An Analysis of International Imbalances and the Saving Glut Hypothesis: A Payment System Perspective

THESIS

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Abbreviations

BIS	Bank for International Settlements
DVP	Delivery versus Payment
ECB	European Central Bank
EEC	European Economic Community
EFSF	European Financial Stability Facility
EU	European Union
FOB	Free on board
GDP	Gross domestic product
ICB	International central bank
ICU	International clearing union
IIP	International investment position
IMF	International Monetary Fund
IMU	International money unit
NOEM	New Open Economy Macroeconomics
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
RTGS	Real-time gross-settlement
SDR	Special Drawing Right
SNB	Swiss National Bank
SSM	Single supervisory mechanism
UN	United Nations
US	United States

Introduction

In an attempt to contribute to the current debate, the focus of this thesis lies on the theory of international imbalances in current monetary macroeconomics. The subject matter could hardly be more topical. Between April and May 2006, "the world's three most important economic policymakers – the G7, the OECD and the IMF – issued almost simultaneously warnings about global trade imbalances" (Koo, 2009, p. 193). At the same time, there exists a broad consensus that mainstream macroeconomic modelling has failed. Stiglitz (2011c, Internet) summarises poignantly the essential insight reached at an IMF conference hosted by himself, Michael Spence, Olivier Blanchard, and David Romer:

> "The most remarkable aspect of the recent conference at the IMF was the broad consensus that the macroeconomic models that had been relied upon in the past and had informed major aspects of monetary and macro-policy had failed."

Even before this insight was reached, a joint article published by Stiglitz (2011b) and seventeen further leading economists (the 'Beijing Group') in the *Financial Times* called for an extension of the International Monetary Fund's (IMF) Special Drawing Rights [SDRs]:

> "[T]he global role of SDRs should be increased, both through new issues and a bigger role for SDRs in IMF lending. [...] Eventually SDRs could become the main, or even the only, mechanism for IMF financing. [...] All of this would make a contribution to enhancing global stability, without altering in any fundamental way existing monetary arrangements. And the dollar would continue as the main currency for private transactions, making this change more acceptable to the US."

The problem clearly perceived by this group of economists concerns the United States' growing external indebtedness, and, on the other side of the equation, the accumulation of dollar reserves in many developing countries. Fading confidence in the US dollar has triggered a search for alternatives to the current international monetary and financial regime that is still centred around the dollar. In fact, Iley and Lewis (2013, p. 61) are right in claiming that "Triffin's ghost continues to haunt many economists, and the global financial system remains unstable and dangerously dependent upon the US dollar". Soon after World War II, "the United States occupied an asymmetric position at the center of the international system, running balance-of-payments deficits, providing international reserves to other countries, and acting as export market of last resort" (Eichengreen, 2007, p. xi). This financial interdependence is ultimately made possible because emerging markets hoard claims on US dollars, instead of demanding real payment. To a

large extent, these dollar reserves serve as insurance from volatile global capital markets, as they can be deployed in order to offset the adverse effects of sudden capital outflows. Moving away from the current, asymmetrical global monetary nonsystem toward a symmetrical system based on rational principles benefitting all member countries will require a considerable degree of intellectual effort and international cooperation. The Basel III agreements and the Single Supervisory Mechanism (SSM) in Europe are a clear indication of policymakers' awareness that financial regulation needs to become increasingly global. With respect to international monetary arrangements, a rational payment mechanism between countries is a public good that must be provided cooperatively by the international community in order for the world to enjoy its positive externalities.

In academia, it has become a widely held view that the microeconomic focus of recent decades has led economists to overlook such systemic issues. Eichengreen (ibid., pp. 2-3) warns that, "[w]hile systematic analyses were once commonplace in the literature on the international monetary and financial system, these have fallen out of fashion in recent years". Yet, "it is impossible to understand the international economy without also understanding its monetary system" (Eichengreen, 2008, p. 1). To wit, the role of the international monetary system is "to lend order and stability to foreign exchange markets, to encourage the elimination of balance-of-payments problems, and to provide access to international credits in the event of disruptive shocks" (ibid.). Eichengreen's remarks are to the point, and remind us to approach the problem of international imbalances in a holistic, macroeconomic manner.

The aim of the present thesis is to critically examine the axiomatic framework of current theories of international imbalances with the intention of improving economists' model-building in this area of research. Particular attention is paid to international payment infrastructures in the present and past, topics that have moved closer to economists' attention only recently. This will be done by critically discussing current approaches in international monetary macroeconomics, after having summarised the major developments of international balance of payments theories since David Hume's price-specie flow mechanism. Ben Bernanke's saving glut hypothesis (2005, Internet) will serve as a valuable example of a widely accepted application of theories of international imbalances. The most important assumptions underlying Bernanke's hypothesis are analysed in order to then present an alternative viewpoint based on the theory of money emissions. A practical reform of the international monetary system is proposed that complies with the theoretical analysis, and that has the potential to improve the stability and efficiency of the current international monetary system.

