

Reformulated Financial Statements

Doron Nissim*
Columbia Business School

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[*Preliminary; comments are welcome:* dn75@columbia.edu;
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Abstract

Conducting informative profitability and 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. This study provides a step-by-step explanation of the reformulation process, and it describes how the reformulated financial statements can be measured using Compustat data items. The last section is important due to the many accounting details involved as well as to accounting changes over time. The informativeness of the reformulated financial statements constructed here is demonstrated in three companion studies (Nissim 2022a,b,c).

JEL Classification: G12, G17, G31, G32, M41

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1. Introduction

Profitability analysis involves using ratios to compare amounts from the income statement and balance sheet. To make the comparisons more meaningful, the balance sheet and income statement are first reformulated. The reformulated balance sheet and income statement distinguish between operating, financing, and other nonoperating activities, and the reformulated income statement also differentiates between recurring and transitory items. For reasons discussed below, these distinctions are important not only for evaluating profitability but also for translating profitability into a value estimate. Yet, proper reformulation of the financial statements is anything but easy. This study provides a step-by-step explanation of the reformulation process, and it describes how the reformulated financial statements can be measured using Compustat data items.

Reported financial statements identify three types of activities: operating, investing, and financing. For example, the cash flow statement classifies cash flows into these three categories. However, a more informative distinction is between operating and financing activities, redefined to include the related investing activities. Investments in and disposal of fixed assets, businesses, intangible assets, and other assets that provide operating capacity are viewed as part of operations, while purchases and sales of financial assets—which reduce net borrowing—are classified as financing. Consistent with common practice, the study uses these broader definitions of operating and financing activities. Some items do not fit either classification (e.g., equity method investments), requiring a third category, which is referred to here as “other nonoperating.”

The primary reasons for distinguishing among the different activities are:

- Value is created primarily in operations, so differentiating operating activities from financing and other nonoperating activities facilitates a more informative evaluation of profitability and value creation. For example, financial leverage increases average shareholders’ profitability but also increases risk, so high profitability due to high leverage does not necessarily indicate value creation. In contrast, high operating profitability is more likely to imply value creation.¹
- The value of operations is estimated based on the firm’s ability to generate free cash flows (DCF analysis) or operating profit (e.g., industry multiple of EBITDA), while the value of financial and other nonoperating items is generally measured based on amounts reported on the balance sheet.² The reason is that balance sheet distortions—including the effects of

¹ In his letter to Berkshire Hathaway Shareholders, included in the 2018 10-K, Warren Buffett explains this point: “We use debt sparingly. Many managers, it should be noted, will disagree with this policy, arguing that significant debt juices the returns for equity owners. And these more venturesome CEOs will be right most of the time. At rare and unpredictable intervals, however, credit vanishes and debt becomes financially fatal. A Russian-roulette equation – usually win, occasionally die – may make financial sense for someone who gets a piece of a company’s upside but does not share in its downside. But that strategy would be madness for Berkshire. Rational people don’t risk what they have and need for what they don’t have and don’t need.”

² The value of the debt tax shield is typically captured by measuring WACC—the cost of capital used to discount free cash flows—on an after-tax basis, with the cost of debt reduced to reflect the tax benefit of interest deductibility. Attributing the value of the debt tax shield to operations is reasonable because when borrowed funds are invested in financial assets the debt tax shield is offset by income taxes on interest income. In contrast, when

historical cost accounting, omission of internally-developed intangibles, and asymmetric treatment of profit and loss—apply primarily to operating items.³

Because the value of operating activities is estimated based on the free cash flows or EBITDA that they are expected to generate, while that of financial and other nonoperating activities is generally based on their book values, it is important to consistently classify assets, liabilities, and related income streams as operating or not. Otherwise, they will either be double-counted (e.g., if an operating asset—such as accounts receivable—is classified as a financial asset) or completely ignored (e.g., if a nonoperating assets—such as equity method investment—is classified as operating without including equity method income in free cash flow or EBITDA).

As noted above, reformulating the income statement involves not just classifying items as operating, financing or other nonoperating, but also distinguishing between recurring and transitory ones. This is important because recurring earnings have greater impact on value than transitory items, and they help predict future profits. Yet, properly identifying and measuring transitory items is not easy; in many cases it is the most difficult part of the analysis.

In addition to providing a step-by-step explanation of the reformulation process, the study describes how the reformulated financial statements can be measured using Compustat data items. This is important due to the many accounting details involved as well as to accounting changes over time.⁴ The informativeness of the reformulated financial statements constructed here is demonstrated in three companion studies (Nissim 2022a,b,c).

The paper proceeds as follows. Section 2 (Section 3) describes the reformulation of the balance sheet (income statement). Section 4 discusses the classification of pension and other postretirement benefits, which is particularly challenging. Section 5 describes potential adjustments to reported numbers to increase their informativeness. Section 6 describes how the reformulated financial statement can be measured using Compustat data items. Section 7 concludes. Appendix A (Appendix B) presents a detailed version of the reformulated balance sheet (income statement). Appendix C derives and explains the relationship between free cash flow and two of the primary components of the reformulated financial statements—net operating assets and NOPAT.

debt is used to fund operations, the tax shield provides a benefit relative to funding all the investment in operations using equity capital.

³ In his letter to Berkshire Hathaway Shareholders, included in the 2018 10-K, Warren Buffett explains why the value of operations should be estimated using a different approach than the balance sheet approach used to estimate the value of financing and other nonoperating activities: “While our equity holdings are valued at market prices, accounting rules require our collection of operating companies to be included in book value at an amount far below their current value.”

⁴ 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.

2. Balance sheet

Reformulating the balance sheet involves classifying assets and liabilities as either operating, financing, or other nonoperating, as shown in Exhibit A.

Exhibit A. Reformulated Balance Sheet

Operating assets	Operating liabilities
+ Financial assets	+ Debt
+ Other nonoperating assets	+ <u>Other nonoperating liabilities</u>
	Total liabilities
	+ <u>Equity</u>
<u>Total assets</u>	<u>Total liabilities and equity</u>

The reformulated balance sheet can also be presented in a net format, derived by subtracting financial assets, operating liabilities, and other nonoperating liabilities from both sides of the balance sheet:

Exhibit B. Reformulated Balance Sheet (net presentation)

Operating assets	Debt
- <u>Operating liabilities</u>	- <u>Financial assets</u>
Net operating assets	Net debt
+ <u>Net other nonoperating assets</u>	+ <u>Equity</u>
Net assets funded by net capital	Net capital

Net operating assets—that is, the difference between operating assets and operating liabilities—measures the amount of net capital invested in operations. Net capital is also used to fund investments in net other nonoperating assets (i.e., other nonoperating assets, such as equity method investments, minus other nonoperating liabilities, such as a reserve for unusual litigation). Net capital is also referred to as invested capital or capital employed.

The relationship between net operating assets and net capital has implications for both valuation and profitability analysis. For example, if net other nonoperating assets is zero, net operating assets is equal to net capital, and the return on invested capital reflects the return on operating activities. In other cases, the return on invested capital is a weighted average of the return generated in operations and the return from other nonoperating activities (for example, the return on equity method investments), with weights proportional to the book values of net operating assets and net other nonoperating assets, respectively.⁵

⁵ The reformulated balance sheet also helps explain why WACC is used to discount free cash flows, as well as to identify cases for which using WACC may result in incorrect valuation. If net other nonoperating assets are equal to zero, net capital is equal to net operating assets—both in terms of book values and market values. Thus, any change in the value of net operating assets will trigger a similar change in the value of net capital. In other words, net operating assets has the same risk as net capital. When discounting free cash flows (i.e., the cash flows generated by

Net operating assets is perhaps the most important balance sheet quantity. It measures the amount invested in operations, and it is accordingly used in evaluating operating profitability (e.g., Nissim and Penman 2001). In addition, free cash flow—the focus of DCF, which is the most used fundamental valuation model⁶—is equal to the excess of NOPAT over the change in net operating assets (see Appendix C).⁷

Net operating assets can be measured directly or indirectly. Under the direct approach, assets and liabilities are classified as either operating (e.g., inventory, PP&E, accounts payable), financing (e.g., investments in marketable securities, debt payable), or other nonoperating (e.g., equity method investments, reserve for unusual litigation). Net operating assets is then measured as the difference between total operating assets and total operating liabilities. Because most assets and liabilities are related to operations, this approach can be implemented by initially assuming that all assets and liabilities are operating, and then identifying and excluding financial and other nonoperating assets and liabilities.

Under the indirect approach, net operating assets is measured using the balance sheet identity (e.g., Hirshleifer et al. 2004). Specifically, net operating assets is calculated by subtracting from net capital (net debt plus equity) the amount that funds net other nonoperating assets (i.e., other nonoperating assets minus other nonoperating liabilities).

The remainder of this section elaborates on each of the six groups of assets and liabilities (operating assets, financial assets, other nonoperating assets, operating liabilities, debt, and other nonoperating liabilities) as well as on equity. It describes how each category should be measured when all the required information is available.⁸ Section 6 describes how these quantities can be

net operating assets), one should use a discount rate that reflects their riskiness. That discount rate is not directly observable, but the reformulated balance sheet implies that it should be the same as the cost of net capital (i.e., WACC), which reflects the riskiness of net capital. Accordingly, the most common application of DCF is to discount free cash flow using WACC (e.g., Mukhlynina and Nyborg 2020). However, if net other nonoperating assets are significant, and their riskiness is different from that of net operating assets, discounting free cash flows using WACC (which reflects the riskiness of both operating and other nonoperating activities) may yield an incorrect valuation. For example, if a company has substantial equity method investments (e.g., Coca Cola), its WACC likely overstates the risk of operations because equity method investments are typically riskier than core operations (e.g., due to financial leverage or smaller size).

⁶ For studies providing evidence on the common use of DCF, see, for example, Allee et al. (2020), Bancel and Mittoo (2014), Brown et al. (2015), Demirakos et al. (2004), Green et al. (2016), Imam et al. (2008), Mukhlynina and Nyborg (2020), Pinto et al. (2019), and Tan and Yu (2021). For a text book discussion of the DCF model, see, for example, Easton et al. (2018), Koller et al. (2020), Lundholm and Sloan (2019), Nissim (2021a), Palepu et al. (2020), and Wahlen et al. (2017).

⁷ Some analysts use the RNOA-based residual income model, effectively bypassing the derivation of free cash flow from NOPAT and net operating assets (e.g., Hand et al. 2017).

⁸ Data limitations affect the classification of assets and liabilities as operating or not. Some nonoperating assets and liabilities are aggregated with operating ones and reported either in a residual category such as “other current assets” or in more specific line items. For example, in the U.S. real estate held for investment is generally reported combined with real estate used in operations, and interest payable is often included in accrued expenses. Aggregated items should generally be classified as operating or not based on the dominant activity, which is typically operating. For some assets and liabilities, book values are available, but the related flows are aggregated with or netted against flows from other activities. For example, interest income, rent income, and equity method income are frequently

estimated using Compustat data items. Appendix A presents a detailed version of the reformulated balance sheet.

2.1 Operating assets

Operating assets are those related to operating revenue and/or operating expenses. They either

- Help generate operating revenue (e.g., PP&E, intangible assets, goodwill, inventory)
- Result from activities that help generate revenue (e.g., accounts receivable—an operating asset—results from extending credit to customers to induce sales), or
- Represent prepayment of operating expenses (e.g., prepaid rent, prepaid insurance, other deferred costs), which contribute to operating profit either because they represent required payments to generate revenue (e.g., rent has to be paid in advance) or because making payments in advance reduces operating costs.

