PHILIPP HARMS

International Macroeconomics 2nd edition



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Philipp Harms

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To Juli and Leo

Preface

Motivation

Several considerations motivated me to write this book. First and foremost, it was the hope that I could reduce the gap between existing textbooks at the advanced bachelors or masters level and current research in international macro-economics.

Against the backdrop of economic globalization, the field of international macroeconomics has developed rapidly in recent years. This development was driven by the need to address new questions emerging from a changing economic environment, but it also reflects the new orientation of macroeconomics - most notably its stronger reliance on microeconomic concepts and methods. Integrating the microeconomic focus on individual optimization into the macroeconomic analysis of national and international aggregates has turned out to be extremely productive during the past decades: first, arguing in the spirit of the "New Neoclassical Synthesis" allows researchers to clearly identify the frictions that are responsible for the frequent deviation of observed economic outcomes from socially desirable equilibria. Second, such an approach makes it possible to thoroughly describe the role of consumers' and firms' expectations in shaping the behavior of macroeconomic aggregates. Finally, the specification of a clearly defined objective function enables researchers and policymakers to assess the normative implications of alternative policy measures and institutions.

The goal of this book is to build upon the recent developments in economic analysis as outlined above, and to present a coherent theoretical framework that can be used to address a large set of issues in the field of international macroeconomics. Presenting the core ingredients of dynamic general equilibrium models used in research and policy analysis, it nevertheless aims at making the presented concepts and methods digestible to an audience of advanced bachelor and master students. Moreover, it will highlight the policy-relevance of the formal approaches it presents, and it will juxtapose the most important theoretical insights with the available empirical evidence. Readers will thus be guided through the key concepts and methods of modern international macroeconomics, they will be enabled to critically appreciate both the contributions and the deficits of existing approaches, and they will learn to address relevant questions at the national or firm level in a rigorous and transparent fashion.

On the Second Edition

The decision to publish the second edition of this book in English, whereas the first edition was written in German, mirrors the fact that globalization not only influences individual decisions at the household, firm and government level as well as the conduct of academic research, but also the composition and ambition of academic audiences: nowadays, a growing number of courses are taught in English even in non-English speaking countries – often because they target an international group of students who use English as their "lingua franca". The transition from "Internationale Makroökonomik" to "International Macroeconomics" intends to reflect this development.

What was originally meant to be a mere translation with a few adjustments eventually turned out to be a major overhaul. In fact, while the basic structure of the first edition has been preserved, large parts of the text have been completely re-written. This is for several reasons: first, some things have simply changed - e.g. the rules underlying the balance of payments. These were redefined in the context of the sixth edition of the Balance of Payments and International Investment Position Manual, and a thorough revision of the previous text was necessary to account for these developments in order to provide readers with accurate and reliable information. Second, the roughly eight years since the publication of the first edition have seen dramatic changes not only in the economic environment, but also in the way both researchers and policymakers interpret the world and develop practical conclusions. While some of the discussions on the "Global Financial Crisis" and the "European Debt Crisis" are still ongoing, a textbook in international macroeconomics must give justice to the practical and intellectual implications of these events. In Chapter I, I will describe in more detail how this insight has shaped the contents of this book.

On a more technical level, the second edition allowed me to update the data material presented in this book. Moreover, my recent experience in teaching – both at Johannes Gutenberg University Mainz and at the Study Center Gerzensee – suggested that some concepts could (and should) be presented in a sharper and more coherent way. Finally, working on a second edition provided me with an opportunity to eliminate the errors that had been overlooked in the original version. While I am fully aware of the fact that new mistakes may have slipped into the text despite several rounds of proofreading, I do hope that the difference between errors removed and errors inserted is positive.

Audience

This book is written for students at the advanced bachelor or early master level in economics or management programs. Its focus on relevant policy questions and the rich data material presented also make it recommendable to practitioners in policy institutions and business. To fully benefit from the text, readers need a basic knowledge of algebra as well as microeconomics and macroeconomics.

Other Textbooks

The goal of this book is to guide readers towards the current frontier of research in international macroeconomics. At the same time, formal concepts and analytical methods have been simplified wherever possible, and the presentation is meant to have a strong focus on real-world phenomena and problems of practical relevance. I tried to bridge the gap between typical undergraduate texts in international economics or international finance – such as Krugman, Melitz and Obstfeld (2014), Solnik and McLeavey (2013), or van Marrewijk (2012) – and books such as Turnovsky (1997), Mark (2001) or Vegh (2013), which address more advanced students in economics and put a stronger emphasis on methodological issues.

Every new textbook in international macroeconomics is necessarily inspired by the groundbreaking work of Obstfeld and Rogoff (1996). The present book adopts their focus on the intertemporal approach to the analysis of open economies, which is based on spelling out the dynamic optimization problems underlying individuals' and firms' decisions. However, it is less ambitious in terms of formal methods while devoting more space to the discussion of empirical phenomena and to economic policy applications. Moreover, it covers some of the progress in research that has been made during the past two decades and addresses the lessons to be learned from the recent financial crises.

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Finally, I am indebted to my beloved wife Claudia who consistently supported me in this project, and to my sons Leonard and Julian who are a constant reminder of the fact that a favorable economic environment is a necessary, but by no means sufficient, condition for living a full and happy life.

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Chapter I

Introduction

I.1 Motivation

Over the last decades, the integration of global goods, services and capital markets has proceeded rapidly. As documented by Figure 1.1, the volume of global trade – measured as the total value of goods and services exports – amounted to 30 percent of global Gross Domestic Product (GDP) in 2014, substantially exceeding the level observed in 1970.



Figure 1.1 : The evolution of world trade. Sum of national exports of goods and services relative to global Gross Domestic Product (in percent). Source: World Bank (World Development Indicators).

The integration of *international capital markets* occurred at an even quicker pace. Figure 1.2 shows that in 2011 the value of countries' external assets and liabilities relative to their GDP was eight times higher than in 1970.

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Figure 1.2 : The evolution of financial globalization (sum of countries' external assets and liabilities relative to global GDP, in percent). Source: Updated and extended version of the dataset constructed by Lane and Milesi-Ferretti (2007).

While the "*Global Financial Crisis*" of 2008 and the subsequent "*Great Trade Collapse*" are clearly discernible in these time series, the two graphs also illustrate that both the value of countries' external assets and liabilities and the volume of goods and services trade have recovered from these dramatic contractions.

There are many causes that explain the expansion of cross-border activities that could be observed in the 1990s and early 2000s and whose various aspects are often summarized under the term "*economic globalization*": after the failure of planned economies in Central and Eastern Europe and the start of fundamental economic reforms in India and China, large countries that had been isolated for decades in the 20th century became integrated into global markets for goods, services and assets. At the same time, the world experienced a rapid deregulation of international trade and capital flows. And, finally, a set of technological innovations – most notably, the internet – substantially reduced both trade costs and the costs of retrieving and transmitting information, thus facilitating international transactions.

The pace at which the process of economic globalization advances may have slowed down in recent years. However, it is still true that there are few aspects of economic activity which are not affected by the international environment. This applies to the conduct of economic policy, whose scope is substantially shaped by macroeconomic interdependencies, but also to individual householdand firm-level decisions, which are often affected by the evolution of exchange rates, access to financial markets, and global business cycle conditions. The experience of the past decades illustrates the income and welfare gains that potentially result from the integration of international goods and capital markets, but they also highlight the distributional conflicts and the vulnerability to crises that are associated with the rapid advance of globalization.

The goal of this book is to contribute to a better understanding of these developments by introducing readers to the arguments that are brought forward in academic and policy discussions on international macroeconomic issues, and by presenting the formal concepts and methods that are used to structure these discussions. After reading this book, readers should be in a position to interpret developments on international goods and capital markets, to assess the consequences of these developments for both economic policy and firm-level decisions, and to evaluate the normative implications of economic globalization.

I.2 International Macroeconomics in Times of Crises

When the first edition of this book went into print in the summer of 2008, signs of increasing financial stress were already visible both in the United States and in Europe. However, at that time few economists anticipated the turmoil on capital markets which started to unfold in September 2008, and which eventually resulted in the worst recession that many countries experienced after the Second World War. Even fewer economists expected that, less than three years after 2008, the Greek government would be forced to renege on its debt and that the Euro area would be on the brink of dissolution.

The "*Global Financial Crisis*" and the "*European Debt Crisis*" have heavily influenced economic reasoning in the past years, and the need to account for recent developments in the theory and application of international macroeconomics is one of the motivations for this book's second edition. While the basic structure of the book has been preserved – in particular, its focus on dynamic models of the open economy with explicit microeconomic foundations – the revised text has absorbed some of the lessons learned from those crises. These lessons include, *inter alia*, a reduced trust in the efficiency of financial markets, a less optimistic perspective on the benefits of international capital flows, a redefinition of imperatives and taboos in monetary policy, and a reappraisal of fiscal policy as a tool of active stabilization policy. Finally, the different crises have exposed the substantial distributional conflicts that are associated with the

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rapid advance of economic globalization, and it would be naïve to ignore the serious political consequences resulting from these conflicts.

