/equity risk premium. Three approaches are used for estimating the equity risk premium (ERP; see, e.g., Nissim 2021a):

- (1) Using averages of historical excess market returns (*historical excess market return approach*)
- (2) Using implied expected return or cost of capital estimates from ratios, models, or regressions that compare price to historical or forecasted fundamentals, such as the dividend yield, earnings yield, Fed model, Shiller PE, Gordon model, residual earnings model, etc. (*market-implied or supply approach*)
- (3) Surveying professionals, including CFOs, analysts, investors, and academics (*survey or consensus approach*)

The two approaches that are most common in practice are the historical excess market return and market-implied approaches.⁴³³ The survey approach performs poorly as a proxy for expected returns. For example, Greenwood et al. (2014) find that surveys of investors' expectations of market returns are negatively correlated with both price-derived measures of expected returns and subsequent market returns. Using a novel implementation of the market-implied approach, Nissim (2021a) reports that the estimated equity risk premium (ERP; premium relative to the 30-year Treasury yield) ranged between two and eight percent over the period May 1984 through April 2021, with an average of 4.7 percent. However, in most periods ERP was relatively stable, having an interquartile range of 1.4% (= 5.4% - 4.0%). Controlling for other economic factors, ERP was high at times of high credit spreads or high inflation, and low when Treasury yields were high. In addition, ERP strongly predicted—and had similar magnitude to—subsequent excess annualized market returns.

Earnings quality and cost of capital

Earnings quality may affect the cost of capital through its effects on information asymmetry and value uncertainty. In addition, measures of earnings quality may inform on the cost of capital because of their correlation with risk exposures. For example, earnings sustainability is affected by the sensitivity to economic fluctuations (a priced risk factor), and low quality of external audit or internal controls (indicators of low earnings quality, see Sections 4.4 and 4.5.6) increases information risk.

Several studies provide evidence that poor earnings quality is associated with relatively low stock liquidity, high information asymmetry (e.g., as proxied for using the bid-ask spread), and high cost of capital (e.g., Francis et al. 2004, 2005; Armstrong et al. 2011; Bhattacharya et al. 2013). For example, Francis et al. (2004) examine the relation between the cost of equity capital and seven attributes of earnings: accrual quality (the negative of the standard deviation of

⁴³³ For example, using a survey of 1,980 analysts (both sell- and buy-side), primarily from developed markets (especially the U.S.), Pinto et al. (2019) report that the equity risk premium is estimated primarily using the historical premium, possibly subject to adjustment, but forward-looking approaches are also common.

residuals from a regression relating current accruals to prior, current and future cash flow), persistence (the slope coefficient from a regression of current earnings on lagged earnings), predictability (the standard error from a regression of current earnings on lag earnings), smoothness (the ratio of earnings variability to cash flow variability), value relevance (R-squared from a regression of stock returns on the level and change in earnings), timeliness (R-squared from a regression of earnings on stock returns), and conservatism (the ratio of the slope coefficient on negative returns to the slope coefficient on positive returns from a regression of earnings on stock returns). The authors characterize the first four attributes as accounting-based because they are typically measured using accounting information only. They characterize the last three attributes as market-based because proxies for these constructs are typically based on relations between market data and accounting data. The authors find that firms with the least favorable values of each attribute, considered individually, generally experience larger costs of equity than firms with the most favorable values. The largest cost of equity effects are observed for the accounting-based attributes, in particular, accrual quality. These findings are robust to controls for innate determinants of the earnings attributes (firm size, cash flow and sales volatility, incidence of loss, operating cycle, intangibles use/intensity, and capital intensity), as well as to alternative proxies for the cost of equity capital.

The effects of earnings quality on information asymmetry and cost of capital are influenced by the information environment. Institutional investors, analysts, and other sophisticated market participants may mitigate these effects. Using empirical proxies for competition among institutional investors (the number of institutional investors and the Herfindahl index), Akins et al. (2011) find a lower pricing of information asymmetry when there is more competition. Similarly, studies have shown that analysts' following increases investor recognition and stock liquidity, and it reduces information asymmetry and the cost of capital (e.g., Roulstone 2003, Bowen et al. 2008, Armstrong et al. 2011, Kirk 2011, Li and You 2015).

Several studies examine the effects of audit quality and internal controls on information risk and cost of capital. For example, Ashbaugh-Skaife et al. (2009) provides evidence that firms with internal control deficiencies have higher idiosyncratic risk, systematic risk, and cost of equity. See Sections 4.4 and 4.5.6 for further discussion.

Cost of capital adjustments

Size adjustment to the cost of equity capital

The size of a company is considered an important proxy for its risk and cost of capital. This relationship is due to several reasons. Compared to small firms, large firms are better diversified, more likely to use financial hedging techniques, and are more profitable. They also have greater financial flexibility, lower information risk, and lower variability in profitability and growth rates. In some industries (e.g., banking), large companies may be considered “too big to fail.” Size is also correlated with stock liquidity. More fundamentally, these relationships are due to many factors, including economies of scale and scope, bargaining power in input and output markets, mature products, access to capital markets, market attention (analysts, institutional investors), and active stock trading.

Because the above differences between small and large firms are not likely to be fully captured by beta, it is common to add a micro/low/mid-cap premium to the beta-based estimate of the cost of equity capital. Size is measured using the market value of equity, and the size premium is often based on Ibbotson estimates.

Currency adjustment to WACC

All WACC components should be measured in the same currency. For example, if the stock is traded in U.S. dollars, the borrowing rate should also be in U.S. dollars. Thus, WACC is generally calculated in the stock trading currency. However, the financial statements and free cash flow are measured in the fundamental currency. For almost all companies the trading and fundamental currencies are the same. But when they are different, WACC must be adjusted to include the expected appreciation (or depreciation) in the trading currency. The adjustment factor can be calculated using and long-term risk-free rates of the two currencies and assuming interest rate parity.

Nonoperating assets and liabilities

An implicit assumption when using WACC to discount FCFs is that equity method investments and other nonoperating assets and liabilities have the same risk as net operating assets, which generate the FCF. WACC reflects the market assessment of the riskiness of all capital-funded investments, not just the riskiness of investments that generate FCF. Therefore, if investments in associates are both significant and have substantially different risk than FCF, WACC should be adjusted. For example, if associates are highly leveraged, WACC should be adjusted downward because FCF is an unlevered flow and thus is less risky than the flows generated by investments in associates. Other nonoperating assets and liabilities may include pension and other postretirement benefits, real estate not used in operations, assets and liabilities of discontinued operations, and other items (see Nissim 2021c).

Other adjustments

Surveys reveal additional adjustments in measuring the cost of capital. For example, Allee et al (2020) survey 172 valuation specialists, which provide valuations related to litigation, taxes, and purchases/sales of a business. They report that valuation specialists use the risk-free rate plus subjective adjustments for size, industry, and firm-specific risk to estimate the cost of capital. The most common adjustment that valuation specialists make to the financial information provided to them is the removal of the owners' personal expenses, and the most common adjustment to the cost of capital is for the use of unaudited financial statements. Balakrishnan et al. (2021) examine a large sample of analysts' estimates of the cost of equity capital. They find that the estimates are systematically related to a firm's beta, book-to-market ratio, size, leverage, and idiosyncratic volatility but unrelated to profitability, investments, price momentum, short-term return reversals, and liquidity.

Fundamental risk factors

The CAPM approach for measuring the cost of equity capital is based on strong assumptions and uses metrics whose measurement involves substantial error (beta, equity risk premium). One approach to check the reasonableness of the cost of equity (and WACC) estimates is to evaluate equity risk using risk-related fundamentals (see Sections 2.9 and 2.10). While translating those measures into a cost of capital estimate is difficult, they do provide relevant information for adjusting the CAPM cost of equity capital and WACC.

6.2.5 Alternative fundamental valuation models

While the DCF model is by far the most common fundamental valuation model (see the beginning of Chapter 6), other approaches are used in some circumstances.⁴³⁴ This section describes alternative fundamental valuation methods, including the dividend discount, net equity flow, residual income, adjusted present value, and capital cash flow models.

Dividend discount model

Under this model, the value of a share is equal to the present value of all expected future dividends per share (including all pro-rata distributions in year t —regular dividends, special dividends, dividends in kind, liquidating dividends, and the value of rights granted to shareholders). The discount rate is the required rate of return on equity, which is also called the cost of equity.

Special cases of this model, which incorporate alternative dividend growth assumptions, include the constant growth formula (also called the one-stage model), the Constant (perpetual) dividend (a special case of the constant growth formula, with zero growth; used to value “plain vanilla” preferred stocks), multiple constant growth periods (for example, a high constant growth period followed by a normal growth period), the H-model (linearly declining growth rate in the first period, followed by constant perpetual growth rate equal to the growth rate at the end of the first period), and a flexible two-stage model (flexible growth rate period followed by constant perpetual growth rate). Based on a survey of 1,980 analysts (both sell- and buy-side), primarily from developed markets (especially the U.S.), Pinto et al. (2019) report the following findings related to the dividend discount model. Of the 500 analysts that responded to questions related to this model, 55.2% (50.5%) indicated that they use the two-stage (more than two stages) model, 40.6% use the constant growth model, and 10.6% use the H-model.

⁴³⁴ For example, Mukhlynina and Nyborg (2020) survey of 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that respondents typically discount expected cash flows at the WACC, and adjusted PV (APV) and capital CF (CCF) are very uncommon. In addition, although WACC is sensitive to leverage because of tax shields, only 48% take debt policy into account at least almost always when selecting the DCF variant (APV and CCF are theoretically preferable when leverage is expected to change). Mukhlynina and Nyborg (2020) survey 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe. They report that the most popular multiperiod model is DCF (mean 3.2 in a scale of 0 to 4) compared to 2.25/1.31/0.87/1.35 for IRR/DD/RI/EVA (private equity professionals favor IRR). Bancel and Mittoo (2014) survey 365 European finance practitioners with CFAs or equivalent professional degrees. They report that DCF is used by 80% of the respondents, while free cash flow to equity and the dividend growth model are used by 35% and 20% respectively.

Implementing the dividend discount model involves the following steps:

1. Forecast dividend per share for each of the next N years
2. Predict the long-term growth rate in dividend per share after year
3. Estimate the cost of equity capital
4. Calculate intrinsic value per share

The dividend discount model has several advantages: it directly relates the value of a stock to its cash flows, it is relatively simple to implement, and it yields reasonable estimates when valuing large portfolios or indexes and some mature companies. Yet it is not commonly used in practice for the following reasons. First, many companies don't pay dividends and are not expected to do so in the foreseeable future. Second, dividends represent value distribution, not value creation, so over a finite horizon are often weakly related to value. Third, firms make distributions in forms other than dividends, particularly share repurchases, which effectively substitute for dividends. Fourth, changes in the number of shares make it difficult to predict dividend per share even when total payout is predictable. Finally, the constant growth versions of the dividend discount model are highly sensitive to the growth and cost of equity assumptions.

Net equity flow model

The net equity flow model is an extension of the dividend discount model. It is often used to value financial firms, for which overall payout can be estimated using forecasts of the equity ratio ($= \text{Equity} / \text{Total assets}$), growth in total assets, and return on equity (ROE).

Unlike the dividend discount model, which focuses on cash flow (dividend) per share, the net equity flow model discounts net equity flows to all shareholders, and then divide the estimated value of equity by outstanding shares to obtain an estimate of value per share. Net equity flows include not just dividends, but also share repurchases (net of share issuance). Still, the model is subject to some of the limitations of the dividend discount models: (1) many companies don't pay dividends or repurchase shares and are not expected to do so in the foreseeable future; and (2) dividends and share repurchases represent value distribution, not value creation, so over a finite horizon are often weakly related to value.

Implementing *NEF* valuation involves the following steps:

1. Forecast the financial statements for as many future years as reasonably possible (the explicit forecasts period).
2. Estimate the cost of equity capital
3. Identify drivers of *NEF* and forecast their steady state value. There are several alternatives. For financial firms, common choices are either (1) the equity ratio, asset growth, and ROE , or (2) ROE and equity growth. For nonfinancial firms, the ratios are typically earnings growth and payout ($= NEF / \text{earnings}$).
4. For each driver, estimate the number of years it will take the ratio to reach steady state
5. Specify a convergence trend (linear as a default) for each ratio from its value at the end of the explicit forecasts period to the steady-state value

6. Calculate NEF for each year during the explicit forecast and convergence periods ($NEF_{t+1} = \text{Equity}_t \times [\text{ROE}_{t+1} - \text{Equity\_Growth}_{t-1}]$ or $NEF_{t+1} = \text{Earnings}_t \times [1 + \text{Earnings\_Growth}_{t-1}] \times \text{Payout}_{t+1}$)
7. Calculate the terminal value, that is, the present value of all NEF during the steady-state period as of the beginning of the steady state period.
8. Estimate the intrinsic value of equity as the present value of all future $NEFs$.
9. Calculate intrinsic value per share by dividing equity value by outstanding shares, possibly adjusted for dilution.

Residual income model

The net equity flow model can be restated in terms of comprehensive income and book value by substituting the difference between comprehensive income and the change in equity for net equity flow (see, e.g., Nissim 2013b). After applying some algebra, one obtains the residual income model:

$$\text{Equity value} = \text{book value} + \text{PV of expected future residual income}$$

Where residual income is equal to comprehensive income minus the product of beginning of period book value and the cost of equity. That is, residual income is earnings in excess of the return required by equity investors given the amount and cost of equity capital.⁴³⁵ Residual income can also be expressed as the product of beginning-of-period book value and the difference between ROE and the cost of equity. Thus, to estimate intrinsic equity value, one must predict ROE and the equity growth rate in each future year as well as estimate the cost of equity. The most important driver is ROE , because it is also the primary determinant of equity growth.

Implementing residual income valuation involves similar steps to the net equity flow model. However, unlike the net equity flow model, residual income valuation is only used when book value is a reasonable proxy for invested capital and there is greater focus on ROE . The steps are:

1. Forecast the financial statements for as many future years as reasonably possible (the explicit forecasts period).
2. Estimate the cost of equity capital

⁴³⁵ Theoretically, residual income in future year t should be calculated using the forward rate for year t and be discounted using the t -years spot rate. However, most people ignore this issue and use a constant discount rate (as they do under the dividend discount and DCF models). Consider the following example. At time $t = 0$ (current time), a firm with a book value of \$10 is expected to exist for two years (i.e., until $t = 2$), and pay dividends of \$1 in year 1 and \$14 in year 2 (liquidating dividend). Expected earnings for year 1 are \$2, and so expected earnings for year 2 are \$3 (=liquidating dividend minus year 1 book value, or $14 - (10 + 2 - 1)$). The price of a zero coupon one-year risk-free bond is \$0.90909 per dollar of par value, and the price of a zero coupon two-years risk-free bond is \$0.75757. These bond prices imply that the spot rate for one year is 10% ($=1/0.90909 - 1$), the spot rate for two years is 14.89% ($=[1/0.75757]^5 - 1$), and the one year forward rate for year 2 is 20% ($=1.1489^2/1.1 - 1$). Assuming that investors are risk neutral and that dividends are paid at the end of each year, stock value can be calculated using the dividend discount model as $1/1.1 + 14/[1.1489^2] = 11.515$. Equivalently, value can be calculated using the residual income model. To do so, note that book value is expected to be \$11 at time 1 ($=10 + 2 - 1$), and residual earnings is expected to be \$1 in year 1 ($=2 - 0.1 \times 10$) and \$0.8 in year 2 ($=3 - 0.2 \times 11$). Therefore, price should equal $\$11.515 (= 10 + 1/1.1 + 0.8/[1.1489^2])$.