As a rule, an asset should be classified as operating if it contributes to operating profit (and therefore to free cash flow), and it should be excluded from operations if it generates a flow that is excluded from operating profit (measured using NOPAT, as described below). For example, long-term investments in marketable securities, which generate interest and dividend income that is excluded from NOPAT, should not be classified as an operating asset. Similarly, equity method investments (“investments in associates” in IFRS terminology), which generate income that is excluded from NOPAT, should not be classified as an operating asset.⁹

Operating assets consist of the following items: estimated liquid funds needed to operate the business (“required liquid funds,” discussed below), accounts receivable, inventory, other working capital assets, PP&E, right-of-use operating lease assets, goodwill, other intangible assets, operations-related notes receivables (e.g., loans and leases of integrated financial captives), and other long-term assets related to operating revenue and/or operating expenses.

Liquid funds consist of cash, cash equivalents, short-term investments, and short-term marketable securities (short-term marketable securities are often—but not always—reported as part of short-term investments). Liquid funds are needed (1) for daily operations (cash receipts and disbursements are not perfectly synchronized), (2) to serve as a “buffer” due to risky operations, and (3) to invest in operations (including capex and investments in unrecognized intangibles). Whereas cash held to invest in existing operations (which contribute to NOPAT) is part of operating assets, cash held to invest in M&A (which do not contribute to current NOPAT) is not part of operating assets. Many companies hold liquid funds in excess of the amount needed for

reported combined with operating items, for instance as part of “other income/expense”. In addition, interest income may include income earned on operating assets such as lease receivables, note receivables from customers, or liquid funds required for operations (discussed below). Classifying assets and liabilities as nonoperating requires that the related flows be excluded from net operating profit after tax (NOPAT). Therefore, when it is impossible to exclude a nonoperating flow from NOPAT, the related asset or liability should be classified as operating even if its nature is more consistent with financing or other nonoperating activities.

⁹ However, if one includes equity method income in NOPAT (for example, because it relates to strategic investments in suppliers or customers, or because equity method income is included in reported operating items with no separate disclosure), then equity method investments should be included in operating assets.

operations. As discussed below, the difference between total liquid funds and the estimated amount needed for operations should be classified as a financial asset.

Required liquid funds are related to revenue, but the relationship depends on firm- and industry-characteristics (e.g., revenue volatility, cost structure, availability and cost of credit).¹⁰ Section 6 describes a simple approach for estimating required liquid funds based on industry membership and the level of revenue.

2.2 Financial assets

Financial assets are financial instruments that are not needed for operations, do not contribute to NOPAT, and are relatively liquid and/or represent fixed (rather than residual) claims. They include liquid funds in excess of amounts needed for operations (excess liquid funds), long-term investments in marketable securities, and illiquid fixed income instruments (e.g., unlisted bonds and nonoperating receivables). The book value of financial assets is typically a reasonable proxy for their fair value.

2.3 Other nonoperating assets

Other nonoperating assets includes illiquid assets that neither contribute to NOPAT nor represent fixed claims. This category includes equity method investments,¹¹ investments in unlisted equity securities,¹² real estate not used in operations, and assets of discontinued operations.¹³ Other nonoperating assets may also include assets that are related to operations but are classified separately from operations because they (or the related income stream) are either particularly difficult to model or are likely to evolve differently from other operating items (e.g., because they relate to past operating activities that are not likely to recur). Examples include some tax

¹⁰ Required liquid funds generally increase with revenue volatility, especially if (1) cash costs are significant and cannot be substantially reduced when revenue declines, and (2) the firm has limited ability to obtain credit. For example, Bates et al. (2009) show that cash holdings are positively related to cash flow volatility, and this correlation is largely explained by industry membership.

¹¹ Equity method investments should not be classified as a financial asset because they represent a residual (equity) claim, are illiquid (even if the investee is public, significant holdings [$\geq 20\%$] are difficult to liquidate), and their fair value is typically substantially different from book value. Moreover, from the perspective of the company, the fair value of equity method investments may be different from market value due to potential benefits from having significant influence over the investee. Still, equity method investments should generally be excluded from operations even if the investment is related to operations (e.g., investments in corporate customers). The primary reasons are that the company does not control the investee, and equity method investments do not generate revenue. However, if all the following conditions are satisfied, it may be warranted to prepare pro-forma financial statements that consolidate the affiliate's assets, liabilities, revenues, and expenses, and include them in operations: (1) the investment is large; (2) the investee is an integral part of the company's operations; (3) the company has effective control over the investee; and (4) the required information is available. If the required information for preparing pro-forma consolidated financial statements is unavailable but the investment is an integral part of operations, it may still be preferable to include it in operating assets (and include equity method income in NOPAT).

¹² Investments in unlisted equity securities should not be classified as a financial asset because they represent a residual (equity) claim and are illiquid.

¹³ Assets of discontinued operations are excluded from operations because NOPAT excludes transitory income. See additional discussion in Section 6.2.

loss carryforward,¹⁴ litigation assets (e.g., expected insurance recoverable related to a recognized loss contingency), most overfunded pension plans (see Section 4), and assets and liabilities of financial captives or other subsidiaries (if modelled separately from operations).

Excluding assets from the operations category requires being able to identify the related income stream and exclude it from NOPAT. If this is not possible, the asset should generally be classified as operating. For example, if equity method income is reported combined with operating items in “other income (expense),” and no separate disclosure of equity method income is available, equity method investments should be classified as operating.

2.4 Operating liabilities

Operating liabilities are those related to operating revenue and/or operating expenses (defined broadly to include cost of revenue and income taxes in addition to SG&A and R&D). They generally represent credit granted to the firm by operating creditors, with the cost of the credit reducing NOPAT. Increases in operating liabilities increase free cash flow because they reduce the required investment in operating assets (operating creditors effectively fund a portion of the investment in operating assets).

The following are common operating liabilities:

- *Accounts payable* – represents credit from suppliers and other operating vendors, which helps fund inventory and/or allows the company to defer payments for operating expenses, thereby increasing free cash flow. The cost of this credit is typically included in cost of revenue or in SG&A expenses, as suppliers may charge higher net prices when they extend credit (e.g., the company may forfeit cash discounts).
- *Deferred revenue* – represents credit from customers, which helps fund operations. The cost of this credit is typically included in revenue, as the firm may grant discounts for advance payments by customers.¹⁵

¹⁴ Negative taxable income creates a net operating loss (NOL), which can generally be used to reduce taxable income in future years (prior to TCJA it was also possible to carry losses back for a refund). However, in many cases there are substantial limitations on the ability to use net operating losses, which are not necessarily related to operations. In such cases, valuing NOL separately from operations may be warranted. For example, section 382 in the U.S. tax code limits a loss corporation’s ability to use its tax net operating losses (and other tax attributes) following an “ownership change.” An ownership change is triggered if one or more “5-percent shareholders” of the loss corporation increase their ownership in the aggregate by more than 50 percentage points during a testing period. Once an ownership change has occurred, the amount of net operating losses that the corporation may use to offset taxable income in any year is limited to the “section 382 limitation” resulting from the ownership change. The section 382 limitation is a formulaic calculation that is basically equal to the product of the value of the loss corporation (subject to certain adjustments) and the long-term tax-exempt interest rate.

¹⁵ Under ASC 606 (generally effective since fiscal year 2018), if a transaction with a customer has a significant financing component, that is, if there is a significant time difference between customer payment and the delivery of goods or services to the customer, an imputed or explicit interest expense (if the customer pays in advance) or income (if the customer pays after receiving the goods or services) has to be recorded as a financing item, separately from net revenue. However, the standard includes a practical expedient that allows companies to disregard the effects of a financing component if the period between payment and performance is one year or less. Most companies use this expedient, and so revenue (and NOPAT) typically includes the related implicit interest expense or income.

- Accrued compensation and other *employee-related obligations* – represent credit from employees, which allows companies to defer payments for operating expenses and so increases free cash flow. The cost of this credit is typically included in cost of revenue and SG&A, as employees would likely agree to accept lower compensation if paid at the time they provide the service. This item may include not just accrued salaries and similar short-term obligations, but also net pension, other postretirement benefits (OPB), and postemployment benefits.¹⁶ However, as discussed in Section 4, net pension and other postretirement obligations should generally be excluded from operations. Until 2017, the interest cost on the gross obligations and expected return on the plan assets were included in operating income, so if the net obligations are excluded from operations, pre-2018 operating income should be adjusted to exclude the interest cost and expected return components of pension and other postretirement obligations (see Section 6).
- Other *accrued expenses* – accrued liabilities related to other services that have already been received by the company (and expensed), which are yet to be paid (e.g., accruals for utilities or contingent rentals). Accrued expenses are often reported combined with accounts payable.
- *Deferred tax liabilities* and *accrued income taxes* – represent credit from governments, which allows companies to defer tax payments and so increases free cash flow. This credit is generally cost-free.
- Operations-related *estimated liabilities* (“*provisions*” in IFRS terminology) – represent ability to defer payments for incurred costs. Examples include asset retirement obligations, environmental obligations, litigation-related provisions, onerous contracts, warranties, restructuring, and other items. As discussed below, provisions that are likely to evolve differently from revenue (e.g., provisions related to truly non-recurring events such as litigation accruals related to past exposure to asbestos), and whose cost can be estimated and removed from NOPAT, should be classified as other nonoperating liabilities.

A recent accounting change (ASC 842) introduced another potential operating liability—operating lease obligations. While the inclusion of right-of-use lease assets in operating assets is noncontroversial, the classification of operating lease obligations is less clear. On the one hand, operating lease transactions are akin to debt-funded asset acquisitions; indeed, it appears that most users as well as data providers/aggregators (e.g., Compustat, Bloomberg) include operating lease obligations in debt. On the other hand, including operating lease obligations in debt creates or magnifies two issues: (1) inconsistent classification of balance sheet and income statement items, and (2) reduced comparability over time.

If operating lease obligations are classified as debt, the implicit interest included in the lease cost (an operating expense) should be added back to both EBIT and interest expense. The implicit interest cost is not disclosed by companies, and estimating it involves significant measurement error (e.g., due to changes in the obligation and the discount rate during the year). While this source of measurement error may be significant in some cases, the reduced comparability over

¹⁶ OPB includes postretirement healthcare and other forms of postretirement benefits (for example, life insurance, deferred compensation) that are provided separately from pension plans. Some firms provide similar benefits to former or inactive employees (after employment but before retirement), giving rise to provisions for postemployment benefits.

time that results from including the operating lease obligation in debt is the more significant concern, as explained next.

If the operating lease obligation is classified as debt, there is often a big increase in net operating assets in 2019 (due to the addition of right-of-use asset to operating assets), which distorts historical relationships (e.g., RNOA and ROIC typically decline). In addition, excluding the implicit interest cost from EBIT (as required if the operating lease obligation is classified as debt) significantly increases the EBIT margin. In fundamental valuation analysis, a primary source of information for forecasting margins and profitability is their levels in prior years, typically over the last business cycle (see, e.g., Allee et al. 2020, and Mukhlynina and Nyborg 2020). Therefore, the negative impact on the time-series comparability of key ratios suggests that, at least through 2024 (i.e., when five years of past data under the new lease standard become available), treating operating lease obligations as an operating liability is the preferred approach. For academic research and quant-type analyses, which often examine the time-series behavior of ratios over many years, this issue will remain relevant for many years.

An alternative approach to deal with the time-series comparability issue is to (1) adjust pre-ASC 842 data include the present value of operating lease commitments in debt and operating assets; and (2) adjust reported EBIT (both pre- and post-ASC 842) to exclude the implicit interest cost on the operating lease liability. Nissim (2022c) shows that the asset and liability can be estimated quite precisely for pre-ASC 842 observations.

