

ENCYCLOPEDIA OF INTERNATIONAL ECONOMICS AND GLOBAL TRADE

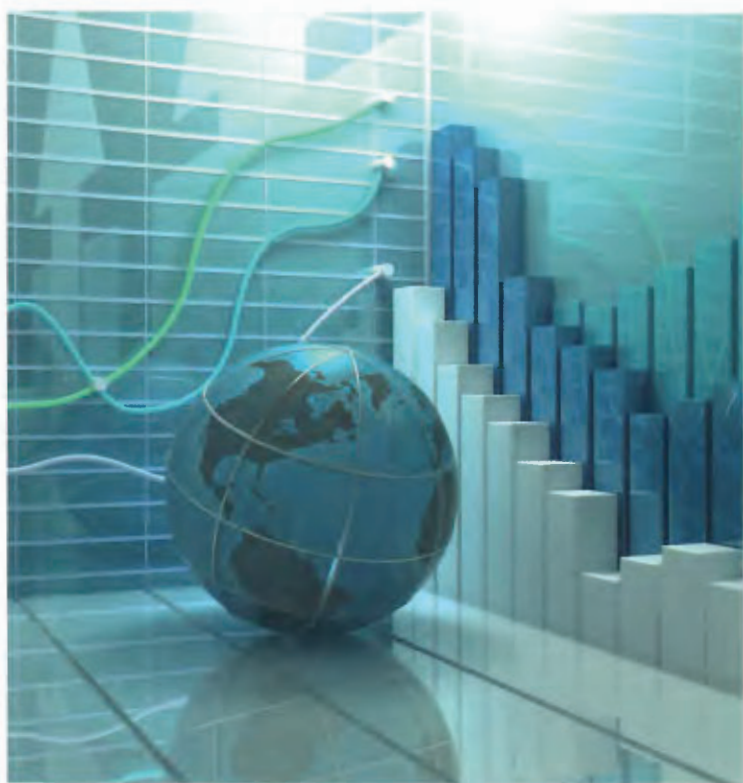
Editor-in-Chief

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Volume 2: International Money and Finance



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Acknowledgments

The editor of this volume is thankful to Anthony Alexander, Jiang Yulin, and Zvi Ruder at World Scientific for their assistance and patience in the completion of this manuscript. He is also thankful to the Federal Reserve Board for the use of a speech delivered by the Hon. Stanley Fischer in his functions as Vice-Chairman of the Fed.

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Introduction

Francisco L. Rivera-Batiz

International monetary and financial economics are at the core of the economic status of any nation. Global finance links economies in an intricate web of interdependent transactions, where crises in distant lands can have serious repercussions at home. Exchange rate changes, monetary and fiscal policies, and economic disturbances in a country can deeply affect its trading partners. Because of its significance, this field often ends up dominating public policy discussions. This is the case when politicians in the United States accuse China of manipulating its currency to stimulate exports, elected government officials in Italy and other European countries blame the euro for their economic problems, or governments in developing countries attack globalization because of the increased volatility of international financial flows. The issues connected to international monetary and financial economics generate great debate and controversy and they need to be discussed and researched intelligently.

This volume comprises 12 chapters offering a comprehensive analysis of some of the major topics in international monetary and financial economics. The coverage ranges from detailed surveys to advanced research of key theoretical and empirical areas in the field. Among the issues covered are the determinants and consequences of international capital flows, the VIX as a measure of risk, the history and current challenges facing the international monetary system, the current status and future of the European Monetary Union, the determinants of the accumulation of international reserves by central banks, the history of the renminbi (RMB) and the prospects for the Chinese currency's future as an international currency, US and European monetary policy and its global consequences, the determinants of current account imbalances in the United States and elsewhere,

the short-run versus long-run impact of changes in currency values on international trade, and how news and announcements affect exchange rates.

Contributors to the volume include a wide cross-section of authors, among them prominent academics colleges and universities all over the world (from the United States to China), researchers at international organizations, such as the Peterson Institute for International Economics and the International Monetary Fund, and policymakers, including those currently or previously at the Federal Reserve Board in the United States and the European Central Bank. They discuss some of the central concepts in international monetary and financial economics using the latest data, including reexaminations of the covered and uncovered interest parity conditions, the exchange risk premium, purchasing power parity, the unholy Trinity or impossible trilemma, optimum currency areas, the carry trade, the J-curve effect, and many others. It is hoped that the diversity of views and approaches utilized in this book provides a sample of the current landscape of research and policy in the field of international monetary and financial economics.

This introduction provides a summary of the sections and chapters included in this volume.

International Financial Markets and Capital Flows

Nothing is more striking in revealing the close integration of world financial markets than the contagion of equity price changes in stock markets throughout the world in response to major economic shocks or news. For example, on 29 September 2008 the US House of Representatives failed to pass a bill intended to inject capital into collapsing American financial institutions at the time. This set up an immediate reaction in the US stock market, with the Dow Jones industrial stock market average price index losing 778 points, the biggest one-day loss ever. But the crash was followed quickly around the world. The lower closing prices quoted on the New York Stock Exchange that day were immediately linked to lower opening prices in Tokyo three hours later, and the Tokyo closing prices in turn influenced the subsequent opening prices on the London Stock Market. The closing prices in London then sharply affected the opening prices on the New York exchange the following day. In a short period of time, under nervous worldwide concern, equity price indexes in industrial countries and emerging markets together dropped precipitously. Overall, the Dow Jones dropped by 41% in the few days between 29 September and 12 October; in Japan the equivalent index dropped by 46%, in Germany by 21%, in the United Kingdom by 21%, and in Brazil by 25%.

Chapter 1 by Francisco Rivera-Batiz presents an overview of the internationalization of financial markets in the post-World War II period and the growth of

cross-border capital flows until its peak in the mid-2000s and subsequent retrenchment during and after the global financial crisis (GFC) of 2007–2008. International financial transactions usually involve the purchase and/or sale of foreign currencies. This makes them susceptible to possible fluctuations in exchange rates, that is, foreign exchange risk. Participants in these markets who want to limit this exchange risk usually engage in covered foreign investments that use some type of hedging instrument, such as forward markets, foreign exchange or currency swaps, currency futures or options. The chapter begins by describing the mechanics of these transactions and their implications.