The research objective is pursued by focusing on theoretical questions. More specifically, an attempt is made to analyse structural-monetary laws in international macroeconomics, thereby largely abstracting from individual

behaviour. By focusing on theory, the author intends in no way to downplay the importance of empirical research in economics. Theoretical and empirical economics are complementary aspects that go hand in hand. But before picking up the measuring stick, it is necessary to know what needs to be measured. In addition to being falsifiable, good economic theory must fulfil at least two criteria: it should refer to reality and be logically consistent. Empirical evidence alone is not a sufficient criterion for the success of a theory. Instead, in economics as in other sciences, "it takes a theory to beat a theory" (Stigler, 1983, p. 541). Many economists empirically tested Bernanke's (2005, Internet) saving glut hypothesis. Only few economists, however, challenged the underlying axiomatic framework. The present thesis contributes to the ongoing efforts to better understand international imbalances by applying the framework of the theory of money emissions to the saving glut hypothesis. By applying this new framework, the author takes seriously Snowdon and Vane's (2005, p. 5) claim that "the coexistence of alternative explanations and views is a sign of strength rather than weakness", as these views "provide a vehicle for improved understanding whereby the effort to comprehend alternative views forces economists to re-evaluate their own views".

The thesis is organised as follows: Chapter 1 offers an overview of the literature on international imbalances, explores Ben Bernanke's (2005, Internet) saving glut hypothesis and presents a selection of the subsequent academic response. Chapter 2 critically revisits the International Monetary Fund's (2009) latest balance of payments framework. Chapter 3 analyses the assumptions underlying the saving glut hypothesis and theories of international imbalances in general. Chapter 4 lays down the foundations of an alternative view on international imbalances by borrowing heavily from the theory of money emissions. Chapter 5 begins by outlining the major shifts in international payment architectures since the international gold standard, focusing on the systems' ability to guarantee final payment between countries. After discussing the role of Special Drawing Rights and Keynes's conception of an International Clearing Union, a new settlement mechanism is suggested that has the potential to improve the stability of the international financial and monetary system. Chapter 6 summarises recent events concerning the Swiss franc's appreciation, an event that dramatically underlines the need for reform of the international monetary framework.

1   The literature on international imbalances

The aim of this chapter is to offer a summary of the development and current state of international macroeconomics – more specifically the theory of international imbalances – in order to then critically review the underlying concepts and assumptions in the following two chapters. As a complete overview of this topic is too large for comprehensive coverage, the account offered here attempts to focus on the salient points relevant to later discussion. This chapter therefore represents a rather narrow selection of aspects in the history of open economy macroeconomics that, according to the author's interpretation, are essential to the subsequent analysis along the lines of the theory of money emissions.

The first section sketches out the evolution of the theory of international imbalances since David Hume's price-specie flow model. Attention is paid to the changing economic circumstances and trends that led economists to adapt their understanding of balance of payments. The second section shifts the attention to Ben Bernanke's saving glut hypothesis. This hypothesis is of particular value and relevance, as it offers a widely accepted application of the current theory of international imbalances and thus illustrates the potency and limitations of today's favoured approach. The third section offers an overview of economists' reactions to Ben Bernanke's hypothesis, followed by a summary of the common elements found in the theoretical criticism.

The term 'international imbalances' is used ambiguously in the literature. 'International', or 'global' imbalances often refer to trade surpluses or deficits. The terms 'international' or 'global' underline that one country's deficit implies the other country's surplus, thereby emphasising countries' economic interdependence. Quite often, the definition of international imbalances is extended to include the entire current account. In part of the literature, international imbalances are identified with balance of payments deficits or surpluses. The term 'balance of payments' is, again, used rather ambiguously, and is therefore open to misinterpretation. Quite often, authors actually mean a current account imbalance when they write of the balance of payments surplus or deficit. Furthermore, it is often unclear if authors have an (accounting) balance or an (economic) equilibrium in mind when they write of surpluses and deficits. From a strict accounting perspective, a balance of payments surplus or deficit does not exist if one agrees with today's conceptual standard set by the International Monetary Fund (2009). The balance of payments, understood as an accounting concept, always sums to zero because "every recorded transaction is represented by two entries with equal values" (International Monetary Fund, 1993, p. 6). However, contemporary economists have no problem to write how "the balance of payments always balances" and, in the same paragraph, explain that balance of payments surpluses and deficits can still occur (see Gandolfo, 2004, p. 63).