In sum, operating liabilities are defined as the total of the following items: accounts payable, accrued expenses (excluding interest payable), deferred revenue, other working capital liabilities, deferred taxes, and other long-term liabilities related to operating revenue and/or operating expenses. In addition, for reason discussed above, the preferred approach is to include operating lease obligations in operating liabilities. Finally, as explained in Section 4 below, while pension and OPB are generally classified as other nonoperating, in some cases they may be included in operations.

2.5 Debt

Debt liabilities comprise borrowings from financial institutions and capital markets as well as other nonoperating interest-bearing contractual obligations. Debt items include interest payable, dividend payable (once dividends are declared they become a liability), short-term debt, current maturities of long-term debt, and long-term debt. Debt should also include preferred stock, both redeemable and nonredeemable. While nonredeemable preferred shares are reported as part of equity, most preferred shares are non-participating and cumulative, essentially paying a fixed return like debt. In some cases, companies report temporary equity, which should also be classified as debt. Theoretically, as discussed in the equity section below, conversion features of debt or preferred stock should be bifurcated and classified as equity.

Debt should not include provisions such as pension obligations, other postretirement obligations, restructuring liabilities, or asset retirement obligations. Provisions are not a source of capital and are indeed excluded from WACC estimates. Provisions are generally created in operations, and their interest cost—which is often implicit—is generally included in operating expenses. Another

difference between provisions and debt is that reported debt involves little if any measurement discretion, while provisions are often “soft” estimates. Provisions that are excluded from operations (e.g., most pension and OPB obligations, see Section 4) should be classified as “other nonoperating liabilities,” not as debt.

2.6 Other nonoperating liabilities

Other nonoperating liabilities include provisions that are likely to evolve differently from revenue and operating assets and whose cost can be estimated and removed from NOPAT. These include provisions related to truly non-recurring activities (e.g., litigation accruals related to past exposure to asbestos) and most pension and OPB obligations (discussed in Section 4). Other nonoperating liabilities also include obligations of discontinued operations.

2.7 Equity

Reported equity consists primarily of common equity (all firms), noncontrolling interest (many firms), and preferred stock (some firms). Noncontrolling interests are included in equity because, like common equity, they represent a residual claim. However, noncontrolling interests are distinct from common equity; they represent outside interests in consolidated subsidiaries, whose profitability is typically different from that of the parent’s own activities or the activities of its wholly owned subsidiaries (e.g., Nissim 2021b). Therefore, when evaluating profitability from the perspective of common shareholders, it is important to understand the impact of noncontrolling interests on the profitability of common equity (see Nissim 2022b).

As noted in Subsection 2.5, preferred shares’ claim on profit is generally fixed (most preferred shares are cumulative and non-participating), so for the purpose of profitability analysis they should be classified as debt. Making the required adjustments to the balance sheet and income statement is straightforward: the book value of preferred stock (including any dividends in arrears) is reclassified as debt, and preferred dividends are added to after-tax interest expense (no tax adjustment is needed because, unlike regular interest expense, preferred dividends are generally not tax deductible).

Another issue in measuring equity concerns conversion features. Some bonds and preferred shares have embedded call options on common stock. In most cases, GAAP effectively ignores embedded options—they are not reported on the balance sheet, and no income is allocated to them (see Section 5.11 and 5.19 in Nissim 2022a). Proper measurement of equity requires that the value of the options at the time the host instrument was issued be classified as equity, and the (contingent) claim of the options on earnings be recognized as part of net income (similar to income attributable to the noncontrolling interest) rather than as interest expense.¹⁷ However, unlike the preferred stock adjustments, adjusting reported financial statements to correct convertibles-related distortions is difficult—one has to estimate the value of embedded options and their contingent share in income, which requires information that is often unavailable. Therefore, these adjustments are typically ignored.

¹⁷ Indeed, the earnings per share calculation—but not the balance sheet nor the income statement—adjusts for some of these effects.

3. Income statement

Like the reformulated balance sheet, the reformulated income statement distinguishes between operating, financing, and other nonoperating items. However, unlike the balance sheet, another layer of analysis is required. Because recurring earnings have greater impact on value than transitory items, and they help predict future profits, it is important to identify and separate out transitory components before classifying items by the nature of activity. This is typically the most difficult step in the analysis, and accordingly much of the discussion in this section relates to the identification and measurement of transitory items. Once transitory items are separated out, the classification is (mostly) straightforward. Revenue generated in operations is classified as operating, while income earned on financial assets (e.g., interest income on long-term marketable securities) is classified as financing, and income from other nonoperating activities (e.g., equity method income) is classified as other nonoperating. Similarly, expenses representing consumption of operating assets (e.g., depreciation of fixed assets or sale of inventory) or incurrence of operating liabilities (e.g., accrued expenses) are classified as operating, while interest on debt is classified as financing. Income taxes are allocated to transitory, operating, financing, and other nonoperating activities based on the related income and tax rates. Measuring the relevant tax rates is another complicated step in the analysis. This section starts with a discussion of tax rates (Subsection 3.1), then transitory income (3.2), and finally the recurring components (3.3-3.5). Exhibit C presents the key components of the reformulated income statement; a detailed version of the reformulated income statement is provided in Appendix B.

Exhibit C. Reformulated Income Statement

	Operating revenue
-	Operating expenses (cost of revenue, recurring operating expenses, tax)
	<hr/> Net Operating Profit After Tax (NOPAT)
-	Net Financial Expense (NFE)
+	Income from other nonoperating activities
	<hr/> Recurring income
+	Transitory income
	<hr/> Net income after preferred dividend
-	Net income attributable to noncontrolling interest
	<hr/> Net income attributable to common equity

3.1 Tax rates

As noted above, reformulating the income statement requires allocating income taxes to the different activities: transitory, operating, financing, and other nonoperating. The tax rates on these flows often vary from each other as well as over time. They can be estimated using information obtained from the income tax footnote in the annual report (especially the effective tax reconciliation) as well as from other sources. I next discuss the estimation of these tax rates.

Tax rate on recurring financing flows

Unlike the effective (i.e., average) tax rate on operating income, which frequently differs substantially from the statutory tax rate due to operations-related items such as R&D tax credits and non-deductible compensation, the tax rate on financing flows is typically close to the statutory tax rate paid by the company. Therefore, the tax rate on financing flows can be estimated using information from the effective tax reconciliation, as the total of the federal statutory tax rate, the net effect of state and local income taxes, and the effect of foreign tax rates being different from the federal tax rate. The last component can be averaged over time if highly volatile (as is often the case). Additional adjustments may be required if the company (1) earns tax-exempt interest income on state and municipal bonds, or (2) is not generating enough taxable income to benefit from interest deductions and is not expected to generate such income in the foreseeable future. The second situation has become more common since TCJA (effective 2018) due to limits on interest deductibility. When interest deductibility is likely to be a concern, the tax rate on financing flows should be adjusted downward, especially if the company created a valuation allowance against the related deferred tax asset.

Tax rate on recurring other nonoperating flows

These sources of income are often reported after tax (or mostly after tax), so no (or small) tax adjustment is needed. For instance, 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). As another example, income from discontinued operations is reported after tax. Finally, tax loss assets—which in some cases are included in other nonoperating assets (see Section 2.3)—represent a tax benefit. For other sources of income and expense that are classified as “other nonoperating,” using the tax rate on financing flows may be reasonable because these items are generally taxed at the company's statutory tax rates. If there are timing differences, deferred taxes are accrued at that rate (for example, a deferred tax liability—and thus income tax expense—is recognized for accrued rent income).

Tax rate on recurring operating profit

Estimating the tax rate on operating income is difficult. Most practitioners use the effective tax rate, possibly subject to some adjustment (see Nissim 2022a). The effective tax rate (ETR)—i.e., the ratio of the income tax expense to pretax income—represents the weighted average tax rate on operating income and other income and expense items that are included in pretax income (e.g., interest income, interest expense, equity method income, special items). If nonoperating items are taxed at different rates than operating income, ETR may be a poor proxy for the tax rate on operating income. In many cases, the tax rate on operating income is lower than the tax rate on nonoperating items due to operations-related tax credits or tax deductions such as R&D tax credits or excess tax benefits on stock-based compensation. In such cases, if net nonoperating income is positive (e.g., interest income is greater than interest expense), ETR will be higher than the tax rate on operating income. In contrast, if net nonoperating income is negative, as is typically the case, ETR will be lower than the tax rate on operating income. For example, if a

company faces a statutory tax rate of 40% and reports operating profit of \$100, interest expense of \$40, and operating tax credit of \$8 (e.g., for R&D), the effective tax rate on operating income is 32% ($= [100 \times .4 - 8] / 100$), while the effective tax rate is 26.67% ($= ([100 - 40] \times .4 - 8) / [100 - 40]$).

Although the tax rate on operating income is often lower than the tax rates on nonoperating items, in some cases the reverse is true. In most cases little if any income taxes are recognized on equity method income and on interest on state and municipal bonds, so these items reduce the ETR relative to the tax rate on operating income. In addition, reported goodwill typically has no tax basis and yet no deferred taxes are recognized on this book-tax difference. Thus, when companies recognize goodwill impairment, pretax income is reduced but the income tax expense remains unchanged, resulting in a higher ETR. Because goodwill impairment is typically excluded from measures of operating profit, ETR in periods of goodwill impairment overstates the tax rate on operating profit.

Another issue with using ETR to measure the tax rate on operating income is its volatility over time due to transitory adjustments, including the impact of changes in tax reserves (called “unrecognized tax benefits” in the U.S.), unreserved tax payments for prior periods, changes in the valuation allowance (U.S. GAAP) or in unrecognized deferred tax assets (IFRS), as well as the impact of changes in tax rates or tax laws.

Given the above issues, the following procedure—which requires information from the income tax note, including the effective tax reconciliation—can be used to estimate the tax rate on recurring operating income.

The first step is to identify and “undo” the impact of items other than recurring operating from pretax income to measure recurring operating income.

The second step is to divide these items into two buckets: non-taxable (e.g., tax exempt interest income, equity method income, goodwill impairment), and taxable (taxable interest income, interest expense, impairment of intangibles other than goodwill, restructuring charges).

Next, taxes on taxable non-recurring/non-operating items can be estimated as the product of these items and the statutory tax rate paid by the company (see “tax rate on recurring financing flows” above). This is a reasonable assumption because most of these items are either taxed at the company’s statutory tax rate or have deferred taxes recognized for any corresponding book-tax difference.¹⁸ The tax amount is then subtracting from the reported income tax expense to get income taxes on recurring operating income.

Having estimated income taxes on recurring operating income, the operating tax rate each year is calculated by dividing these income taxes by recurring operating income. To mitigate the impact of volatility in the tax rate over time (e.g., due to the transitory effects discussed above), one may use the median value of the ratio in recent years (adjusted for changes in statutory tax rates over time; see Nissim 2022a). In addition, although the effective tax rate is potentially meaningful

¹⁸ For example, while intangible assets (other than goodwill) typically have a zero-tax basis, a deferred tax liability is recognized with respect to the corresponding book-tax difference. Accordingly, when these assets are impaired (reducing pretax income), the deferred tax liability is reversed (lowering the income tax expense).

even when taxable 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). Therefore, when calculating the median tax rate, excluding observations with negative operating income may increase precision.

Tax rate on transitory items

For transitory items, the tax rate on recurring financing flow is often a reasonable estimate. Two exceptions are goodwill impairment and transitory tax items (e.g., the impact of changes in the valuation allowance; discussed in Section 3.2 below), for which there is no tax effect.