The covered interest rate parity condition establishes that in countries that are freely open across borders, the return on covered foreign investments and the return on domestic investments should equalize. Otherwise, there are unexploited profit opportunities that would lead to capital flows and to equilibrium adjustments of exchange rates and/or interest rates that quickly eliminate such deviations. In the past, significant deviations from the covered interest parity condition were observed because of the presence of capital controls and political risk. The 1980s and 1990s however, witnessed a major liberalization of international financial flows in the industrialized world and in emerging markets. This was reflected in sharply declining covered interest differentials.

As Chapter 1 shows, however, this all broke down with the financial crisis of 2007 and 2008 and in its aftermath. Why? Substantial deviations from covered interest parity are generally observed in periods of great turbulence and turmoil in world financial markets. This appears to be the case during the GFC. The increased default and counterparty risk existing during the period — whether from financial institutions or retail customers — meant that the risk premia associated with these generated a wedge between rates of return across borders, even for covered investments. But explaining the breakdown of covered interest parity after the end of the GFC has become a challenge for researchers in this field. A popular hypothesis is based on the fact that international banks are intricately involved in the international financial transactions that give rise to covered interest parity. The breakdown of the covered interest parity condition, it is argued, lies on the tighter bank regulatory framework established by many countries after the crisis. Capital regulations, for example, have made it costlier for commercial banks to fund covered interest arbitrage activities. And in the presence of a huge demand for dollar assets by foreign investors in recent years, especially when the dollar appreciates in value, global banks find themselves in a “dollar shortage” that limits covered interest arbitrage activities.

Not all transactions in international finance involve covered investments. Many participants in international financial markets are willing to tolerate exchange risk when making their investments abroad, that is, they engage in

uncovered investments. If these investors ignore exchange risk, then the equalization of expected rates of return between domestic and foreign uncovered investments leads to the uncovered interest parity condition. This condition states the equality of the interest rate differential between domestic and foreign assets — to the expected rate of depreciation of domestic currency.

Chapter 1 documents the difficulties in testing uncovered interest parity. Since uncovered investments are subject to foreign exchange risk, and investors are not generally risk-neutral, the presence of an exchange risk premium will generate deviations from uncovered parity, reflected in a wedge between the interest rate differential and expected exchange rate changes. Testing whether uncovered interest parity holds then becomes identical to testing for the absence of a risk premium. A second problem in testing uncovered parity is that exchange rate expectations are generally unobservable in foreign exchange markets, and therefore the condition is not directly testable.

One approach in the literature has been to assume rational expectations and examine whether its implications are consistent with the data. Testing whether interest parity holds then becomes a joint test of rational expectations and the absence of a risk premium. In addition, under rational expectations and no risk premium, the forward premium would be an unbiased estimator of future exchange rate movements, which can be tested empirically. The evidence reviewed in Chapter 1, however, is not consistent with the joint hypothesis of uncovered interest parity and rational expectations and it suggests also that the forward premium is not an unbiased forecast of the future expected rate of depreciation of domestic currency.

As an alternative to assuming participants in international financial markets follow rational expectations, some researchers have adopted survey-based expectations to measure foreign exchange rate expectations. They use these to test uncovered interest parity. Their conclusion is that there is a substantial, systematic exchange risk premium that generates deviations from the uncovered interest parity condition. This also means that the value of the forward premium does not correspond to what the market anticipates the exchange rate will be in the future, at least as measured through surveys of market participants.

The research surveyed in Chapter 1 has a number of policy implications. The capital flows generated by covered and uncovered investments are massive and although they can provide substantial gains for the countries involved, they can also have deleterious effects. For instance, as the chapter explores, when the carry trade boom in the 2000s imploded with the sudden advent of the GFC, the consequences were not only massive losses for the participants but there were also serious repercussions for the economies involved. A number of countries — from

the United States to Iceland — were subject to disruptive capital outflows that increased the volatility of currency values, put additional stress on financial intermediaries and aggravated the crisis.

The chapter also shows how the slowdown of capital flows since the end of the GFC can be partly linked to the long-term repercussions of the collapse of international financial transactions during the crisis. Some countries have imposed capital controls as a means to reduce the possible consequences of the massive movement of capital in and out of their economies. But the effectiveness of such measures varies and they are often imposed instead of — or to postpone — needed monetary, fiscal, and exchange rate policies. Other policies have focused on the global banks that dominate international financial transactions. The credit flows generated by these banks are pro-cyclical and therefore can act to magnify the consequences of local or global economic and financial disturbances. Some have argued that there is a need for international coordination of monetary and banking policies and/or some type of globally-enforced set of financial regulations in order to minimize future global financial crises. But in the absence of such multi-lateral initiatives, emphasis has been placed on the macro-prudential regulation of global banks through policies imposed on the onshore banking system — such as countercyclical capital requirements, debt-to-income limits or restrictions on non-core liabilities, and short-term wholesale funding.

Chapter 2 by Swarnali Ahmed Hannan examines the determinants of international capital flows into emerging markets. More specifically, she studies whether these flows are driven by “push” or “pull” factors. The push factors are external conditions (or supply-side factors) that underpin the supply of global liquidity, and include variables like global risk aversion, global commodity prices, US economic growth, and US interest rates. On the other hand, pull factors are the domestic characteristics (or demand-side factors) that influence risks and returns to investors, and include domestic macroeconomic fundamentals, domestic policies, market imperfections, and domestic cyclical components like economic growth and interest rates in the country. Assessing the relative importance of push versus pull factors has serious implications for policymaking. If the causes are exogenous for the emerging market, then compensatory policies are appropriate while if the causes are predominantly domestic, then direct policy design is more desirable and effective.

As an example, consider the rise of capital flows to Latin America in the early 1990s. Early studies, such as those made by the IMF, concluded that domestic factors were the most important for these episodes, ranging from structural and fiscal policy changes to tightening of domestic credit market conditions. But later studies, such as those by Guillermo Calvo and his co-authors, concluded that external factors were more significant, including the sharp drop in US short-term

interest rates, the prolonged recession in the US, and other advanced economies, the decline in Latin America's terms of trade throughout the previous decade, which contributed toward the widening of Latin America's current account deficit and needed to be financed by inflows of capital, and, finally, the widespread adoption of regulatory reforms that decreased transaction costs in international financial markets.