3. Identify drivers of residual income and forecast their steady state value. The drivers are either (1) the equity ratio, asset growth, and *ROE*, (2) *ROE* and equity growth, or (3) *ROE* and payout.
4. Estimate the number of years it will take each of the drivers to reach steady state.
5. Specify a convergence trend (linear as a default) for each ratio from its value at the end of the explicit forecasts period to the steady-state value.
6. Calculate residual income flow for each year during the explicit forecast and convergence periods.
7. Calculate the present value of all residual income flows during the steady-state period as of the beginning of the steady state period.
8. Estimate the intrinsic value of equity as the total of current book value and present value of all future residual income.
9. Calculate intrinsic value per share by dividing equity value by outstanding shares, possibly adjusted for dilution.

As noted above, residual income valuation requires that book equity be a reasonable proxy for invested capital. This is often the case for financial firms because:

- The book values of major assets and liabilities are relatively close to fair values (investments in securities, loans receivable, debt, derivatives, ...)
- Unrecognized intangibles are relatively small, in part because the financial sector is highly competitive
- Activities are constrained by the book value of equity or related quantities, making book equity a useful proxy for future activities/earnings. For example, most financial institutions are required by regulators to maintain minimum equity capital at levels commensurate with the size and risk of their activities, assets, and liabilities.

For example, Nissim (2013a) inverts the residual income model to estimate the implied cost of equity capital of insurance companies.

Although uncommon in practice, substantial research investigates different aspects of residual income valuation. The following is a review of insights provided by these studies.

Richardson et al. (2010) survey academics and practitioners about their opinions on fundamental analysis. They report that there are significant differences between academics and practitioners about the type of valuation model they use. 71% of academics note they use some version of residual income valuation and only 16% of practitioners use this type of valuation model. Instead, 74% (52%) of practitioners use simple earnings (book) multiples. These contrast with only 54% (38%) of academics respectively. This is suggestive of simplistic heuristics being used in practice but can also indicate that the quality of inputs necessary to use residual income valuation approaches (most notably forecasts of future earnings and earnings growth) is currently too low to be fully harnessed in practice.

Hand et al. (2017) investigate the use and performance of residual income (RI) valuation methods by U.S. sell-side equity analysts. They observe that RI valuations are much rarer than discounted cash flow (DCF) valuations, and that different RI and DCF valuations are sometimes provided by the same analyst for the same firm in the same report. They find that while some analysts build RI models around net operating income (RNOA-RI) and others around net income

(ROE-RI), RNOA-RI valuations are optimistic to the same degree as DCF valuations and contain RNOAs that increase to an economically unlikely terminal year median of 27 percent. In contrast, analysts' ROE-RI valuations are unbiased when done in tandem with a DCF valuation, as are the DCFs that accompany them, and contain ROEs that decline over the forecast horizon to a more plausible terminal year median of 17 percent. They conclude that analysts' use of ROE-RI methods can lead to more sophisticated forecasts of economic fundamentals and equity valuations, especially when used in tandem with DCF.

Imam et al. (2013) conduct a content analysis of equity research reports for European firms. They find that earnings multiples and DCF valuation models are the two most popular valuation models. In addition, the use of earnings multiples alongside DCF improves forecast accuracy, but neither DCF nor earnings multiples are superior to book value and return on equity (ROE) based models, supporting the use of residual income valuation.

Gleason et al. (2013) find that substantial improvements in analysts' price target quality occur when analysts appear to be using a residual-income valuation technique rather than a PEG valuation heuristic. This improvement in 12-month realized returns is most pronounced among analysts who are also adept at formulating accurate earnings forecasts, a key ingredient in both stock valuation approaches.

Bradshaw (2004) finds that analysts' stock recommendations are more correlated with heuristic valuation models (PEG and LT growth) than with residual income models, but residual income valuation predicts stock returns better than the heuristics.

Adjusted present value model

The discounting of FCF using WACC is the most common approach of fundamental valuation, so much so that the term DCF is used as a synonym to discounting free cash flow at WACC. An important assumption underlying the DCF model is that the components of WACC are constant over time. If leverage, cost of debt, or the corporate tax rate are expected to change significantly over time, this model may produce highly imprecise estimates. The adjusted present value (APV) model attempts to address these limitations. Instead of discounting free cash flow at WACC, the APV model separately discounts two cash flow streams—free cash flow and the interest tax shield—using discount rates that reflect their differential risks. This model allows for changes over the horizon in the leverage ratio, interest rate, and tax rate. Another model that allows for changes in the interest and tax rates, but not in the leverage ratio, is the capital cash flow (CCF) model. Under the CCF model, the total of free cash flow and the interest tax shield is discounted at the pre-tax WACC, which reflects the weighted average required rate of return by the providers of capital. I elaborate on these models below. In a survey of 272 valuation professionals (Mukhlynina and Nyborg 2020), DCF received an average rating of 3.25, compared to 1.09 for the APV model and 1.00 for the CCF model (a scale of 0 to 4, with higher values corresponding to greater frequency).

Under APV approach, the present values of FCF and the interest tax shield (ITS) are calculated separately, using discount rates that reflect the differential riskiness of these cash flows. FCF is discounted using the unlevered cost of equity, and ITS is discounted using the pretax cost of

debt. The APV model is particularly useful when leverage is expected to change significantly over time such as in leverage buyout (LBO) transactions.

The unlevered cost of equity is the rate of return that would have been required by shareholders if the firm had no debt. Because debt increases the riskiness of equity cash flows, the unlevered cost of equity is lower than the (levered) cost of equity. The most common approach for estimating the unlevered cost of equity is using unlevered industry beta (see Section 6.2.4).

The APV model assumes that the riskiness of the interest tax shield (ITS) is the same as that of debt, and so it uses the required rate of return on debt to discount it. Some versions of the APV model use higher discount rates for ITS, arguing that ITS is riskier than debt cash flows, either because taxable income may be negative or because the level of debt is correlated with the value of operations.

Capital cash flow model

This model estimates the value of capital by discounting net cash flows to the providers of capital, which are defined as follows:

Net cash flow to the providers of capital = free cash flow + interest tax shield
+ sale of financial assets - purchase of financial assets

Assuming that investments in financial assets will not generate or destroy value (other than the impact on the interest tax shield, which is accounted for separately), and that all financial assets will eventually be sold, the present value of the last two terms (sale of financial assets - purchase of financial assets) is equal to the value of existing financial assets. Thus,

Equity Value (EV) = present value of (free cash flow + interest tax shield)
+ value of financial assets - value of debt

Equity Value (EV) = present value of (free cash flow + interest tax shield) - value of net debt

Because the net cash flows that the providers of capital receive are derived from FCF and ITS, the riskiness of (FCF + ITS) is the same as that of equity and net debt, and so the discount rate for (FCF + ITS) should be the weighted average required rate of return on equity and net debt (i.e., pretax WACC).

6.3 Sensitivity analysis

Many of the inputs to DCF analysis are highly *uncertain*. It is therefore important to evaluate the sensitivity of the intrinsic value estimate to changes in key assumptions (e.g., WACC, steady-state growth, exit multiple). This analysis is referred to as sensitivity analysis. Mukhlynina and Nyborg (2020) survey of 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe, and report that most professionals perform sensitivity analysis as part of the valuation analysis. Sensitivity analysis is

conducted by calculating intrinsic value under alternative assumptions regarding key inputs, either changing one at a time (vector), pairs (matrix), or even three (three-dimensional analysis).

Sensitivity analysis is typically emphasized in the context of fundamental valuation, but it is also relevant when conducting relative valuation. Sensitivity analysis is related to earnings quality primarily because low earnings quality implies high uncertainty, which increases the importance of sensitivity analysis.

Sensitivity analysis addresses the following question: how sensitive is the intrinsic value estimate—or any inference based on that estimate—to changes in key inputs? For example, if the base case yields a value estimate that is 20% above current price, implying a buy recommendation, would that conclusion change if WACC is increased by one percentage point or steady state growth (*STG*) is reduced by one percentage point?

Sensitivity analysis is related to the *margin of safety* concept, which is emphasized in value investing. If the margin of safety appears high (e.g., 30% upside relative to current price), but a relatively small increase in WACC significantly reduces the upside potential (for example, if the company is a high growth company), then the margin may not be that safe after all.

Implementing sensitivity analysis requires identifying the key drivers that involve substantial uncertainty and deciding the incremental change in each driver for which value is recalculated. Additional considerations include how to report the impact of changes in the key drivers (e.g., on total value or on components of value), and whether and how to address potential correlations among the drivers. I discuss these four issues in turn.

Most analysts evaluate sensitivity with respect to WACC and STG, typically in a matrix form. Some consider additional or other key inputs, including exit multiple or ROIC. When exit multiples are considered in sensitivity analysis, they are typically evaluated as an output rather than input. Namely, intrinsic value is recalculated under alternative WACC and STG assumptions, and for each case the resulting exit multiple is reported. Evaluating sensitivity with respect to ROIC or ROE is common when using EVA or residual income type models.

Most analysts use incremental changes of one percentage point when evaluating sensitivity. This can yield limited information or even misleading results. One should select incremental changes that are consistent with the uncertainty associated with the driver. For example, for STG a one percentage point change is often too large while for WACC it may be too small. Instead of changing the step size, one may use a rectangular rather than square sensitivity matrix, with a larger range for WACC than for STG.

As discussed in Section 6.2.2, implementing fundamental valuation involves specifying at least two distinct future periods: explicit forecast period (typically 5-10 years) and the terminal period (all subsequent years). In some cases, an intermediate period is specified, to allow key ratios to gradually converge to their steady-state level. When reporting the results of sensitivity analysis, it is important to distinguish between the effect on the terminal value and that on the value associated with the explicit forecasts period. For example, changing WACC will affect both value components, while changing STG only affects the terminal value. The reason is that the

level of uncertainty associated with the terminal value is typically much greater than that associated with the earlier years, and the primary objective of sensitivity analysis is to inform on uncertainty. In general, the level of uncertainty increases with the proportion of value that is due to the terminal value.

Key value drivers—such as WACC, STG, exit multiples or ROIC—are typically correlated with each other. For example, because both WACC and STG reflect expected inflation, a high WACC due to high expected inflation is likely to be associated with a relatively high STG. As another example, firms select investment projects that are expected to earn ROIC above WACC, so a high WACC implies high ROIC. Such correlations can be incorporated by examining sensitivity with respect to differences between key drivers (e.g., [WACC – STG], or [ROIC – WACC]) in addition to sensitivity to the drivers themselves; for example, when using the matrix form, one may examine sensitivity to WACC and [WACC – STG] instead of WACC and STG. An alternative approach is to use the key drivers when conducting the sensitivity analysis (e.g., matrix reporting of sensitivity to WACC and STG), but emphasize the more likely cells in the matrix (e.g., using color background) which reflect the correlation; for example, for WACC and STG, these would be cells along (or close to) the main diagonal.

Most implementations of sensitivity analysis focus on long-term inputs. However, some analysts evaluate sensitivity with respect to drivers of near-term forecasts, such as product price assumptions or profit margin. This type of sensitivity analysis effectively becomes scenario analysis, to which we turn next.

6.4 Scenario analysis

Scenario analysis involves estimating intrinsic value under alternative assumptions, including, but not limited to, the key inputs examined in sensitivity analysis. For example, scenario analysis may use alternative growth forecasts for each of the explicit forecast years as well as alternative values of steady-state growth. In effect, scenario analysis is a more detailed version of sensitivity analysis, which also involves changing assumptions for the explicit forecasts period. Mukhlynina and Nyborg (2020) survey of 272 valuation professionals from consulting, investment banking, private equity, and asset management firms from across the globe, and report that most professionals conduct scenario analysis as part of the valuation analysis.

Similar to sensitivity analysis, scenario analysis is typically emphasized in the context of fundamental valuation, but it is also relevant when conducting relative valuation. Scenario analysis is related to earnings quality primarily because low earnings quality implies high uncertainty, which increases the importance of evaluating alternative scenario and conducting scenario-based valuation.

Scenario analysis typically uses either three scenarios (e.g., bear, base, bull), five, or even more. In some cases, analysts use event-based scenarios (e.g., base, M&A-target, M&A-acquirer). Each scenario specifies different trends for key ratios; for example, alternative revenue growth, margin, and capex intensity forecasts for each of the explicit forecast years as well as in steady state. In practice, there is substantial variation in the degree of differentiation across the scenarios. A simplified approach is to adjust key ratios by parallel shifts, for example, reduce

sales growth by one percentage point each year for the bear scenario. In contrast, some analysts specify complete sets of alternative forecasts for each scenario, including for “drivers of drivers” (e.g., the rate of increase in product prices, which drives sales growth).

Unlike sensitivity analysis, scenario analysis is likely to consider relationships among the key inputs. For example, higher than expected sales growth is likely to be associated with higher-than-expected EBIT margin due to operating leverage (fixed costs) as well as to the increase in product price (if the sales growth is due to an increase in demand). Such correlations are also result from the dynamic nature of business, which allows companies to take advantage of real options (discussed below).

Most analysts simply report the value estimate under each of the examined scenarios. Others also assign a probability to each scenario, which potentially increases the informativeness of the analysis, especially because it allows for the calculation of a probability-weighted (across the scenarios) intrinsic value. As explained below, such an estimate may capture value effects that base-case DCF omits.

Motivation

The motivation for conducting scenario analysis is different from that of sensitivity analysis. While sensitivity analysis is conducted primarily to address uncertainty regarding key long-term inputs, scenario analysis is used for the following purposes:

- To deal with uncertainty when there is substantial *uncertainty about the near- to intermediate-term* – How disperse are the intrinsic value estimates across the scenarios?
- To provide information about the *down-side risk* and *up-side potential* – How much loss would be incurred if the “bad” scenario materializes? How big are the potential gains if the “good” scenario occurs?
- To demonstrate *conviction*. For example, a small difference between the good and bad scenario (*tightness*) may indicate that the analyst is confident in his/her valuation. Any *tilt* in the scenarios may also be informative. For instance, if the base case scenario is closer to the good (bad) scenario, it may indicate that the analyst believes the good (bad) scenario is more likely.
- To capture the cost of *financial distress* (discussed below).
- To capture the value of *real options* and other sources of *co-variation* among value drivers (discussed below) – How large is the difference between the probability-weighted average intrinsic value across the scenarios and the base case value?
- To evaluate alternative *courses of actions* or valuations under *corporate events* – What would be the impact on value (e.g., of a proposed M&A)?