3.2 Transitory income

Transitory items are included in pretax income, in the income tax expense, and in income reported below income taxes. As explained below, transitory income (i.e., the impact of transitory items on reported earnings) is calculated as the total of the following components:

- Volatile nonoperating income (expense) – for example, gain (loss) from sale of investments or early retirement of debt
- Transitory operating income (expense) – for example, goodwill impairment that is truly unusual
- Transitory portion of volatile quasi-recurring operating income (expense) – for example, abnormal portion of restructuring charges
- Income taxes on transitory pretax income (-; transitory pretax income is the total of the above three components)
- Abnormal income taxes (-)
- Transitory income reported below income taxes

The following is a recommended procedure for estimating transitory items:

- (1) Identify all volatile components of pretax income
- (2) Classify each volatile component as either nonoperating (a), operating but transitory (b), or volatile quasi-recurring operating
- (3) Estimate the transitory portion of volatile quasi-recurring operating items (c)
- (4) Calculate transitory pretax income as the total of (a), (b), and (c)
- (5) Estimate income taxes on transitory pretax income
- (6) Estimate abnormal income taxes
- (7) Estimate the transitory portion of income reported below income taxes
- (8) Calculate transitory income as (4) - (5) - (6) + (7)

I next elaborate on each of these steps.

(1) Identifying volatile components of pretax items

Volatile items are income and expense items that are either non-recurring, or that do not regularly recur or attain similar magnitude. These items are often referred to as “unusual,” “special” or “exceptional” items.

Volatile items are difficult to identify or measure because they are often aggregated with recurring items in the income statement.¹⁹ Relevant information for identifying and measuring volatile items is provided in the income statement, cash flow statement (the reconciliation of net income to cash from operations), the notes, the MD&A, press releases, investor presentations, conference calls, and other disclosures. Non-GAAP reconciliations—contained in the MD&A, press releases, 8-K, investors presentations, and other disclosures—are often particularly useful for this purpose.

Strategies for identifying volatile items include:

- Examine the income statement to identify “suspect” items such as “other operating charges,” “unusual items,” “special items,” “other income (loss).” In some cases there are explicit references to impairment, restructuring, gains, or losses.
- Examine the volatility of income statement line items over time
- Examine the operating section of the cash flow statement to identify non-cash items (e.g., impairment losses) and gains or losses (e.g., from selling an investment), which are “undone” from net income in the reconciliation
- Read the discussion of results of operations in the MD&A
- Skim through the notes to the financial statements and other sections of the financial report
- Search for “impairment,” “restructuring,” “gain,” “loss,” “unusual,” “nonoperating,” and other words that are likely associated with volatile items
- Skim through press releases, transcripts of conference calls, investor presentations, 8-K filings, and other reports or disclosures in which the company may discuss performance

(2) Classifying volatile components of pretax income

This step involves classifying each volatile item identified in the previous step as either nonoperating, operating but transitory, or volatile quasi-recurring operating.

Volatile nonoperating income (expense) includes gains and losses from sale of investments, impairment of investments, gains and losses from early retirement of debt, unrealized gains and losses from marking-to-market financial instruments, and gains and losses on derivatives other than those used to hedge operating activities.²⁰ These items should be classified as transitory. While they generally recur over time, volatile nonoperating items often switch sign, their expected value is typically close to zero, and they relate to non-core activities.

Transitory operating income (expense) includes items such as losses from natural disasters or expropriation of assets, gains and losses related to business combinations or divestitures

¹⁹ Adding to the difficulty in identifying and measuring transitory items is the substantial variation across firms and over time in (1) the tendency to recognize volatile items such as impairment and restructuring charges, (2) the classification of volatile item (e.g., included in COGS or SG&A versus reported separately), and (3) related disclosures. In addition, there are many errors, inconsistencies, and omissions in the classification of volatile items by data providers/aggregators such as Bloomberg, FactSet, Capital IQ, Compustat, and Refinitiv Worldscope.

²⁰ Gains or losses on derivatives used to hedge operating activities should generally be included in recurring income because they offset volatility in hedged operating items.

(“bargain purchase” gains, gains or losses from step acquisitions, gains or losses from adjusting liability-classified contingent considerations, loss-of-control gains or losses; see Section 5.17 in Nissim 2021a), truly unusual litigation charges, and possibly some cases of goodwill impairment. These items generally fall beyond the control of operating segments and relate to unusual events; their high volatility and/or low recurrence implies that they should generally be classified as transitory (i.e., excluded from NOPAT).

Arguably, M&A transaction costs and goodwill impairment should also be excluded from NOPAT because they do not correspond to ongoing operations (unlike restructuring charges, for example), and in the case of goodwill impairment are also infrequent. However, companies often engage in M&A activities as a substitute for organic investments. For example, instead of incurring expenditures on IT, IP, or human capital, some companies are able to maintain high margins by acquiring companies that already developed such intangibles. In addition, for some companies M&A as a recurring strategic activity. Thus, ignoring M&A-related items such as transaction costs, amortization, or goodwill impairment may result in overstated profitability (Nissim 2019). Furthermore, as shown by Nissim (2022d), M&A costs are associated with subsequent declines in profitability and are relatively persistent (i.e., a company that reported M&A costs in the current year is much more likely than other firms to also report M&A costs in the future). Nissim (2022d) also shows that goodwill impairment is not completely transitory and, more importantly, that it is associated with low profitability in the years after its recognition. Goodwill impairment should not be ignored also because it implies that the purchase price allocation that created the goodwill understated the fair value of depreciable, amortizable, or otherwise expensed assets, resulting in overstated profitability (see earnings quality issue “Manipulating cost estimates of intangible assets acquired in business combinations” in Section 5.5 of Nissim 2021a).

Volatile quasi-recurring operating income (expense) include operating items that—while more volatile than other operating items—do recur and are on average negative. If a volatile item that is identified in step (1) is not classified as either nonoperating or transitory, then it belongs to this category. Examples include restructuring charges (recognition and reversal), impairment of fixed and intangible assets, write-down of other operating assets (e.g., inventory), M&A transaction costs, gains or losses related to pending litigation or settlement, losses recognized on onerous contracts, gains or losses from disposal of PP&E, foreign exchange income/loss, and other income and expense items that fall within the control of operating segments. Most volatile items belong to this category.

(3) Estimating the transitory portion of volatile quasi-recurring operating items

Volatile quasi-recurring operating items often substitute for recurring operating expenses; for example, impairment and disposal losses are often due to insufficient depreciation, and restructuring charges often include recurring operating expenses (e.g., McVay 2006, Fan et al. 2017). In addition, expenses classified by companies as unusual or non-recurring often do recur, and some companies are “serial abusers” (Elliott and Hanna 1996, Atiase et al. 2004, Cready et al. 2010). Therefore, these items should be divided between transitory and recurring income.²¹

²¹ In his letter to Berkshire Hathaway Shareholders, included in the 2018 10-K, Warren Buffett explains the importance of decomposing volatile charges into recurring and transitory components rather than ignoring them (i.e.,

One way to do so is to estimate the average magnitude (over time) of these items as a percentage of revenue, and then use the product of the average ratio and the period's revenue as an estimate of the recurring portion. The difference between the period's volatile quasi-recurring operating items and the normalized amount is an estimate of the transitory component.²²

(4) Calculating transitory pretax income

Given an estimate of the transitory portion of volatile quasi-recurring operating income (expense), total transitory pretax income can be calculated as the sum of volatile nonoperating income (expense), transitory operating income (expense), and the transitory portion of volatile quasi-recurring operating income.

(5) Estimating income taxes on transitory pretax income

A simple approach to estimate this item is to multiply the “normal tax rate” by transitory pretax income. See (Nissim 2022a) for a discussion of how this tax rate should be estimated.

(6) Estimating abnormal income taxes

Abnormal income taxes include 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 (see Section 5.8 in Nissim 2021a). Information on these items is often available in the effective tax reconciliation as well as in disclosures related to deferred tax assets (valuation allowance) and unrecognized tax benefits. In some cases, there is limited information in the effective tax reconciliation (e.g., some transitory items are aggregated with recurring ones) or the effective tax reconciliation is unavailable (e.g., when using Compustat data). Another issue with identifying transitory items directly is that they may not be completely transitory. For example, if a company consistently understates the liability for unrecognized tax

treating them as completely transitory): “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.”

²² The “normal” ratio of volatile quasi-recurring operating items to revenue should be measured over a relatively long period of time, using the mean rather than the median, and with weights that decline with the distance from the current year. There are several reasons for these choices. First, special items follow an irregular pattern. For example, a company may recognize a large restructuring charge every several years. Second, impairment losses are more likely to be recognized during recessions, so it is important to cover a full business cycle. Third, measuring the ratio over a long period smooths out “bumps” in the ratio over time that result from the exclusion of the earliest year and the addition of a new year. Finally, recent past is often more relevant due to changes in management or other factors. Section 6 describe an algorithm that incorporates these considerations.

benefits (e.g., to reduce the likelihood of tax audit; e.g., Holt et al. 2021), the impact of changes in tax reserves on the ETR is likely to partially persist.

An approach that deals with the two issues discussed above (limited data and partially recurring “transitory” items) is to estimate transitory income taxes indirectly, 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 (see Nissim 2022a).

(7) Estimate the transitory portion of income reported below income taxes

Since 2016, the only income item that is reported below income taxes is income from discontinued operations. (Before 2016 in rare cases companies reported extraordinary items.) Theoretically, the operating portion of income from discontinued operations should be classified as part of recurring income from other nonoperating activities, consistent with the classification of assets and liabilities of discontinued operations as “other nonoperating.” However, companies typically report all sources of income from discontinued operations in one line item, with no distinction between operating and nonoperating components. Moreover, the operating portion is not likely to reflect the recurring income of the disposed-off business, in part because assets held for sale are reported at the lower of cost and fair value less cost to sell rather than being depreciated. Therefore, in most cases all income reported below income taxes should be classified as transitory.

(8) Calculating transitory income

Transitory income is calculated as transitory pretax income, minus income taxes on transitory pretax income, minus abnormal income taxes, plus income from discontinued operations.

3.3 Net financial expense

Consistent with the items included in “debt,” financial expense includes interest expense and other financing charges as well as preferred dividends. Financial income includes interest and dividend income. The tax adjustment is applied to all financing items except preferred dividends and tax-exempt interest income.

3.4 Income from other nonoperating activities

Depending on the assets and liabilities classified as other nonoperating, this category may include equity method income, income from discontinued operations, rent income from investment properties, and possibly other items.

3.5 Operating expenses

Operating expenses (in a broad sense, including cost of revenue, SG&A, other operating expenses, and income taxes on operating profit) can be measured using either a direct or indirect approach. The two methods should yield the same result. The indirect approach starts with net income after preferred dividends and “undoes” the effect of transitory, financing, and “other”

items to get NOPAT. Given NOPAT, operating expenses are calculated as the difference between operating revenue and NOPAT. The direct approach measures operating expenses as the total of the following items: cost of revenue (excluding transitory components), SG&A expense (excluding transitory components), other recurring operating items, and income taxes on recurring operating profit. “Other recurring operating items” include items such as R&D expense (excluding transitory components), rent income (-; if the assets generating that income are included in operations), and the normal portion of volatile quasi-recurring operating income (-). Income taxes on recurring operating profit are estimated either directly, using the effective tax rate on operating profit, or indirectly, by adjusting the reported income tax expense to remove the tax effects of transitory, financing, and other nonoperating items, as well transitory tax components (e.g., change in the valuation allowance).

4. Pension and other postretirement benefits

Should pension and other postretirement benefits (hereafter postretirement benefits) be included in net operating assets or in net other nonoperating assets? For defined contribution plans (most pension plans), any related asset or liability are typically small. However, for defined benefit plans (some pension plans and almost all OPB plans), the related assets and liabilities can be significant. This question has important implications for both profitability and valuation analyses.