As a reaction to the Global Financial Crisis, some prominent economists argued that the paradigm of "*Dynamic Stochastic General Equilibrium (DSGE)*" models, which had been shaping macroeconomic thinking for almost two decades, had run its course, and that it was time to replace this framework with models which did not rely on the assumptions of rational optimization and frictionless markets.¹ Regarding that debate, this book takes a middle ground: while it sticks to the principle of modeling macroeconomic variables as being driven by individuals' and firms' rational decisions, it acknowledges and repeatedly refers to the serious institutional defects and informational frictions prevailing on financial markets and the non-trivial distributional implications of financial globalization.

These novel developments and reappraisals will not be presented in a separate chapter. Instead, they will surface in various parts of the text, sometimes superseding the old exposition, sometimes adding a new perspective or new observations. In Chapter II, we will touch upon the consequences of the Global Financial Crisis when considering the importance of valuation effects for countries' net international investment position. The distributional effects of financial globalization will be discussed repeatedly in Chapter III. Chapter V will confront the theoretical discussion of the growth effects of international capital flows with the rather sobering empirical evidence. In Chapter VI, we will link our general discussion of sovereign default to the European Debt Crisis. Chapter VIII on the nominal exchange rate will present the standard operating procedures of central banks, but also discuss the various "unconventional" policy measures adopted in times of crisis. Moreover, Chapter VIII will address the problem of balance of payments equilibrium within monetary unions. In Chapter X, finally, we will review the recent discussion on the perils of deflation, offer interpretations of the Global Financial Crisis and the European Debt Crisis as particular variants of "international financial crises", and introduce the reader to the arguments brought forward in favor of imposing capital controls in order to limit international asset trade.

I.3 Overview

This section provides a brief overview of the book's structure and outlines the questions that will be addressed in the following chapters.

¹ An easily accessible summary of the controversy about the future path of macroeconomics is offered by The Economist (2009). Bussière et al. (2013) sketch the lessons that international macroeconomics should learn from the Global Financial Crisis.

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Chapter II presents the most important definitions and rules that are used by countries in compiling their *balance of payments* statistics. The exposition introduces the novel definitions and conventions stipulated by the sixth edition of the International Monetary Fund's *"Balance of Payments and International Investment Position Manual (BPM6)"*. Moreover, it gives justice to the growing importance of *valuation effects* in shaping countries' net international investment position. The material presented in this chapter is important for (at least) two reasons: first, a firm grasp of balance of payments accounting is of crucial importance for a correct interpretation of observed data. Second, the structure of the balance of payments motivates the *intertemporal approach to the current account*, which emphasizes the role of saving and investment decisions in determining a country's current account balance.



Figure 1.3 : Countries' current account balances relative to their Gross Domestic Product (in percent). Source: IMF (World Economic Outlook database).

Figure 1.3 presents the current account balances (relative to GDP) for a sample of four countries. Apparently, the current accounts of Switzerland, Greece and the USA widened towards the mid-2000s, only to contract in the more recent past, while the current account of Germany has been following an upward trend since the turn of the millennium. To assess whether these developments are unusual – or even alarming – one needs an analytical toolbox that allows identification of the fundamental determinants of current account balances.

In **Chapter III**, we will introduce such an analytical framework. We will spell out the intertemporal optimization problems underlying individual saving and investment choices, and will show how the interaction of these decisions determines the volume and the direction of international capital flows. Moreover, we will discuss how *intertemporal trade* – i.e. the trade in assets that establish claims on future payments – affects aggregate welfare and the income distribution. While a large part of this chapter will be based on the notion that there is a *representative consumer* whose decisions determine aggregate savings and investment, we will also show how this concept can be reconciled with the idea of a market economy that is populated by independently optimizing individuals and firms. The focus on a market economy will also allow us to identify the *distributional effects* of financial globalization.



Figure 1.4 : Private foreign capital flows to emerging and developing economies (billions of US dollars). Source: World Bank (International Debt Statistics).

In **Chapter IV**, we will extend and modify the basic model of intertemporal trade to address several questions of practical policy relevance: how does demographic change affect international capital flows? What is the relationship between a government's budget deficit and the current account? Do the results of the standard model introduced in Chapter III change if international goods and services trade is hampered by physical and administrative barriers? And

I.3 Overview

how can the international capital market be used to diversify national income risks? To answer these questions, we will continue to use the basic principles of dynamic optimization, and we will demonstrate that the intertemporal approach offers a useful and flexible framework that allows to identify the fundamental determinants of current account balances and to characterize the consequences of financial globalization.

Chapter V will focus on the question of how the integration of international financial markets – in particular, the massive increase of private foreign capital flows to developing and emerging economies illustrated by Figure 1.4 – affects the growth prospects of recipient countries. To answer this question, we will first review the most important approaches to explaining *economic growth* in closed economies. In a next step, we will discuss what economic theory has to say on the consequences of integrated goods and asset markets for investment, innovation, and economic development. Finally, we will confront the theoretical predictions on the relationship between financial globalization and economic performance with the empirical evidence.



Figure 1.5 : Sovereigns in default (in percent of all sovereigns). Source: Beers and Nadeau (2015).²

 $^{^{2}}$ A sovereign in default is a government that has failed to make due payments on outstanding debt. When considering the large percentages in Figure 1.5, note that Beers and Nadeau (2015) do not weight countries by their aggregate output, population, or some other measure of size.

In **Chapter VI**, we will first explain how to assess the *sustainability* of countries' net international investment positions and current accounts, defining solvency as a country's ability to comply with its intertemporal budget constraint. We will then shift the focus from the ability to pay to the willingness to pay, and discuss the risks faced by investors when purchasing foreign assets. As indicated by Figure 1.5, the percentage of sovereign governments ("sovereigns") that failed to make due payments on their debt has decreased substantially since the mid-1990s. However, the *default* of the Argentinian government in 2000 and the near-bankruptcy of Greece in the context of the European Debt Crisis indicate that these risks are more prevalent than ever. Against this background, the second part of Chapter VI discusses the determinants and consequences of default and *expropriation* risks.



Figure 1.6 : Per capita incomes (average for 2010-2014, relative to the USA in percent) and relative prices of a McDonald's Big Mac in 2015 (relative to the USA in percent). Sources: *The Economist* and World Bank (World Development Indicators).

While the analytical framework presented in the first chapters largely assumed that frictionless goods and services trade eliminated all price differences across countries, **Chapter VII** will allow for deviations from the *law of one price* and introduce the *real exchange rate* as the relative price of a foreign goods bundle

in terms of a domestic goods bundle. We will identify different sources of international price differences and discuss both the theoretical foundations and the empirical relevance of *purchasing power parity* as a simple theory of the real exchange rate. In a next step, we will show that the existence of non-tradable goods may give rise to systematic deviations from purchasing power parity, driven either by windfall income gains or differences in labor productivity. The insights conveyed in that section will enable readers to better understand systematic cross-country differences in price levels, as indicated by Figure 1.6, which relates the relative price of a McDonald's Big Mac in 2015 to countries' average per capita income in the preceding five years.

The real exchange rate is often interpreted as indicating an economy's *price competitiveness*. In the later part of Chapter VII, we will discuss under which conditions such a view is justified, and present both the theory and the empirical evidence on the relationship between the real exchange rate and countries' net exports. Finally, we will show how this relationship can be used to identify the *equilibrium real exchange rate* – i.e. the value of the real exchange rate that is in line with fundamental technology and preference parameters as well as appropriate policy choices.



Figure 1.7 : The nominal USD/EUR exchange rate (Euros per US dollar). Source: IMF (International Financial Statistics).

Chapter VIII will focus on the determinants of the *nominal exchange rate*, which is the price of one currency in terms of another currency. We will start by presenting the basic operation of different *exchange rate regimes*, and explain the implications of these regimes for monetary policy. After this, we will introduce the concept of *uncovered interest rate parity*, which relates the expected evolution of the nominal exchange rate to cross-country interest rate differences. We will show that uncovered interest rate parity is the basis of the *asset market approach*, which highlights the importance of market participants' expectations in determining fluctuations of the exchange rate – for example, the USD/EUR exchange rate depicted in Figure 1.7.