I elaborate on some of these motivations below.

Scenario analysis and financial distress

Scenario analysis helps capture the cost of financial distress. In most cases, free cash flow forecasts do not reflect the potential loss to the providers of capital that would result if the company were to suffer severe financial distress or even bankruptcy. By considering bear scenarios, and weighting them in the overall valuation, this bias can be mitigated. Alternatively

(or in addition), forecasted free cash flows can be adjusted for potential loss from default using estimates of the probability of default and loss given default (see Chapter 10). Still, other costs of financial distress that are incurred even if there is no ultimate bankruptcy should be accounted for. For example, stakeholders such as employees, suppliers and customers may not be willing to transact with the company under the same terms if the risk of bankruptcy is high.

Real options and other sources of covariation

Scenario analysis helps capture the impact of real options and other sources of covariation among value drivers, which are generally excluded from estimated intrinsic value when conducting base-case DCF. To see this, note that NOPAT in future year t can be expressed as follows:

$$\text{NOPAT}_t = \text{Revenue}_0 \times (1+g_1) \times (1+g_2) \times \dots \times (1+g_t) \times \text{PM}_t$$

Where PM is NOPAT margin and year 0 is the most recently reported year. Spreadsheet valuation effectively calculates $E[\text{NOPAT}_t]$ as follows:

$$E[\text{NOPAT}_t] = \text{Revenue}_0 \times E[(1+g_1)] \times E[(1+g_2)] \times \dots \times E[(1+g_t)] \times E[\text{PM}_t]$$

That is, the covariances among the random variables $g_1, g_2, \dots, g_t$, and PM_t are ignored (recall that $E[X \times Y] = E[X] \times E[Y] + \text{cov}[X, Y]$). These covariances are typically positive, implying that NOPAT and free cash flow are understated. For example,

- An unexpected increase in growth in a future year likely implies higher growth than previously expected in the following years as well. Similarly, an unexpected increase in profitability in a future year likely implies higher profitability than previously expected in the following years. These effects are due to both economic forces (e.g., a greater demand than expected is likely to partially persist across periods) and accounting principles (economic shocks are often gradually recognized in earnings).
- An unexpected revenue growth increases margin (due to fixed costs) and turnover (improved capacity utilization)
- An unexpected increase in profitability may lead to additional investments and hence further growth. This follows because an unexpected increase in profitability implies that investments are likely to generate higher profits than previously expected, while an unexpected decrease in profitability implies the opposite. Such information would trigger the exercise of real options to invest or expand (positive profitability shock) or to delay or abandon projects (negative profitability shock). These effects may be intensified by a cost of capital effect. High profitability is likely to reduce the cost of capital because internal funds are cheaper than external funds due to market frictions (asymmetric information, transaction costs, taxes), and because profitable firms have a better access to capital markets, obtain more operating credit, and pay less for capital infusions and operating credit.

Scenario analysis helps capture the impact of real options and other sources of covariation among value drivers by incorporating them into the scenarios. For example, a “bull” scenario may involve both high growth and high profit margin (e.g., due to operating leverage), while under a “bear” scenario a decline in revenue growth may trigger the exercise of real options to

reduce investments. Thus, measuring intrinsic value as the probability-weighted value across the alternative scenarios incorporates the value of the covariances. Accordingly, the estimated value under this approach should generally be larger than the base-case value, especially for companies for which the covariance effect is likely to be particularly large, that is, companies with substantial real options or other sources of correlations.

When is scenario-based valuation especially important?

The covariance effect depends on correlations and volatilities (recall that $\text{Cov}[X, Y] = \text{corr}[X, Y] \times \text{std}[X] \times \text{std}[Y]$). Thus, the covariance effect is likely to be particularly large for small, low profitability, high volatility, or high growth firms, because:

- Firms with high volatility have a high potential for large profitability or growth shocks.
- Growth firms are more exposed to shocks and are more likely to invest following a positive profitability shock. Mature firms may face saturated markets, so for them positive profitability shocks may not lead to expansion.
- Small or low profitability firms have a relatively high potential for large growth or profitability shocks.

Li and Nissim (2014) show that the value effect of the growth-profitability covariance on average explains more than 10% of equity value, and its magnitude varies substantially with firm size (-), volatility (+), profitability (-), and expected growth (+). The covariance value effect is driven by both operating and financing activities, but large effects are due primarily to operating shocks. One implication of the findings is that conducting scenario analysis or using other methods that incorporate the growth-profitability correlation (e.g., Monte Carlo simulations, decision trees) is particularly important when valuing small, high volatility, low profitability, or high growth companies. In contrast, for mature, high profitability companies, covariance effects are typically small and their omission is not likely to significantly bias value estimates.

Selecting scenarios

In selecting scenarios, one should consider correlations over time and across drivers. For example, compared to the base scenario, the “bull” scenario should have:

- Higher sales growth rates over multiple years (higher than expected demand in one year is likely to persist over time at least partially; higher than expected sales are likely to trigger additional investments and thus further sales growth)
- Higher margin (fixed costs; demand shocks imply higher price)

For the “bear” scenario, additional effects on the margin include

- Cost stickiness – the tendency of some expenses to increase more when revenue increases than to fall when revenue declines by an equivalent amount, due to the costs associated with cutting resources (e.g., severance, selling assets, morale, reputation) and building them up again when demand is restored (e.g., search and hiring, acquiring, and installing assets)
- The costs of financial distress – stakeholders such as employees, suppliers and customers may not be willing to transact with the company at the same terms if the risk of bankruptcy is high.

6.A Deriving fundamental valuation models

This appendix provides derivations of the valuation models discussed in this chapter.

6.A.1 The DCF model

To derive the DCF model, the following ratios are assumed to remain constant forever:

- The required rate of return on debt (r_d)
- The corporate tax rate (t)
- The required rate of return on equity (r_e)
- The leverage ratio, measured using market values (D vs. E)

Under the above assumption, enterprise value is equal to the present value of FCFs discounted using WACC, where

$$WACC = w \times r_e + (1 - w) \times r_d \times (1 - t)$$
$$w = \frac{\text{market value of equity (E)}}{\text{market value of equity (E)} + \text{market value of debt (D)}}$$

The proof is as follows:

Firm value in the next-to-last period (V_{T-1}): $V_{T-1} = D_{T-1} + E_{T-1}$

Expected value in the last period:

$$FCF_T + t \times r_d \times D_{T-1} = V_{T-1} + r_d \times D_{T-1} + r_e \times E_{T-1}$$

Where the left-hand side is the amounts expected to be received, and the right-hand side reflects the pricing of that expected cash flow.

Assuming constant leverage ratio (D/V), we get

$$FCF_T = V_{T-1} \times (1 + r_d \times (1 - t) \times D/V + r_e \times E/V) = V_{T-1} \times (1 + WACC)$$

Or

$$V_{T-1} = \frac{FCF_T}{1 + WACC}$$

Similarly, expected value in the next-to-last period:

$$FCF_{T-1} + t \times r_d \times D_{T-2} + V_{T-1} = V_{T-2} + r_d \times D_{T-2} + r_e \times E_{T-2}$$

$$FCF_{T-1} + \frac{FCF_T}{1 + WACC} = V_{T-2} \times (1 + r_d \times (1 - t) \times D/V + r_e \times E/V)$$

Or

$$V_{T-2} = \frac{FCF_{T-1}}{1 + WACC} + \frac{FCF_T}{(1 + WACC)^2}$$

And so on ...

$$V_0 = \frac{FCF_1}{1 + WACC} + \frac{FCF_2}{(1 + WACC)^2} + \dots + \frac{FCF_T}{(1 + WACC)^T}$$

6.A.2 Net equity flow model

Expected net equity flow (NEF) in the last period:

$$NEF_T = EqV_{T-1} + r_e \times E_{T-1}$$

Where $r_e \times E_{T-1}$ is the expected dollar return to equity holders in year T .

$$EqV_{T-1} = \frac{NEF_T}{1 + r_e}$$

Similarly, expected value in the next-to-last period:

$$NEF_{T-1} + E_{T-1} = E_{T-2} + r_e \times E_{T-2}$$

$$NEF_{T-1} + \frac{NEF_T}{1 + r_e} = E_{T-2} \times (1 + r_e)$$

Or

$$E_{T-2} = \frac{NEF_{T-1}}{1 + r_e} + \frac{NEF_T}{(1 + r_e)^2}$$

And so on ...

$$E_0 = \frac{NEF_1}{1 + r_e} + \frac{NEF_2}{(1 + r_e)^2} + \dots + \frac{NEF_T}{(1 + r_e)^T}$$

6.A.3 Residual income model

Start with the NEF model

$$E_0 = \frac{E[NEF_1]}{1 + r_e} + \frac{E[NEF_2]}{(1 + r_e)^2} + \dots = \sum_{t=1}^{\infty} E[NEF_t] \times (1 + r_e)^{-t}$$

Assume clean surplus: $CE_{t-1} + CI_t = NEF_t + CE_t$ or $NEF_t = CE_{t-1} + CI_t - CE_t$

Substitute for NEF_t ...

$$E_0 = \frac{E[CE_0 + CI_1 - CE_1]}{1 + r_e} + \frac{E[CE_1 + CI_2 - CE_2]}{(1 + r_e)^2} + \frac{E[CE_2 + CI_3 - CE_3]}{(1 + r_e)^3} + \dots$$

For each $t = 1, 2, \dots$, add and subtract $r_e \times CE_{t-1}$

$$E_0 = \frac{E[CE_0 + CI_1 - CE_1 + r_e \times CE_0 - r_e \times CE_0]}{1 + r_e} + \frac{E[CE_1 + CI_2 - CE_2 + r_e \times CE_1 - r_e \times CE_1]}{(1 + r_e)^2} + \frac{E[CE_2 + CI_3 - CE_3 + r_e \times CE_2 - r_e \times CE_2]}{(1 + r_e)^3} + \dots$$

Rearrange terms

$$E_0 = \frac{(1 + r_e) \times E[CE_0]}{1 + r_e} + \frac{E[CI_1 - r_e \times CE_0]}{1 + r_e} + \frac{E[-CE_1]}{1 + r_e} + \frac{(1 + r_e) \times E[CE_1]}{(1 + r_e)^2} + \frac{E[CI_2 - r_e \times CE_1]}{(1 + r_e)^2} + \frac{E[-CE_2]}{(1 + r_e)^2} + \frac{(1 + r_e) \times E[CE_2]}{(1 + r_e)^3} + \frac{E[CI_3 - r_e \times CE_2]}{(1 + r_e)^3} + \frac{E[-CE_3]}{(1 + r_e)^3} + \dots$$

Simplify and cancel offsetting terms⁴³⁶

$$E_0 = CE_0 + \sum_{t=1}^{\infty} E[CI_t - r_e \times CE_{t-1}] \times (1 + r_e)^{-t}$$

6.A.4 Residual income per share?

Some researchers and analysts implement the residual income model on a per share basis. However, to derive the residual income model, one assumes clean surplus accounting. While the clean surplus relation is a reasonable approximation when using earnings and net equity flow, it does not hold on a per share level. For the clean surplus relation to hold at the per share level, all share issuances and share repurchases must be at book value. This is almost never the case – in most cases share issuance and share repurchase transactions are at prices significantly higher than book value per share.⁴³⁷

⁴³⁶ Similar to the net equity flow model, which assumes that the present value today of price at time T converges to zero as T converges to infinity, the derivation of the following equation uses the assumption that the present value today of book value at time T converges to zero as T converges to infinity. See Ohlson (1995).

⁴³⁷ To see why the clean surplus relation fails at the per share level, assume that at the beginning of the year a company has 10 shares and \$10 book value (i.e., \$1 book value per share). Assume earnings and dividends for the year are both \$0. What if the company repurchases 2 shares at \$2 per share (I.e., NEF is \$4)? Book value will decrease to \$6 (=10-2*2), and book value per share will decrease to \$0.75 (=6/[10-2]). On a total basis, the clean surplus relation holds: ending book value (\$6) = beginning book value (\$10) + earnings (\$0) – NEF (\$4). In contrast, on a per share basis the clean surplus relation does not hold: ending book value (\$0.75) ≠ beginning book value (\$1) + earnings (\$0) – dividends (\$0).

The residual income model can still be implemented on a per share basis if the following adjustments are made. To create clean surplus accounting, the earnings construct should be adjusted by adding the change in book value per share due to share repurchases and subtracting the forfeited dividends, where the change in book value per share due to changes in the number of shares is equal to $Book\ value_t \times \left(\frac{1}{\#\ of\ shares_t} - \frac{1}{\#\ of\ shares_{t-1}} \right)$, and forfeited dividends are equal to $\frac{Share\ repurchases_t}{\#\ of\ shares_{t-1}}$. With these adjustments, the clean surplus relation will hold for any repurchase price, so the model should work. For example, repurchasing stock at a deflated price will lead to a relatively large increase in book value per and therefore in adjusted residual income and value per share, to be captured by investors that will continue to hold the shares. Yet implementing this model requires forecasts of future share repurchases (net of share issuance) and the prices at which these transactions will take place. One motivation for using this model is to capture value creation (destruction) due to share repurchases at deflated (inflated) prices.

7. Earnings Quality and Stock Return Predictability

[Note: This chapter is highly incomplete]

Over the past fifty years research in finance and accounting has documented correlations between many variables (factors or signals) and subsequent stock returns (e.g., earnings surprise, accruals, asset growth, value ratios, past returns, etc.). Many of these so-called stock return anomalies are related to aspects of earnings quality. In most cases, the stock return predictability is at least partially due to a correlation between the factor and risk attributes or is otherwise difficult to exploit. Section 7.1 reviews anomalies that have been attributed to earnings quality issues as well as other anomalies that are indirectly related to earnings quality. Section 7.2 discusses the approaches used to distinguish between exploitable mispricing and alternative explanations.

7.1 Stock return anomalies

Stock return anomalies that are directly or indirectly related to earnings quality include accruals and operating cash flow (Section 7.1.1), net operating assets (7.1.2), asset growth and investment (7.1.3), net stock issuance and composite equity issuance (7.1.4), profitability (7.1.5), financial distress (7.1.6), low volatility and low beta (7.1.7), quality composite (7.1.8), value versus glamour (7.1.9), growth (7.1.10), investor sentiment (7.1.11), post earnings announcement drift (earnings momentum; 7.1.12), price momentum (7.1.13), long-term reversal (7.1.14), and size (7.1.15).

7.1.1 Accruals and operating cash flow

Sloan (1996) and many subsequent studies show that firms with high accruals (i.e., a large difference between net income and cash from operations) or low cash from operations subsequently earn lower risk-adjusted returns. These anomalies are related to earnings quality because large accruals or small cash from operations imply low earnings sustainability (see Section 2.1). If investors do not fully understand the differential persistence of these earnings components, they may overreact to accruals and underreact to cash from operations. The mispricing will be corrected when future earnings are announced: high accruals firms will have low stock returns, and high operating cash flow firms will have high returns.