If net postretirement obligations are included in net operating assets, the related net interest cost should be deducted in the calculation of operating income, NOPAT, and free cash flow. In addition, free cash flow should be increased by the change in the net postretirement obligation, similar to the adjustment for changes in working capital liabilities such as accounts payable or accrued expenses. Accordingly, using DCF or industry multiples of operating income to value the operations will give a value that is net of the postretirement obligation.

In contrast, if the net postretirement obligation is included in net other nonoperating assets, NOPAT and free cash flow should exclude the net interest cost, and free cash flow should also exclude the change in net postretirement obligations. With these adjustments, the estimated value of operations excludes the value of net postretirement obligations, and an estimate of their fair value should be deducted from the estimated value of operations to get equity value.

There are arguments on both sides. For reasons explained below, in most cases the preferred choice is to include net postretirement obligations in net other nonoperating assets (i.e., exclude them from operations). This is due in part to an important accounting change (ASU No. 2017-07), which is effective since 2018.

Arguments for classifying postretirement benefits as operating include:

- The liability is directly affected by operations: employees earn additional benefits each period (service cost) as they contribute to operations, and these benefits are effectively a substitute for cash compensation. In addition, the future benefits are likely to be affected by the success of operations (e.g., future salary increases, employee turnover, curtailment).
- The counterparty is operating (employees).

- Removing postretirement benefits from operating items can be complicated—it requires measuring the related deferred taxes and—prior to ASU No. 2017-07, which is effective since 2018—removing the interest cost and expected return components from operating expenses. “Undoing” postretirement benefits from operating items is particularly difficult in interim financial reports due to limited information.
- If postretirement benefits are excluded from operations, the value of the corresponding net liability (asset) must be estimated and subtracted from (added to) the present value of free cash flows in measuring enterprise value. As discussed below, the true value of net postretirement obligations is difficult to estimate, and it may be substantially different from the funded status.

Arguments for excluding postretirement benefits from operations:

- The obligations and related expenses have characteristics of financial items: benefit obligations are measured at present value, pension assets are measured at fair value, and the interest cost and expected return components of postretirement benefits are similar to interest expense and interest and dividend income, respectively.
- Operating assets and operating liabilities are generally projected to grow with revenue (e.g., working capital, PP&E). In contrast, in many cases the net postretirement obligation is likely to evolve differently from revenue. Firms often change (typically reduce or freeze) the defined benefits (offering defined contribution plans instead), and the relationship between retired employees (which receive the defined benefits) and current employees (which contribute to operations) may not be stable.
- Pension assets and the return that they generate are typically unrelated to the firm’s operations.
- Since 2018, the interest cost of postretirement obligations and the expected return on pension assets are excluded from NOPAT. In earlier years, companies typically disclosed these cost components, so users were able to remove them from NOPAT.
- Firms can (and some do) settle the liabilities by paying lump sums to plan participants or by purchasing annuities from insurance companies.

The relevance of some of the pros and cons discussed above varies across companies. Excluding net postretirement obligations from net operating assets may be justified if they are likely to evolve very differently from revenue, either because: (1) the company closed the plans to new participants or is expected to do so; (2) the plans were or are expected to be frozen, so employees will not earn additional benefits; (3) the firm substantially reduced the benefits or is expected to do so; (4) the firm is expected to settle the obligations (rather than pay the benefits over time); or (5) the plans relate primarily to past employees, and current service cost is small relative to the size of the plan (for example, due to a decline in operations or to a spin-off of some operations while retaining the postretirement benefit obligations related to past employment).

Treating postretirement benefits as nonoperating requires: (1) excluding postretirement obligations and assets from net operating assets; (2) excluding the deferred tax asset (liability) related to net postretirement obligations from net operating assets (it can be estimated as the product of net postretirement obligation and the tax rate or, in many cases, obtained from the tax footnote); (3) excluding all components of defined benefit expenses other than service cost from

NOPAT;²³ and (4) excluding from NOPAT income taxes related to all components of defined benefit expenses other than service cost (they can be estimated as the product of the tax rate and the difference between the defined benefit expense and service cost).

If postretirement benefits are excluded from operations, the fair value of net postretirement obligations, net of related taxes, must be subtracted from the present value of free cash flows in calculating enterprise value.²⁴ But what is the fair value of net postretirement obligations? The answer to this question is not trivial. Most analysts use the difference between the benefit obligations and the fair value of plan assets (i.e., the negative of the funded status). However, this measure may overstate or understate the net obligation, depending on the following factors.

The fair value of net postretirement obligations depends on whether the company is expected to settle the liability (rather than pay the benefits over time) and, if so, the way that the liability is expected to be settled (lump-sum payouts or offloading it to insurance companies or to other financial institutions). Lump sum payouts are often offered to terminated vested participants and typically result in lower payment than the recognized pension obligation. Purchasing annuities from an insurance company for some or all the benefit obligation is often more costly to execute than a lump sum payout because it involves a third party, which has to be compensated for risk and effort.

If the company is expected to retain the plans (with or without freezing the benefits, and with open plan or closing the plan to new participants), the fair value of the net liability is probably smaller than the negative of the funded status. This follows because, from the perspective of equity investors, the discount rate used in measuring benefit obligations (corporate AA) is understated, which implies that the obligation is overstated. Most or all the cash flows needed to pay the existing benefit obligation will come from investments that generate a higher average return than the discount rate (e.g., stocks, high yield bonds, real estate, hedge funds, private equity). 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 may be justified. However, some of the investment risk is borne by the government (through pension guarantees) or by the employees themselves (excess benefits over guarantees), so the reported liability overstates the true liability. In addition, to the extent that equity investors bear benefit-related risks, beta and therefore WACC and the present value of free cash flows

²³ Even if postretirement benefits are excluded from operations, the service cost should be included in operating expenses as it is effectively a substitute for cash compensation. Past values of the service cost component of the expense are essentially proxies for future values of the service cost, which should be included in future operating expenses as it relates to benefit obligations to be created in the future. If a defined benefit plan is expected to be closed to new participants, it is likely to be replaced with a defined contribution plan, with contributions under the new plan approximately equal to the service cost. Similarly, if the benefits to existing participants are expected to be frozen, those employees are likely to receive benefits for future work under defined contribution plans.

²⁴ 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 it is an aftertax measure—paying back the principal of debt gives no tax deduction (in technical terms, the book value and tax basis of debt are equal or at least similar). In contrast, paying down the net benefit obligation (either by making contributions into the plan trust or making payments directly to or on behalf of retirees) gives a tax deduction. Therefore, if postretirement benefits are excluded from operations, the present value of the tax savings associated with paying down the net obligations should be netted against the fair value of the net obligations when estimating equity value.

already reflect at least some of that risk. In summary, using the funded status to measure the fair value of net benefit obligations, which effectively assumes that equity investors will absorb all benefit-related risks, overstates the true liability either because other parties (beside shareholders) will absorb some of that risk, and/or because it effectively double-counts the benefit risk (to the extent that beta and WACC capture that risk).

If postretirement benefits are included in operations, one must forecast future contributions. This in turn requires forecasting how the funded status will evolve over time. Such modelling requires distinguishing between plan asset and benefit obligations because they have different yields associated with them. In fact, a defined benefit plan is similar to a financial institution that obtains funds at a lower cost than the return that it generates on investments made with those funds. Analysts that follow financial institutions model earning assets and interest-bearing liabilities separately; the modelling of pension plans should follow suit (if they are included in operation, which should not generally be the case).

5. Accounting adjustments

The discussion thus far has focused on the classification of reported items. In some cases, adjusting reported numbers before classifying them enables the reformulated financial statements to better reflect economic activity or to generate more consistent time-series. For example, ASC 842—which requires the balance sheet recognition of operating leases—substantially increased reported operating assets and liabilities starting in fiscal year 2019. Thus, without adjustment, the time-series of ratios that use these quantities (e.g., operating asset turnover or the growth rate in operating assets) exhibits a “jump” in 2019, making it difficult to extrapolate from past ratios. In addition, the omission of right-of-use assets before 2019 reduces the informativeness of reported operating assets for evaluating efficiency and forecasting revenue.²⁵

Nissim (2021a) describes many adjustments that can be applied to reported financial statements. The following is a list of relatively common ones:

- *Capitalizing operating leases* (pre-2019). See Nissim (2022c) and Section 5.9 in Nissim (2021a).
- *Capitalizing expensed economic investments* such as R&D, advertising, start-up costs, and (a portion of) other SG&A expenses. See, for example, Iqbal et al. (2021), Koller et al. (2020, Chapter 24), and Sections 2.11.5 and 5.5 in Nissim (2021a).
- *Converting from LIFO to FIFO*. See Section 3.3.3 in Nissim (2021a).
- *Excluding transitory effects from cost of revenue*, including holding gains/losses on inventory and the effect of abnormal production. See Section 3.3.1 in Nissim (2021a).

²⁵ For example, if a company switched its strategy from purchasing to leasing fixed assets (e.g., stores), using the historical relationship between asset growth and subsequent revenue growth to predict revenue would result in an understated forecast. In contrast, if reported operating assets are adjusted to reflect leased capacity, the asset/subsequent revenue relationship would be maintained, resulting in unbiased revenue forecasts. Similarly, cross-sectional differences in purchasing versus leasing make it difficult to compare operating capacity across companies based on reported assets. For example, firms that tended to lease rather than purchase assets had relatively high asset turnover ratios even if they were less efficient than their peers.

- *Adjusting PP&E-related items for inflation*, including both reported assets and depreciation. See earnings quality issue “Historical cost distortions” in Section 5.4 of Nissim (2021a) and Section 3.4.6.
- Undoing factoring or securitization transactions. See Section 5.2 in Nissim (2021a).
- Undoing the effects of interest capitalization. See earnings quality issue “Interest capitalization” in Section 5.4 of Nissim (2021a).
- Undoing excess capitalization of expenditures. See earnings quality issue “Excess capitalization” in Section 5.4 of Nissim (2021a).
- Consolidating significant associates or unconsolidated VIEs/SPEs. See Sections 5.16 and 5.18 in Nissim (2021a).
- *Adjusting EBITDA for changes in capitalized depreciation*. See earnings quality issue “Depreciation expensed and EBITDA are measured with error” in Section 5.4 of Nissim (2021a).
- *Reclassifying cash flows in the cash flow statement*. Reported cash flow statements reflect several distortions (e.g., interest payments and income taxes on gains are included in operations). See earnings quality issue “Distorted cash from operations” in Section 5.11 of Nissim (2021a), and the discussion of cash flow liquidity in Section 2.9.3.
- *Removing intangibles and amortization*. Instead of capitalizing organically developed intangibles (see above), consistent treatment of intangibles can be achieved by removing acquired intangibles and related amortization from reported amounts. See earnings quality issue “Low comparability” in Section 5.5 of Nissim (2021a).

6. Measurement using Compustat

This section describes how the key components of the reformulated financial statements can be measured using Compustat datasets, including North America Fundamental Annual, Pension Annual, and Snapshot Annual (to obtain lease data post ASC 842). Since perfect identification of operating, financing and other nonoperating items requires data that are unavailable on Compustat, some of the variables are measured with error. When applicable, I discuss measurement issues below the variable’s definition.²⁶

Reformulated financial statements can be prepared using reported or adjusted financial statements (see Section 5). I use reported financial statements, with one exception—operating leases. As demonstrated in Nissim (2022c), without this adjustment the informativeness and consistency (across firms and over time) of operating assets is significantly lower. In the definitions below, I refer to *Estimated ROU Asset* and *Estimated Operating Lease Obligation*, measured as described in Nissim (2022c).