According to Gandolfo (ibid.), this procedure is allowed since 'balance' is an accounting concept, while 'equilibrium' is an economic concept. As we will see, the problems related to these definitions are not merely semantic. A thorough analysis of the meaning of surplus and deficit of the balance of payments will therefore be offered in Chapters 2 and 3. In general, it can be stated that, if all accounts are included, then the balance of payments always balances from an accounting ('*ex post*') perspective. Imbalances are therefore confined to the various subcategories of the balance of payments, most notably the official reserves account. The reader who would like to learn more about the differences before plunging into this chapter is referred to Chapter 2.

1.1   From David Hume to New Open Economy Macroeconomics

In accordance with Taylor (1990, p. 41), it may be agreed upon that three major shifts mark the development of economists' understanding of international imbalances. The first shift took place in the eighteenth century, when mercantilist views gave way to the classical paradigm in international commerce. The second, methodological shift took place in the decades around 1900, when the Marginalists reformulated the price-specie flow mechanism laid out by the Classics in the language of classical physics, without changing the basic message of the theory. The third shift took place in the post-war years. Macroeconomic identities moved into the background and gave way to monetary aspects of international imbalances. We may add a fourth shift that has taken place since. Adherents of New Open Economy Macroeconomics (NOEM) integrate market imperfections and focus on forward-looking decision-making processes of rational individuals, in line with today's *Zeitgeist* that requires rigid micro-foundations for macroeconomic theory. Besides pointing out the major shifts that took place, this chapter stresses the considerable continuities connecting the theories in question.

Economic theories are hard to get rid of once they have been empirically 'verified' for a limited period of time in a limited region of the world (think of the Phillips curve). This is so because 'falsification' – a much higher hurdle than 'verification' – does, in practice, not really challenge a theory in economics. Lack of empirical support in most time-periods and regions of the world does not greatly harm an economic theory that can be verified in a few selected cases and is deemed sufficiently attractive by the profession. Quiggin (2010, p. 1) is quite right when he notices with respect to economic theories that "even when they have proved themselves wrong and dangerous, ideas are hard to kill. Even after the evidence seems to have killed them, they keep on coming back". Refutations on theoretical grounds are difficult, as there is virtually no agreement on the legitimacy of the most basic assumptions in economics even at the very top of the academic pyramid (see Chapter 4 for a further discussion). This has led to a

confusing co-existence of conflicting economic theories that does little to facilitate research or attract sceptical students. To the disadvantage of the prestige of our science, it has also turned economics into a hotbed for political partisans, as an economist can pick and choose the theories that most corresponds to his or her pre-set political beliefs. For these reasons, it is useful to present a variety of theories on international imbalances, as none of them in fact superseded the other one. Instead, the development of economic thought can be likened to a complex process of sedimentation, whereby each new layer is placed on top of older layers. In order to understand the landscape of current theories of international imbalances, we must therefore include into our analysis the older sediments that bequeath their structure to more recent theories.

1.1.1 The classical price-specie flow mechanism

Since the beginning of the economics profession, the concept of balance of payments has been at the core of international economics. To a large extent, Smith's (1776/1970) *Wealth of Nations* was a rebuttal of the mercantilist position that the British government ought to intervene in economic affairs in order to increase Britain's gold reserves. Hume's (1955) price-specie flow model can be seen as an early refutation of mercantilist positions (Taylor, 1990, p. 9). Until about the 1920s or 1930s, Hume's model provided the dominant theoretical framework to think about the tendency to equilibrium in international trade. On the dominance of Hume's model of international trade, Schumpeter (1954/1994, p. 367) remarked:

> "In fact it is not far from the truth to say that Hume's theory, including his overemphasis on price movements as the vehicle of adjustments, remained substantially unchallenged until the twenties of this century."

The price-specie flow mechanism is historically closely linked to the classical gold standard. Until this day, this theory "remains the dominant approach to thinking about the gold standard" (Eichengreen, 2008, p. 24). Although a lot of theoretical inquiries accompanied the gold standard, above all the works of David Ricardo, the gold standard was introduced by chance rather than design. For example, Isaac Newton, then master of the mint, set too low a gold price for silver in an attempt to uphold bimetallism in 1717. This government intervention induced the British public to hoard silver coins, which were worth more, in line with Gresham's Law. Only gold coins and clipped silver coins were subsequently used for transactions. The gold standard was formally acknowledged in Britain in 1774, partly because of this miscalculation. The gold standard as a basis of international monetary affairs that emerged after 1870 was a late consequence of a series of such accidental developments. Britain's role as an important trading partner in Europe and Germany's liquidation of silver induced other countries to

adopt the British monetary arrangement. After the two most powerful industrial nations, Britain and Germany, had adopted the gold standard by 1871, other countries quickly followed suit. Eichengreen (2008, p. 24) explains the theoretical mechanism of the international gold standard as follows:

> "Each time merchandise was exported, the exporter received payment in gold, which he took to the mint to have coined. Each time an importer purchased merchandise abroad, he made payment by exporting gold."