But despite the historical focus on push versus pull, Chapter 2 shows that the recent research on this topic concludes that both push and pull factors are important in determining capital flows, with the relative importance of global as well as country-specific factors varying over time and contingent on the type of flow considered. For instance, capital flows into emerging markets in general can be triggered by external factors. But whether a particular country receives that surge depends on domestic factors such as external financing needs, capital account openness and the exchange rate regime. This was the case of the capital flows to emerging markets following what is known as the taper tantrum episode. This refers to the sharp reaction of markets, in terms of significant outflows across a large group of emerging markets, during the summer of 2013 when the Fed discussed the prospects for gradually unwinding its unconventional monetary policy. Although capital outflows indiscriminately faced many countries during the initial periods following the Fed's announcement, over time there was greater differentiation depending on the domestic characteristics of emerging markets.

The chapter identifies several areas for future research. One is to understand the cyclical versus structural factors responsible for capital flow movements to emerging markets. Second, more work is needed to understand the impact of external factors on FDI, particularly for mature emerging markets. Third, there is a need to understand how the drivers of capital flows can be different for advanced economies compared to emerging markets.

Risk-taking underlies most international investing, whether in the form of exchange rate risk, political risk, default risk, liquidity risk, etc. It is for this reason that indexes of potential market risk are constantly monitored by investors, whether those who wish to manage their portfolio risk or those who seek to profit from increased market volatility. Chapter 3 by Thomas Kostka examines one such index, the popular Volatility Index or VIX index. The VIX Index measures the market's expectations of near-term future stock market price volatility, as implied by the pricing of Standard & Poor's (S&P) 500 index options (SPX) offered by the Chicago Board Options Exchange. Index options are part of the financial derivatives options market. They give the holder of the option the right, but not the obligation, to buy or sell the value of an underlying index, in this case the S&P 500 index, at a stated exercise price on or before the expiration date of the option. The S&P 500 index is an index of the equity prices of 500 of the leading companies

in the US and, therefore, of overall US stock market prices. The prices of these index options are used by the VIX Index to calculate the implied expected market volatility in the near future because such volatility is a key factor in the valuing of these options, with greater expected market volatility raising the price of the option and *vice versa*. The VIX is quoted in percentage points and represents the expected range of movement in the S&P 500 index over the following year. For example, if the VIX is 15, this represents an expected annualized change of at the most 15% up or down on the S&P 500 index. The expected volatility range is a confidence interval of one standard deviation from the expected value of the VIX index in the future.

As Chapter 3 observes, the VIX has been increasingly used by market participants, policymakers and academics as a broader gauge of overall market volatility as well as global investor sentiment (e.g., as a general “fear index”). This was justified because of the high correlation of the VIX with other risky financial prices and volumes for many years, such as returns from FX carry trades and capital flows to emerging markets. More recently, however, Kostka shows that, despite considerable political uncertainty as well as various bouts of volatility in different other asset markets, the VIX has remained at relatively low levels and that the episodes of elevated VIX levels have become more short-lived. The chapter then moves on to explain why this has been the case, suggesting that benign macroeconomic developments as well as very accommodative monetary policies by the world’s central banks can lie behind the reduction in equity market volatility reflected in the more stable VIX index.

Chapter 3 compares the VIX Index with other measures of uncertainty, including economic policy uncertainty, macroeconomic uncertainty, volatility estimates from other asset classes, and a global financial factor of risky asset prices. It is shown that the VIX has recently decoupled from most of these measures. This reflects the fact that US equity prices and volatility over the recent past have remained unaffected by the turmoil in other asset classes and in other regions of the world as well as in the domestic and international political arenas. At the same time, macroeconomic uncertainty (forecast disagreement) has remained low overall, which might have had a dampening effect on the risk perception of equity investors.

Kostka concludes that since the VIX Index is a price-based measure of expected US equity market volatility, caution should be taken when using it as an indicator of general global financial stress or uncertainty. Composite indicators of financial market risk, such as the global risk factor, are better suited to gauge financial market uncertainty from an international and inter-asset perspective. A more thorough assessment of uncertainty should feature additional measures to the VIX Index, including indexes of macroeconomic and economic policy uncertainty.

The International Monetary System

The international monetary system involves the set of conventions, rules, procedures, and institutions that govern financial and monetary relations across countries. Many such arrangements have developed throughout history, from the Gold Standard first widely adopted in the 1870s to the Bretton Woods system that prevailed after World War II and until the early 1970s.

Chapter 4 by Arvid J. Lukauskas traces the history and political economy of global monetary affairs and develops a framework for explaining the basic features and evolution of the international monetary system. The chapter examines three major questions: (1) What are the elements of a functioning international monetary system? (2) What is needed for a stable monetary system to emerge? (3) How do states handle the tradeoffs identified by what scholars have called the “inconsistent trinity”?

In terms of the first question, Lukauskas identifies three key elements. First, the monetary system must possess a mechanism for managing the level of *liquidity*. A system that is awash in liquidity runs the risk of generating inflation, whereas a lack of liquidity can result in low growth and deflation. Second, the system needs a means of *adjustment* of balance of payments disequilibria. Adjustment can occur through three means: (1) exchange rate depreciation (for a balance of payments — BoP — deficit) or appreciation (BoP surplus); (2) contraction (BoP deficit) or expansion (surplus) of national economies; and (3) capital controls (e.g., rationing foreign exchange to limit imports). A means of adjustment is critical because nations cannot sustain large imbalances indefinitely (unless perhaps the country is the international economy’s leading state — for example, the United States currently). Moreover, the ability to resolve imbalances is important for the smooth functioning of the international financial and trading system. Large imbalances can lead to capital flows that may prove destabilizing; the US financial crisis, for instance, was exacerbated by huge capital inflows that fed speculative investments. Third, there must be *confidence* in the rules and unit of account of the system. The majority of states have to believe that the rules are well designed and legitimate (in the sense that they do not favor some states at the expense of others). Confidence in the unit of account mainly hinges on the perceived stability and value of the international money used.

In answering the second question above, Lukauskas observes that achieving stability in an international monetary system requires some degree of cooperation among its members. Such cooperation is not automatic, as various states have their own interests which may clash with those of other countries. One way to achieve stability, some economic historians have argued, is by the presence of a hegemonic state (a country with a preponderance of economic and possibly military power) that imposes the key elements of a stable monetary order. But others believe that

a stable international monetary system requires active cooperation of its member countries.

The third key element of an international monetary system is the need to manage the tradeoffs imposed by the so-called “unholy” or “inconsistent trinity” postulated by economists Robert Mundell and Marcus Fleming. They demonstrated that states can achieve only *two* of the following *three* policy goals: an open capital account; a fixed exchange rate; an independent monetary policy oriented toward domestic objectives.