Another variable whose measurement is described in a companion study (Nissim 2022a) is the *Normal Tax Rate*—the effective tax rate on taxable pretax income that would have been reported by the company if there were no transitory income tax effects. Given the limited data available from Compustat, this tax rate is used here to estimate the tax rates on all items other than equity method income, goodwill impairment, and pre-2009 in-process R&D, for which the tax rate is assumed to equal zero. As noted in Section 3.1, more precise estimates—including different tax

²⁶ Nissim and Penman (2001, 2003) use more basic definitions of some of the variables described in this section.

rates for different sources of income—may be derived using information from the income tax footnote, especially the effective tax reconciliation.

Sections 6.1 and 6.2 discuss the measurement of balance sheet and income statement quantities, respectively. Nissim (2022b) uses these estimates to conduct a comprehensive profitability analysis.

6.1 Balance sheet items

Liquid Funds = cash and short-term investments (Compustat's CHE). If CHE is unavailable, *Liquid Funds* is measured as the total of cash and cash equivalent (Compustat's CH; zero if missing) and short-term investments (Compustat's INVST; zero if missing).

Required Liquid Funds = the minimum of (1) *Liquid Funds*, and (2) the product of *Revenue* (Compustat's SALE) and the industry-year *Required Liquid Fund Ratio*, estimated as described below.

Because firms are more likely to hold excess liquid funds than to have insufficient liquid funds, a simple approach for estimating required liquid funds is to multiply the firm's revenue by a percentage derived from the lower tail of the distribution of [*Liquid Funds* / *Revenue*] across firms from the same industry (identified here using the Global Industry Classification (GIC) system).²⁷ I measure the required liquid funds ratio using the lower quartile of the cross-sectional distribution of the firm-specific ratios across firm-years with revenue of at least \$100 MM in December 2020 prices. To smooth out fluctuations over time due to exit and entrance of firms (from or to the industry) as well as due to random movements, I use the five-years moving average of the ratio (instead of the most recent ratio).

Excess Liquid Funds = *Liquid Funds* minus *Required Liquid Funds*.

Financial Assets = *Excess Liquid Funds* plus investments and advances-other (Compustat's IVAO; zero if missing).

IVAO includes long-term investments in marketable securities and illiquid fixed income instruments (e.g., loans to nonoperating counterparties), which should be classified as financial assets (see Section 2.2). However, IVAO also includes items that should be classified as other nonoperating or operating. For example, IVAO includes investments in unlisted companies (which should be classified as other nonoperating; see Section 2.3) as well as long-term

²⁷ I use the GIC system because prior studies find that it dominates alternative ones (e.g., Bhojraj et al. 2003). Due to data issues, I make the following adjustments. Period covered by the Historical file: The Compustat Historical Industry Classification file covers the period starting on June 30, 1999, while the sample for this study starts in January 1991. I therefore assume that the June 1999 classification applied to earlier observations. Companies covered by the Historical file: For companies that delisted before June 30, 1999, historical GIC classifications are unavailable, but for many of these firms GIC classifications are available in the Compustat Company Information file. I use those later classifications when the historical ones are missing. Firms covered by the Company file: For some firms that delisted prior to 1999, the GIC classification is unavailable in either the Historical or Company files. To prevent survivorship bias, I assign GIC codes to these companies based on an empirical mapping of SIC to GIC, derived using firms with available SIC and GIC codes. Specifically, for each SIC I identify the SIC/GIC pair with the largest number of observations each month, and I assign that GIC to observations with available SIC and missing GIC.

receivables that are related to operating activities. Unfortunately, Compustat does not provide information on these components.

Pension Funded Status = The first available value in the following series: (1) pension plan assets (Compustat's PPLAO) minus pension projected benefit obligation (Compustat's PBPRO); (2) pension long-term asset (Compustat's PBALT) minus pension current liability (Compustat's PBLIC) minus pension long-term liability (Compustat's PBLLT); and (3) if fiscal year end is after December 15, 2006, prepaid (accrued) pension cost (Compustat's PCPPAO).

Since 2006 (SFAS 158), the balance sheet reflects the funded status of pension plans.

Pension Net Asset = The first available value in the following series: (1) if fiscal year end is after December 15, 2006, *Pension Funded Status*; and (2) prepaid (accrued) pension cost (Compustat's PCPPAO; zero if missing) plus prepaid (accrued) pension cost (underfunded) (Compustat's PCPPAU; zero if missing).

Since 2006 (SFAS 158), the balance sheet reflects the funded status of pension plans.

Pension Asset = The first available value in the following series: (1) pension long-term asset (Compustat's PBALT); and (2) *Pension Net Asset* plus pension current liability (Compustat's PBLIC; zero if missing) plus pension long-term liability (Compustat's PBLLT; zero if missing). If the calculation in (2) results in a negative number, *Pension Asset* is set equal to zero.

Pension Liability = The first available value in the following series: (1) pension current liability (Compustat's PBLIC) plus pension long-term liability (Compustat's PBLLT); and (2) *Pension Asset* minus *Pension Net Asset*. If the calculation in (2) results in a negative number, *Pension Liability* is set equal to zero.

OPB Funded Status = The first available value in the following series: (1) OPB plan assets (Compustat's PRAA) minus OPB benefit obligation (Compustat's PRBO); (2) OPB long-term asset (Compustat's PRALT) minus OPB current liability (Compustat's PRLC) minus OPB long-term liability (Compustat's PRLLT); and (3) if fiscal year end is after December 15, 2006, prepaid (accrued) OPB cost (Compustat's PRBA).

Since 2006 (SFAS 158), the balance sheet reflects the funded status of OPB plans.

OPB Net Asset = The first available value in the following series: (1) prepaid (accrued) OPB cost (Compustat's PRBA); and (2) if fiscal year end is after December 15, 2006, *OPB Funded Status*.

Since 2006 (SFAS 158), the balance sheet reflects the funded status of OPB plans.

OPB Asset = The first available value in the following series: (1) OPB long-term asset (Compustat's PRALT); and (2) *OPB Net Asset* plus OPB current liability (Compustat's PRLC; zero if missing) plus OPB long-term liability (Compustat's PRLLT; zero if missing). If the calculation in (2) results in a negative number, *OPB Asset* is set equal to zero.

OPB Liability = The first available value in the following series: (1) OPB current liability (Compustat's PRLC) plus OPB long-term liability (Compustat's PRLLT); and (2) *OPB Asset* minus *OPB Net Asset*. If the calculation in (2) results in a negative number, *OPB Liability* is set equal to zero.

Deferred Tax on Pension Asset = The product of *Pension Asset* and *Normal Tax Rate*.

Deferred Tax on OPB Asset = The product of *OPB Asset* and *Normal Tax Rate*.

Deferred Tax on Pension Liability = The product of *Pension Liability* and *Normal Tax Rate*.

Deferred Tax on OPB Liability = The product of *OPB Liability* and *Normal Tax Rate*.

For tax purposes, pension and OPB are generally accounted for on a cash basis.

Accordingly, recognized pension and OPB assets and liabilities have zero tax basis, necessitating the recognition of deferred taxes. Companies often disclose these amounts in the tax note, but Compustat does not provide this information. I therefore estimate the amount of deferred taxes.

Other Nonoperating Assets = equity method investments (Compustat's IVAEQ; zero if missing) plus *Pension Asset* plus *OPB Asset* plus *Deferred Tax on Pension Liability* plus *Deferred Tax on OPB Liability* plus current assets of discontinued operations (Compustat's ACDO; zero if missing) plus long-term assets of discontinued operations (Compustat's ALDO; zero if missing)

Other Nonoperating Assets should also include investments in unlisted companies, and real estate not used in operations. Unfortunately, Compustat does not provide information on these items.

Operating Assets = total assets (Compustat's AT) minus *Financial Assets* minus *Other Nonoperating Assets* plus *Estimated ROU Asset* (pre-ASC 842 observations; see Nissim 2022c)

Debt = debt in current liabilities (Compustat's DLC; zero if missing) plus long-term debt (Compustat's DLTT; zero if missing) plus preferred stock (Compustat's PSTK; zero if missing) minus preferred treasury stock (Compustat's TSTKP; zero if missing) plus preferred dividends in arrears (Compustat's DVPA; zero if missing) minus the operating lease obligation (starting 2019, see below).

Starting 2019 (ASC 842), public companies report the present value of future operating lease payments as a liability, and Compustat (as well as other data providers/aggregators) include it in debt (i.e., in DLC and DLTT). For reasons discussed in Section 2.4, I classify this liability as operating. Therefore, I subtract it in the measurement of *Debt*. Unfortunately, Compustat fundamental annual does not provide the operating lease liability. However, it is available (with a significant delay, unlike the fundamental annual data) from Compustat Snapshot (data items OLNPV or LLC+LLLT). Due to the data delay, I obtain recent values of the obligation from XBRL files (<https://www.sec.gov/dera/data/financial-statement-and-notes-data-set.html>).

Net Debt = *Debt* minus *Financial Assets*.

Noncontrolling Interests = the first available value in the following sequence: (1) noncontrolling interests (Compustat's MIBT), and (2) redeemable noncontrolling interest (Compustat's MIB; zero if missing) plus nonredeemable noncontrolling interest (Compustat's MIBN; zero if missing).

Redeemable noncontrolling interests should be included in debt, but this requires being able to identify the related earnings and include in net financial expense. Unfortunately, Compustat does not provide this information.

Common Equity = common equity (Compustat's CEQ) plus preferred treasury stock (Compustat's TSTKP; zero if missing) minus preferred dividends in arrears (Compustat's DVPA; zero if missing).

Equity = *Common Equity* plus *Noncontrolling Interests*.

Other Nonoperating Liabilities = *Pension Liability* plus *OPB Liability* plus *Deferred Tax on Pension Asset* plus *Deferred Tax on OPB Asset*.

Other nonoperating liabilities should also include reserves related to unusual litigation, liabilities of discontinued operations, and possibly other items. However, identifying and measuring these liabilities requires information that is not available in Compustat.

Operating Liabilities = total assets (Compustat's AT) minus *Equity* minus *Debt* minus *Other Nonoperating Liabilities* plus *Estimated Operating Lease Obligation* for pre-ASC 842 observations (see Nissim 2022c).

For post-ASC 842 observations, total liabilities include the operating lease obligation, so there is no need for adjustment.

Net Operating Assets = *Operating Assets* minus *Operating Liabilities*.

Net Other Nonoperating Assets = *Other Nonoperating Assets* minus *Other Nonoperating Liabilities*.

6.2 Income statement items

Operating Revenue = revenue (Compustat's SALE).

Net Income Attributable to Common Equity = income before extraordinary items (Compustat's IB) plus extraordinary items (Compustat's XI; zero if missing) plus discontinued operations (Compustat's DO; zero if missing) minus preferred dividends (Compustat's DVP; zero if missing).

Noncontrolling Interests in Income = noncontrolling interest in income (Compustat's MII; zero if missing).

Net Income after Preferred Dividends = *Net Income Attributable to Common Equity* plus *Noncontrolling Interest in Income*.

Volatile Recurring Operating Income (Expense) = For pre-2001 observations: special items (Compustat's SPI; zero if missing). From 2001: M&A-related costs (Compustat's AQP; zero if missing) plus impairment of goodwill (Compustat's GDWLIP; zero if missing) plus litigation or insurance settlement (Compustat's SETP; zero if missing) plus restructuring charges (Compustat's RCP; zero if missing) plus asset write-downs (Compustat's WDP; zero if missing) plus in-process R&D (Compustat's RDIP; zero if missing) plus other special items (Compustat's SPIOP; zero if missing) plus unidentified special items (SPI minus sum(AQP, GLP, GDWLIP,

SETP, RCP, WDP, DTEP, RDIP, SPIOP, 0); including this items also corrects some double-counting of components of SPI, see Nissim 2022d).

SPI components are generally available starting in 2001.