According to this mechanism, every country effectively paid for its imports by exporting gold. Every commercial deficit of a country had to be compensated with a corresponding export of gold, thereby guaranteeing perfect symmetry of international trade by using gold as an internationally accepted settlement asset.

How does Hume's (1955, pp. 60-77) model explain the equilibrating mechanism of the gold standard? Importantly, the price-specie flow model incorporates neither banks nor bank money. Instead, the model assumes that a given stock of gold coins physically circulates within an economy. Deficit countries physically lose gold to the surplus countries, triggering a decrease in the quantity of money in deficit countries and thereby falling prices (output remains constant). The inflow of gold into surplus countries, on the other hand, will provoke an increase in the quantity of money relative to output and therefore an increase in prices until international equilibrium is reached. The change of relative international prices tends to reverse trade flows, thereby equilibrating the economic systems of the trading partners involved. While domestic money supply – identified with the amount of gold coins in the economy – is supposed to be exogenously determined, the money supply can increase through exports, thereby leading to an increase in prices. This view was picked up in the monetary approach to the balance of payments two centuries later.

Needless to say, a model that assumes away bank money and capital flows fails to shed much light on the nature of balance of payments, as payments are carried out with (bank) money within as well as between countries today. Also, the model refers to an *ideal* gold standard, which was never put into practice in this form. In reality, gold was not used to settle all imports:

> "Leaving aside flows of newly mined gold from South Africa and elsewhere to the London gold market, [international gold shipments] were but a fraction of countries trade deficits and surpluses". (Eichengreen, 2008, p. 25)

In practice, claims on pound sterling deposits were often viewed as just as good as gold, or even better, as these claims could be used to settle international transactions. According to Brown's (1940) interpretation, the gold standard had

actually been a sterling standard. McCloskey and Zecher (1976, p. 358) confirm that the gold standard "was a standard involving the major currencies as well as gold itself, and that few, if any, central banks followed the putative 'rules of the game'".

It is helpful at this point to register an important, but rarely noticed connection between Hume's classical price-specie flow mechanism and more modern, neoclassical conceptions of international equilibrium. Both Hume and neoclassical writers, such as Léon Walras, were explicitly inspired by hydraulics when constructing their models of the economy. In his influential essay on the balance of trade, published in 1752, Hume (1955, p. 63) compares the international economic system with systems of hydraulics.

> "All water, wherever it communicates, remains always at level. Ask naturalists the reason; they tell you, that, were it to be raised in any place, the superior gravity of that part not being balanced, must depress it, till it meet a counterpoise".

This passage witnesses the early dominance of classical physics in classical economics. As is well known, Léon Walras (1874/1954, p. 71) likewise believed that "the pure theory of economics […] is a physico-mathematical science like mechanics or hydrodynamics". It is striking, in fact, that Léon Walras (ibid., pp. 224-5) used exactly the same metaphor to explain the tendency towards equilibrium:

> "Viewed this way, the market is like a lake agitated by the wind where the water is incessantly seeking its level without ever reaching it. But whereas there are days when the surface of a lake is almost smooth, there never is a day when the effective demand for products and services equals their effective supply and when the selling price of products equals the cost of the productive services used in making them."

Alfred Marshall (1948, p. 32) believed, very similarly, that the laws of economics could be compared to the laws of the tides. This common intellectual root of classical and neoclassical economics helps to understand why the Marginalist Revolution, carried out by economists such as Menger, Jevons, Walras and Marshall, left Hume's thesis virtually intact. "If anything", Taylor (1990, p. 16) even points out, "the theory was strengthened". Both classical and neoclassical economists were thinking about international trade and money flows hydraulically, in terms of dynamic equilibria brought about by laws of nature. Economists since Hume have been trying to interpret an equilibrating mechanism based on competition and arbitrage into international trade flows, mimicking the effect gravity has on water. There has therefore been no emancipation from physics, and Friedman (1953, p. 4, emphasis added) still believed that "positive

economics is, or can be, an 'objective' science, *in precisely the same sense as any of the physical sciences*". Therefore, in 1937, it was still possible to write that "[t]he 'classical' theory of the mechanism of international trade from Hume to J.S. Mill, is still, in its general lines, the predominant theory" (Viner, 1937, p. 291).