Chapter 4 details how various international monetary regimes have different combinations of elements to manage liquidity, adjustment of balance of payments disequilibria, and confidence while achieving the levels of cooperation needed for stability and the policies required to deal with the impossible trinity. Each system has been able to undertake these goals under the constraints established by the era’s underlying political trends, the prevailing trade and financial linkages among countries, and existing economic and technological forces.

The chapter examines four major periods in the history of the international monetary system: (1) The Gold/Sterling Standard: 1875–World War I; (2) the Gold Exchange Standard in the interwar period; (3) Bretton Woods, 1944–1971; and (4) Floating Exchange Rates, 1973–present. Learning the history and political economy of these systems provides key insights into contemporary affairs as international monetary arrangements have emerged incrementally and one cannot fully comprehend today’s monetary relations without knowing the past. Moreover, ineffective institutions, rules, and national policies — even if disguised as new — have parallels in the past and the evidence from the past should inform us in order to avoid repeating the past’s mistakes. The chapter emphasizes these insights by examining two contemporary issues that illustrate the value of understanding past experience: the continuing controversy over floating rates versus currency pegs and the rise of potential challengers to the US dollar.

Chapter 5 by George K. Zestos and Jason M. Benedict focuses its attention on one particular international monetary regime: the European Monetary Union. On January 1999, 11 European Union (EU) member countries replaced their national currencies with a single currency, the euro, and a single monetary authority, the European Central Bank (ECB). Over time, this common currency area has grown to incorporate 19 members of the EU and the euro is now the second most important global currency next only to the dollar.

The Eurozone economy performed well for almost a decade; its real Gross Domestic Product (GDP) grew at a relatively low but steady growth rate. Additionally, the inflation rate among the original Eurozone members converged toward a low inflation rate, which was the mission of the ECB. Since 2008–2009, however, the Eurozone has experienced a prolonged recession that seriously

challenges both the monetary union and the overall European economic integration initiative.

Chapter 5 presents a historical background to the events that led a group of European countries to pursue monetary and economic integration, including (1) the creation of a common market and the Europe 1992 trade and investment integration initiative, (2) the European Monetary System (EMS) and the Exchange Rate Mechanism (ERM), which restricted exchange rate fluctuations among European countries, (3) the Maastricht Treaty, which established convergence criteria that candidate countries to the EMU needed to satisfy, and (4) the Stability and Growth Pact, which required member countries to maintain their public deficit to GDP ratio below 3% and their external debt-to-GDP ratio below 60% (these requirements were watered down in 2005 and later unenforced).

The EMU was anticipated to have a substantial positive impact on long-run economic growth due to its potential effects on reducing transaction costs and increasing trade among the members of the union, as well as by inducing greater macroeconomic stability through the pursuit of a credible, low-inflation monetary policy. On both accounts the EMU appears to have been successful.

But despite the benefits of creating a monetary union, Zestos and Benedict point out that there were also potential dangers attached to such regimes, especially if certain preconditions did not exist or if certain institutions were not created at the same time as the common currency. One of the key difficulties of a monetary union is that if the member countries are economically dissimilar or have specialized in different sectors of production, a common currency — by preventing exchange rate adjustments — would make it more difficult to adjust to economic disturbances. Factor mobility can diminish this problem as it can act as a substitute for exchange rate changes in generating economic adjustments within a monetary union. But although capital mobility increased as part of the European integration project, labor mobility has been much slower to develop.

Another alternative path is to adopt a union-wide fiscal policy that targets countries or regions within the common currency area suffering from local recession. Such a policy mechanism is what the United States has. The US federal government has a variety of programs that transfer resources to various states and local governments, depending on their economic situation. These regional countercyclical fiscal policies allow a currency union to counteract the impact of asymmetric shocks. But this requires that the monetary union be accompanied by a fiscal union as well, which did not happen — and still has not happened — in the EMU.

The missing pieces in the EMU that economists had previously suggested were necessary for a common currency union to function effectively came to the surface in the aftermath of the US subprime mortgage crisis of 2007–2008. The GFC

generated a major asymmetric shock to the Eurozone as it had a deeper impact on those members that were lagging in international competitiveness, like Spain, and/or that had accumulated excessive public debt-to-GDP ratios, such as Greece. Over time, Greece, Ireland, Portugal, Spain, and Cyprus fell into serious financial crises and had to implement bailout programs organized by the EU and the IMF.

Recovery from the Eurozone economic crisis has been slow and it has generated enormous stress on the political systems of its member countries. Zestos and Benedict suggest that one of the main reasons that the crisis has lasted so long is that EU countries enacted contractionary policies to deal with rising budget deficits and sovereign debt. Fiscal austerity was the word of the day in the EU, unlike the US, which had launched extraordinary expansionary fiscal policies that helped it expedite its recovery. The absence of an EU-wide fiscal authority that could act as a countercyclical force against the economic downturn aggravated the problem. The ECB was also slow to implement expansionary monetary policies, in contrast again to the US, where the Fed implemented immediate, massive conventional and unconventional expansionary monetary policies. The stated mission of the ECB to control inflation led to a slow reaction to the crisis, as fears of inflation prevented it from being more proactive in seeking to counter the growing recession with expansionary monetary policy.

Chapter 6 by Kuk Mo Jung presents a detailed examination of the determinants of central bank foreign exchange reserves. The world economy has witnessed an unprecedented increase in the holdings of these reserve assets, especially by developing countries, since the late 1990s. For instance, emerging economies' share of global foreign exchange reserves has more than tripled, from about 20% to 70%, between 1990 and 2016. The growth rate itself has also accelerated since 2000, with reserves growing on average by more than 20% per year. The upward trend for China's reserve holdings was particularly exceptional. From 2001 to January 2019, the international reserves held by China grew from 168 billion to over \$3 trillion.

This chapter examines the costs and benefits of holding international reserves and provides empirical evidence on its various determinants. In terms of costs, an accumulation of foreign exchange reserves, which are often invested in liquid assets with low rates of return, represents substantial opportunity costs for a country. Furthermore, central banks usually sterilize their purchases of foreign reserve assets by issuing domestic bonds in order to avoid an expansion of the domestic money supply, which could ignite inflation. But the difference between the rate of return on international reserves and the return on sterilized bonds has been increasingly negative for many emerging economies since the late 1990s. The upsurge in the level of reserve holdings means that the cost of holding international reserves for developing countries has been tremendous.