For pre-2009 observations, I gross up RDIP (i.e., divide it by one minus *Normal Tax Rate*) because pre-2009 in-process R&D was generally expensed at the time of M&A with no tax effect recognized. I also gross up GDWLIP because goodwill typically has no tax basis (and so is not tax deductible) and no deferred taxes are recognized on the corresponding book-tax difference. The purpose of these adjustments is to make RDIP and GDWLIP comparable to other special item components, which are subject to income taxes.

Average Volatile Recurring Operating Income Ratio = the ratio of the weighted sum of *Volatile Recurring Operating Income (Expense)* over the last ten years to the weighted sum of revenue over the same period. The weights are calculated with 10/55 weight applied to the most recent value (current year), 9/55 weight to the prior year value, ... 1/55 weight to the value nine years ago. A minimum of three years of data is required.

I use ten years to allow for a long period that fully covers a business cycle as well as the impact of impairment charges on subsequent depreciation and amortization.

I use declining weights for two reasons: (a) recent past is more relevant (e.g., new management), and (b) to prevent “bumps” in the time-series distribution of the ratio from a drop in an earlier year.

Abnormal Volatile Recurring Operating Income (Expense) = *Volatile Recurring Operating Income (Expense)* minus the product of revenue (Compustat’s SALE) and *Average Volatile Recurring Operating Income Ratio*.

Volatile Nonoperating Income (Expense) = gains (losses) on asset sales (Compustat’s GLP; zero if missing) plus gain (loss) on extinguishment of debt (Compustat’s DTEP; zero if missing).

This item should also include impairment of investments and gains (losses) from marking-to-market investments (an item that has become significant for some firms since 2018 with the implementation of ASU No. 2016-1). Unfortunately, Compustat does not identify these items.

GLP includes all gains, losses, and asset write-downs that Compustat classifies as “special item” (Compustat’s SPI). Ideally, operating gains and losses and write-down of operating assets should be included in *Volatile Recurring Operating Income (Expense)*.

Transitory Operating Income (Expense) = zero.

This item should include income or loss from truly non-recurring activities related to operations. Examples include M&A-related transitory items, including gains from “bargain purchases” (since 2009), gains or losses from step acquisitions (since 2009), gains or losses from adjusting liability-classified contingent considerations (since 2009), and loss-of-control gains/losses (since 2009). Unfortunately, Compustat does not identify these items. However, at least some of them are likely included in Compustat’s GLP, which is treated as a transitory item (it is included in *Volatile Nonoperating Income (Expense)*).

Tax on Pretax Transitory Income = *Normal Tax Rate* times the total of *Abnormal Volatile Recurring Operating Income (Expense)* and *Volatile Nonoperating Income (Expense)*.

Abnormal Income Taxes = income taxes (Compustat's TXT) minus the product of the *Normal Tax Rate* and *Taxable Pretax Income*.

This item represents the abnormal portion of the income tax expense given the level of pretax income and an estimate of the *Normal Tax Rate* (essentially the effective tax rate that would have been reported by the company if there were no transitory income tax effects; estimated in Nissim 2022a).

Transitory Income = *Abnormal Volatile Recurring Operating Income (Expense)* plus *Volatile Nonoperating Income (Expense)* plus *Transitory Operating Income (Expense)* minus *Tax on Pretax Transitory Income* minus *Abnormal Income Taxes* plus extraordinary items (Compustat's XI; zero if missing) plus discontinued operations (Compustat's DO; zero if missing).

Classifying income from discontinued operations as transitory seems logical given that the related operations have already been discontinued or are expected to be discontinued soon (see Nissim 5.7). In addition, income from discontinued operations includes gains and losses from asset sales and from marking assets down to fair value less cost to sell (if needed). However, it also includes operating income earned on the investment of these operations and thus, given that capital is (or was) employed in funding these operations, classifying all income from discontinued operations as transitory would result in understated measures of the profitability of invested capital. Unfortunately, Compustat does not differentiate between operating income from discontinued operations and nonoperating income (this information is sometimes disclosed in the notes or in the MD&A) so, given the above considerations, I classify all income from discontinued operations as transitory.

Recurring Income = *Net Income after Preferred Dividends* minus *Transitory Income*.

Nonoperating Pension Cost = The product of one minus *Normal Tax Rate* and the difference between periodic pension cost (Compustat's PPC) and pension service cost (Compustat's PPSC).

Nonoperating OPB Cost = The product of one minus *Normal Tax Rate* and the difference between periodic OPB cost (Compustat's PPRBC) and OPB service cost (Compustat's PRSC).

Income from Other Nonoperating Activities = equity method income (Compustat's ESUB; zero if missing) minus *Nonoperating Pension Cost* minus *Nonoperating OPB Cost*.

Interest Income on Required Liquid Funds = interest income (Compustat's IDIT; zero if missing) times the ratio of the average balance of *Required Liquid Funds* to the total of the average balance of *Required Liquid Funds* and the average balance of *Financial Assets*.

This calculation assumes that *Required Liquid Funds* and *Financial Assets* earn the same rate of return, with all the income included in IDIT. Average balance is measured using the beginning- and end-of-year values of the variable.

Net Financial Expense = preferred dividends (Compustat's DVP; zero if missing) plus the product of one minus the *Normal Tax Rate* and net interest cost, which in turn is measured as interest expense (Compustat's XINT; zero if missing) minus interest income (Compustat's IDIT; zero if missing) plus *Interest Income on Required Liquid Funds*.

NOPAT = Recurring Income minus Income from Other Nonoperating Activities plus Net Financial Expense.

7. Conclusion

A firm's value reflects its ability to earn recurring operating profits. Thus, to conduct informative profitability and valuation analyses, the balance sheet and income statement should be reformulated to separate operating activities from financing and other nonoperating activities, and the income statement should be reformulated to also distinguish between recurring and transitory items. This study provides a step-by-step explanation of the reformulation process. It also describes how the reformulated financial statements can be measured using Compustat data items.

Identifying and measuring transitory earnings components is often the most difficult step in the reformulation. Yet, it is critical for evaluating performance and earnings quality as well as for forecasting and valuation analysis. The paper develops a systematic approach that uses information on the nature and time-series behavior of income statement line items to decompose earnings into recurring and transitory components. Nissim (2022b) demonstrates the informativeness of this approach.

Three additional areas that require particular attention are leases, income taxes, and retirement benefits. All three involve complicated accounting issues and managerial discretion, as well as many details (especially pension), changes over time (especially leases), and embedded transitory components (especially income taxes). This paper contains a comprehensive discussion of these issues, and two companion studies provide pertinent empirical evidence on leases (2022c) and income taxes (2022a).

Appendix A. Reformulated Balance Sheet (detailed version)

Assets	Liabilities and Equity
<p>Operating assets <i>Assets related to operating revenue and/or operating expenses</i></p> <ul style="list-style-type: none"> Required liquid funds Accounts receivable Inventory Other working capital assets (e.g., prepaid expenses, deferred costs) PP&E Right-of-use operating lease assets Intangible assets Net pension assets (if included in operations) Other long-term operating assets 	<p>Operating liabilities <i>Liabilities related to operating revenue and/or operating expenses</i></p> <ul style="list-style-type: none"> Accounts payable Accrued liabilities Deferred revenue Other working capital liabilities (e.g., income taxes payable) Deferred taxes Operating lease liabilities Pension and OPB net obligations (if included in Operations, which is uncommon) Other long-term operating liabilities
<p>Financial assets <i>Financial instruments that are not needed for operations and are relatively liquid and/or represent fixed (rather than residual) claims</i></p> <ul style="list-style-type: none"> Cash, cash equiv. & ST invest. in excess of amounts needed for operations Long-term investments in marketable securities Illiquid fixed income instruments (other than operating receivables) 	<p>Debt <i>Borrowings from financial institutions & capital markets (including preferred stock and temporary equity)</i></p> <ul style="list-style-type: none"> Interest and dividends payable Short-term debt & current maturities of long-term debt Long-term debt (excluding conversion features) Temporary equity & preferred stock (excluding conversion features)
<p>Other nonoperating assets <i>Illiquid assets that neither contribute to operating profit nor represent fixed claims</i></p> <ul style="list-style-type: none"> Equity method investments (investments in associates) Investments in unlisted equity securities Real estate not used in operations Assets of discontinued operations Tax loss carryforwards (if excluded from operations) Net pension assets (if excluded from operations, which is the preferred approach) Litigation assets (if excluded from operations) 	<p>Other nonoperating liabilities <i>Non-debt liabilities that do not affect operating profit</i></p> <ul style="list-style-type: none"> Liabilities of discontinued operations Litigation liabilities (if excluded from operations) Pension and OPB net obligations (if excluded from Operations, which is the preferred approach)
	<p>Equity</p> <ul style="list-style-type: none"> Common stock Noncontrolling interest Contingent claims (options & warrants, conversion features)

Appendix B. Reformulated Income Statement (detailed version)

Operating revenue

Sales and other recurring revenue generated by activities whose costs are recognized in cost of revenue and operating expenses

Cost of revenue

The cost of products and services delivered in generating operating revenue

Operating expenses

Recurring operating expenses other than cost of revenue and income taxes

Selling, general and administrative expenses

R&D

Operating expenses that are reported separately from SG&A and R&D (e.g., amortization is often reported separately)

Other recurring operating income (expense)

Normalized volatile quasi-recurring operating income (expense) (e.g., recurring portion of restructuring charges)

Interest and dividend income on required liquid funds

Other (e.g., rental income derived from properties classified as operating assets)

Pretax operating profit

Tax on operating profit

Net operating profit after tax (NOPAT)

Net financial expense

Interest expense

Interest and dividend income (excluding interest income on required liquid funds)

Income taxes on net interest expense (difference between the above two items)

Preferred dividends

Income from other nonoperating activities

Recurring Income (expense) from other nonoperating activities (e.g., equity method income, operating income from discontinued operations), net of tax

Recurring income

Transitory items

Volatile nonoperating income (expense) (e.g., gain or loss from selling investments)

Transitory operating income (expense) (e.g., losses from natural disasters or expropriation of assets)

Abnormal portion of volatile quasi-recurring operating income (expense) (e.g., abnormal portion of restructuring charges)

Income taxes on transitory pretax income (transitory pretax income = sum of above three components)

Abnormal income taxes (e.g., impact of TCJA tax reform on the 2017 income tax expense)

Income from discontinued operations (excluding operating income from discontinued operations if disclosed)

Net income after preferred dividends

Net income attributable to noncontrolling interest

Net income attributable to common equity

Appendix C: Free cash flow

Most analysts measure free cash flow (FCF) as NOPAT, plus depreciation & amortization (D&A), minus capex, and minus the change in working capital (e.g., Green et al. 2016). This calculation is sometimes presented as NOPAT minus “growth capex” (i.e., capex in excess of depreciation) and minus the change in working capital. However, these adjustments to NOPAT are a subset of the items that change net operating assets. In measuring FCF, all changes in net operating assets should be subtracted from NOPAT; otherwise, the discounted flow will not represent *free* cash flow. Examples of additional changes in net operating assets that should be subtracted from NOPAT in measuring FCF include:

- ***Changes in net operating assets due to business acquisitions*** (if the benefits from the acquisitions—either in the form of increased sales or reduced expenses—are reflected in expected NOPAT). Whether the acquisitions will be consummated in a cash or noncash transaction (i.e., by issuing stock or debt) is irrelevant; any value surrendered in acquisitions should be subtracted from FCF; if not, the present value of FCF will reflect the benefits from acquisitions without subtracting their cost.
- ***Noncash capex*** (e.g., purchasing equipment with vendor financing, finance leases). FCF reflects the benefits from all investments in capex, including noncash investments. Accordingly, all capex must be subtracted from NOPAT in measuring FCF, not just cash capex. Because the cash flow statement reports only cash capex, if capex is forecasted by extrapolating from past reported cash capex, overall capex may be understated.
- ***Changes in right-of-use assets and operating lease liabilities***. See Section 5.9 in Nissim 20221a).
- ***Changes in deferred tax assets and liabilities due to operating activities***. For example, a company may have a high effective tax rate but pay little taxes currently (e.g., due to accelerated tax depreciation or to bonus depreciation); if the change in the deferred tax liability is not accounted for, FCF will be understated. Similarly, a decrease in deferred tax assets due to utilization of net operating losses imply that the income tax expense (which reduces NOPAT) is larger than income tax payments (which reduce free cash flow).
- ***Changes in estimated liabilities for which the related cash flows are part of free cash flow***. Changes in estimated liabilities (provisions in IFRS terminology) are generally due to a difference between the related expense, which reduces NOPAT, and the cash flow, which reduces free cash flow.²⁸ Examples include:
 - ***Changes in restructuring liabilities***. For example, next period’s cash outflow to settle an already recognized restructuring liability will not be reflected in next period NOPAT. Failing to adjust for this change in NOA would result in overstatement of next period’s FCF.
 - ***Changes in loss contingencies***, including litigation reserves, tax reserves (unrecognized tax benefits), and environmental liabilities. For example, changes in environmental liabilities are generally due to a difference between environmental-related expenses

²⁸ Estimated liabilities (provisions in IFRS terminology) that are likely to evolve differently from revenue and operating assets and whose cost can be estimated and removed from free cash flow should generally be accounted for separately in DCF valuation. That is, FCF should exclude all cash flows related to settling the provisions, and the estimated value of the provisions should be subtracted from the present value of free cash flow in measuring equity value. Examples include provisions related to truly non-recurring activities (e.g., liabilities related to asbestos losses from past activities), and most pension obligations.

(which reduce NOPAT) and payments of environmental liabilities (which reduce free cash flow).

- *Changes in asset retirement obligations (ARO)*
- *Changes in net pension and other postretirement obligations* (if included in operations, which should normally not be the case; see Section 4).
- ***Changes in assets and liabilities that are part of working capital but are not treated as such.*** Many analysts measure working capital as accounts receivable plus inventory and minus accounts payable, ignoring items such as cash required for operations, prepaid expenses, accrued expenses, or deferred revenue. They implicitly assume that the excluded items will remain unchanged, which typically results in overstated free cash flow.
- ***Changes in long-term deferred revenue*** (e.g., Microsoft). For example, a decline in long-term deferred revenue implies that NOPAT overstates cash from operations even after adjusting for the change in (current) working capital.
- ***Changes in long-term operating receivables*** (e.g., FOX).
- ***Changes in industry-specific operating assets and liabilities*** such as inventory of film and programming rights (e.g., FOX), or regulatory assets and liabilities of US utilities (e.g., Duke Energy).

And this is not a complete list. Identifying and measuring all these items separately is difficult and often impossible (many of them are aggregated on the balance sheet with other assets or liabilities, and the related income statement items are often aggregated with other flows). For example, environmental liabilities may be reported combined with other estimated operating liabilities. Therefore, instead of trying to identify these items, one may simply define free cash flows based on the following relation: $FCF(t) = NOPAT(t) - NOA(t) + NOA(t-1)$. This approach guarantees that all investments in operations are accounted for as long as NOPAT and NOA are measured consistently.

The remainder of the appendix demonstrates that ***free cash flow is equal to NOPAT minus the change in net operating assets.***

Free Cash Flow =

- Collections from customers
- Payments to suppliers
- Payments to employees
- Payments of other operating expenses
- Payments of taxes on operating profit
- Capital expenditures
- Capitalized expenditures on intangible assets
- Acquisition of businesses
- + Sale of property, plant, and equipment
- + Disposal of businesses

Free Cash Flow =

- Net cash flow from operations
- Net investment in long-term operating assets

Net Operating Profit after Tax (NOPAT) =
Operating revenue
– Costs and operating expenses
– Income taxes on operating profit

Collections from customers \cong Operating revenue
Payments to suppliers, employees, ... \cong Costs and operating expenses
Payments of taxes on operating profit \cong Income taxes on operating profit

Net cash flow from operations \cong NOPAT

Net cash flow from operations = NOPAT \pm Adjustments

Free Cash Flow =
NOPAT
 \pm Adjustments
– Net investment in long-term operating assets

Collections from customers =
Operating revenue
– e.b. accounts receivable (credit sales not yet collected)
+ b.b. accounts receivable (prior year credit sales collected this year)
+ e.b. deferred revenue (collections not yet recognized in sales)
– b.b. deferred revenue (sales collected last year)

Collections from customers =
Operating revenue
– Δ accounts receivable
+ Δ deferred revenue

Payments to suppliers, employees, ... =
Costs and operating expenses
– Depreciation and amortization
– Other noncash charges
+ Δ Inventory
– Δ accounts payable
+ Δ Prepaid expenses
– Δ Accrued expenses

Payments of taxes on operating profit =
Income taxes on operating profit
– Deferred taxes
– Δ Current income tax liabilities (assets)

Net cash flow from operations =
NOPAT
+ Depreciation and amortization
+ Other noncash charges
+ Deferred taxes
– Δ accounts receivable
+ Δ deferred revenue
– Δ Inventory
+ Δ accounts payable
– Δ Prepaid expenses
+ Δ Accrued expenses
+ Δ Current income tax liabilities (assets)

Net cash flow from operations =
NOPAT
+ Noncash charges
– Δ working capital

Free cash flow =
NOPAT
+ Noncash charges
– Δ working capital
– Net investment in long-term operating assets

Free cash flow =
NOPAT
– Δ Net operating assets

References

- Allee, K.D., Erickson, D., Esplin, A.M. and Yohn, T.L., 2020. The characteristics, valuation methods, and information use of valuation specialists. *Accounting Horizons*, 34(3), pp.23-38.
- Atiase, R., D. Platt, and S. Tse. 2004. Operational restructuring charges and post-restructuring performance. *Contemporary Accounting Research* 21: 493-522.
- Bancel, F. and Mittoo, U.R., 2014. The gap between the theory and practice of corporate valuation: Survey of European experts. *Journal of Applied Corporate Finance*, 26(4), pp.106-117.
- Bates, T.W., Kahle, K. M., Stulz, R.M., 2009. Why Do U.S. Firms Hold So Much More Cash Than They Used To? *Journal of Finance*, 64(5), 1985-2021.
- Bhojraj, S., C. Lee, and D. Oler. 2003. What's my line? A comparison of industry classification schemes for capital market research. *Journal of Accounting Research* 41: 745–774.
- Brown, L. D., A. C. Call, M. B. Clement, and N. Y. Sharp. 2015. Inside the “black box” of sell-side financial analysts. *Journal of Accounting Research* 53 (1): 1–47.
- Cready, W., T. Lopez, and C. Sisneros. 2010. The persistence and market valuation of recurring nonrecurring items. *The Accounting Review* 85 (September): 1577-1615.
- Demirakos, E.G., Strong, N.C. and Walker, M., 2004. What valuation models do analysts use? *Accounting horizons*, 18(4), pp.221-240.
- Dyer, T., Guest, N.M. and Yu, E., 2021. New Accounting Standards and the Performance of Quantitative Investors. *Available at SSRN 3969442*.
- Easton, P.D., McAnally, M.L., Sommers, G.A. and Zhang, X.J., 2018. *Financial statement analysis & valuation*, 5th Edition. Boston, MA: Cambridge Business Publishers.
- Elliott, J., and J. D. Hanna. 1996. Repeated accounting write-offs and the information content of earnings. *Journal of Accounting Research* 34 (Supplement): 135-155.
- Fan, Y. and Liu, X. 2017. Misclassifying core expenses as special items: Cost of goods sold or selling, general, and administrative expenses? *Contemporary Accounting Research*, 34(1):400–426.
- Green, J., Hand, J.R. and Zhang, X.F., 2016. Errors and questionable judgments in analysts' DCF models. *Review of Accounting Studies*, 21(2), pp.596-632.
- Hand, J.R., Coyne, J.G., Green, J.R. and Zhang, X.F., 2017. The use of residual income valuation methods by US sell-side equity analysts. *Journal of Financial Reporting*, 2(1), pp.1-29.
- Hirshleifer D, Hou K, Teoh SH, Zhang Y. 2004. Do investors overvalue firms with bloated balance sheets? *Journal of Accounting and Economics* 38(1):297–331.
- Holt, M., Nessa, M.L. and Towery, E., 2021. The Effect of Unchallenged Tax Positions on Corporate Tax Aggressiveness: Evidence from Statute of Limitations Lapses. *Available at SSRN 3920571*.

- Iqbal, A., Rajgopal, S., Srivastava, A. and Zhao, R., 2021. Value of Internally Generated Intangible Capital. *Available at SSRN 3917998*.
- Imam, S., Barker, R. and Clubb, C., 2008. The use of valuation models by UK investment analysts. *European Accounting Review*, 17(3), 503-535.
- Koller, T., Goedhart, M., and D. Wessels. 2020. *Valuation: Measuring and Managing the Value of Companies*, 7th Edition. Wiley Finance.
- Lundholm, R. and Sloan, R., 2019. *Equity valuation and analysis*, 5th Edition.
- McVay, S.E. 2006. Earnings management using classification shifting: An examination of core earnings and special items. *The Accounting Review* 81 (3), 501-531.
- Mukhlynina, L. and Nyborg, K.G., 2020. The Choice of Valuation Techniques in Practice: Education versus Profession. *Critical Finance Review*, 9(1-2), pp.201-265.
- Nissim, D. 2019. EBITDA, EBITA, or EBIT? Columbia Business School Research Paper No. 17-71. Available at <https://ssrn.com/abstract=2999675>.
- Nissim, D., 2021a. Earnings Quality. Columbia Business School. Available at <http://ssrn.com/abstract=3794378>.
- Nissim, D. 2021b. Valuing minority interests. Columbia Business School. Available at <https://ssrn.com/abstract=3472592>.
- Nissim, D., 2022a. Normal tax rate. Columbia Business School. Available at <http://www.columbia.edu/~dn75/>.
- Nissim, D. 2022b. Profitability analysis. Columbia Business School. Available at <http://ssrn.com/abstract=4064824>.
- Nissim, D., 2022c. Right-of-use assets. Columbia Business School. Available at <http://www.columbia.edu/~dn75/>.
- Nissim, D., 2022d. Special items: Implications for forecasting. Columbia Business School. Available at <http://www.columbia.edu/~dn75/>.
- Nissim, D., and Penman, S. H. 2001. Ratio analysis and equity valuation: From research to practice. *Review of Accounting Studies*, 6, 109–154.
- Nissim, D. and Penman, S.H., 2003a. Financial statement analysis of leverage and how it informs about profitability and price-to-book ratios. *Review of Accounting Studies*, 8(4), 531-560.
- Palepu, K.G., Healy, P.M., Wright, S., Bradbury, M. and Coulton, J., 2020. *Business analysis and valuation: Using financial statements*. Cengage AU.
- Pinto, J.E., Robinson, T.R. and Stowe, J.D., 2019. Equity valuation: A survey of professional practice. *Review of Financial Economics*, 37(2), pp.219-233.
- Tan, H. and Yu, C., 2021. Valuation uncertainty and analysts' use of DCF models. *Review of Accounting studies* (forthcoming).
- Wahlen, J.M., Baginski, S.P. and Bradshaw, M., 2017. *Financial reporting, financial statement analysis and valuation: A strategic perspective*, 9th Edition. South-Western Cengage Learning.