If investors react properly to total earnings (operating cash flow + accruals), an overreaction to accruals implies an equivalent underreaction to cash from operations. However, on average investors underreact to earnings (the “earnings momentum” phenomenon, see Section 7.1.12 below), so an overreaction to accruals implies an even stronger underreaction to operating cash flow.

The accruals factor is typically measured as the ratio of accruals to average total assets or to sales. The operating cash flow factor is measured relative to market cap or revenue. See Section 2.1 for various adjustments to the accruals factor aimed at increasing its informativeness about earnings persistence and future stock returns.

7.1.2 Net operating assets

Hirshleifer et al. (2004) show that firms with higher net operating assets subsequently earn lower risk-adjusted returns. This anomaly is related to earnings quality because excessive net operating assets imply low earnings sustainability (see Section 2.3).

7.1.3 Asset growth and investment

Cooper et al. (2008) report that firms with higher ***growth in total assets*** subsequently earn lower risk-adjusted returns. Titman et al. (2004) find that firms with higher ***investment*** (relative to total assets) earn lower future risk-adjusted returns. Many subsequent studies confirm these results. These anomalies are related to earnings quality because high asset growth or high investment implies large accruals, low cash conversion ratio, or high net operating assets and thus low earnings sustainability (see Sections 2.1, 2.2 and 2.3). These anomalies may also be related to another dimension of earnings quality—the extent to which earnings represent value creation. For example, Fama and French (2006) show that, holding expected earnings constant, higher investment implies either lower value or lower expected returns.

7.1.4 Net stock issuance and composite equity issuance

Ritter (1991) and many subsequent studies find that firms ***issuing new shares*** (measured using the growth rate in share outstanding) underperform the market in the following three to five years. Daniel and Titman (2006) find that firms with higher ***composite equity issuance*** earn lower future risk-adjusted returns, where composite equity issuance includes any actions that increase share issuance (such as seasoned equity offerings and share-based acquisitions) minus any actions that reduce share issuance (such as share repurchases). These anomalies are related to earnings quality because issuers invest more than nonissuers, and investments imply lower earnings quality (see Sections 2.1, 2.2, 2.3 and 7.1.3).⁴³⁸

7.1.5 Profitability

Many studies show that profitability rates—including ***return on equity***, ***return on assets***, and ***gross profits to assets***—are positively associated with subsequent risk-adjusted returns (e.g., Fama and French 2006, Novy-Marx 2013). Ball et al. (2016) report that ***cash-based operating profitability*** outperforms measures of profitability that include accruals, and it subsumes accruals in predicting the cross section of average returns.

The profitability anomaly is related to earnings quality because high profitability implies high earnings quality (see Section 2.8). In addition, some measures of profitability (e.g., gross profit, EBITDA, cash earnings) reflect earnings quality-related adjustments. For example, Novy-Marx

⁴³⁸ Lyandres et al. (2008) show that an investment factor, long in low-investment stocks and short in high-investment stocks, helps explain the new issues puzzle. Adding the investment factor into standard factor regressions reduces the SEO underperformance by about 75%, the IPO underperformance by 80%, the underperformance following convertible debt offerings by 50%, and Daniel and Titman's (2006) composite issuance effect by 40%. The reason is that issuers invest more than nonissuers, and the investment factor earns a significantly positive average return of 0.57% per month.

(2013) argues that gross profitability is the cleanest measure of true economic profitability due to low accounting manipulations.

The common interpretation of the profitability anomaly is that it is due to investors and other market participants underestimating the persistence of earnings. For example, Bouchaud et al. (2019) show that (1) analysts systematically underestimate future profits when current profits are high; (2) the profitability anomaly is stronger for firms that are subject to stickier EPS forecasts (forecasts by less experienced analysts and busier analysts that follow more industries); and (3) firms with more persistent earnings are more prone to the profitability anomaly.

Research suggests that combining the profitability and investment factors can lead to particularly strong stock return predictability. For example, Blitz and Fabozzi (2017) show that the abnormal return to investment in “sin stocks” (i.e., firms that make money from human vices such as alcohol, tobacco, gambling, and weapons) is due to their exposures to the profitability (+) and investment (-) factors.

7.1.6 Financial distress

Campbell et al. (2008) and other studies show that firms with higher bankruptcy probability earn lower risk-adjusted returns. Financially distressed stocks have lower returns but much higher standard deviations, market betas, and loadings on value and small-cap risk factors than stocks with low failure risk. This anomaly is potentially related to earnings quality because financial distress is negatively related to profitability and earnings sustainability (see Sections 2.8 and 2.9). Bankruptcy probability is estimated either based on accounting information (e.g., Ohlson 1980 O-score) or based on both accounting and equity market information (e.g., Campbell et al. 2008).

7.1.7 Low volatility or low beta

Low volatility and low beta stocks tend to outperform riskier ones, even before controlling for risk. For example, a zero-beta portfolio that is long on low beta firms and short on cash and high beta firms (“betting-against-beta” or BAB factor; Frazzini and Pedersen 2014) produces alpha in excess of the value and momentum factors. Similarly, idiosyncratic volatility is negatively associated with subsequent stock returns. This phenomenon is typically referred to as the low-volatility (or low-beta) anomaly, although it is just as much a high-volatility (or high-beta) anomaly. This anomaly is related to earnings quality because low volatility implies high earnings sustainability (see Section 2.10).

Explanations for the low volatility/low beta anomaly include:

- *Investor biases*, including overconfidence and preference for lottery-like returns or speculative assets. Overconfidence increases the relative price of high volatility stocks (and thus reduce their subsequent returns) because its effects are related to uncertainty and to the expected direction of the market. For example, when there is little uncertainty about the value of a stock, its pricing is likely to be relatively efficient. In addition, for investors who believe that the market will go up, it makes sense to invest in high beta stocks. In contrast, investors who believe that the market will go down stay out of equities altogether.

- *Short-selling constraints.* In a market with little or no short selling, a firm's stock price is affected by the minority who hold the most optimistic expectations about it. As both divergence of opinion and short-selling constraints tend to increase with risk, high-risk stocks are more likely to be overpriced than low-risk stocks, because their owners will have the greatest bias.
- *Leverage (borrowing) constraints.* Investors that would like to construct a portfolio with beta in excess on one need to borrow, but they may face borrowing constraints. This may induce them to tilt the portfolio toward high beta stock, causing an increase (decrease) in the price of high (low) beta stocks and therefore a decrease (increase) in expected returns on high (low) beta stocks. To exploit this mispricing, arbitrageurs need to borrow (e.g., the BAB portfolio described above), and they may similarly face borrowing constraints.
- *Regulatory constraints.* This is a variant of the leverage constraints argument. To exploit the low volatility anomaly, asset allocator theoretically can simply reduce the allocation to bonds and invest in low beta stock. However, many institutional investors are restricted in their ability to change asset allocation (e.g., pension funds) or are required to allocate capital to equity securities in a way that doesn't factor in their volatility (e.g., banks and insurance companies subject to Basel III and Solvency II, respectively). This may also explain the existence of the anomaly in the first place, as investors subject to capital-based regulation may invest in high beta stock as a form of regulatory arbitrage.
- *Benchmark constraints.* Benchmark-relative performance evaluation gives portfolio managers the incentive to shun low-volatility stocks and focus on high-volatility stocks instead. There are two motivations for such behavior. First, if risk is measured using only the tracking error, high beta and low beta stock have the same risk, but high beta stocks give higher average return and therefore higher information ratios. Second, the benefits from outperforming the benchmark in an up market are greater than the costs of underperformance in a down market. This is due to PM compensation structure and the attention and reputation that high performance brings. For similar reasons, analysts have strong incentives to follow "hot", high volatility stocks. Finally, fund manager firms have incentives to generate volatile fund performance, because AUM flows are particularly high in up markets and go mostly to the best performers.
- *Tax harvesting.* While I am not aware of a study that addresses this issue, it seems reasonable to assume that investing in high volatility stocks may give tax benefits by creating tax losses that can be realized to offset capital gains, giving taxable investors greater flexibility in adjusting their portfolios or withdrawing cash without triggering net taxable gains.

7.1.8 Quality composite

Asness et al. (2019) define quality as characteristics that investors should be willing to pay a higher price for, including profitability (various measures of earnings and cash flow, scaled by book value), growth (prior five-year growth in profitability measures), and safety (beta, leverage, volatility of profitability, credit risk). Using these characteristics, they create a quality composite and use it to rank stocks. They show that high-quality stocks have high risk-adjusted returns—a quality-minus-junk (QMJ) factor that goes long high-quality stocks and shorts low-quality stocks earns significant risk-adjusted returns in the United States and across 24 countries. The price of quality varies over time, reaching a low during the internet bubble, and a low price of quality predicts a high future return of QMJ. Analysts' price targets and

earnings forecasts imply systematic quality-related errors in return and earnings expectations. This anomaly is related to earnings quality because—as described in the previous sections—the components of “quality” (e.g., profitability, safety) are related to earnings quality.

7.1.9 Value versus glamour

Value stocks are those with relatively low price compared to reported or expected values of fundamentals such as earnings, book value, dividends, sales, etc.⁴³⁹ The rationale of value-style investing is that current fundamentals proxy for future cash flows, which in turn determine intrinsic value (i.e., “true” value). Thus, a low price-to-fundamental ratio (value stock) implies that price is lower than intrinsic value.⁴⁴⁰ Over time prices gravitate toward intrinsic values, so investments in value stocks should generate positive abnormal stock returns. Similarly, investment in high price-to-fundamental ratio (glamour) stocks should generate negative abnormal stock returns. The value-glamour anomaly refers to this return differential. Common value ratios used to construct value minus glamour portfolios include the book-to-market ratio, earnings-price ratio, and EBITDA-to-EV. This anomaly is potentially related to earnings quality because high price-earnings ratios generally imply high earnings sustainability (see Section 2.12), and investors may not price this information in a timely manner.

Identifying value stocks appears relatively simple: rank firms based on the price-to-fundamental ratio and select firms with the lowest value ratios. In reality, however, low value ratios do not necessarily indicate undervaluation. Firms may have low value ratios because their fundamentals are temporarily high (e.g., reported earnings include a one-time gain), expected growth is relatively low, or risk is relatively high (so the discount rate applied to expected cash flows is high).

The following are some insights from academic and practitioner research:

- Value stocks tend to be found in utilities and financials.
- Technology stocks are almost always under-weighted in value-focused portfolios
- Financials are excluded from value portfolios when value is identified using enterprise value multiples, but they are overweighted when using book value multiples.
- Typically, value portfolios require less frequent rebalancing than other factors like momentum.
- Value stocks are more volatile than core stocks and may be more sensitive to economic conditions.
- Value stocks, which are often in cyclical industries, may do well early in an economic recovery but are typically more likely to lag in a sustained bull market
- Value stocks benefit more from a falling dollar than a rising one.

⁴³⁹ For example, Morningstar’s style (value-growth) scores are each calculated using five factors, one forward-looking (50%) and four historical based (12.5% each). The value factors are Price/Projected Earnings (50%): Price/Book (12.5%), Price/Sales (12.5%), Price/Cash Flow (12.5%), and Dividend Yield (12.5%).

⁴⁴⁰ The same rationale applies even when the fundamental chosen is book value (rather than a flow measure. For example, Ball et al. (2020) show that the book-to-market ratio predicts stock returns because retained earnings—a component of book value—is a proxy for average earnings over time.

- Value companies tend to pay dividends because they tend to be more established companies with less room to grow.

7.1.10 Growth

Growth stocks are those with relatively high expected long-term earnings growth rates. Weber (2018) provides evidence that growth stocks earn high stock returns at times of high investor sentiment, but they perform poorly subsequently. Growth-style investing may also perform well if investors underreact to information on growth opportunities. This anomaly is related to earnings quality because high expected growth implies high earnings sustainability (see Section 2.11).

To implement growth-style investing, one has to construct a proxy for expected long-term earnings growth. Practitioners use a combination of consensus analysts' long-term earnings growth forecast and past growth rates in earnings, sales, cash flows, book value, etc.⁴⁴¹ This involves several issues:

- Analysts' long-term earnings growth forecasts may not be available for small firms, and they are typically very noisy, even for large firms (e.g., Chan et al. 2003).
- Growth rates typically have very low persistence, so past growth rates are poor proxies for future growth (e.g., Nissim and Penman 2001).
- Earnings and cash flow measures are often negative, making it difficult to measure growth rates.

While less common in practice, academics often identify growth stocks as those with high value ratios, especially the market-to-book ratio. This approach is based on the rationale that a high price to fundamental ratio implies that investors expect the fundamental to grow. The use of value ratios to identify growth stocks is problematic because high value ratios may be due to factors other than long-term growth prospects, including low risk, overvaluation, or a negative transitory component that reduces the fundamental.

The following are some insights from academic and practitioner research:

- Technology stocks are almost always overweighed in growth-focused portfolios.
- Typically, growth portfolios require less frequent rebalancing than other factors like momentum.
- Growth stocks generally perform well in a momentum driven market.
- Growth stocks have high idiosyncratic risk, and their price could fall sharply on any negative news about the company, especially if earnings disappoint.
- Growth firms are less sensitive than other firms (especially value) to overall economic activity for two reasons: (1) for high-duration stocks, fluctuations in economic activity due to business cycle effects or other non-permanent shocks (e.g., COVID) have a relatively small effect because near-term cash flows account for a small proportion of total value (e.g.,

⁴⁴¹ For example, Morningstar's style (value-growth) scores are each calculated using five factors, one forward-looking (50%) and four historical based (12.5% each). The growth factors are: Long-term Projected Earnings Growth (50%), Book Value Growth (12.5%), Sales Growth (12.5%), Cash Flow Growth (12.5%), and Earnings Growth (12.5%).

Dechow et al. 2021); (2) the impact of negative economic shocks on earnings due to operating leverage and sticky costs is relatively small for growth companies because they can react to such shocks by reducing investment and delaying hiring rather than continuing to pay for unutilized resources, sell assets, or fire employees (e.g., Zhang 2005).

- Growth companies may continue to achieve high-earnings growth regardless of economic conditions. This follows because the success or failure of many growth companies is related to idiosyncratic factors rather than to economic conditions. In addition, if deteriorating economic conditions lead growth companies to cut investments, there is often a large positive effect on current and near-term earnings because organic investments in intangibles are generally expensed as incurred (R&D, hiring, advertising, IT, IP, etc.). In contrast, investments by other companies—especially value ones—are relatively small (so there is smaller impact when investments are reduced) and are often in fixed rather than intangible assets.
- Growth stocks perform better when interest rates are falling. Conversely, increases in interest rates have a large negative effect on growth firms due to their high duration.
- Growth stocks represent companies that have demonstrated better-than-average gains in earnings in recent years and are expected to continue delivering high levels of profit growth. Emerging growth companies have the potential to achieve high-earnings growth but lack a history of strong earnings growth.
- Growth stocks benefit more from a falling dollar than a rising one, and they are more sensitive to the dollar movements than value and core stocks.
- Growth companies tend to reinvest profits rather than paying them out to shareholders.