But why is this relevant? We may simply point out at this stage that the 'hydraulics analogy' in international (monetary) economics is not self-evident, as money and payments are essentially immaterial (accounting) phenomena that rely on anthropogenic payment architectures. Payments are carried out with money, which has a distinctly numerical nature; numbers certainly are not defined physically. Payments are a cultural achievement that should not be compared to natural forces light-heartedly. This point will be taken up again and discussed in more detail in Chapters 4 and 5.

The Cunliffe Committee, a British government committee established to assess the vices and virtues of the equilibrating price-specie flow mechanism, slightly extended Hume's model (see Eichengreen, 2008, pp. 25-6). In the Cunliffe version, an exogenously determined stock of paper money circulates in an economy, the central bank guaranteeing gold convertibility. Surplus countries convert the acquired foreign paper money into gold and then convert the gold back into domestic currency, thereby increasing the money supply. Equilibrium is achieved through a higher price level in the surplus country and a lower price level in the deficit country, analogous to Hume's price-specie flow mechanism. As Eichengreen (ibid.) points out, "nothing essentially differed from the version of the price-specie flow model elaborated by Hume". In fact, money is simply identified with a sort of gold certificate in the Cunliffe version of balance-of-payments imbalances. Capital flows do not play a role. The role of banks and bank money remains negligible. Instead of gold physically circulating in the economy, gold certificates are used to settle debts between economic agents. Physical gold then circulates between countries to offset net positions in international trade.

The Marginalist Revolution brought classical political economy to its knees at the end of the nineteenth century. Some classical concepts, for example Ricardo's theory of comparative advantage, survived the Marginalist Revolution virtually unscathed despite their dependence upon the labour theory of value. However, Hume's price-specie flow mechanism was quickly draped into the language of equilibrium as economists soon came to believe that "international monetary economic analysis never received precise mathematical formulation" (Mundell, 1976, pp. 64-5).

1.1.2 The elasticity approach

The elasticity approach (also: elasticities approach) goes back to a paper published by Charles Bickerdike (1920) and examines the effects of exchange rate variations on the balance of payments. In this view, international equilibrium depends on relative price adjustments of goods and services between trading nations. Compared to Hume's price-specie flow model, which focuses on the influence of price levels in trading countries, the elasticity approach stresses exchange rate variations between trading nations. A relative price change of export and import goods between two countries will induce the public to shift their consumption pattern, thereby changing the flow of international trade. A devaluation of the domestic currency, *ceteris paribus*, increases exports and decreases imports, *vice versa*. However, it is not sure that the quantity effect of a devaluation of a currency will necessarily lead to a betterment of the trade balance, as the latter is expressed in terms of value, not quantity. In the short run, the devalued domestic currency will cause an import price increase, thereby worsening the trade balance in the short run (price effect). In the long run, the depreciation might lead to an improvement due to a volume effect. A depreciation of the currency will only lead to an improvement of the trade balance in the long run if the sum of export and import elasticities is greater than unity. The reason for this is that a depreciation will make imports more expensive, thereby worsening the balance of trade in the short run. In the long run, however, increased exports will tend to overcompensate this effect, producing a J-curve in net exports. The case in which increased exports overcompensate the higher price of imports is known as the Marshall-Lerner condition (Gandolfo, 2004, p. 76), a condition that is usually supposed to hold according to economics textbooks. Abel and Bernanke (1992, p. 508), however, remind their readers that "this assumption may not be valid for shorter periods – and in some cases, even for several years". The elasticity approach is largely a barter model with relative prices between goods traded directly without the necessary intervention of money, and was deemed too simple after the Keynesian Revolution had taken place.

1.1.3 The absorption approach

The absorption approach to the balance of payments is mainly attributed to Sidney Alexander (1952, 1959) and stresses that a country's current account balance is determined by the difference between its produced output and its 'absorption'. Absorption means the expenditures by domestic residents on goods and services, or, in Alexander's (1952, p. 265) terms, "the taking of goods and services off the market". The absorption approach superseded the older elasticity approach (Johnson, 1976b, p. 150), which was considered too simple, and shaped subsequent theories of international imbalances in important ways. A new feature of this approach was that it stressed the increase or decrease of foreign assets that

result from international trade. The principal aim of the model was to answer the question if currency devaluations improve a country's balance of trade (Vines, 2008, p. 3). While the elasticity approach attempts to answer this question by focusing on relative price changes, Alexander (1952) argues that devaluation is only successful if it widens the gap between domestic output and domestic absorption. The gap widens due to the inflation resulting from the devaluation, triggering a reduction in absorption relative to production.