The logical question, posed by Professor Jung, is why have so many developing countries continued increasing their reserve assets in spite of the rising costs? The answer, he suggests, must lie in the benefits central banks perceive the reserves provide them with. He postulates three main reasons for the accumulation of international reserves and examines their theoretical basis and the empirical evidence supporting them.

The first one is basically about precautionary saving against possible external shocks. This motive got particularly popular in the aftermath of the late 1990s East Asian financial crisis. During the latter, many emerging Asian economies experienced a so-called “sudden stop” episode in which capital inflows suddenly dropped. In turn, access to foreign financing also suddenly got blocked, which eventually caused catastrophic macroeconomic consequences. In light of this devastation, many emerging economies adopted a reserve asset management policy aiming to overstock their reserves as a way to buildup an ample war chest of international liquidity.

The second explanation focuses on a “mercantilist motive.” According to this view, the reserve buildup is a direct consequence of industrial policies aiming to achieve undervalued currencies, and therefore, to promote export industries.

The third category posed by Jung for the accumulation of reserves is relatively new and revolves largely around various financial frictions. One hypothesis is that international reserves held by central banks act as an implicit insurance for private sectors of the economy against possible future credit constraints. Another is that domestic financial sectors within emerging economies are so vulnerable to capital outflows by local residents that the central bank has motives to accumulate foreign reserve assets to counteract such outflows. Yet another possible reason for the growth of international reserves lies in the growth of foreign capital inflows in emerging markets occurring through over-the-counter (OTC) markets, such as private equity funds, emerging market debts, etc. International reserves could effectively serve as aggregate liquidity or collateral to facilitate these foreign capital inflows into emerging economies.

Chapter 6 examines the evidence on the various factors that might explain the growth in the demand for international reserve. The literature has produced a large amount of quantitative studies. However, the evidence is mixed. To some extent, this is neither too surprising nor disappointing since no consensus yet exists concerning the relative importance of reserve determinants, and the central bank's objectives may differ greatly across different nations. To sum up, the appropriateness or the optimality of reserve holdings still remains a largely open question.

The chapter concludes by posing a number of additional open questions on the behavior of central banks regarding international reserves. One question is why the upsurge in international reserve holdings has not extended into developed economies except for Japan and Switzerland? Why are Japan and Switzerland so eager to accumulate foreign reserves as opposed to other developed countries such as Germany? Another question has to do with the aftermath of the GFC in 2008. Some have argued that the GFC acts as a structural break point for emerging economies' reserve hoarding behavior. They point that after the GFC big reserve asset holders like China and South Korea actually never lifted up their reserves/GDP ratio to the pre-crisis level, but instead showed their preferences toward using different policy tools such as sovereign wealth funds (SWF), currency swaps, and macroprudential regulations in dealing with potential external shocks. If indeed this change becomes common among other developing countries, consequences for the future global monetary system may loom large. Related to this issue, another important question is about the international dimension of emerging economies' reserve hoarding behavior. Does too much reserve accumulation by the developing world pose a threat to the world? If so, is international cooperation needed?

Chapter 7 by Yin-Wong Cheung and Kon S. Lai provides a detailed analysis of the economics of China's currency, the renminbi (RMB). China's foreign exchange policy has undergone many changes and has kept evolving since the creation of the RMB. The evolution of its exchange rate system is a good reflection of how China as an economy has developed. The country has become the largest trading nation and also the largest foreign exchange reserves holder in the world. In addition, the RMB is the first emerging market currency included in the IMF's Special Drawing Rights (SDRs) currency basket, which includes the US dollar, the euro, the Japanese yen, and the British pound.

To understand the significance of China's recent changes in exchange rate policy and its push to internationalize the RMB, Chapter 7 provides some historical background, including a discussion of the period between 1949 and 1978, before economy-wide market and economic reforms were first introduced; the initial reform period (1979–1993) when currency reforms were shaped by the export growth policies adopted by the government; the transitional reform period (1993–2005), that was characterized by a *de facto* peg of the RMB to the dollar; and the current regime (2005–present), where more exchange rate flexibility has been adopted. The chapter discusses the most recent reforms and challenges facing the current exchange rate system, including the topic of whether the RMB currency values have been misaligned (overvaluation or undervaluation), the use of sterilization and the management of monetary policy in the face of heavy intervention in foreign exchange markets, and the growing internationalization of the RMB.

Assessments and predictions about the future potential of the RMB as an international currency and whether it could eventually overtake the dollar has been proliferating in recent years. Some have evaluated whether the RMB will rise based on comparison with other historical precedents, including the rise of the dollar from 1913 to 1945, the rise of the German mark from 1973 to 1990, and the rise of the yen from 1984 to 1991. Cheung and Lai review in the chapter China's efforts to reduce capital controls in the pursuit of RMB internationalization. They conclude that China has made many significant moves in reforming its foreign exchange policy and liberalizing its financial markets and this helps in promoting the international use of the RMB, but their full effects have yet to be seen. China did reach a milestone in 2016 when the RMB was added to the IMF's SDR currency basket. The RMB has a weight of 10.92% in the new SDR basket, compared to 41.73% for the dollar, 30.93% for the euro, 8.09% for the pound, and 8.33% for the yen. The RMB's SDR inclusion will have a positive long-term effect on the demand for the Chinese currency.

But the authors note that despite the SDR inclusion, the process of RMB internationalization appears to have stalled amid concerns over China's economic slowdown, increased exchange rate volatility, and tighter capital controls. They do believe, however, that the recent decline in RMB usage for cross-border payments is likely to be just a bump in the road and they discuss several factors that support continuing long-run internationalization of the RMB. First, central banks around the world show a growing interest in adjusting the composition of their foreign exchange reserves to include more RMB holdings. Second, new offshore RMB clearing centers will be opened, increasing cross-border RMB payment flows across the globe. Third, China's ongoing Belt and Road initiative promises to create new market opportunities for trade and direct investment that are likely to boost the use of the RMB for trade, financing, and investment purposes. Fourth, China's continuing efforts to open up its financial markets and increasing market participation of foreign investors — including the opening of the bond market to foreign investors — will substantially elevate the use of RMB for settling cross-border investment transactions. Fifth, China's Cross-border Interbank Payment System (CIPS) — the new real-time clearing and settlement system for the RMB — can greatly improve the speed and lower the cost for processing cross-border RMB payments.

Macroeconomic Policies in the Open Economy

The field of international macroeconomics deals with the macroeconomic aspects of economies that trade with each other. One reason for studying open-economy macroeconomics is that openness alters the impact of macroeconomic policies.