7.1.11 Investor sentiment

Baker and Wurgler (2006) show that investor sentiment affects the stock returns of firms whose valuation are highly subjective and difficult to arbitrage. When beginning-of-period proxies for sentiment are low (see Section 4.9.7), subsequent returns are relatively high for small stocks, young stocks, high volatility stocks, unprofitable stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks. When sentiment is high, on the other hand, these categories of stock earn relatively low subsequent returns. This anomaly is related to the informativeness interpretation of earnings quality (see Sections 1.1.3 and 4.9.7).

7.1.12 Post earnings announcement drift

The post earnings announcement drift (PEAD; also called earnings momentum) is the tendency of stocks to earn positive (negative) average abnormal returns in the three quarters after positive (negative) earnings surprises. Similar inefficiencies have been documented with respect to other types of announcements, particularly dividends. This anomaly is potentially related to earnings quality because the magnitude of the post announcement drift may be negatively associated with transparency, which is an aspect of earnings quality.

To implement the strategy, one needs a measure of the earnings surprise associated with recently announced earnings information. This metric—called standardized unexpected earnings (SUE)—is measured as the standardized difference between reported and expected earnings, where expected earnings are derived either from analysts' earnings forecasts prior to the earnings

announcement or from the time-series of past earnings (see Section 2.11.2). The standardization (i.e., deflation) of the earnings surprise is either by some measure of the average magnitude of the surprise in prior quarters (typically the standard deviation of earnings surprises in prior quarters), or by market price. The results are not particularly sensitive to the choice of deflator.

When using the time-series approach for measuring expected earnings, earnings in quarter t (earn_t) are typically specified as follows:

$$\text{earn}_t = \text{drift} + \text{earn}_{t-4} + \text{disturbance}_t \quad (\text{SRWWD})$$

This model (called the seasonal difference model or seasonal random walk with drift, or SRWWD) assumes that earnings innovations (as captured by the disturbance) are uncorrelated. However, several studies have shown that seasonal differences in quarterly earnings are correlated. Specifically, seasonally differenced quarterly earnings are positively correlated up to three lags, and negatively correlated at longer lags. In both cases, the strength of the correlation declines with the length of the lag.

The reason for the positive correlation (at short lags) is that earnings innovations are typically not completely transitory, as assumed by the seasonal difference model. This is due to economic reasons (economic shocks tend to persist) and accounting effects (the use of the integral approach for measuring quarterly earnings, see Section 4.5.3). Thus, if earnings in quarter t are larger than in quarter $t-4$, earnings in quarter $t+1$ are likely to be larger than in quarter $t-3$.

The reason for the negative correlation (at long lags) is that earnings innovations are not completely permanent. This is especially true for large earnings shocks. So, for example, if current earnings are unexpectedly high (disturbance_t is positive), earnings four quarters ahead are likely to be smaller (disturbance_{t+4} is likely to be negative). Accordingly, the difference between earnings in quarter $t+4$ and earnings in quarter t is likely to be negative.

If investors implicitly use the naïve seasonal difference model (SRWWD above), earnings surprises and therefore earnings announcement returns should be positively correlated up to three quarters apart, and negatively correlated for longer lags. Indeed, research has demonstrated both effects: earnings announcement returns are positively correlated up to three lags and negatively related at longer lags. Moreover, the correlations are especially strong for one lag (positive) and four lags (negative). This evidence does not imply that investors are as naïve as implied by model (1), but it does imply that investors do not *fully* adjust their expectations of future earnings when current earnings are announced. Thus, abnormal returns can be generated by exploiting the incomplete market response.

For zero-investment portfolios constructed based on the magnitude of unexpected earnings estimated using the seasonal random walk model (long firms with SUE in the top decile and short firms with SUE in the bottom decile), Bernard and Thomas (1990) document abnormal returns from the day after the earnings announcement through the subsequent earnings announcement of approximately 8 to 9 percent, or 35 percent on an annualized basis, before transactions costs. The abnormal returns per unit time are even higher (67 percent on an

annualized basis) for portfolios constructed 15 days prior to the expected date for the upcoming announcement and held through the announcement.

Although the cumulative abnormal return from the zero-investment trading strategy continues to increase in the second and third quarters after the earnings announcement, the main part of the abnormal return is earned in the first subsequent quarter. Within each subsequent quarter, large portions of the return are concentrated in the three days surrounding earnings announcement, especially in the first and second subsequent quarters. The magnitude of abnormal returns associated with the PEAD is smaller for large firms and for firms that have high percentage of institutional ownership (e.g., Bartov et al. 2000). Many studies have documented the robustness of these results. However, research has documented a substantial decline in the magnitude of the PEAD over time (e.g., Richardson et al. 2010).

Rangan and Sloan (1998) show that the post earnings announcement drift (earnings momentum) is smaller following fourth quarter earnings announcement compared to the first three fiscal quarters. This result is consistent with several of the features of interim reporting discussed in Section 4.5.3, including effects of the integral approach, special items, and seasonality.

7.1.13 Momentum

Momentum refers to the tendency of recent returns (e.g., over the last year) on assets such as stocks, commodities, currencies, bonds, and even real estate to persist for a while. This phenomenon was originally documented by Jegadeesh and Titman (1993) for U.S equities but has since been shown to hold internationally and for other asset classes. Specifically, Jegadeesh and Titman (1993) show that firms performing well in the past three to 12 months continue to perform well in the next three to 12 months. They further find that a strategy based on the past six-month returns, skipping the most recent week/month (to mitigate the effect of bid-ask bounces), and holding for the next six months, is the most profitable. This anomaly is potentially related to earnings quality because the magnitude of the price drift may be negatively associated with transparency, which is an aspect of earnings quality (see Section 1.1.3).

Explanations for the momentum anomaly include the following:

- *Cognitive dissonance.* Humans prefer the comfort of consistency in their beliefs and opinions. So, while investors react logically to information that confirms their beliefs, they may underreact to information that runs counter to their beliefs, giving rise to price anomalies that feed momentum.
- *Mistaking small clues as unimportant.* The “frog-in-the-pan” hypothesis suggests investors are inattentive to information arriving continuously in small amounts. Thus, a series of frequent gradual changes attracts less attention than infrequent dramatic changes. That inattention results in price anomalies.
- *The disposition effect.* Behavioral research suggests that investors dislike incurring losses much more than they enjoy making gains, and this leads them to hold on to stocks that have lost value and sell stocks that have risen in value. These behavioral biases increase the supply of winners and reduce the supply of losers, leading the price of winners (losers) to understate (overstate) intrinsic value. Subsequent returns gradually correct this mispricing.

- *Skepticism.* Overconfident investors overestimate their ability to produce information but are skeptical of others' ability. Skeptical traders that are yet to receive information believe that the informed have learned little. This leads to underreaction and momentum. Skepticism also causes prices to react to stale information, implying overreaction and long-term reversals (see below).

7.1.14 Long-term reversal

DeBondt and Thaler (1985) show that loser stocks in the past 3 to 5 years outperform winners by 25% over the next 3 years. This anomaly is related to earnings quality because glamour firms may be particularly inclined to manipulate earnings (see Section 4.1.3). However, the more common explanation for the anomaly is that long-run reversal stems from momentum traders' overshooting of fundamental values. Momentum profits initially increase for approximately up to a year, reverse over the following year, and continue to decline over the subsequent five years.

7.1.15 Size

The size anomaly is the tendency of small market capitalization firms to earn higher stock returns than expected given their beta. This anomaly is indirectly related to earnings quality because size is correlated with characteristics that affect earnings quality (e.g., governance).

Research on the size anomaly provides mix results. Asness et al. (2018) describe prior research as follows "The size premium has been accused of having a weak historical record, being meager relative to other factors, varying significantly over time, weakening after its discovery, being concentrated among microcap stocks, residing predominantly in January, relying on price-based measures, and being weak internationally." Yet, they find that when controlling for quality⁴⁴² "a significant size premium emerges, which is stable through time, robust to specification, not concentrated in microcaps, more consistent across seasons, and evident for non-price-based measures of size, and these results hold in 30 different industries and 24 international equity markets. The resurrected size effect is on par with anomalies such as value and momentum in terms of economic significance and gives rise to new tests of, and challenges for, existing asset pricing theories."

7.2 Evaluating stock return anomalies

Documenting stock return predictability does not necessarily imply exploitable mispricing. In many cases the stock return predictability is either spurious (e.g., a result of data mining), due to a correlation between the factor and risk attributes, or it has characteristics that make it difficult to exploit. Several approaches are used to distinguish between exploitable mispricing and alternative explanations. These tests address the following questions:

⁴⁴² Asness et al. (2018) define quality as characteristics that investors should be willing to pay a higher price for, including profitability (various measures of earnings and cash flow scaled by book value), growth (prior five-year growth in profitability), payout, and safety (beta, leverage, volatility of profitability, credit risk).

Is the stock return predictability robust to the use of alternative methodologies for measuring risk-adjusted returns or controlling for risk?

Choices include regression vs. portfolio analysis, time-series vs. cross-section regressions, and alternative risk controls (mimicking portfolios based on characteristics or the characteristics themselves, including market/beta, size, market-to-book, momentum, profitability, growth, ...). If all approaches indicate mispricing, then it probably is.

Are the returns concentrated during subsequent information release events such as earnings announcements?

If the average returns to the strategy are instead relatively smooth and drift over time, then they are probably compensation for risk.

Are the factors correlated with subsequent analysts forecast errors or analysts' forecast revision?

If yes, then the anomaly probably represents mispricing.

How long does the drift last?

If the drift continues for a relatively long period of time (e.g., several years), then it most likely reflects risk. In contrast, if the average return pattern flattens after a not-too-long period, it probably represents mispricing.

Is the stock return predictability associated with change in risk?

For example, if one uses past beta to measure abnormal return after an event that is associated with an increase in risk, "abnormal" returns may be significantly different from zero even if there is no mispricing. To rule out this possibility, one needs to show that changes in risk measures (e.g., beta) are unrelated or negatively related to the subsequent returns, or provide reasoning why such changes are unlikely. For example, a positive earnings surprise is not likely to be associated with an increase in risk, so an increase in risk is not a likely explanation for the document post earnings announcement drift.

Are the abnormal returns positively correlated with the market?

If the strategy works best when the market as a whole is doing well, it may be due to risk.

How consistent are the abnormal returns over time—i.e., in what proportion of the periods did the strategy work?

High proportion imply mispricing.

Does the factor involve price?

If yes, it may be due to risk. The reason is that price decreases in the discount rate, which reflects the stock's risk.

How big are the losses when they occur?

A limited downside risk suggests mispricing.

How difficult is it to implement the strategy?

High information or transaction costs, or other difficulties of implementing the strategy, imply mispricing that may be difficult to exploit. For example,

- What are the characteristics of firms that are included in the strategy? Are these stocks that have high transaction costs (including price impact), that are difficult to short, or that institutional investors avoid? For example, does implementing the strategy requires taking positions in stock with low price, small size, low turnover or high bid-ask spread?
- How often is (costly) rebalancing required?
- How many stocks should the portfolios include to obtain consistent performance?

How sophisticated is the marginal investor?

Low sophistication suggests greater likelihood of mispricing. This is true in the cross-section (for example, variation across firms in institutional holdings) as well as over time (e.g., variation in investor sentiment)

Is the explanation for return predictability plausible, and is there any other analytical or empirical support for the theory?

For example, the accrual anomaly is supported by (1) regulators' concerns regarding accruals manipulation, (2) the discretionary nature of accruals, (3) many documented cases of accruals manipulation, and (4) evidence that accruals predict earnings declines.

Does the anomaly hold out of sample?

For example, in different periods, different geographies and, in some cases, different asset classes.

8. Conclusion

This monograph provides a comprehensive discussion and analysis of earnings quality. It starts with an overview of earnings quality (Chapter 1). While there are several alternative definitions of earnings quality, the monograph focuses on the earnings sustainability or persistence view, which is consistent with practice and most academic research. This interpretation emphasizes valuation implications: high earnings sustainability implies that value estimates derived using price multiples are relatively accurate, because current earnings are a good proxy for future earnings. High earnings sustainability also implies that the current margin is a reasonably accurate estimate of future margins, which are key inputs in fundamental valuation models. With a working definition of earnings quality, the study then analyzes comprehensive and line-item financial statement indicators of earnings quality. This analysis is followed by a discussion of nonfinancial indicators of earnings quality, related primarily to incentives and ability to manipulate earnings as well as transactions, events and circumstances that inform on earnings sustainability. The next chapter describes potential earnings quality issues for each key line item from the financial statements, related red flags, and how to address the issues in financial analysis and valuation. The final two chapters discuss the role of earnings quality in valuation and its relationship with stock return anomalies.

Unlike prior reviews, the study focuses on line-item earnings quality issues and red flags. To enhance the reader's understanding of the earnings quality issues, the monograph also describes the related accounting principles, and it provides many examples of alleged abuses and other reporting issues drawn primarily from SEC enforcement releases and comment letters. The study also complements prior reviews by elaborating on comprehensive financial and nonfinancial indicators of earnings quality.

The primary objective of the monograph is to provide a deep understanding of earnings quality and facilitate the development of comprehensive, granular, and contextual earnings quality indicators. Such analysis may benefit any user of financial statement information, including those developing or using quantitative factor or risk models. These models, which often incorporate quality factors, have increased in popularity in recent years. The data mining nature of many of the models suggests that incorporating a systematic contextual analysis that is grounded in a deep understanding of accounting particularities may yield significant improvement. Similarly, relatively few practitioners (e.g., analysts, institutional investors) and even fewer academics conduct granular earnings quality analysis, despite evidence that such analysis may yield important insights. For example, in many AAERs, the SEC points to abnormal relationships among fundamental data items (e.g., receivables and sales) as indication or reflection of the alleged abuse.

As noted, another objective of the monograph is to review findings of research related to earnings quality. Given that there are several comprehensive reviews and commentaries of earnings quality research (e.g., Healy and Wahlen 1999, Melumad and Nissim 2009, Dechow et al. 2010, DeFond 2010, Amiram et al. 2018) and audit quality (e.g., DeFond and Zhang 2014), this monograph focuses primarily on recent work. In addition, unlike most prior reviews, this study emphasizes research that provides practice-related insights rather than methodological or analytical contributions.

Appendix A: Review of the Financial Statements

This appendix provides a “big-picture” review of the financial statements, the key products of financial accounting.