Based on this insight, the *monetary model* interprets the current exchange rate as a function of observed and expected future monetary policy decisions and real-economy developments. While this perspective is of crucial importance when it comes to understanding exchange rate fluctuations, the monetary model fails to explain the observation that nominal exchange rates are usually more volatile than the underlying fundamentals. In Section VIII.5, we will therefore present the *Dornbusch "overshooting" model*, whose name goes back to the economist Rüdiger Dornbusch, and which explains the excess volatility of nominal exchange rates. Finally, we will explore how monetary authorities can affect exchange rates without varying the money supply through *sterilized foreign exchange interventions*, and we will present a simple *portfolio balance model* that relates the effectiveness of such interventions to the imperfect substitutability of foreign and domestic assets.

How do supply and demand shocks as well as monetary and fiscal policy affect aggregate output in open economies? To answer this question, Chapter IX will start by reviewing the crucial role of *nominal rigidities* – i.e. the delayed adjustment of goods prices - for the effect of aggregate demand on economic activity. We will introduce the Mundell-Fleming model, developed by Robert Mundell (1963) and Marcus Fleming (1962), as a simple framework to analyze the consequences of changes in government spending or variations of the money supply in a small open economy, and we will highlight the crucial role of the exchange rate regime for these effects. Furthermore, we will use the Mundell-Fleming model to demonstrate that a unilateral monetary expansion in a large open economy can come at the expense of other countries' output, and that the existence of such beggar-thy-neighbor effects underlines the importance of international monetary coordination. While its simplicity and transparency is a clear advantage of the Mundell-Fleming model, the absence of explicit microeconomic foundations makes it susceptible to the Lucas critique, i.e. the problem highlighted by Robert Lucas (1976) that structural relationships crucially depend on agents' expectations and may therefore change over time. Moreover,

I.3 Overview

the nature of the Mundell-Fleming model prevents us from drawing any meaningful normative conclusions. As a reaction to these problems, the *New Open Economy Macroeconomics (NOEM)* emerged as a new paradigm in the late 1990s and has dominated research and policy discussions in recent years. The second part of Chapter IX will present the details of a canonical NOEM model by Corsetti and Pesenti (2001). Using this model to analyze the effects of monetary and fiscal policy in open economies, we will show, e.g., that the normative implications of an expansionary monetary policy may deviate from the predictions of the Mundell-Fleming model once the effect of changing *terms of trade* on individuals' consumption possibilities are explicitly taken into account. In the last part of Chapter IX, we will consider alternative variants of the NOEM framework and will demonstrate how some of the model implications may change if one makes different assumptions on consumers' preferences or firms' price-setting strategies.



Figure 1.8 : Real GDP before and after an international financial crisis (with GDP normalized to 100 in the year *t*-1 that preceded the start of the crisis). Source: International Monetary Fund (World Economic Outlook database).

Chapter X will use the insights gained in previous chapters to approach some important questions faced by policymakers in open economies: what are the advantages and disadvantages of having a *fixed exchange rate*? And is there a case for limiting the cross-border trade of assets by imposing *capital controls*?

As we will argue in the first part of that chapter, the choice of an exchange rate regime reflects the fundamental trade-off between *flexibility* and *credibility*: a floating exchange rate offers the advantage that the central bank can quickly react to supply and demand shocks by adjusting its monetary policy. However, there is a risk that policymakers misuse this instrument to constantly stimulate demand. As a result, a systematically higher inflation rate – an *inflation bias* – may emerge. Given this problem, a fixed exchange rate may be an effective tool for fighting high inflation rates – especially in countries in which announcements to curb inflation are not trusted. However, a fixed exchange rate may also be a source of macroeconomic instability. Recent economic history is rife with examples where pegged currencies were the subject of *speculative attacks* such that monetary authorities eventually had to abandon a fixed exchange rate. In Section X.3, we will show that such *balance of payments crises* may result from an inconsistent economic policy, but that they may also be driven by the self-fulfilling expectations of foreign exchange market participants.

Models of currency crises are useful to explain the breakdown of fixed exchange rate regimes that several economies experienced in the late 1990s and early 2000s. However, the *Global Financial Crisis*, which started with the collapse of the US real estate market in 2007, followed a different pattern. In Section X.3.5, we will therefore present a simple framework that demonstrates how international linkages between banks can turn a national problem into a global capital market crisis. Section X.3.6, finally, relates the *European Debt Crisis* to the occurrence of a "*sudden stop*" – the reluctance of foreign investors to finance current account deficits – and explains how the consequences for countries in the Euro area differed from the experience of emerging markets in previous decades.

Regardless of whether they were driven by speculative attacks, a sudden stop of capital inflows or a contagion via the balance sheets of financial institutions, the episodes of economic turmoil witnessed in the past decades have illustrated the perils associated with financial globalization. Figure 1.8 shows the evolution of real GDP for a set of countries that were hit by some type of "international financial crisis". While the specific time path – in particular, the depth of the recession and the speed of recovery – differs across countries, the figure illustrates the substantial output losses experienced by the affected economies. Given these observations, the last part of Chapter X addresses the choice of an *exchange rate regime* and discusses the question whether countries should limit the free cross-border flow of assets by establishing *capital controls*. Finally, the last subsections of Chapter X briefly describe the role of the *International Monetary Fund* and of the *World Bank* in the context of the *international financial architecture*.

I.4 A User's Manual

The structure of this book reflects the goal to present a coherent modeling framework that allows analyzing and assessing different aspects of economic reality. By moving from one chapter to another, the reader is guided towards a canonical model of the "New Open Macroeconomics (NOEM)", i.e. the paradigm which has shaped research and policy discussions in recent years, and which is likely to guide theoretical and empirical analyses in the foreseeable future. This model will be presented in the second part of Chapter IX, and a thorough understanding of it requires being familiar with the contents of preceding chapters. Readers who are mainly interested in coming to terms with the NOEM paradigm should therefore adhere to the following roadmap: we recommend to start with the review of balance of payments accounting in Chapter II, as the relationships presented in this chapter motivate the intertemporal approach to the current account. Because this approach is essential for the NOEM, it is advisable to thoroughly read Chapter III. In Section IV.4, the reader is introduced to dynamic models with multiple goods, which are another key building block of the NOEM. Chapter VII on the real exchange rate is relevant since it introduces fundamental concepts like the law of one price, purchasing power parity, etc. Chapter VIII on the nominal exchange rate presents the concept of uncovered interest rate parity as well as a dynamic model of money demand, both important ingredients of the NOEM model. Finally, we stress the importance of reading the first sections of Chapter IX, since a thorough knowledge of the Mundell-Fleming model allows an appreciation of the strengths and limitations of the NOEM approach. In conclusion, Chapter X uses the insights from the previous chapters and discusses their implications both for the conduct of economic policy and for the design of monetary-policy institutions. In that chapter, we will present a simplified NOEM model, which accounts for the implications of individuals' and firms' intertemporal optimization, but reduces the sophisticated apparatus of the original framework to a small number of equations.

Readers who are mainly interested in topics at the intersection of international macroeconomics and development economics are also recommended to start with Chapters II and III. Section IV.2 considers the implications of demographic change, and thus focuses on a phenomenon that will influence capital flows between industrialized and developing countries for the foreseeable future. Chapter V explores the factors that determine the long-run growth of an economy and sheds light on the potential role of international investment. Both Chapter VI and the second part of Chapter X deal with the causes and consequences of international financial crises. While Chapter VI analyzes the incentives and mechanics behind sovereign defaults and expropriation, Chapter X focuses on currency crises and the more recent Global Financial Crisis and European Debt Crisis. The first part of Chapter X discusses the advantages and shortcomings of alternative monetary policy arrangements, emphasizing the importance of credible rules – in particular in countries where monetary authorities do not have a reputation of guarding price stability. Based on the insights provided by this analysis, the last part of Chapter X presents some arguments that are relevant for the choice of policies and institutions in open economies – e.g. the exchange rate regime or the extent of capital mobility – and discusses the role of the World Bank and the International Monetary Fund.

Chapter II

The Balance of Payments

II.1 Definitions and Rules

II.1.1 Overview

The balance of payments reports all economic transactions that take place between domestic and foreign residents during a specific time period. While balance of payments data as such do not reveal any causal mechanisms, a firm grasp of the definitions and structural relationships of this accounting framework is of crucial importance for a correct interpretation and, ultimately, explanation of observed phenomena. This is why this book starts with an introduction to the most important principles underlying the balance of payments.¹

The transactions reported in the balance of payments may be subdivided into three basic categories: the first group comprises transactions reflecting the international trade in *goods* and *services*, as well as payments associated with the supply of *factors of production* (e.g. capital or labor) or *financial resources*, the second group of transactions reflects international *transfers*, i.e. the provision of resources that is not associated with any obvious material return, while the third category reflects the change of ownership of *assets*, with an "asset" representing any store of value that is associated with a claim on future payments – a bond, a share in a company, but also an internationally recognized means of payment (e.g. a liquid currency like the US dollar or gold).