When interest rates and financial markets as well as production and employment are closely interlinked globally, the issues of how government policies are transmitted internationally and their spillover effects into foreign economies become critical.

Chapter 8 by Stanley Fischer, the Former Vice-Chairman of the Federal Reserve Board, discusses the details of global policy interdependence by showing the various mechanisms through which US monetary policy affects the global economy and how foreign economic events influence US monetary policy.

The chapter begins by examining how foreign policy developments influence the American economy. The US is affected significantly by foreign developments through both trade and financial channels. Given that about one-eighth of the goods and services produced in the United States are exported, a sizable component of US aggregate demand depends on foreign consumption and investment decisions, and hence ultimately on the economic health of foreign economies. In addition, the high degree of interconnectedness between domestic and foreign financial intermediaries — banks, the non-bank financial sector, and insurers, among others — means that developments in foreign financial markets tend to reverberate quickly back to the United States, including through changes in asset prices and risk tolerance. For instance, the euro-area sovereign debt crisis that occurred from 2011 to 2012 led to a pronounced tightening of US financial conditions, showing how foreign financial developments can affect the US.

Fischer then turns to showing how US monetary policies affect the rest of the world. Given the importance of the United States in international trade and in the global financial system, the monetary policy actions of the Federal Reserve have a significant influence on the global economy through a wide range of trade and financial channels. Foreign economies were affected when the Fed engaged in unconventional monetary policy stimulus a few years ago and will likely experience some effects of the Fed's ongoing normalization of policy.

One popular point of view examined in Chapter 8 is that the large-scale asset purchases by the Fed, oriented to pulling the US out of recession, had a beggar-thy-neighbor effect by putting downward pressure on the dollar and thus hurting America's trading partners. But Fischer's reading of the evidence is that, overall, Federal Reserve policies during that period probably boosted foreign economic output. It is indeed likely that the depreciation of the dollar that accompanied US asset purchases and forward guidance reduced foreign net exports and thus weighed negatively on foreign GDP through the exchange rate channel. However, the Fed's monetary policies also increased US domestic demand, a second key channel of transmission that operated to boost the net exports of America's foreign trading partners. Empirical estimates suggest that these countervailing effects roughly canceled each other out, on average, so that foreign net exports to the US

were not affected that much by the US expansionary policies. Moreover, since the American unconventional policies reduced global interest rates and boosted asset prices — another channel that tended to expand foreign as well as domestic demand — there was again a positive impact on the global economy. Finally, insofar as monetary easing contributed to a faster stabilization and recovery of the US economy, this benefited the global economy by mitigating a major source of downside risk, thus improving global risk sentiment and confidence.

But Fischer also notes that despite the evidence that the overall impact of American expansionary monetary policies on foreign economies has not been negative, as some have argued, there is also considerable variation in how Fed policy actions — whether easing or tightening — affect the output of different foreign economies. Economies with more open capital accounts and that keep their exchange rate relatively stable against the dollar should experience larger positive effects on their GDP of an expansionary Fed monetary policy action. The larger positive spillovers reflect the fact that these countries' own interest rates move more in lockstep with US interest rates, while the effects on their traded goods sector from the exchange rate channel are smaller. Conversely, spillovers from US policy actions tend to be smaller for economies that have flexible exchange rates and adjust their policy rates based on domestic conditions; or, alternatively, for economies with less open capital accounts such as China.

Chapter 8 concludes with a discussion of the more recent tightening of monetary policy in the US. Fischer focuses on how this tightening affected foreign economies. In 2013, the Fed announced that it would no longer be purchasing bonds under the quantitative easing policies it had adopted earlier. This tapering of bond purchases caused what has been referred to as a “taper tantrum” in global bond markets, with bond yields rising sharply. Indeed, the large increase in US bond yields precipitated a nearly commensurate rise in interest rates in many foreign economies and caused the prices of risky assets to fall globally. Emerging markets with weak fundamentals experienced sharp capital outflows, an abrupt tightening of financial conditions, and large currency depreciations. Many have interpreted this episode as showing how monetary tightening by the Federal Reserve can exert a strong contractionary effect on America's foreign trading partners through its effect on global financial conditions, just as the high level of Fed accommodation after the financial crisis provided a net boost to the global economy.

On the other hand, Fischer points out, the foreign developments associated with the “taper tantrum” fed back on the US economy. He points out that the prospect of a gradual normalization of US monetary policy — and slow foreign growth — contributed to a large appreciation of the dollar since mid-2014, with the real effective exchange value of the dollar rising around 17%. The sizable

appreciation of the dollar caused a substantial drag on US exports that then subtracted from American economic growth and was a factor keeping inflation well below the Federal Open Market Committee's (FOMC) 2% goal. These developments influenced the FOMC's decisions to maintain a very accommodative monetary policy, longer than members of the FOMC had expected in 2014 and through the end of 2015.

Chapter 9 by Joseph E. Gagnon examines one major source of global macro-economic stress: the sustained massive current account imbalances that have plagued the world in the last two decades. In October 2018, the world regions with significant current account balance deficits included North Africa with a 4.9% current account balance deficit as a percentage of GDP, Sub-Saharan Africa with a 3.6% deficit as a percentage of GDP, North America with a 2.9% deficit, and South Asia with a 2.8% deficit. On the other side, the regions with significant current account balance surpluses were the Middle East with a 4.5% surplus relative to GDP, Western Europe with a 2.9% surplus, and East Asia, with a 2.1% surplus. Sustained current account balance deficits generate concern among macroeconomists as countries must pay for them and this usually involves an accumulation of external debt. At some point, the growth of debt payments — principal plus interest — can become unsustainable and can then lead to financial and economic crisis. At current levels, global current account imbalances will push the net debt of deficit countries gradually toward unprecedented and unsustainable levels. Furthermore, the domestic political consequences of persistent trade deficits are already evident in both the United States and the United Kingdom, having contributed importantly to the election of Donald Trump and the outcome of the Brexit referendum.

As Gagnon points out, since the Pittsburgh Summit of September 2009, the leaders of the G20 nations have agreed to “promote more balanced current accounts.” And although global current account imbalances did narrow somewhat in the immediate aftermath of the GFC of 2008, they have remained broadly constant since about 2010 in relation to national economies. Surpluses in China and some commodity exporters have narrowed, but surpluses in the euro area and some Asian economies have grown. Deficits in the United States and the United Kingdom have roughly remained the same.