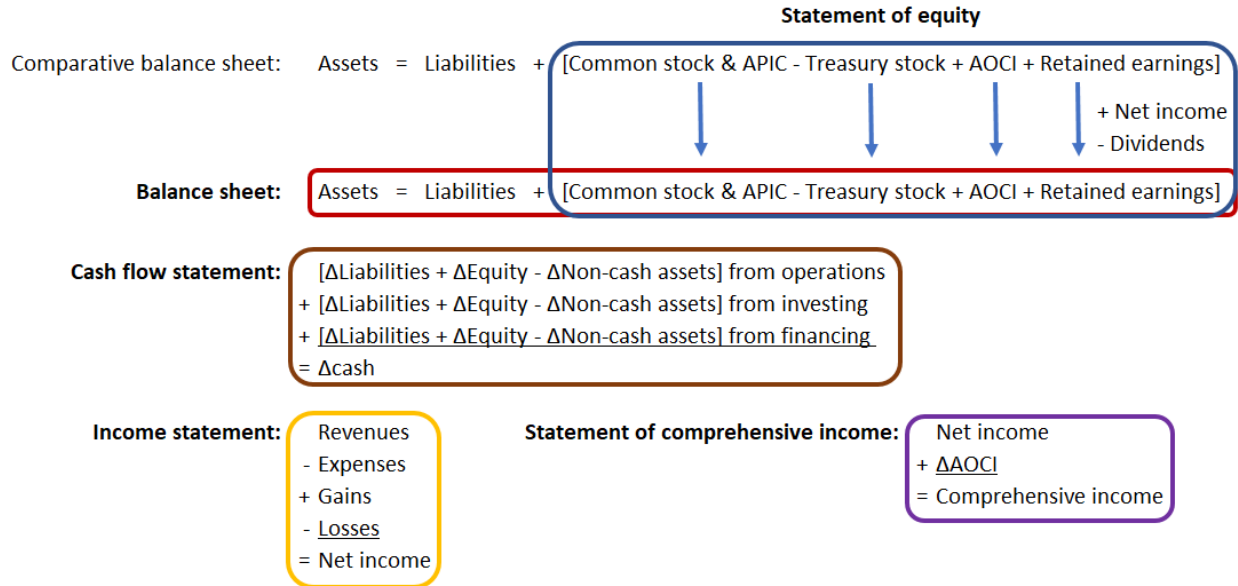
Financial reports include three primary financial statements: the balance sheet, the income statement, and the cash flow statement. The balance sheet reports the resources that the entity owns or controls (assets) and the claims against those resources (liabilities and equity) as of the balance sheet date. In other words, it provides information about the financial position of the company, and it is accordingly also referred to as the statement of financial position. The income statement (also called the statement of earnings/operations/profit of loss or P&L) presents accrual-based measures of performance for the period that ended on the balance sheet date, including revenue, expenses, gains, and losses; it ends with net income. The cash flow statement explains the difference between net income and net cash flow from operating activities, and it also provides information on investing and financing cash flows. In doing so, the cash flow statement helps explain changes in the financial position during the period.

Published financial reports also include a statement of comprehensive income and a statement of equity. The statement of comprehensive income lists gains and losses that are reflected on the balance sheet (i.e., assets or liabilities were adjusted to reflect the gains or losses), but which have not yet been reported in the income statement. These gains and losses are added to reported net income to yield comprehensive income. (Companies may present the statement of comprehensive income combined with the income statement, but almost all companies present it separately.) The statement of equity describes changes in each of the equity accounts during the period that ended on the balance sheet date; it is also called the statement of changes in shareholders' equity.

As explained below, the five financial statements are related to each other. Exhibit 1a summarizes the relationships among them.

The five sections of this article (Section 1 through 5) describe each of the financial statements. The discussion includes a review of basic accounting principles as well as explanations about the relationships among the financial statements and their key limitations.

Exhibit 1a: Articulation of the financial statements



A.1 Balance sheet

The balance sheet presents information about the financial position of the firm, which in turn reflects the cumulative effect of all operating, investing and financing activities since the formation of the company through the balance sheet date. Exhibit A.1a presents Microsoft's balance sheet for the fiscal year that ended on June 30, 2020.

The balance sheet presents the following equation:

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

In fact, as shown in the Exhibit 1a and explained below, all five financial statements are related to this equation.

Exhibit A.1a: Microsoft's Balance Sheet

(In millions)

June 30,	2020	2019
Assets		
Current assets:		
Cash and cash equivalents	\$ 13,576	\$ 11,356
Short-term investments	122,951	122,463
Total cash, cash equivalents, and short-term investments	136,527	133,819
Accounts receivable, net of allowance for doubtful accounts of \$788 and \$411	32,011	29,524
Inventories	1,895	2,063
Other current assets	11,482	10,146
Total current assets	181,915	175,552
Property and equipment, net of accumulated depreciation of \$43,197 and \$35,330	44,151	36,477
Operating lease right-of-use assets	8,753	7,379
Equity investments	2,965	2,649
Goodwill	43,351	42,026
Intangible assets, net	7,038	7,750
Other long-term assets	13,138	14,723
Total assets	\$ 301,311	\$ 286,556
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	\$ 12,530	\$ 9,382
Current portion of long-term debt	3,749	5,516
Accrued compensation	7,874	6,830
Short-term income taxes	2,130	5,665
Short-term unearned revenue	36,000	32,676
Other current liabilities	10,027	9,351
Total current liabilities	72,310	69,420
Long-term debt	59,578	66,662
Long-term income taxes	29,432	29,612
Long-term unearned revenue	3,180	4,530
Deferred income taxes	204	233
Operating lease liabilities	7,671	6,188
Other long-term liabilities	10,632	7,581
Total liabilities	183,007	184,226
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding 7,571 and 7,643	80,552	78,520
Retained earnings	34,566	24,150
Accumulated other comprehensive income (loss)	3,186	(340)
Total stockholders' equity	118,304	102,330
Total liabilities and stockholders' equity	\$ 301,311	\$ 286,556

A.1.1 Assets

Assets are economic resources, but not all resources are recognized on the balance sheet. To be recognized, an economic resource must represent *probable* future economic benefits (criterion 1) that are *measurable* with reasonable precision (criterion 2) and are owned or controlled by the entity as a *result of past transactions* (criterion 3).

The third criterion means that the entity is entitled to receive the benefits from the asset because it already performed (i.e., paid cash to acquire the asset or provided other goods or services) or it incurred a liability.

Economic resources that do not satisfy the above criteria are not recognized on the balance sheet. In particular, economic benefits resulting from *executory contracts*—that is, contracts where both parties are yet to perform (e.g., employment contracts, sale contracts)—and most *internally developed intangibles* (e.g., research and development, brands, human capital, information technology, intellectual property) remain off balance sheet.

Resources resulting from executory contracts are not recognized because the firm has not performed yet, so the “past transaction” criterion (criterion 3 above) is not satisfied.

Investments in internally developed intangibles such as research and development (R&D) are generally not recognized on the balance sheet because the related benefits involve high uncertainty and are not considered sufficiently “probable” or “measurable” (criteria 1 and 2, respectively).

Microsoft’s financial statements provide a nice example of the economic significance of unrecognized intangibles. On June 30, 2020, the market value of outstanding shares was \$1,541 billion (7,571 million shares, \$203.51 price per share; see, e.g., yahoo finance), while the related book value (i.e., the amount reported on the balance sheet) was \$118 billion. The gap between the market and book values of equity is due primarily to the omission of Microsoft’s R&D capital and brand—its most important economic resources—from the balance sheet. These resources, which have been developed over many years of R&D efforts, advertising and other activities, are omitted from the balance sheet because R&D, advertising, and other organic investments in intangible assets are expensed as incurred rather than being capitalized and reported as an asset on the balance sheet.

Most firms distinguish between five groups of assets: current assets; long-term investments; property, plant, and equipment (fixed assets); intangible assets; and other assets. Since 2019, many companies also report separately a right-of-use operating lease asset. When long-term investments, intangibles or the right-of-use assets are relatively small, they are included in “other assets.”

Current assets include cash and cash equivalents (e.g., very short-term deposits), short-term investments, and assets that the firm expects to sell (e.g., inventory), realize in cash (e.g., accounts receivable) or consume (e.g., prepaid expenses) during the coming year or the operating cycle, whichever is longer.

Long-term investments may include investments in marketable securities that the company intends to hold for a period longer than the next twelve months, investments in private entities, and investments in entities (public or private) over which the company has significant influence.

Property, plant, and equipment (PP&E or fixed assets) are long-lived assets that provide the firm with operating capacity and have physical substance (e.g., buildings, equipment, furniture, land for plant site).

Right-of-use operating lease assets represent the right to use leased fixed assets. They are generally measured at the present value of future lease payments.

Intangible assets are assets other than financial instruments that lack physical substance and provide the firm with operating capacity (e.g., goodwill, acquired patents, franchise rights). Because expenditures made to internally develop intangible assets are generally expensed as incurred, most reported intangible assets were acquired from others, typically in a business combination.

Other assets include assets that do not belong to any of the other categories.

A.1.2 Liabilities

Similar to reported assets, which exclude some economic resources, reported liabilities omit some obligations. To be reported as liabilities, obligations must represent *probable* future sacrifice of economic benefits (criterion 1), which can be *measured* with reasonable precision (criterion 2) and be a *result of past transactions* (criterion 3). The third criterion means that the party to the obligation has already performed.

Obligations that do not satisfy all three criteria (and therefore remain off balance sheet) include obligations arising from *executory contracts* (e.g., purchase commitments, employment contracts), where the party to the obligation has not performed yet, and *loss contingencies* (e.g., pending lawsuits, unsettled tax positions), where there is significant uncertainty regarding the existence and amount of related obligations.

Liabilities include both current and long-term obligations. **Current liabilities** are liabilities that the firm expects to settle within one year or the operating cycle, whichever is longer. They include *accounts payable* (credit purchases from suppliers), *accrued expenses* (services that have been received by the company from employees or other parties that are yet to be paid), *deferred revenue* (payments that have been received by the company but delivery is yet to occur), and current debt (short-term borrowings and current maturities of long-term debt). Long-term liabilities include ***long-term debt***, ***operating lease obligation*** (since 2019), ***deferred taxes***, ***pension and other post-retirement benefits***, and ***other accrued liabilities*** (e.g., restructuring, environmental).

A.1.3 Equity

Equity is the residual value of the assets of an entity that remains after the liabilities are deducted. For corporate entities, owners' equity has the following components: contributed capital accounts (common stock, preferred stock, additional paid in capital), treasury stock, retained earnings, accumulated other comprehensive income, and noncontrolling interests.

Contributed capital accounts report the amount invested by shareholders. **Common stock** and **preferred stock** (if issued) are typically reported at the par value of issued shares. **Additional paid in capital** (also referred to as **capital surplus**) reflects the difference between the amount received from shareholders and the par value of issued shares.

Treasury stock measures the reduction in equity due to repurchase of shares from investors.

Retained earnings (also referred to as **reinvested earnings**) represent the excess of cumulative net income over cumulative dividends since the formation of the company. In other words, retained earnings measure the increase in net assets (assets minus liabilities) due to earning activities since the formation of the company, minus assets that have been paid out as dividends. The change in retained earnings each period is generally equal to net income for the period minus declared dividends.

Accumulated other comprehensive income represents the net effect of revaluations of assets and liabilities that did not pass through the income statement. Because all revaluations of assets and liabilities change net assets, revaluations that are not balanced by a change in retained earnings (i.e., revaluations that bypassed the income statement) require a direct adjustment to equity. The equity account that absorbs such adjustments is accumulated other comprehensive income.

Noncontrolling interests are equity claims of outside shareholders on the net assets of consolidated subsidiaries.

The omission of some economic assets and liabilities from the balance sheet is not the only reason for the large difference between the market and book values of equity observed for many companies (e.g., the Microsoft example discussed above). While some assets and liabilities are reported at fair value, most are measured based on the historical (i.e., original) transaction amount, which often deviate significantly from current value. In many cases, *historical cost accounting* results in significant understatement of assets due to inflation. Moreover, while assets are generally not marked up for increases in fair value, they are marked down when deemed impaired. For example, inventory is generally reported at the lower of cost or net realizable value and fixed and intangible assets are written down to fair value when deemed impaired. These adjustments are motivated by *accounting conservatism*.

A.2 Income Statement

While the balance sheet reports the financial position as of a given day, the income statement reports the results of business activities—primarily operating activities—during the period that ended on that day. Specifically, the income statement lists the resources earned (revenues and gains) and the related resources used up or lost (expenses and losses), and it ends with net income.

$$\text{Revenues} - \text{Expenses} + \text{Gains} - \text{Losses} = \text{Net Income}$$

Revenues and expenses relate to recurring activities, while gains and losses measure the net effect of non-recurring activities such as a gain or loss from disposal of old equipment, sale of

investments, or early retirement of debt. Exhibit 1.2a presents Microsoft's income statement for the fiscal year that ended on June 30, 2020.

Exhibit A.2a: Microsoft's Income Statement

(In millions, except per share amounts)

Year Ended June 30,	2020	2019	2018
Revenue:			
Product	\$ 68,041	\$ 66,069	\$ 64,497
Service and other	74,974	59,774	45,863
Total revenue	143,015	125,843	110,360
Cost of revenue:			
Product	16,017	16,273	15,420
Service and other	30,061	26,637	22,933
Total cost of revenue	46,078	42,910	38,353
Gross margin	96,937	82,933	72,007
Research and development	19,269	16,876	14,726
Sales and marketing	19,598	18,213	17,469
General and administrative	5,111	4,885	4,754
Operating income	52,959	42,959	35,058
Other income, net	77	729	1,416
Income before income taxes	53,036	43,688	36,474
Provision for income taxes	8,755	4,448	19,903
Net income	\$ 44,281	\$ 39,240	\$ 16,571

Most firms—including Microsoft—report subtotals for gross profit, operating income, and pretax income (multiple-step format). Some companies use the single-step format where they subtract all pretax expenses from revenue and do not explicitly report gross profit or operating income.

Operating income is not a well-defined concept. Companies that report this subtotal use different definitions. Items that are reported by some companies as operating are often classified by others as nonoperating. For example, a company that leases out a portion of an owned building that is mostly used for operations may classify the rent income as operating (reflecting the fact that that income effectively offsets the related depreciation) or outside operations (consistent with the fact that renting is not an operating activity for the company). As another example, a company that makes charitable contributions may classify those outflows as an operating item (consistent with the likely motivation for the contribution – to enhance the company's reputation) or outside operations, arguing that they contributions are not related to operations.

The amounts reported in the income statement are based on three basic accounting principles: realization / satisfaction of performance obligations (revenue recognition), matching (expense recognition), and historical cost (affects revenue and expense measurement). Prior to 2018, the revenue recognition standard was referred to as the realization principle. Since 2018 the framework for recognizing revenue has changed to one that emphasizes the satisfaction of performance obligations. However, under both frameworks, revenue is generally recognized at the time of delivery. I first explain the old principle, then the new framework, and finally the key

changes. Understanding both frameworks facilitates a better understanding of revenue recognition.

The ***realization principle*** states that revenue should be recognized and reported in the income statement when the amount and timing of net cash flows from the revenue are reasonably determinable (condition 1), and the earnings process with respect to the revenue is complete or virtually complete (condition 2).