The balance of payments consists of three accounts – the *current account*, the *capital account*, and the *financial account* – each of which reports a specific subset of the transactions mentioned above. In what follows, we will first describe the principles according to which observed transactions are assigned to the individual balance of payments accounts. After this, we will consider how these accounts are related to each other.

¹ Our presentation is based on the sixth edition of the International Monetary Fund's **Balance of Payments and International Investment Position Manual** (IMF, 2009). The rules stipulated in this manual – the "**BPM6**" – have now been adopted by most institutions in charge of publishing the balance of payments (usually countries' central banks). The changes associated with the transition from BPM5 to BPM6 were substantial. Nevertheless, you are likely to meet fellow students, practitioners and academics who will refer to the old (BPM5) framework for quite a while.

Goods: Exports (fob) ² Goods: Imports (fob) Balance	1180.1 916.9	263.2	
Services: Exports (fob) Services: Imports (fob) Balance	238.5 268.7	-30.2	
Primary income: Receipts Primary income: Expenditure Balance	194.8 131.1	63.7	
Secondary income: Receipts Secondary income: Expenditure Balance	64.1 103.6	-39.5	
Balance of the current account			257.2
Balance of the capital account		-0.2	
Net direct investment		56.4	
Net portfolio investment		199.1	
Net financial derivatives and em- ployee stock options Net other investment		25.8 -53.3	
Reserve assets		-2.2	
Net financial account			225.8
Net errors and omissions			-31.2

Table 2.1: Germany's balance of payments in 2015. All numbers are in billions of Euros. Source: Deutsche Bundesbank (Balance of payments statistics June 2016).

² The abbreviation *fob (free on board)* indicates that transaction values are reported net of trade costs – i.e. at the border of the exporting country. Whenever values are reported *cif (cost, insurance, and freight)*, this indicates that trade costs are included and that the numbers reported refer to prices at the border of the importing country.

II.1.2 The Current Account

Transactions that reflect the international trade in goods and services or the remuneration of factors of production and financial resources are reported in the current account. Moreover, the current account reports *current transfers*, i.e. resources "that are provided by one party without anything of economic value being supplied as a direct return to that party" (IMF 2009:9). For each of these categories (goods and services trade, international income flows, current transfers) there is a separate sub-account. Adding up the balances on these sub-accounts yields the *current account balance*.

Transactions referring to the international sale and purchase of goods and services are reported in the goods and services account. Sales to foreign residents, i.e. exports, are entered as credits, while purchases from foreign residents, i.e. *imports*, are reported as *debits*. Throughout the rest of this book, we will often refer to the balance on the goods and services account as *net exports*.³ Table 2.1 follows standard practice and splits the goods and services account into its goods and services components. In 2015, the value of German goods exports amounted to 1180.1 billion Euros, while the value of goods imports amounted to 916.9 billion Euros. By contrast, the value of German services exports in 2015 was smaller than the value of services imports. A typical example for a services import is the payment for a foreign hotel room by a domestic tourist. In fact, expenses associated with travelling abroad have dominated German services imports in the recent past. However, due to technological innovations - most notably, the advent of the internet - and the dismantling of administrative barriers, other international services transactions have gained in importance. Box 2.1 sheds light on the different components of recent German services exports and imports.

Box 2.1: Germany's Services Exports and Imports

Figure B2.1 shows various subcomponents of Germany's services exports and imports, averaged over the years 2011 to 2015. While most of the services categories are self-explaining, some of them deserve further explanation: the export and import of *manufacturing services* reflects the existence of *global value chains*, with firms delegating certain stages of the production process to their own affiliates or independent contractors abroad. *Other business services* encompass the work of architects, business consultants etc. It is apparent that, in the period considered, transport and

³ The difference between *goods exports* and *goods imports* is sometimes called the *trade balance*, with a *trade surplus* (deficit) indicating that the value of goods exports exceeds (falls short of) the value of goods imports.

travel services as well as other business services and telecommunications, computer and information services were the dominant categories among Germany's services exports and imports. Moreover, the negative net exports of services are obviously driven by the Germans' urge to travel abroad. At the same time, the graph reveals that there are some services categories – e.g. financial services – for which Germany's exports exceeded its imports in the years 2011 to 2015.



Figure B2.1: Components of Germany's services exports (credit) and imports (debit). Average values for the years 2011 - 2015 (billions of US dollars). Source: IMF (Balance of Payments Statistics)

The second sub-account of the current account, the *primary income account*, reports international payments that result from the fact that domestic residents supply labor, physical or financial capital, or nonproduced nonfinancial assets to residents of other countries and vice versa.⁴ In all these cases, payments received from abroad are reported as credits, payments made to the rest of the

⁴ The concept of residence is extensively discussed in the Balance of Payments Manual (IMF 2009:70-79). In brief, a person is a "domestic resident" – regardless of her/his citizenship – if she/he takes residence in a country for at least one year. Firms are usually residents of the economy where they are registered. Examples of "nonproduced nonfinancial assets" are natural resources, contracts, leases and licenses, or marketing assets.

world are reported as debits. For example, if a person lives in France, but is employed in Switzerland, the salary payments she receives enter the compensation of employees section of the French (Swiss) primary income account as a credit (debit). Conversely, if the German government makes interest payments on bonds held by a US resident, these payments enter the German (US) primary income account as a debit (credit). Finally, if the Italian subsidiary of a British multinational firm earns a profit, this is reported in the British (Italian) primary income account as a credit (debit). Note that, in the latter two cases, it is not the sale or purchase of the underlying assets - the German government bond or the shares of the Italian subsidiary – that is reported in the primary income account, but the investment income associated with the possession of these assets. Table 2.1 shows that, in 2015, the balance of the German primary income account was strongly positive. A closer look at the data (not reported in the table) documents that the lion's share of this surplus was due to investment income earned on foreign assets. The net compensation of employees received by German residents was also positive, but rather small.

The third part of the current account is the secondary income account, which reports transfers received from the rest of the world as credits, and transfers given to the rest of the world as debits. A part of these transfers are payments between governments or institutions, such as bilateral or multilateral development aid. Another part reflects cross-border aid payments of non-governmental organizations. Finally, the secondary income account also includes personal transfers sent by individuals residing in one country to individuals residing in another country. Although personal transfers are not necessarily associated with international migration, the dominant position within this category are so-called workers' remittances - i.e. payments made by immigrants to individuals in their country of origin. Table 2.1 documents that the balance on Germany's secondary income account in 2015 was negative, i.e. transfers sent abroad exceeded transfers received from the rest of the world by 39.5 billion Euros. A closer look at the data (not reported in the table) reveals that the largest part of this difference is due to public transfers. Net personal transfers received were negative, but rather small. However, as we show in Box 2.2, cross-border payments associated with the migration of individuals are a very important component of the current account for many developing countries and emerging markets.

Box 2.2: The Importance of Personal Transfers in Developing Countries

For some developing countries, the emigration of their labor force is an important part of reality and has considerable effects both on domestic la-

bor markets and on the level and distribution of income. As we have outlined above, the money sent home by these migrants is reported as "personal transfers" in the secondary income account. Figure B2.2 documents that these personal transfers can be immense. For some countries, they amounted to double-digit percentages of gross domestic product (GDP) in the years from 2010 to 2014. This has important implications: first, the motivation behind personal transfers differs from the – usually profit-maximizing – objective that drives most other cross-border financial flows. In addition, there is some evidence that personal transfers are negatively correlated with the GDP growth of the recipient country, but positively correlated with the GDP growth of the sending country, generating a particular channel of international business-cycle transmission. Finally, large inflows of personal transfers may raise the living standard of the individual recipients, but may also have non-desirable macroeconomic side-effects like an appreciation of the domestic currency, or a rising price level.



Figure B2.2: Personal transfers received as a percentage share of GDP, averages for the years 2010 – 2014. Source: International Monetary Fund (Balance of Payments Statistics) and World Bank (World Development Indicators).

Table 2.1 shows that, in 2015, Germany was running a current account surplus. This surplus was mainly driven by positive net exports of goods, but the positive balance of the primary income account also played an important role.

While Table 2.1 offers a snapshot of Germany's balance of payments in 2015, Figure 2.1 shows how the different components of that country's current account has evolved over recent decades.



Figure 2.1: Components of the German current account (in percent of GDP) Source: IMF (Balance of Payments Statistics) for 1971 through 1990, Deutsche Bundesbank for 1991 through 2015. The IMF's data were compiled according to BPM5.

As we see in this figure, a positive difference between goods exports and goods imports are not a novelty in Germany – nor is the fact that the value of services exports falls short of services imports, and that the balance on the secondary income account is negative. Conversely, the balance on primary income, though never negative, has grown substantially in recent years. Note also that the combination of relatively low net exports of goods and services, a zero balance on the primary income account coupled with a strongly negative secondary income balance resulted in current account deficits during the 1990s.