Chapter 9 examines the extent to which government policies are responsible for current account imbalances and, by implication, the extent to which such policies might be used to achieve the G20 goal of reducing imbalances. There are two broad approaches to modeling the determinants of current account balances. The first focuses on proximate causes, in which trade flows respond to exchange rates and aggregate demand or output. However, exchange rates and output themselves respond endogenously to trade shocks. A second approach focuses on medium term, relatively exogenous factors, such as demographics, natural resources, and

policy stances. This chapter follows a mixed approach, as developed in the recent literature. This methodology adds measures of a country's exchange rate policy (based on its official purchases of foreign assets) to a set of medium-term policy and economic determinants of current account imbalances, while seeking through econometric methods to ensure that the causal effects of these variables are correctly identified.

One of the key issues examined in the analysis carried out in this chapter is the extent to which government policies have a causal impact on the current account balance instead of the other way around. One can certainly postulate situations where the government engages in foreign exchange market intervention to counteract changes in the current account balance. To correct for this endogeneity, the empirical analysis employs a set of instrumental variables that reflect possible exogenous reasons why policymakers may choose to accumulate official assets and liabilities, including saving resource revenues for future generations, borrowing for economic development, and adopting economic growth strategies that rely on achieving higher net exports.

The chapter examines the causal impact of exchange rate and fiscal policies on current account imbalances. National income accounting indicates that — holding constant the balance of private national savings and investment — higher fiscal deficits (surpluses) will be associated with greater current account balance deficits (surpluses). There are also variables other than government policies that can affect the current account, including domestic GDP growth, foreign GDP growth, demographics associated with private sector savings behavior, etc. These variables were added to the empirical work as explanatory variables for the behavior of the current account.

The empirical evidence presented in Chapter 9 shows that both fiscal policy and foreign exchange intervention (net official flows and stocks) have important effects on current account balances. Fiscal surpluses and reserve accumulation tend to increase a country's current account balance. These findings are robust to alternative specifications, estimation techniques, and sample choices.

Because current accounts must balance out at the global level, factors that increase surpluses in some countries must increase deficits in other countries. As a result, reserve accumulation in some countries — such as China — has an especially large negative effect on the current account balances of reserve-issuing countries, mainly the United States and the euro area.

Gagnon concludes that G20 countries (and others) have the necessary tools to achieve their stated goal of narrowing current account imbalances. President Trump and some members of his administration have proposed using trade barriers to narrow the US current account (trade) deficit. The data show that trade barriers have very little effect on a country's trade balance. Fiscal policy and net

official flows are the policies that matter for trade balances. Increasing the fiscal deficit — which appears to be the case presently in the US — is likely to cause the trade deficit to widen.

Exchange Rates, Prices, and International Trade

The determinants of exchange rates and their impact on the economy have been topics of study in international monetary economics for centuries, leading to a number of approaches, including the popular and long-lasting purchasing power parity theory, the elasticities approach, the portfolio balance and monetary theories, Rudiger Dornbusch's overshooting model, the intertemporal-intergenerational approach, and the microstructure to foreign exchange markets perspective, among others.

In Chapter 10, James R. Lothian examines the theory and evidence on how exchange rates and prices are connected under fixed and flexible exchange rates. He focuses on analyzing the purchasing power parity theory of exchange rates (PPP). The theory offers a simple, empirically tractable explanation of exchange rate behavior under floating exchange rates and of international price behavior under fixed exchange rates. Professor Lothian outlines the history of economic thought on PPP, discussing three contributions to this literature, the first by the writers associated with the University of Salamanca in the 16th century, who were the first to posit the PPP relationship, the second by the Bullionists in 19th century Britain, as represented by John Wheatley, and the third by the American economist Irving Fisher at the turn of the last century.

At its simplest level, PPP states that prices in different countries when converted to the same currency should converge to each other. It is an application of the law of one price, not in the usual sense as applied to individual goods and securities, but on an aggregate level. Viewed solely from the latter perspective, PPP has given rise to a laundry list of reasons why aggregate price indices for different economies can differ from one another, such as changes in the relative prices of traded and non-traded goods, differences in the market baskets of goods in different countries and so forth. The interesting question, therefore, is why in light of these problems, PPP continues to be the most popular theory of exchange rates. Lothian observes that a second rationale for PPP — as a position of long-run monetary equilibrium — gives the approach a much more solid theoretical and empirical basis. Although the many forces suggesting deviations from PPP may be relevant to the short-run movement among equilibria, PPP theory remains germane in determining the long-run equilibria.

Chapter 10 presents evidence on the behavior of exchange rates and purchasing power parity across countries under floating rates and compares that behavior

with the one under fixed exchange rates, using long-run, historical data. The first body of evidence consists of annual data for the United States and a group of 21 other OECD countries during the period of 1995–2015. This analysis replicates an earlier study by Lothian and Simaan for the same group of countries over the period 1974–1994. The second body of evidence presented in the chapter data for the Netherlands and the UK spanning the ultra-long period of 1590–2010.

The empirical results presented in this chapter reinforce earlier studies that conclude the PPP relation provides a useful characterization of exchange rate and international price behavior over the long run, both during fixed and floating exchange rate regimes. These results are remarkable from two standpoints. The first is that PPP holds as well as it does over the exceedingly long and diverse periods studied and shows no signs of temporal instability. The second is the substantial similarity between the results under fixed and flexible exchange rates. If the two sets of scatter plots and regressions obtained from the two empirical studies in this chapter had been left unlabeled, a reader would have a hard time distinguishing between them, yet they come from such different bodies of data and from two very different time periods.

Professor Lothian concludes that the results presented in Chapter 10, confirming the validity of PPP in the long-run, have significant implications for how we think both about exchange rate behavior and about exchange rate systems in our theorizing and in our practical day-to-day analysis. It implies, for example, that theories that focus exclusively on the effects of real variables on exchange rates miss a major portion of the picture. It implies further that purchasing power parity as an equilibrium condition is an important constraint, one that cannot be ignored either by policymakers or the business community.

Chapter 11 by Mohsen Bahmani-Oskooee studies how exchange rate changes affect the trade balance. He observes that this has been a matter of controversy over the years. A simple-minded view would consider the impact quite clear: a domestic currency depreciation or devaluation, for instance, should make foreign goods relatively more expensive compared to domestic goods and lead consumers to switch from foreign to domestic products, spearheading an improvement of the trade balance. This is behind the thinking of many policymakers — from the administration of US President George W. Bush to that of President Donald Trump — who have argued that a depreciation of the yuan has made Chinese products more competitive relative to US goods, causing the huge American trade deficit with that country.