The SEC issued further guidance, which effectively interprets the first criterion as requiring that the price be fixed or determinable and collection be reasonably assured. It further specifies that the second criterion requires the existence of persuasive evidence of an arrangement, and that product delivery has occurred or services have been rendered.

For most transactions these criteria were satisfied at the time of delivery, and revenue was recognized accordingly. When companies recognized revenue before cash collection, they increased an asset called accounts receivable instead of cash, and this asset was reduced when cash was collected. When companies received advance payments from customers (i.e., before the delivery of goods or services), they increased a liability called deferred revenue, and this liability was reduced when delivery took place and revenue was recognized.

Under ASC 606, *Revenue from Contracts with Customers*, which is effective since 2018, an entity recognizes revenue to depict the transfer of promised goods or services to customers at an amount that reflects the consideration the entity expects to be entitled in exchange for those goods or services.

The principles in the standard are applied using the following five steps:

1. Identify the contract(s) with a customer (a contract creates enforceable rights and obligations)
2. Identify the performance obligations in the contract (obligations that are both capable of being distinct and distinct in the context of the transaction)
3. Determine the transaction price (including variable consideration)
4. Allocate the transaction price to the performance obligations in the contract (generally based on relative fair values)
5. Recognize revenue when (or as) the entity satisfies a performance obligation.

Any consideration received from the customer before all the above criteria are met is generally recognized as a deposit (liability)

As noted, while the framework of ASC 606 is different from that of prior GAAP, under both frameworks revenue is generally recognized at the time of delivery. Primary changes include:

- More multiple elements/deliverables (now called “performance obligations”)
- Recognition at “transfer of control” rather than “transfer of risks and rewards”
- For variable consideration, the expected value or “most likely amount” is used, rather than delayed recognition (until the uncertainty is resolved)
- Some differences for specific transactions such as percentage of completion method and license revenue
- Substantially more disclosure

Companies incur costs in generating revenues. The ***matching principle*** requires that each cost be expensed in the same period in which the revenues that the cost helped generate are recognized (e.g., the cost of inventory sold is matched against the related sales revenue in the same income statement).

Similar to the revenue recognition, the matching principle can be satisfied before, at the time of, or after the cash payment, with the expense recognized accordingly.

To implement the matching principle, companies first apply the revenue recognition criteria and decide which revenues to recognize. Then, they identify the costs that helped generate those revenues and expense them in the same income statement to measure net income for the period.

Applying the matching principle with respect to costs that are directly related to specific revenues—such as cost of inventory sold or sales commissions—is straightforward (at least conceptually). However, most costs are not directly related to specific revenues but rather provide the capacity to generate revenue during the period (e.g., administrative salaries, headquarter rent, interest). Consistent with the matching principle, these costs are recognized as expenses when they provide the capacity to generate revenue, which is typically when they are incurred. Some costs, such as capital expenditures, jointly benefit several periods and thus require a systematic allocation to the periods that benefit (e.g., through a depreciation schedule).

While most costs are reported in the income statement based on the matching principle, two types of costs are expensed in a way that violates matching. The first type relates to costs that are expected to benefit future periods, but the amount and timing of those future benefits are highly uncertain. Since the future benefits are too uncertain to be recognized as an asset on the balance sheet, these costs are expensed when incurred. Examples include R&D expenditures, advertising, start-up costs, investments in human capital, and some organizational repositioning charges. The second type of costs that are recognized in violation of matching are those that relate to past periods. For example, new information may indicate that past depreciation was insufficient and thus trigger a write down of fixed assets. Other examples include resolution of lawsuits or other contingent obligations, and most restructuring charges.

The ***historical cost principle*** governs the measurement of most assets and liabilities; it requires that assets and liabilities be measured based on the amounts paid or received when the asset or liability was originally recognized. Because revenues are inflow of assets (cash, receivables) or settlement of liabilities (deferred revenue), and expenses are reductions in assets (inventory, fixed assets, prepaid expenses) or incurrence of liabilities (accrued expenses), the historical cost principle also affects the reported amounts of revenues, expenses, and income.

Most companies report four major expense items: cost of goods and services sold; selling, general, and administrative expenses; interest expense; and income taxes.

For manufacturing companies, cost of goods sold includes direct materials, direct labor, and manufacturing overhead (including depreciation), which were used to produce units that were sold during the period.

Selling, general and administrative (SG&A) expenses are comprised of marketing expenses, selling expenses, research and development costs, administrative expenses, and other non-manufacturing operating costs (including depreciation and amortization expense on non-manufacturing assets). Companies with significant research and development activities often report these expenditures separately.

Companies typically report impairment, restructuring and similar non-recurring charges under captions such as “other operating charges”.

Gains and losses (e.g., from selling investments or old PP&E) are typically reported net under captions such as “other income (loss) – net”.

A.3 Cash Flow Statement

The cash flow statement explains how cash has been provided and used during the period that ended on the balance sheet date. The sources and uses of cash are classified into three categories: operating, investing, and financing. Exhibit A.3a presents Microsoft’s cash flow statement for the fiscal year that ended on June 30, 2020.

The ***operating section*** includes all cash flows used for or provided by purchasing merchandise (raw materials in manufacturing firms), producing the products (in manufacturing firms), marketing the products, and administering the operations.

Although labeled “operating activities”, this section of the cash flow statement also reflects several investing and financing items, including interest income and expense, and dividends received (but not dividends paid out to the shareholders). In addition, essentially all income taxes are included in the operating section, including those related to investing and financing activities (e.g., income taxes paid on a gain from selling fixed assets). In general, cash from operations includes the cash counterparts of all revenues and expenses reported in the income statement.

The operating section of the cash flow statement is typically presented using the so-called *indirect approach*, which starts with net income and reconciles it to cash provided by (or used for) operating activities. The adjustments “undo” the effects of accruals accounting. For example, depreciation—a noncash expense which is deducted from revenues in calculating income—is added back to net income, and the change in accounts receivable—measuring credit sales which are included in revenues and income but have not been collected yet—is deducted from net income.

Exhibit A.3a: Microsoft's Statement of Cash Flows

(In millions)

Year Ended June 30,	2020	2019	2018
Operations			
Net income	\$ 44,281	\$ 39,240	\$ 16,571
Adjustments to reconcile net income to net cash from operations:			
Depreciation, amortization, and other	12,796	11,682	10,261
Stock-based compensation expense	5,289	4,652	3,940
Net recognized gains on investments and derivatives	(219)	(792)	(2,212)
Deferred income taxes	11	(6,463)	(5,143)
Changes in operating assets and liabilities:			
Accounts receivable	(2,577)	(2,812)	(3,862)
Inventories	168	597	(465)
Other current assets	(2,330)	(1,718)	(952)
Other long-term assets	(1,037)	(1,834)	(285)
Accounts payable	3,018	232	1,148
Unearned revenue	2,212	4,462	5,922
Income taxes	(3,631)	2,929	18,183
Other current liabilities	1,346	1,419	798
Other long-term liabilities	1,348	591	(20)
Net cash from operations	60,675	52,185	43,884
Financing			
Repayments of short-term debt, maturities of 90 days or less, net	0	0	(7,324)
Proceeds from issuance of debt	0	0	7,183
Cash premium on debt exchange	(3,417)	0	0
Repayments of debt	(5,518)	(4,000)	(10,060)
Common stock issued	1,343	1,142	1,002
Common stock repurchased	(22,968)	(19,543)	(10,721)
Common stock cash dividends paid	(15,137)	(13,811)	(12,699)
Other, net	(334)	(675)	(971)
Net cash used in financing	(46,031)	(36,887)	(33,590)
Investing			
Additions to property and equipment	(15,441)	(13,925)	(11,632)
Acquisition of companies, net of cash acquired, and purchases of intangible and other assets	(2,521)	(2,388)	(888)
Purchases of investments	(77,190)	(57,697)	(137,380)
Maturities of investments	66,449	20,043	26,360
Sales of investments	17,721	38,194	117,577
Other, net	(1,241)	0	(98)
Net cash used in investing	(12,223)	(15,773)	(6,061)
Effect of foreign exchange rates on cash and cash equivalents	(201)	(115)	50
Net change in cash and cash equivalents	2,220	(590)	4,283
Cash and cash equivalents, beginning of period	11,356	11,946	7,663
Cash and cash equivalents, end of period	\$ 13,576	\$ 11,356	\$ 11,946

The **investing section** of the cash flow statement reports cash flows used for acquiring or provided by selling (1) tangible long-lived assets (e.g., land, buildings, and equipment), (2) intangible assets (e.g., patents, franchises, computer software, copyrights, permits, licenses and other contractual rights), (3) businesses, and (4) investment assets (assets that are not used in

operations such as securities issued by other firms and loans receivable). Unlike cash from operations, this section is always presented directly—each type of cash inflow or outflow is reported explicitly.

The **financing section** reports cash obtained from owners (stock issuance) and lenders (issuance of bonds or notes, other borrowings), cash provided to owners (cash dividends, share repurchases), and principal repaid to lenders. Like the investing section, this section is always presented directly, with each type of cash inflow and outflow reported explicitly.

The cash flow statement is used for assessing liquidity, understanding changes in the financial position, and evaluating earnings quality. Cash flow information is useful for evaluating **liquidity** because the different sources and uses of cash have different implications for the company's ability to meet its short-term obligations. For example, a company that generates a strong cash flow from recurring operating activities is likely to have better liquidity than a company that borrows cash or that increases its cash position by selling a business unit or by cutting capital expenditures.

While the original motivation for requiring companies to disclose cash flow information was to inform about liquidity, the cash flow statement also facilitates a better **understanding of changes in financial position**. Because assets equal liabilities plus equity, an increase in cash (an asset) must be accompanied by either a decrease in another asset or an increase in a liability or equity account. For example, “capital expenditures”—an investing cash outflow—represent an increase in fixed assets, and “issuance of debt”—a financing cash inflow—represents an increase in debt liabilities. Thus, by providing information about cash transactions, the cash flow statement informs not only on changes in cash but also on changes in other assets, liabilities, and equity accounts. In other words, the cash flow statement provides information about changes in the financial position.

Finally, financial analysts and other sophisticated users of the financial statements utilize the cash flow statement to evaluate **earnings quality**. As discussed above, the operating section of the cash flow statement reports the magnitude of and reasons for the difference between earnings and cash from operations. This information is useful for evaluating the sustainability of earnings because noncash earnings items are generally less persistent than operating cash flows. For example, an impairment charge, which reduces net income but does not affect cash from operations (and is therefore added to net income in the operating section of the cash flow statement), is likely to be less persistent than other earnings items.

A.4 Statement of Comprehensive Income

The statement of comprehensive income reports gains and losses that are reflected on the balance sheet but haven't yet been reported in the income statement. Adding those items to net income gives a more complete measure of income – comprehensive income. Examples of such gains and losses include: (1) unrecognized changes in the funding status of postretirement benefits, (2) foreign currency translation adjustment (reflects the impact of fluctuations in exchange rates used to translate the book values of assets and liabilities of foreign subsidiaries), and (3)

unrealized holding gains/losses from marking-to-market available-for-sale securities and some derivatives.

Companies have the option to present the components of net income and other comprehensive income either in a single continuous statement or in two separate but consecutive statements in annual financial statements. Most companies use the two statements option, as does Microsoft. Exhibit A.4a presents Microsoft's statement of comprehensive income for the fiscal year that ended on June 30, 2020.

Exhibit A.4a: Microsoft's Statement of Comprehensive Income

(In millions)

Year Ended June 30,	2020	2019	2018
Net income	\$ 44,281	\$ 39,240	\$ 16,571
Other comprehensive income (loss), net of tax:			
Net change related to derivatives	(38)	(173)	39
Net change related to investments	3,990	2,405	(2,717)
Translation adjustments and other	(426)	(318)	(178)
Other comprehensive income (loss)	3,526	1,914	(2,856)
Comprehensive income	\$ 47,807	\$ 41,154	\$ 13,715

A.5 Statement of Equity

The statement of equity explains changes in each of the equity accounts during the period that ended on the balance sheet date. Examples of line items in this statement include net income (increases retained earnings), dividends (reduce retained earnings), issuance of new shares (increases common or preferred stock and additional paid in capital), repurchase of shares (increases treasury stock, a contra-equity account),⁴⁴³ issuance of shares from the treasury (reduces treasury stock and changes additional paid in capital), and other comprehensive income (increases accumulated other comprehensive income). Exhibit A.5a presents Microsoft's statement of shareholders' equity for the fiscal year that ended on June 30, 2020.

⁴⁴³ Instead of increasing treasury stock, some companies—including Microsoft—account for share buybacks by reducing common stock, APIC, and retained earnings.

Exhibit A.5a: Microsoft's Statement of Shareholders' equity

(In millions)

Year Ended June 30,	2020	2019	2018
Common stock and paid-in capital			
Balance, beginning of period	\$ 78,520	\$ 71,223	\$ 69,315
Common stock issued	1,343	6,829	1,002
Common stock repurchased	(4,599)	(4,195)	(3,033)
Stock-based compensation expense	5,289	4,652	3,940
Other, net	(1)	11	(1)
Balance, end of period	80,552	78,520	71,223
Retained earnings			
Balance, beginning of period	24,150	13,682	17,769
Net income	44,281	39,240	16,571
Common stock cash dividends	(15,483)	(14,103)	(12,917)
Common stock repurchased	(18,382)	(15,346)	(7,699)
Cumulative effect of accounting changes	0	677	(42)
Balance, end of period	34,566	24,150	13,682
Accumulated other comprehensive income (loss)			
Balance, beginning of period	(340)	(2,187)	627
Other comprehensive income (loss)	3,526	1,914	(2,856)
Cumulative effect of accounting changes	0	(67)	42
Balance, end of period	3,186	(340)	(2,187)
Total stockholders' equity	\$ 118,304	\$ 102,330	\$ 82,718

Appendix B: SEC Filings and Other Required Disclosures

Under the securities Act of 1933, all securities offered in the U.S. must be registered with the SEC or must qualify for an exemption from the registration requirements. In addition, under the Securities Exchange Act of 1934, listed companies are required to file the following forms with the SEC:

- Form 10-K – An annual report including financial statements and many additional disclosures. This report is described in detail in a separate section below.
- Form 10-Q – A quarterly report including financial statements and some additional disclosures. The Form 10-Q provides similar but more abbreviated disclosure than the Form 10-K. Like the 10-K, it includes and MD&A, Quantitative and Qualitative Disclosures About Market Risk, Controls and Procedures, Legal Proceedings and Risk Factors, but it omits other 10-K items.
- Form 20-F – An annual report from non-U.S. companies
- Form 8-K – A report used to describe significant events that may affect the company; companies generally have four business days to file a Form 8-K for the events
- Proxy Statement – A report used when management requests the right to vote through proxies at shareholders' meetings

SEC rules require companies to send an **annual report** to their shareholders when they are holding annual meetings to elect members of their boards of directors. There is a lot of overlap in the requirements for the 10-K and the annual report to shareholders, but there are also important differences. The 10-K typically includes more detailed information than the annual report to shareholders, while the annual report to shareholders often appears as a colorful, glossy publication and include “stories” and other soft information about the companies. Some companies simply take their 10-K and send it as their annual report to shareholders.