Figure 2.2 extends our view beyond the boundaries of Germany and shows the recent composition of the current account for the USA, China, the Czech Republic and the Philippines. All numbers are expressed relative to GDP (in percent) and averaged over the 2010-2014 period. Apparently, the current account deficit run by the United States in these years reflected a large difference between goods imports and exports, which was only partly compensated by a surplus of services exports over imports and a positive balance on primary income. In the same time interval, China exhibited the opposite constellation: a large surplus of goods exports over goods imports, combined with services and primary income deficits. In both countries, the balance on secondary income had the expected sign - negative in the USA with its considerable immigrant population and substantial aid payments, positive in China – but was not very large relative to GDP. Turning to the Czech Republic and the Philippines we see that a superficial view of the current account, which both practitioners and academics sometimes identify with net exports, can be highly misleading: in the Czech Republic, the current account deficits of the years 2010 to 2014 predominantly reflected a strongly negative balance on primary income, while exports of goods and services exports were, in fact, larger than imports. By contrast, the Philippines would have run a current account deficit if it were not for the strongly positive balance on the secondary income account, which mainly reflects the personal transfers sent home by a large expat community.



Figure 2.2: Components of the current account for selected countries (in percent of GDP, average values for the years 2010 - 2014). Source: IMF (Balance of Payments Statistics and International Financial Statistics).

II.1.3 The Capital Account

The capital account reports *capital transfers* and the *acquisition or disposal of nonproduced, nonfinancial assets*. Both types of transactions change a country's wealth position towards the rest of the world without being driven by residents' saving decisions. There is a subtle but important difference between "current transfers" reported in the secondary income account and "capital transfers" reported in the capital account: "Current transfers directly affect the level of disposable income and influence the consumption of goods and services" (IMF 2009:209). By contrast, a "capital transfer results in a commensurate change in the stocks of assets of one or both parties to the transaction without affecting the saving of either party" (IMF 2009:209).⁵ A typical example for a capital transfer is *debt forgiveness*: if a private or public creditor in Germany voluntarily writes off claims against a debtor residing in another country, this enters the German capital account as a debit and the recipient country's capital account as a credit.

In a similar spirit, the acquisition and disposal of "nonproduced, nonfinancial assets" changes a country's stock of assets and liabilities vis-à-vis the rest of the world regardless of aggregate savings. This class of assets includes natural resources such as land, mineral rights, fishing rights, electromagnetic spectrum, leases and licenses, as well as marketing assets – e.g. brand names, trade marks or logos. If a domestic resident acquires these assets abroad, this is reported as a debit in the domestic capital account and as a credit in the other country's capital account. The difference between the total value of credit transactions and the total value of debit transactions gives the *capital account balance*. As documented by Table 2.1, Germany's capital account balance amounted to a mere -0.2 billion Euros in 2015. In fact, the capital account is a rather minor component of most countries' balance of payments. However, this does not hold for recipients of large capital transfers. In these countries, the capital account balance sometimes amounts to a double-digit percentage share of GDP.

II.1.4 The Financial Account

The financial account reports transactions that reflect the "acquisition of financial assets" and the "incurrence of liabilities" (IMF 2009:11). An *asset* is a store of value that is usually associated with a claim on *receiving* future payments – e.g. interest payments on a bond, dividend payments on equity etc. A *liability*

⁵ The IMF offers additional guidance by stating that "capital transfers are typically large and infrequent" but also emphasizes that "capital transfers cannot be defined in terms of size or frequency" (IMF 2009:209). In practice, countries have some discretion when it comes to determining whether large transfers are reported in the secondary income account or in the capital account.

is the commitment to *make* such payments. In the financial account, increases in a country's assets and liabilities towards the rest of the world are both reported with a positive sign, while decreases in assets and liabilities are reported with a negative sign. The *financial account balance* reflects the difference between the net increase of assets and the net increase of liabilities. A *financial account surplus (deficit)* thus reflects the fact that, within a period, a country's assets – i.e. claims against residents of other countries – have increased by *more (less)* than its liabilities.⁶

These conventions are a bit confusing at first glance. We therefore illustrate them by presenting a simple example. Suppose that, in a given period, only the following financial transactions take place: some residents of the domestic economy *lend* 2000 Euros to the rest of the world, while others *borrow* 1000 Euros from the rest of the world. In the same period, some domestic residents repay outstanding foreign debt of 700 Euros while others receive repayments of 200 Euros on loans outstanding. Combining these numbers, we see that the net increase of assets amounts to 2000 - 200 = 1800 Euros while the net increase of liabilities amounts to 1000 - 700 = 300 Euros. The financial account balance in this example is 1800 - 300 = 1500 Euros.⁷

Reflecting the different characteristics of securities and contracts that exist on international financial markets as well as the different objectives of the parties involved, the balance of payments assigns transactions to different parts of the financial account. Such a distinction is useful for several reasons: first, some assets are associated with payments that are *state-contingent* – e.g. dividend payments that depend on firms' profitability – while other assets define claims whose size and timing is clearly defined ex-ante and does not hinge on the current situation (e.g. interest payments). Moreover, it is important to distinguish assets and liabilities with respect to the maturity structure of the associated payments (short-term or long-term), and it matters whether the acquisition of company shares reflects the buyer's intention to actively interfere with the operations of the respective firms. Finally, the framework accounts for the fact that

⁶ The term "financial account" was introduced with the 5th revision of the balance of payments manual (BPM5) in 1993, replacing and re-defining the "capital account" which, up to that point in time, had reported the international purchase and sale of financial assets. It is rather unfortunate that many practitioners and academics still use the term "capital account liberalization" to describe the deregulation of international financial flows, since most of the transactions affected by such measures are reported in the financial, not the capital account. Note, finally, that an increase of assets (liabilities) in the financial account is sometimes called a "capital export" ("capital import").

⁷ Note that the signing of financial account transactions stipulated by BPM6 is in stark contrast to BPM5, according to which an increase of assets entered the balance of payments with a *negative* sign. For the foreseeable future, you should therefore check whether the balance of payments data you are working with are presented according to BPM5 or BPM6.

countries' central banks purchase and sell securities for reasons that usually differ from the objectives of other market participants.

Following these considerations, Table 2.1 adopts the categories defined in the IMF's balance of payments manual and distinguishes between "direct investment", "portfolio investment", "financial derivatives and employee stock options", "other investment" and "reserve assets". (Foreign) direct investment - often abbreviated as FDI - reflects companies' decisions to establish (or purchase) foreign subsidiaries with the intention to actively manage the respective firms. It is assumed that such an intention is revealed by the ownership stake held by the parent company, and BPM6 thus defines direct investment as "arising when an entity has equity that gives it voting power of 10 percent or more in the enterprise" (IMF 2009:278). Following the sign convention introduced above, this implies that the purchase of a German firm by a British multinational raises the United Kingdom's assets against the rest of the world, while it raises the stock of German external liabilities. Note, finally, that it is not only the initial acquisition that is reported in the direct-investment section of the financial account, but also subsequent transactions that take place within a "directinvestment relationship", e.g. intra-company loans or the re-investment of earnings. Table 2.1 indicates that, in 2015, the volume of German direct investment abroad - the increase of FDI-related assets - exceeded the volume of foreign direct investment in Germany - the increase of FDI-related liabilities - by 56.4 billion Euros.8

The second category of international asset transactions reported in the financial account refers to *portfolio investment*. These are transactions "involving debt or equity securities other than those included in direct investment or reserve assets" (IMF 2009: 110) – i.e. purchases and sales of liquid securities that can easily be traded on financial markets. Within this category, the balance of payments framework further distinguishes between *portfolio debt* – mostly corporate and government bonds – and *portfolio equity*, i.e. share ownership that does not reflect a managing interest. Lumping both sub-categories together, Table 2.1 shows that, in 2015, the net increase of German portfolio assets exceeded the net increase of its portfolio liabilities by 199.1 billion Euros.

The third category, *financial derivatives and employee stock options* has gained in importance in recent years. A *financial derivative* establishes a claim whose value is tied to the value of another financial instrument, commodity or indicator – the so-called *underlying asset*. Important types of financial derivatives are *options*, which entitle the owner to purchase or sell the underlying asset at a pre-specified price without forcing him to realize this option, and *forward contracts*, which are a binding commitment to exchange the underlying

⁸ Note that this number does not report the *stock* of German FDI-type assets and liabilities, but the *changes* of these stocks that resulted from transactions in the year 2015.

asset at a pre-specified price. An *employee stock option* grants the holder the right to purchase shares of their own employer and is usually a form of remuneration. As indicated by Table 2.1, the net increase of Germany's assets in this category exceeded the net increase of liabilities by 25.8 billion Euros in 2015.