The absorption approach can be best illustrated by referring to Keynesian income-expenditure accounting identities. Let the symbols Y, C, I, G, X and M stand for output, consumption, investment, government expenditure, exports and imports, respectively (Vines, 2008, p. 3). Then,

$$Y = C + I + G + X - M, \tag{1}$$

which may be rewritten as

$$X - M = Y - (C + I + G). \tag{2}$$

The trade surplus, $X - M$, is equal to total output available in the economy, Y, minus total expenditure, $C + I + G$. Alexander translates this formula into a simpler version, $B = Y - A$, where B is the balance of trade, Y total output and A total absorption. Alexander's absorption approach can be seen as a notable shift away from traditional (microeconomic) partial equilibrium analysis of supply and demand to the study of (macroeconomic) relationships between macroeconomic magnitudes:

> "[A] more fruitful line of approach can be based on a concentration on the relationships of real expenditure to real income and on the relationships of both of these to the price level, rather than on the more traditional supply and demand analysis." (Alexander, 1952, p. 263)

The absorption approach shows that for a devaluation to improve the balance of trade, it must either lead to increasing output (Y) without increasing absorption (C + I + G), or a decrease in absorption without decreasing output, or a combination of both. Different effects work in different directions in case of a devaluation of the domestic currency. Gandolfo (2004, pp. 146-7) offers a good overview of these effects, which are not relevant to the question at hand.

The absorption approach underlined for the first time the role of desired wealth changes in generating international imbalances (Obstfeld, 2001, p. 5). Despite focusing on macroeconomic identities, it already heralded later approaches that sought a more thorough microeconomic foundation. The main points of the absorption approach were integrated into subsequent theories of international

imbalances. For Gandolfo (2001, p. 297), the pioneering idea of the absorption approach is that "*it is the set of macroeconomic factors underlying absorption (i.e., saving and investment decisions) that ultimately determine the current account and hence international borrowing or lending patterns*". Indeed, it was the first model that explicitly linked the saving-investment identity with the current account balance. This idea gave a crucial impulse for further research in the area of international macroeconomics, so that the modern intertemporal approach (see section 1.1.7) can be seen as an extension of the absorption approach. The desire to integrate the capital market and individual behaviour into the theory of international imbalances also led to the approach by Robert Mundell and Marcus Fleming a decade later.

1.1.4 James Meade's neoclassical synthesis

Before the Keynesian Revolution, international imbalances were studied in the classical context of the price-specie flow mechanism. Relative price changes of goods and services, along the lines described by the elasticity approach, were meant to equilibrate international trade. International macroeconomics after World War II focused on the path to internal (full employment) and external (balance of payments) equilibrium and optimal government policy. This also reflected the widening and deepening of democracy in the first half of the twentieth century. In the nineteenth century, the macroeconomic burden of adjustment could be laid on the working classes owing to an authoritarian state, and unemployment was not yet such a crucial issue on the government's agenda. After the two world wars had changed the nature of the state, government policy increasingly took into consideration the demands of those classes formerly excluded from the political arena. In *The Balance of Payments*, volume I of the *Theory of International Economic Policy* – a book that set the standard for years to come – Meade (1951) integrates aspects of Keynesian thought into open economy macroeconomics in the neoclassical equilibrium tradition. In a sometimes opaque exercise of comparative statics, he analyses partial and temporary equilibrium positions, introduces exogenous shocks and then considers the new equilibrium position.

Keynes's work can be characterised as a spirited attempt to integrate monetary and real analysis into a general, holistic framework. The difficult task for Meade was to somehow add money to the classical barter model of trade, in order to integrate classical analysis with Keynesian concepts (Mundell, 1976, p. 67). Meade does this by building the capital market into a general-equilibrium framework, thereby extending the traditional elasticities approach to the balance of payments. He stresses that governments need one policy tool for each policy objective they want to achieve. If a government wants to achieve internal and external balance (full employment and current account equilibrium, respectively),

it needs one tool for each objective. For Meade, these instruments are fiscal and monetary policy. The central thesis of Meade's book is that if trade is sensitive to price changes, international equilibrium should be brought about by price adjustments. In general, international equilibrium will come about by itself if things are left to themselves. The view that there is a tendency to equilibrium in the balance of payments when exchange rates are left to float is mirrored in Meade's advocacy of floating exchange rates in the European Economic Community (EEC). Only if price adjustments do not bring about international equilibrium, "reliance must be placed on direct controls" (Meade, 1951, p. viii). The possibility of sustained and harmful disequilibria – something that did not exist in the classical paradigm – reflected the Keynesian spirit in which Meade elaborated his economic model.