But, historically, Professor Bahmani-Oskooee notes there are many cases showing an apparent lack of influence of changes in currency values on the trade balance. For instance, during the breakdown of the international monetary system in 1971, when the US refused to convert dollars to gold, foreign countries began

dumping dollars in the foreign exchange markets causing the dollar to depreciate. However, the U.S. trade deficit continued to grow, raising concerns about the effectiveness of a depreciation or devaluation in improving the trade balance. More recently, there has been considerable skepticism about how the large exchange rate fluctuations of various currencies against the dollar have changed trade balances. For example, the dollar appreciated sharply against the Japanese yen, by close to 40%, between 2012 and 2017, yet this did not fuel a significant growth of exports from Japan to the United States. The *Financial Times* on 31 August 2015 asked whether the “benefits of depreciation on exports may have evaporated.”

One of the complexities involved in examining the impact of exchange rate changes on the trade balance involves the time behavior of exports and imports in response to changes in currency values. For instance, the lack of response of the US trade balance to the dollar depreciation after the breakdown of the Bretton Woods system was explained by some economists as originating in the fact that increasing exports and reducing imports may require an extended period of time. This means that the domestic trade balance may actually worsen in response to a currency depreciation in the short run, but it would improve over the long run. Since this response of the trade balance to a currency depreciation or devaluation over time (first declining and later expanding) resembles the letter J, it has been labeled the J-curve effect.

Chapter 11 provides an analysis of the theory and evidence on the J-curve and the effects of changes in exchange rates on the trade balance over the short and long run. The chapter begins by postulating the factors that may explain the J-curve effect, including slow pass-through of exchange rate changes to prices, and adjustment lags — such as recognition, decision, delivery, replacement, and production lags.

The empirical literature on the J-curve effect has expanded dramatically over the years. Chapter 11 reviews the recent econometric methods that are being used to study the intricate patterns of adjustment of exports and imports over time to changes in currency values. One issue that has been examined recently is whether there is an asymmetric response to exchange rate changes, that is, when a currency depreciation may have favorable long-run effects but a currency appreciation may not (or the other way around). The chapter concludes by presenting the results of Professor Bahmani-Oskooee’s own analysis, applying the latest time series econometric methods to the case study of the bilateral trade balance between the US and China. Although support for the J-curve effect is obtained, in both linear and non-linear models, the effects are found to be asymmetric in the short run.

Chapter 12 by Walid Ben Omrane, Tanseli Savaser, and Xinyao Zhou examines how exchange rates respond to news and announcements. As they point out, it is

well known that currency values respond immediately to a variety of news involving political and economic events. For instance, as the referendum results approving the exit of the UK from the European Union (Brexit) on 23 June 2016 started to emerge, the value of the British pound experienced its largest intra-day collapse in 30 years. In another example, President Donald Trump's announcement in May 2018 that it would impose tariffs on the imports of aluminum and steel from Mexico and Canada had a brusque immediate negative impact on the value of the Mexican peso and the Canadian dollar relative to the US dollar.

Why and in what way news and announcements affect exchange rates? As Chapter 12 discusses, this question is related to the more fundamental matter of which economic variables affect short-term exchange rate changes. Macroeconomic theory has established a rich set of factors linking key economic variables to exchange rates. For instance, increased economic activity — such as GDP growth — is expected to cause a domestic currency appreciation because it tends to increase the demand for domestic money (according to the monetary approach to exchange rate changes), generate capital inflows that raise the demand for domestic currency (according to the Mundell–Fleming model), or through other mechanisms. And indeed, a number of econometric studies find that favorable US growth news tends to generate dollar appreciation.

Chapter 12 studies specifically how announcements regarding the trade balance affect currency values in the US and Europe. In the US, for example, news about the US trade and current account balances are generated by the Bureau of Economic Analysis (BEA) and the Bureau of the Census on or about the 15th of each month at 8:30 am Eastern Standard Time. They tend to generate significant activity in foreign exchange markets (by the way, so do also the employment reports released by the Bureau of Labor Statistics of the US Department of Labor, Gross GDP announcements made by the BEA, retail sales estimates, and others).

At the theory level, the direction of the impact of trade balance news on exchange rates can vary depending on the economic environment. Typically, a larger than expected trade deficit announcement tends to depreciate the currency. This is especially the case if the news of larger deficits is perceived as a signal that the country's current account is on an unsustainable path at current asset prices. On the other hand, trade deficits often rise when the economy is growing at a faster pace. In this case, rather than signaling unsustainable imbalances, an unexpectedly large current account deficit might be an equilibrium response as domestic residents smooth their consumption by borrowing from abroad in anticipation of higher future income. The signal of a surging economy may then result in a domestic currency appreciation. That is, bad news about the trade balance position can be good news for (i.e., appreciate) the nominal exchange rate. Consequently,

the literature suggests that the direction of the exchange rate response to trade balance news depends on the investors' perception about the economy over time.

Omrane, Savaser, and Zhou use intraday exchange rate changes to investigate how currency markets react to the announcement of news related to US and European trade balance positions between 2004 and 2014. The chapter examines whether the currency market's response to trade balance news varies over time and whether the magnitude of the reaction depends on the origin of the news. To conduct the analysis, the authors use the five-minute euro-dollar returns and estimate the magnitude of the contemporaneous return response to the surprise component of the US and European trade balance news. The empirical framework first assumes that this relationship is stable over time and then relaxes this assumption to allow for time-variance in exchange rate reaction to news. Finally, the potential factors that may contribute to the time-variance in exchange rate reaction to news are examined using a regression framework.

The empirical results presented in this chapter show that US trade balance news have a significant impact on the euro-dollar exchange rate over the sample period considered. On average, the authors find that a one standard deviation surprise decrease in the US trade balance position (i.e., a larger than expected deficit) depreciates the dollar against the euro by about five basis points. Contrary to the strong reaction to US trade balance announcements, European trade news has a more modest impact on the euro-dollar exchange rate. The authors consider German, Italian, and French trade balance news. Among these announcements, only the German trade balance news is associated with a statistically significant impact. In addition, the results highlight the dynamic nature of the relationship between trade balance news and exchange rates. In particular, the findings suggest that, during periods of elevated risk and significant monetary policy changes, traditionally stable relationships between macroeconomic fundamentals and exchange rates weaken significantly.