According to BPM6, other investment "is a residual category that includes positions and transactions other than those included in direct investment, portfolio investment, financial derivatives and employee stock options, and reserve assets" (IMF 2009:111). While the IMF's definition seems to suggest that the volume of transactions falling into this category is small, the fact that "other investment" includes such entries as "currency and deposits", "loans" and "trade credit" indicates that the numbers reported in this part of the financial account may actually be quite large: a loan granted by an Austrian bank to a foreign client is reported as an increase in Austria's other investment assets, while foreigners' deposits attracted by this bank are reported as an increase of Austria's other-investment liabilities. The crucial difference between other investment and portfolio debt is that claims associated with portfolio debt are traded on secondary markets, while the claims resulting from other investment are usually tied to a direct creditor-debtor relationship. Table 2.1 shows that the net increase of Germany's other-investment liabilities exceeded the net increase of other-investment assets by 53.3 billion Euros in 2015.

The fifth major category of the financial account covers transactions related to reserve assets, which are defined as "those external assets that are readily available to and controlled by monetary authorities for meeting balance of payments financing needs, for intervention in exchange markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, and serving as a basis for foreign borrowing)" (IMF 2009:111). Note that, unlike the other parts of the financial account, the reserve assets category focuses on the particular institution involved in the transactions - a country's monetary authorities, usually its central bank - rather than the nature of the securities considered. However, the purposes evoked in the definition - in particular, the availability for foreign exchange market interventions - stresses the importance of securities that can easily be bought and sold on financial markets. In fact, the bulk of most central banks' reserves consist of foreign-currency denominated cash, deposits and bonds, gold, as well as special drawing rights (SDRs), i.e. reserve assets created by the International Monetary Fund. For the time being, we restrict our attention to a definition of reserves and to a description of their evolution, as reflected by countries' financial accounts. In Chapter VIII, however, we will explore the determinants and consequences of central banks' decisions to increase or reduce the stock of their reserve assets. As indicated by Table 2.1, the stock of reserve



assets held by the German central bank – the *Deutsche Bundesbank* – decreased by 2.2 billion Euros in 2015.

Figure 2.3: Components of the German financial account (net changes of assets minus net changes of liabilities, average values in percent of GDP) Source: IMF (Balance of Payments Statistics) for 1971 through 1990, Deutsche Bundesbank for 1991 through 2015. The IMF's data were originally compiled according to BPM5, which necessitated a sign change for all entries of the years 1971 – 1990.

Figure 2.3 documents how the size and composition of the German financial account have evolved in recent decades. Unlike the current account, the financial account exhibited quite a bit of variation: in particular, the sign of the "other investment" position was subject to large fluctuations. Moreover, portfolio investment assets have increased by more than liabilities in the most recent past (2011 to 2015), in contrast to previous decades. Finally, foreign exchange reserves, which were an important component of the financial account balance in the 1970s, barely moved in the 1990s and 2000s.

Figure 2.4 shows the composition of the financial account for the USA, China, the Czech Republic and the Philippines. All numbers are presented relative to the respective countries' GDP, and averaged over the years 2010 to 2014. The graph indicates that, in the United States, FDI assets increased by more than liabilities during that time period, while portfolio and other investment liabilities increased by more than assets. This conveys an important message: a financial account deficit does not necessarily imply that the respective country is accumulating more liabilities than assets for all categories. Between 2010 and 2014, United States residents were selling bonds and equity and borrowing from the rest of the world while, in the same period, they purchased more direct-investment assets than they sold. The picture is even more complex for China, the Czech Republic and the Philippines: while in all these countries, FDI- and/or portfolio-investment liabilities increased by more than assets - implying that individuals, firms and public institutions were selling these types of securities to the rest of the world - the central banks' reserves increased considerably. In two cases (China and the Philippines), the increase of central bank reserves was so substantial that the overall financial account balance turned positive. Hence, while the financial account surpluses of China and the Philippines indicate that, between 2010 through 2014, these countries were accumulating more assets than liabilities vis-à-vis the rest of the world, a closer look at the data reveals that it was, in fact, a particular institution within these countries - the central bank - that brought about this result.



Figure 2.4: Components of the financial account for selected countries (net changes of assets minus net changes of liabilities in percent of GDP, average values for the years 2010 - 2014). Source: IMF (Balance of Payments Statistics and International Financial Statistics).

II.1.5 Balance of Payments Equilibrium

The balance of payments follows a *double-entry accounting system*, i.e. each transaction is recorded twice: if a foreign customer purchases domestic goods in exchange for foreign currency, the transaction enters the domestic current account as a credit and the domestic financial account as an increase in assets. Conversely, if a domestic customer imports foreign goods which he is allowed to pay for with some delay, the transaction enters the domestic current account as a debit and the domestic *financial account* as an increase in liabilities. When adding up all cross-border transactions for a given interval - say, a year - a lot of them actually cancel out: if the sum of all credit-financed exports of goods and services equals the sum of all credit-financed imports of goods and services, both the current account and the financial account balance are zero. However, this constellation is rather unlikely. Usually, the balances on the individual accounts of the balance of payments are positive or negative. But it must hold that, if all transactions are recorded and evaluated properly, the sum of the current account and the capital account balances must equal the financial account balance, i.e.

$$(2.1) CA_t + KA_t = FA_t$$

In this equation, CA_t is the current account balance in period t, KA_t is the capital account balance, and FA_t is the financial account balance. While this expression technically results from the principle of double-entry accounting, it can also be interpreted using a compellingly simple logic: suppose that the value of a country's imports in a given time period exceeds the value of its exports, i.e. residents of that country receive more goods and services from abroad than they are returning to the rest of the world. Suppose further that these negative net exports are not compensated by a surplus in the primary or secondary income account, then it follows that the country is running a current account deficit. Now suppose that the capital account balance - the sum of net capital transfers received and the net sale of nonfinancial assets - still leaves the left-hand side in equation (2.1) negative. A blunt interpretation of this situation is that, in period t, the country is living beyond its means, and that the discrepancy between exports and imports is not compensated by foreigners' willingness to offer capital transfers or current transfers. Such a situation can only prevail if the rest of the world can expect to be compensated in the future, i.e. if the combined current and capital account deficit is matched by the commitment to make future payments. This, however, means that the country we consider is incurring additional liabilities, which is reflected by a financial account deficit. Conversely, a current account surplus which is not dominated by a capital account deficit necessarily implies an accumulation of claims towards the rest of the world, i.e. a financial account surplus.

Beyond illustrating a technical result that immediately follows from the rules of balance of payments accounting, equation (2.1) points at an important relationship that we will meet over and over again in this book: the financial account documents how a combined current account and capital account deficit is financed, or how a combined surplus of the current account and the capital account is used to accumulate claims against the rest of the world. This, in turn, implies that the current account balance is not only driven by domestic and foreign residents' decisions on goods and services purchases as well as income flows and current transfers, but also on financial markets' willingness and ability to finance deficits or to absorb surpluses.

Equation (2.1) states that the balance of payments is always in *equilibrium*. Nevertheless, people sometimes refer to *balance of payments surpluses* or *balance of payments deficits*. Such statements are usually based on a distinction between the reserve assets part and the other components of the financial account. If we adopt this distinction and define ΔR_{t+1} as the net increase of reserve assets held by monetary authorities between the start of period *t* and the start of period *t*+1, we can rewrite equation (2.1) as

$$(2.2) CA_t + KA_t = FA_t^{NR} + \Delta R_{t+1}$$

In this expression, FA_t^{NR} is the ("non-reserve") part of the financial account that does not reflect monetary authorities' purchase or sale of foreign-currency denominated assets. It is the sum of the net increase of assets over liabilities for all the other categories covered by the financial account: direct investment, portfolio investment, financial derivatives, and other investment. The above expression obviously implies that

$$(2.3) CA_t + KA_t - FA_t^{NR} = \Delta R_{t+1}$$

This equation highlights another important principle: if a country's current and capital account surplus exceeds the net accumulation of assets outside the central bank, reserves increase. Conversely, if the sum of the current and capital account balances is negative, and if it is not matched by a net increase of liabilities outside the central bank, reserves decrease. For the time being, we report this as an important accounting fact without exploring the forces that determine the composition of the financial account. Such an analysis will be performed in Chapter VIII, which will consider foreign exchange markets and the role of countries' central banks in the context of different exchange rate regimes.