But Meade was only partially happy with his two-country model: "[T]his is a work not on dynamics, but on comparative statics, in economics" (ibid.). There was a desire in academia for a model that better explained a self-adjusting path to external equilibrium. Furthermore, the wide variety of heroic assumptions and the expository style of Meade's work created a forbidding *façade* that greatly reduced the impact of his work.

1.1.5 The approach of Robert A. Mundell and John M. Fleming

The Mundell–Fleming model of international macroeconomics that resulted from the works of Robert Mundell (1963) and Marcus Fleming (1962) promised to introduce a missing dynamical component by integrating a self-adjusting mechanism. It extends Keynesian income-expenditure models developed by Metzler (1942) as well as Meade's (1951) equilibrium approach. The mechanism resembles the classical price-specie flow mechanism described by Hume in important ways. Indeed, Mundell (1961, p. 154) even argues that his approach incorporates classical and Keynesian models as special cases. Mundell and Fleming managed to integrate a self-adjustment mechanism by putting international capital flows into the centre of their analysis. The theoretical developments in the 1960s reflected the increasing global integration of capital markets that was occurring at the time. While theories of international imbalances before the 1960s focused on the trade balance and the current account, new approaches increasingly integrated the capital account into formal modelling (Kenen, 1985, p. 673). In this view, perfectly informed and forward-looking *arbitrageurs* immediately exploit interest and exchange rate differentials between countries by trading currencies and securities in financial markets without government restrictions, a condition known today as perfect capital mobility. In Frenkel and Razin's (1987, p. 1) opinion, "[t]he key contribution of this model has been a systematic analysis of the role played by international capital mobility

in determining the effectiveness of macroeconomic policies under alternative exchange rate regimes".

The model quickly turned into the dominant paradigm for studying monetary and fiscal policy issues in open economies and still features prominently as the open-economy extension of the IS–LM model in economics textbooks. The model can be reduced to three equations: equilibrium on the goods market (real equilibrium), equilibrium on the money market (monetary equilibrium) and equilibrium of the balance of payments (external balance). Importantly, net capital inflows are an increasing function of the interest rate differential; the higher the domestic interest rate relative to the external interest rate, the more securities foreigners will demand, hence the greater the capital inflows. Balance of payments equilibrium is defined as the situation in which the stock of international reserves remains constant (Gandolfo, 2004, p. 86). The model enables studying the reactions of interest rates and output to fiscal and monetary policy in the case of fixed and flexible exchange rates in a neoclassical framework. A popular and rather simple version of the model that assumes perfect capital mobility is based on an article by Mundell (1963) published in the *Canadian Journal of Economics and Political Science*.

The Mundell–Fleming model suggests that, under fixed exchange rates and perfect capital mobility, monetary policy is completely impotent. This, of course, is perfectly in line with the policy trilemma (Obstfeld and Taylor, 1997). Interest rate differentials between countries erode because of free capital flows. A rise in the money supply lowers domestic interest rates relative to foreign interest rates. Households will then immediately start to demand foreign assets with higher yields, thereby increasing the demand for foreign currency and weakening the external value of the domestic currency. The central bank must restrict the money supply in order to stabilise the exchange rate. In a fixed exchange rate regime, the monetary authorities therefore cannot control the money supply. In this case, only fiscal policy has an effect on output and employment through an increase in aggregate demand. All that the central bank can do is alter the amount of foreign-exchange reserves in order to keep the exchange rate stable.

With flexible exchange rates, monetary policy can play a role and has an effect on output and employment: "The monetary expansion puts downward pressure on the interest rate and induces a capital outflow, further depreciating the exchange rate and creating an exports surplus, which in turn increases, through the multiplier effect, income and employment" (Mundell, 1963, p. 478). However, with flexible exchange rates, fiscal policy only has short-term effects. An increase in government spending will, *ceteris paribus*, increase interest rates owing to a crowding-out mechanism and therefore also increase the inflow of capital from abroad, thus strengthening the exchange rate and depressing net exports. The lower net exports offset the higher government expenditure.

While the income-specie flow mechanism was able to demonstrate self-adjustment processes of external positions, it did not explain internal adjustment. In order to overcome this deficiency, Mundell (1962) describes a mix of fiscal and monetary policy that would harmonise internal and external equilibrium. A country experiencing high unemployment and a negative official settlements balance could expand fiscally and contract monetarily. The fiscal expansion would increase employment; the monetary contraction would close the payments gap, as foreign residents would demand domestic financial assets.