Companies offering securities for sale must file a **registration statement**. The registration statement (Form S-1 for domestic issuers) includes

- A description of the security to be offered for sale and the plan use of the proceeds
- A description of the company's properties and business
- Information about management and compensation
- Financial statements certified by independent accountants
- Management's discussion and analysis of financial condition and results of operations
- Risk factors and market risks
- Many additional disclosures and exhibits

The next step is to issue a **preliminary (red herring) prospectus**, and eventually the final **prospectus**. The prospectus is the legal offering or “selling” document that must be delivered to everyone who is offered or buys the securities. It contains some, but not all, of the information that is included in the registration statement. The final prospectus also includes pricing and underwriting details.

The remainder of this appendix elaborates on two forms: Form 10-K, and Form 8-K.

B.1 Form 10-K Annual Report

The 10-K is an annual report filed with the SEC, which provides a comprehensive overview of the company's business and financial condition and includes audited financial statements. The deadline for filing the report is based on a company's public float, which is essentially the number of shares held by public investors multiplied by the share price:

Large Accelerated Filer (public float \$700MM or more):	60 days
Accelerated Filer (\$75MM or more and less than \$700MM):	75 days
Non-accelerated Filer (less than \$75MM):	90 days. ⁴⁴⁴

The Sarbanes-Oxley Act requires the company's CFO and CEO to certify the accuracy of the 10-K, and it requires the SEC to review every public company's financial statements at least once every three years. The SEC staff may provide comments to a company where disclosures appear to be inconsistent with the disclosure requirements or deficient in explanation or clarity. As discussed in several sections of this monograph (e.g., Section 4.7.4), comment letters are an important source of information for evaluating earnings quality. All 10-Ks filed with the SEC are available on the SEC's EDGAR website, and most companies also post their 10-Ks on their own websites.

The following is a short description of each of the items contained in the 10-K, which is based on "Form 10-K" (<https://www.sec.gov/files/form10-k.pdf>; effective through October 31, 2022), "How to Read a 10-K/10-Q," July 1, 2011 (<https://www.sec.gov/fast-answers/answersreada10khtml.html>), and additional sources.

Part I (Items 1 through 4)

Item 1. Business. A description of the company's business, including its main products and services, what subsidiaries it owns, and what markets it operates in. It may include information about recent events, competition the company faces, regulations that apply to it, labor issues, special operating costs, or seasonal factors. In some cases, comparing the discussion in this item with related disclosures in the MD&A and notes to the financial statements may indicate reporting inconsistencies and potential earnings quality issues. For example, if a company emphasizes a source of revenue in item 1 but provides no details on that revenue in the MD&A or in the notes, it may be due to management attempt to hide unfavorable trends.

Item 1A. Risk Factors. Information about the most significant risks that apply to the company or to its securities. This information is descriptive, often boilerplate, and purely qualitative. Given that higher risk implies lower earnings sustainability (see Sections 2.9 and 2.10), reading and summarizing key points from the disclosure (which for some firms is very lengthy) may be helpful when conducting earnings quality analysis. Changes in disclosure compared to prior

⁴⁴⁴ Before December 15, 2006, the 10-K deadline for Large Accelerated Filers was 75 days. For 10-Q, the corresponding deadlines are 40, 40, and 45 days, respectively (both before and after December 15, 2006). Prior to 2003, some 10-K were submitted as Form 10-K405 (if an officer or director of the company did not disclose their insider trading activities within the required time period). For the years where electronic filing has been required, almost one-third of the filings are registered as a 10-K405. This classification was discontinued after 2002.

periods may be particularly informative. Smaller reporting companies are not required to provide this disclosure.

Item 1B. Unresolved Staff Comments. This item requires the company to explain certain comments it has received from the SEC staff on previously filed reports that have not been resolved after an extended period.

Item 2. Properties. Information about the company's significant properties, such as principal plants, mines, and other materially important physical properties. This information may be relevant for evaluating geographic segment disclosures as well as disaggregated revenue disclosures (effective since 2018 under ASC 606).

Item 3. Legal Proceedings. Information about significant pending lawsuits or other legal proceedings, other than ordinary litigation. This information may be relevant for evaluating off-balance sheet exposures and the adequacy of litigation loss accruals.

Item 4. Mine Safety Disclosures.

Part II (Items 5 through 9)

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities. Information about the company's equity securities, including market information, the number of holders of the shares, dividends, stock repurchases by the company, and similar information.

Item 6. Selected Financial Data. Eliminated since 2021. Required certain financial information about the company for the last five years.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations (a.k.a. MD&A). Management perspective on (1) the company's operations and financial results; (2) the company's liquidity and capital resources, including off-balance sheet arrangement; and (3) critical accounting judgments, such as estimates and assumptions, which can have a significant impact on the financial statements. Additional objectives (besides providing management's perspective) include to enhance the overall financial disclosure, to provide the context within which financial information should be analyzed, and to provide information about the quality of, and potential variability of, earnings and cash flow so that investors can assess the likelihood that past performance is indicative of future performance. Consistent with these objectives, the discussion should focus on the results for the fiscal year and explain material changes relative to the previous year. It should also cover any known trends or uncertainties that could materially affect the company's results (e.g., re supply chain, regulation, foreign exchange, commodity prices, changing customer tastes) as well as management actions to address them.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk. Information about the company's exposure to market risk, such as interest rate risk, foreign currency exchange risk,

commodity price risk, or equity price risk. The company may discuss how it manages its market risk exposures.

Item 8. Financial Statements and Supplementary Data. Audited financial statements, prepared under GAAP (see Appendix A), notes that explain the information presented in the financial statements, auditor report (see Section 4.7.2), and auditor reports on a company's internal controls over financial reporting (for large companies; Section 4.4).

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure. If there has been a change in its accountants, the company must discuss any disagreements it had with those accountants. Many investors view this disclosure as a red flag (see Section 4.7.1)

Item 9A. Controls and Procedures. Information about the company's disclosure controls and procedures and its internal control over financial reporting.

Item 9B. Other Information. Any information that was required to be reported on Form 8-K during the fourth quarter of the year covered by the 10-K but was not yet reported.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Part III (Items 10 through 14)

Most companies meet Part III's disclosure requirements by providing the information in the proxy statement, which is provided to shareholders in connection with annual meetings. If the information is provided through the proxy statement, the 10-K would include a statement from the company that it is incorporating the information from the proxy statement by reference – in effect directing readers to go to the proxy statement document to find this information. The proxy statement is typically filed a month or two after the 10-K.

Item 10 Directors, Executive Officers and Corporate Governance. Information about the background and experience of the company's directors and executive officers, the company's code of ethics, and certain qualifications for directors and committees of the board of directors.

Item 11. Executive Compensation. Disclosure about the company's compensation policies and programs and how much compensation was paid to the top executive officers of the company in the past year.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters. Information about the shares owned by the company's directors, officers and certain large shareholders, and about shares covered by equity compensation plans.

Item 13. Certain Relationships and Related Transactions, and Director Independence. Information about relationships and transactions between the company and its directors, officers, and their family members, and whether each director of the company is independent.

Item 14. Principal Accountant Fees and Services. Information about fees paid to the auditor firm for various types of services, including audit, audit-related, tax, and all other.

Part IV (Items 15 and 16)

Item 15. Exhibits and Financial Statement Schedules. A list of the financial statements and exhibits included as part of the Form 10-K. Many exhibits are required, including documents such as the company's bylaws, copies of its material contracts, and a list of the company's subsidiaries.

Item 16. Form 10-K Summary. Optional summary of the information contained in the 10-K.

B.2 Form 8-K Current Report

The following summary is based on “Form 10-8” (<https://www.sec.gov/files/form8-k.pdf>; effective through October 31, 2024), “How to Read an 8-K,” January 26, 2021 (<https://www.sec.gov/oiea/investor-alerts-and-bulletins/how-read-8-k>), and additional sources.

Form 8-K provides investors with information about “material” corporate events (i.e., there is a substantial likelihood that a reasonable investor would consider the information important in making an investment decision). Companies are required to make most 8-K disclosures within four business days of the triggering event and in some cases even earlier. 8-Ks are available on the SEC's EDGAR website. The rest of this section lists—and in some cases describes—the items that require filing a Form 8-K.

Item 1.01. Entry into a Material Definitive Agreement. This item requires disclosure of certain material agreements not made in the ordinary course of business, or material amendments to those agreements. For example, if a company takes out a five-year loan with a bank or signs a long-term lease, and the loan or lease is material to the company, the agreement must be reported here. But if a retailer already has a chain of stores and signs a lease for one more, the new lease generally would be in the ordinary course of business and would not be reported here.

Item 1.02. Termination of a Material Definitive Agreement. Under this item, a company generally must disclose the early termination of a material agreement.

Item 1.03. Bankruptcy or Receivership. Filed upon initial court filing as well as subsequently to outline the company's plan for reorganization (under Chapter 11) or liquidation (under Chapter 7) and the court's confirmation of the plan.

Item 1.04. Mine Safety – Reporting of Shutdowns and Patterns of Violations.

Item 2.01. Completion of Acquisition or Disposition of Assets. Describes the terms of the transaction.

Item 2.02. Results of Operations and Financial Condition. Many companies announce their quarterly and annual results simultaneously in a press release and an 8-K (which includes the

press release as an exhibit). The documents often include an announcement that the company will hold a conference call (sometimes called an analyst or earnings call) shortly after the release to discuss the results. The financial disclosures in the 8-K typically summarize the full financial statements, which will appear later in the company's quarterly report (on Form 10-Q) or annual report (on Form 10-K).

Item 2.03. Creation of a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement of a Registrant. Describes the terms of the transaction. Includes material debt, leases, and off-balance sheet arrangements.

Item 2.04. Triggering Events That Accelerate or Increase a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement. Upon material default, the company must disclose the amount to be repaid, the repayment terms and other financial obligations that might have to be repaid on an accelerated basis because of the initial default. Cross-default provisions may allow other creditors to demand immediate repayment of amounts owed to them.

Item 2.05. Costs Associated with Exit or Disposal Activities. Disclosure of restructuring plans under which the company will incur material charges, including cost estimates.

Item 2.06. Material Impairments. If the company determines the impairment when routinely preparing its financial statements for its periodic report, the company may make the disclosure in the periodic report rather than in an 8-K.

Item 3.01. Notice of Delisting or Failure to Satisfy a Continued Listing Rule or Standard; Transfer of Listing.

Item 3.02 – Unregistered Sales of Equity Securities. Private sales of securities exceeding 1 percent of a company's outstanding shares of that class (or 5 percent for smaller reporting companies) would be reported under this item. Public offerings registered with the SEC need not be disclosed under this item. Investors can use the information provided under this item to determine the amount of capital raised by the company as well as the potential dilutive effect of reported private sales.

Item 3.03 – Material Modification to Rights of Security Holders. Under this item, companies must disclose material changes to instruments that define the rights of shareholders (such as a company's governing documents) or material limitations on the rights of security holders that result from the issuance or modification of another class of securities. Examples of such changes could include loan terms restricting dividend payments, the adoption of an antitakeover device or the issuance of preferred stock.

Item 4.01. Changes in Registrant's Certifying Accountant. Companies must disclose if they dismiss their independent auditor, if the auditor resigns or declines to stand for re-appointment, and if the company hires a new auditor. See Section 4.7.1.

Item 4.02. Non-Reliance on Previously Issued Financial Statements or a Related Audit Report or Completed Interim Review. This item requires disclosure if the company believes that

previously issued financial statements should not be relied upon because of an error in the statements. Disclosure is also required if the auditor believes that its previously issued audit reports or interim reviews on financial statements should not be relied upon. Companies generally restate their financial statements after the 8-K disclosure. The restatement could come at a much later date. See Section 4.7.3.

Item 5.01. Changes in Control of Registrant. If there is a change of control of the company, the company must identify the persons who have acquired control and the percentage of voting securities that they beneficially own, as well as any arrangements between the old and new control groups regarding the election of directors or other matters.

Item 5.02. Departure of Directors or Certain Officers; Election of Directors; Appointment of Certain Officers; Compensatory Arrangements of Certain Officers. See Section 4.7.1

Item 5.03. Amendments to Articles of Incorporation or Bylaws; Change in Fiscal Year. This item generally requires disclosure if a company amends its articles of incorporation or bylaws, or changes its fiscal year, unless the company already disclosed the proposed amendment or fiscal year change in a proxy statement or information statement. Companies that issue only debt securities are typically not required to comply with this item.

Item 5.03. Temporary Suspension of Trading Under Registrant's Employee

Item 5.04. Temporary Suspension of Trading Under Registrant's Employee Benefit Plans.

Item 5.05. Amendments to the Registrant's Code of Ethics, or Waiver of a Provision of the Code of Ethics. Companies must generally report changes to their code of ethics that apply to the chief executive officer, chief financial officer, chief accounting officer or controller, or others performing similar functions. The company also must disclose any waivers granted to any of these persons. Many investors consider ethics waivers to be a red flag. Please note that a company may elect to provide these disclosures on the company's website instead of filing an 8-K.

Item 5.06. Change in Shell Company Status.

Item 5.07. Submission of Matters to a Vote of Security Holders. Within four business days of the end of an annual or special meeting, companies must file the results of shareholder votes in director elections and on all other matters put to a vote. If the company is only able to report preliminary results at that time, it must file an amended 8-K to report the final vote results within four business days after those results are known.

Item 5.08. Shareholder Director Nominations.

Items 6.01-6.06. Asset-backed securities.

Item 7.01. Regulation FD. The purpose of Regulation FD (for "fair disclosure") is to prevent companies from selectively disclosing material, non-public information. Under the regulation,

companies generally must give material information to the public at the same time they provide it to others, such as securities market professionals. Companies may submit an 8-K under this item or Item 8.01 as one method of complying with Regulation FD. Examples of 8-Ks filed under this item include announcements of dividends, quarterly sales figures, or other business developments. See Section 2.11.9.

Item 8.01. Other Events. This is the place where companies may report anything that they believe is important but is not specifically required elsewhere in the 8-K.

Item 9.01. Financial Statements and Exhibits. Under this item, a company must file certain financial statements and list the exhibits that it has filed as part of the 8-K. For example, if a company discloses in Item 2.01 that it has acquired a business, Item 9.01 would require the company to provide the financial statements of the business acquired in the same or a later-filed amended 8-K. In addition, the company must also present “pro forma” financial statements that show what the company’s financial results might have been if the transaction had been completed earlier. Likewise, if the company discloses in Item 1.01 that it has entered into a material agreement, that agreement may be filed as an exhibit in the 8-K. See Section 2.11.4 and earnings quality issue “Consolidation-related distortions in M&A years” in Section 5.18.

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