II.1.6 Net Errors and Omissions

While balance of payments equilibrium as expressed by equation (2.1) is a sound theoretical concept, it is rarely observed in the data. Usually, the sum of the current and capital account balances differs from the financial account balance. There are many reasons for this: first, it is hardly possible for statistical authorities – more specifically, central banks in charge of compiling and publishing the balance of payments – to correctly record and evaluate *all* international transactions that take place within a time period. While large purchases and sales have to be reported in most countries, central banks often have to rely on estimates when it comes to assessing the sum of small transactions – e.g. in the case of travel expenditures or personal transfers. Moreover, some international transactions are deliberately kept secret, either because they are illegal or because they are driven by tax-evasion purposes. To account for the possible discrepancy between the left-hand side and the right-hand side of equation (2.1), the balance of payments reports *net errors and omissions*, the sign and size of which are implicitly defined by the following equation:

$$(2.4) CA_t^{rep} + KA_t^{rep} + NEO_t = FA_t^{rep}$$

where the superscript "*rep*" refers to the fact that we are not talking about theoretical concepts, but the actual numbers reported in the current, capital and financial accounts, respectively. If net errors and omissions in period t (*NEO*,) are negative, the reported net increase of assets is apparently smaller than what would have been suggested by the combined current and capital account balances. This may be due to an overrating of credits in the current and capital account, an underrating of debits in these accounts, an underrated net increase of assets, or an overrated net increase of liabilities.

Table 2.1 shows that the sum of Germany's reported current account and capital account balances amounted to 257 billion Euros in 2015. This exceeded the reported financial account balance of 225.8 billion Euros by 31.2 billion Euros, which implies that net errors and omissions in the German balance of payments amounted to -31.2 billion Euros in the year 2015.

Figure 2.5 describes the evolution of the German balance of payments from 1971 through 2015. While the current account surpluses of the 1970s were associated with an increase of the Bundesbank's stock of reserves, the 1980s, 2000s and 2010s were characterized by current account surpluses combined with a net increase of assets held by agents other than the central bank. By contrast, the German current account was negative, on average, during the 1990s, and this was reflected by the net increase of liabilities exceeding the net increase of assets. Throughout the period considered, net errors and omissions were rather small.



Figure 2.5: Components of the German balance of payments (average values in percent of GDP) Source: IMF (Balance of Payments Statistics) for 1971 through 1990, Deutsche Bundesbank for 1991 through 2015. The IMF's data were originally compiled according to BPM5, which necessitated a sign change for the financial account entries of the years 1971 – 1990).

Figure 2.6 considers the balance of payments of the USA, China, the Czech Republic, and the Philippines. Both the United States and the Czech Republic exhibited current-account deficits in the 2010-2014 period. In the USA, these deficits were financed by increasing liabilities towards the rest of the world, while the stock of reserves barely moved. In the Czech Republic, the currentaccount deficits were partly compensated by an unusually large capital account surplus - a sign of large capital transfers received in that period. Since the lefthand side of equation (2.1) was still negative, the financial account balance of the Czech Republic had to be negative as well, i.e. liabilities had to increase faster than assets. A look at Figure 2.6 shows that capital inflows into the Czech Republic during the 2010-2014 were, indeed, substantial. In fact, they were so large that the stock of reserves of the Czech National Bank increased – i.e. while individuals and institutions outside the central bank incurred substantial liabilities towards the rest of the world, monetary authorities increased their assets. This evolution was even more pronounced in China and the Philippines: both countries were running current account surpluses during the 2010-2014 period. At the same time, they witnessed substantial capital inflows in the form of FDI,

portfolio investment or other investments. This increase of liabilities outside the central bank system was associated with a strong increase of reserve assets. Note, finally, that the substantial size of net errors and omissions in the Philippines illustrates the large margin of error involved in balance-of-payments accounting.



Figure 2.6: Components of the balance of payments for selected countries (in percent of GDP, average values for the years 2010 - 2014). Source: IMF (Balance of Payments Statistics and International Financial Statistics).

II.2 Some Important Balance-of-Payments Relationships

II.2.1 The Balance of Payments and the Net International Investment Position

A country's *net international investment position* (*NIIP*, sometimes also called its *net foreign assets*) at a given point in time is computed by subtracting the value of all external liabilities from the value of all external assets. Unlike the balance of payments, which reports *flow* magnitudes – i.e. the value of transactions taking place during a specific time *interval* – the net international investment position refers to *stock* magnitudes that can be observed at a given *point in time*. A country with a negative net international investment position is often considered "indebted". However, this perspective misses the fact that both assets and liabilities consist of positions with very different characteristics. Hence, a country can have a largely negative net international investment position despite a moderate level of external *debt* – e.g. if the major share of external liabilities is in the form of direct investments or portfolio equity. This distinction is important: all external liabilities represent a commitment to make future payments to foreigners. However, the individual types of liabilities differ substantially with respect to whether these payments are *state-dependent* or not. While debt-type liabilities – portfolio debt or credit reported in the "other-investment" category – stipulate principal and interest payments that are contractually fixed ex ante, the payments associated with FDI and portfolio equity usually depend on the (ex-ante uncertain) profitability of the companies involved. As we will see in later chapters, these different payoff structures imply that the *composition* of a country's net international investment position matters as much as its *size*.



Figure 2.7: The composition of Switzerland's net international investment position. Assets are shown as positive values and liabilities as negative values in percent of GDP. Source: IMF (Balance of Payments Statistics).

Figure 2.7 describes the structure of Switzerland's net international investment position at the end of 1985, 1995, 2005, and 2014. Several things are noteworthy about this graph: first, it illustrates that the volume of assets and liabilities has increased massively since the mid-1980s. Second, the positive difference between total assets and total liabilities documents that Switzerland's net international investment position (NIIP) has grown from 79 percent to 126 percent of GDP. Third, while the figure does not show that Switzerland has always held both assets *and* liabilities for most categories except central bank reserves, it reveals that the difference between assets and liabilities was usually positive for direct investment and portfolio debt, but negative for portfolio equity. Finally, the figure documents the changing structure of Switzerland's external balance sheet – most notably, the considerable increase of central bank reserves in the most recent past and the growing surplus of other investment liabilities over other investment assets.⁹

As we have explained above, the financial account balance is positive (negative) if the net increase of a country's assets exceeds (falls short of) the net increase of its liabilities. This implies that there is a straightforward relationship between the financial account and the evolution of the net international investment position. Denoting the net international investment position *at the start of period t* by B_t , we can write:¹⁰

$$(2.5) \qquad \qquad B_{t+1} - B_t = FA_t$$

For that reason, a positive financial account balance in period t implies that the NIIP is increasing between the start of that period and the start of the subsequent period, while a financial account deficit implies a decreasing NIIP. Note that B_t itself can be negative at every point in time, signaling that the value of liabilities exceeds the value of assets. Moreover, as mentioned above, the concise representation in (2.5) masks the fact that the net international investment position consists of assets and liabilities with very different characteristics, whose relative importance may vary substantially over time.

By substituting the characterization of balance of payments equilibrium from (2.1) into (2.5), we get

$$(2.6) B_{t+1} - B_t = CA_t + KA_t$$

which relates the evolution of the net international investment position to the capital and current account balances. For example, a large capital transfer –

⁹ For the time being, we focus on a mere description of this evolution. In Chapter VIII, we will relate it to events on international financial markets and to the Swiss National Bank's exchange rate policy.

¹⁰ By defining B_i as the net international investment position at the *start of period t*, we follow a widespread convention in academic literature. Note, however, that annual NIIP data published by policy institutions sometimes refer to the *end* of a year.

reflecting, e.g., debt forgiveness by foreign creditors – has a positive effect on the net international investment position.¹¹ Moreover, an increase of the net international investment position may result from a current account surplus: a country for whom the sum of net exports, net primary income and net secondary income is positive accumulates claims against the rest of the world, which are mirrored by an increasing net international investment position.

II.2.2 Valuation Effects

Equation (2.6) suggests that the evolution of the net international investment position mirrors the sum of the current and capital account balances. This claim can easily be confronted with the data.



Figure 2.8: The sum of the current and capital account balances and the evolution of the net international investment position in Switzerland. Source: Updated and extended version of the dataset constructed by Lane and Milesi-Ferretti (2007).

Figure 2.8 shows the left-hand side and right-hand side of equation (2.6) for Switzerland. In the 1970s, the two time series move almost in parallel. Starting

¹¹ In this case, the credit entry in the capital account is combined with a reduction of liabilities that is reported in the financial account.

in the mid-1980s, however, we observe major differences between the sum of the current account and capital account balances and the change of the NIIP: in the year 2000, for example, $CA_i + KA_i$ amounted to 29 billion US dollars, but in that year the NIIP *decreased* by 45 US billion dollars. Conversely, the Swiss NIIP increased by 165 billion US dollars in 2007, although the combined current and capital account balances were just 36 billion US dollars.¹²

To understand these huge discrepancies, we have to realize that the value of a country's external assets and liabilities may change due to transactions that are reported in the balance of payments - i.e. the purchase of additional assets and the incurrence of new liabilities during a time period - but also due to the fact that the value of *existing* assets and liabilities varies during that year. To account for this effect, we rewrite the evolution of the net international investment position as follows:

$$(2.7) \qquad B_{t+1} - B_t = CA_t + KA_t + VAL_t$$

In this expression, VAL_i represents the *valuation effects* that influence the change of the NIIP beyond the transactions that are reported in the current and capital account balances. There are various factors that may give rise to such valuation changes: first, they may reflect price fluctuations on national equity and bond markets. If domestic investors hold large equity stakes in another country's firms, a stock market crash in that country reduces its external liabilities, while it reduces the home country's external assets. Another important driving force of valuation effects are exchange rate movements: since most countries hold assets and liabilities in different currencies, any change in the exchange rate – i.e. the relative price of one currency in terms of another currency – has immediate consequences for the value of foreign assets and liabilities.

Of course, such price fluctuations have always been around. The reason why they did not have a large impact on the evolution of countries' net international investment position is that, prior to the mid-1980s, the volume of external assets and liabilities – relative to the transactions reported in the balance payments – was rather modest. The rapid progress of financial globalization that started some 30 years ago brought about a huge increase in cross-border investments. As a result, fluctuations of asset prices and exchange rates started to have much bigger effects on the net international investment position. Figure 2.8 documents that this was the case even before the Global Financial Crisis, which

¹² While net errors and omissions contribute to generating such discrepancies, they do not fully explain them, and sometimes they make matters worse: for the year 2000, the net errors and omissions reported by the IMF for the Swiss balance of payments amounted to 13.6 billion US dollars, while it amounted to -10.0 billion US dollars in 2007.

started to unfold in 2007 hit the world economy. Given the huge swings in asset prices and exchange rates that followed the collapse of the US real estate market in 2007, it is not surprising that, in the recent past, countries experienced huge changes in their net international investment positions. Box 2.3 reports the results of a study that assesses the size of these valuation effects and disentangles their components.

Box 2.3: Valuation Effects during the Global Financial Crisis

In the summer of 2007, the world economy had gone through a sequence of prosperous years that were characterized by a substantial increase of cross-border capital flows. This evolution came to an abrupt stop when housing prices started to collapse in the United States, the United Kingdom and some other economies which had experienced a real estate boom in the preceding years. As the crisis unfolded in these countries, it turned out that banks' balance sheets were burdened with a huge amount of bad loans to home owners who could not service their debt, and were collateralized by houses whose value had dropped substantially. The massive increase of foreclosures accelerated a vicious circle of decreasing real estate prices, increasing bank losses and household bankruptcies. When the large US American investment bank Lehman Brothers, which had been severely exposed to the real estate collapse, failed in September 2008, economic mayhem broke loose on a global scale. What transformed the national problems of the countries involved into a global financial crisis were the many interdependencies that had built up during the rapid financial globalization of the early 2000s: in these years, financial institutions around the world had purchased large amounts of *mortgage backed securities (MBS)* - i.e. bulky loans to US American home owners that had been sliced and packaged into smaller pieces and sold on to overseas banks, savers, etc. As the US real estate market broke down, these MBS turned out to be practically worthless, putting pressure on European banks' balance sheets. The bankruptcy of Lehman Brothers exposed these banks to additional stress because many of them had to write off their claims against this institution. What followed was a domino reaction that brought the global financial system to the brink of a meltdown and resulted in a collapse of asset prices and heavy exchange rate fluctuations as well as a major recession in most economies.

Given these developments and the large volume of external asset and liability positions that countries had accumulated in the years preceding the crisis, it is not surprising that the Global Financial Crisis was associated with massive valuation effects. In a study published in 2012, Pierre-Olivier Gourinchas, Hélène Rey and Kai Trümpler assess the sign and magnitude of these effects at the country level, and identify the contribution of different asset categories to countries' total gains and losses.

As shown in Figure B2.3, valuation effects were, indeed, large. Interestingly, the NIIP of some countries that were heavily affected by the crisis actually *increased* between the fourth quarter of 2007 and the fourth quarter of 2008. One of these countries was the United Kingdom, whose assets had been largely denominated in foreign currency, while the major share of liabilities had been denominated in British pounds. As a consequence, the massive depreciation of the British pound that took place in 2008 resulted in a *valuation gain*. The Euro area's NIIP, by contrast, partly increased due to the reduction of external liabilities that was associated with collapsing domestic stock markets. However, these gains were dominated by the losses on the Euro area's direct investment and debt assets.



Figure B2.3: Components of valuation gains (positive) and losses (negative) between the fourth quarter of 2007 and the fourth quarter of 2008. All numbers are in percent of the respective countries' nominal GDP in 2007. Source: Gourinchas et al. (2012) and own computations.

The diversity of country-specific valuation effects during the Global Financial Crisis, as documented by Gourinchas et al. (2012), highlights countries' different exposure to asset-price and exchange rate fluctuations. This exposure, in turn, crucially hinges on the asset-type and currency composition of countries' external assets and liabilities. The question which factors determine this composition is a topic of active research, and one we will repeatedly come across in later parts of this book.

II.2.3 The Dynamics of the Net International Investment Position

Recall from subsection II.1.2 that the current account balance is the sum of net exports of goods and services (NX_t) , the balance on the primary income (BPI_t) and the balance on secondary income (BSI_t) :

$$(2.8) CA_t = NX_t + BPI_t + BSI_t$$

The balance of the primary income account BPI_t can be split into a component that reflects net foreign labor income (BPI_t^L) and a component reflecting net foreign capital income (BPI_t^K) . The latter can be written as the net international investment position times a composite return r_t on foreign assets and liabilities. Hence,

$$(2.9) \qquad BPI_t = r_t B_t + BPI_t^L$$

Note that the "interest rate" r_t in (2.9) represents the composite return on *all* types of securities, i.e. not only interest payments, but also dividends, profits, etc. Combining (2.6), (2.8) and (2.9) and abstracting from valuation effects implies

(2.10)
$$B_{t+1} = (1 + r_t) B_t + NX_t + BPI_t^L + BSI_t + KA_t$$

This law of motion of the net international investment position will be of crucial importance in subsequent chapters. It illustrates that the *future* value B_{t+1} depends on net exports, net foreign labor income, net secondary income and the balance on the capital account, but also on the *initial* value B_t . This relationship is due to the role of the net international investment position for the primary income account. Since r_t is usually greater than zero, it gives rise to dynamics through which a positive (negative) difference between assets and liabilities results in an even higher (lower) NIIP in the future. Furthermore, it allows for constellations where a strongly negative value of B_t results in a decreasing net international investment positive net exports.¹³ Conversely,

¹³ The situation of the Czech Republic in the years 2010-2014, as illustrated by Figure 2.2, documents the empirical relevance of such a situation.

countries' net international investment position may increase despite negative net exports if high returns on the net international investment position dominate in the current account.

Box 2.4: Return Differences and the Evolution of the NIIP

In equations (2.9) and (2.10), we have implicitly assumed that the return on foreign assets equals the return on foreign liabilities. If we drop this assumption and abstract from the capital account, we can follow Lane and Milesi-Ferretti (2007) and rewrite (2.10) as

$$B_{t+1} - B_t = CA_t^{pr} + r_t^{liab} B_t + \left(r_t^{assets} - r_t^{liab}\right) B_t^{assets}$$

Here, $B_t = B_t^{assets} - B_t^{liab}$ represents the country's net international investment position at the start of period t – with B_t^{assets} denoting the value of assets, B_t^{liab} the value of liabilities, and r_t^{assets} (r_t^{liab}) denoting the returns on assets (liabilities). The "primary current account" CA_t^{pr} reflects the sum of net exports, net foreign labor income and the balance on the secondary income account, and the capital account balance is set equal to zero for simplicity. Using lower-case letters to denote variables relative to GDP and defining the growth rate of real GDP as $(1 + g_{t+1}) = Y_{t+1} / Y_t$, we can rewrite the above expression as

$$b_{t+1} - b_t = \frac{ca_t^{pr}}{1 + g_{t+1}} + \frac{\left(r_t^{liab} - g_{t+1}\right)}{1 + g_{t+1}}b_t + \frac{\left(r_t^{assets} - r_t^{liab}\right)}{1 + g_{t+1}}b_t^{assets}$$

This equation demonstrates that the evolution of the net international investment position (as a share of GDP) depends on the primary current account, the difference between the yield on liabilities and the output growth rate times the initial NIIP, and the difference between returns on assets and the return on liabilities. The latter difference weighs stronger if the stock of foreign assets is larger. This decomposition demonstrates that a country which manages to combine high returns received on its assets with low returns paid on its liabilities can afford high primary current account deficits and still avoid large drops of its net international investment position.