Although the Mundell–Fleming model was the academic workhorse for many decades and was used to understand short-term developments in international economics, Obstfeld (2001, p. 7) argues that "the theory of the policy mix had little practical significance under Bretton Woods". An early empirical study by Michaely (1971, p. 33) suggests that the Mundell–Fleming model was relevant only at universities, not for policy makers. Also, the scientific community was moving away from the analysis of stable relationships between macroeconomic aggregates and looked for models that increasingly rested on individual behaviour, as Frenkel and Razin's (1987, p. 45) critique illustrates:

> "A key characteristic of the formulation of the income-expenditure framework underlying the Mundell–Fleming model is the lack of solid microeconomic foundations underlying the behaviour of the private and public sectors, and the absence of an explicit rationale for the holdings of zero interest-bearing money in the presence of safe interest-bearing bonds."

The monetary approach to the balance of payments was supposed to overcome these deficiencies.

1.1.6   The monetary approach to the balance of payments

Mundell's dissatisfaction with his own approach led him to pursue the so-called monetary approach to the balance of payments in the 1960s, followed by Frenkel and Johnson in the 1970s. Frenkel and Johnson (1976) clearly show that the historical origins of their theory reach back to authors such as Kindleberger, Wicksell, Mill and Gervaise. As the authors maintain – tautologically we may add – the main characteristic of the monetary approach to the balance of payments is the notion that "the balance of payments is essentially a monetary phenomenon". According to Blejer and Frenkel (2008, p. 687), the monetary approach distinguishes itself from other analytical approaches because it enables studying "the direct connection between the money market and the balance of payments, rather than working through the implied changes in the goods or financial assets markets". For example, older approaches in international macroeconomics

traditionally assumed that countries with a trade surplus were to expect appreciating currencies, and countries with trade deficits were to expect depreciating currencies. It was soon clear that the world did not work as simply as this, and that currency speculation could move exchange rates in directions completely unanticipated by economists (Melvin and Norrbin, 2012, p. 271).

Johnson (1977, p. 251) explains that the monetary approach stresses three points. First, balance-of-payments problems are monetary problems that should be addressed with monetary models. Exchange rates are not simply viewed as the results of trade, but as the results of demand for and supply of different national monies. The money account represents the excess supply of or demand for money and is modelled in terms of behavioural relationships. Secondly, money is considered a stock, not a flow. This difference is "to some extent an empirical matter. In the stock approach, it is assumed that financial markets equilibrate very fast" (Kouri, 1976, p. 281). In the flow approach, transaction costs slow down the adjustment of portfolios. Thirdly, the money supply can be increased in two ways – through the expansion of domestic credit or the export of domestic products. Monetary authorities can control the first, though not the second source of money supply. The supply of money is the product of high-powered money and the money multiplier. High-powered money is composed of the domestic asset holdings of the monetary authorities and the domestic-currency value of the monetary authority's foreign currency (Blejer and Frenkel, 2008, p. 687). Similarly to the absorption approach, the balance of payments may be written as follows (Johnson, 1976a, p. 49):

$$B = R - P, \qquad\qquad\qquad\qquad\qquad (3)$$

where B represents the positive or negative balance of payments, R represents aggregate receipts by residents, and P represents aggregate payments by residents. The balance of payments "refers specifically to the Official Settlements Balances, that is, the 'money account'" (Mussa, 1976, p. 189). The demand for or supply of money drives the balance of payments in the monetary approach to the balance of payments, a clear indication of the microeconomic foundation of the theory. In case a higher demand for money is not met by an increase in supply, a stock disequilibrium is at hand. Higher levels of income, lower interest rates or rising prices will lead to an increase in the demand for nominal money balances (Mark, 2004, p. 66). If domestic money supply does not accommodate this extra demand for money, an increase in net exports will result and cause a current account surplus. The surplus will increase the foreign exchange holdings of the public, who subsequently can sell them to the foreign exchange authorities in order to satisfy their demand for domestic money holdings. In exchange for the foreign currency, the foreign exchange authority is able to create – *ex nihilo* – the sum of domestic money.

Looked at from the other side, a growth of the domestic money supply, induced by central bank policy, over and above what the public wishes to hold, will cause higher imports and thereby a current account deficit, leading to a decrease of the domestic money supply and the running down of international reserves. With respect to the adjustment process, Mussa (1976, p. 188) adds that "[t]he exact nature of the process of adjustment will vary from model to model. The only necessary feature is that the balance-of-payments surplus must always be equal to the excess of income over expenditure".

Frenkel and Johnson (1976, p. 22) argue that their monetary approach improves the cruder elasticity approach because it integrates Sidney Alexander's (1952) absorption approach and stresses the money-demand function. According to the absorption approach, the current account surplus is the result of an excess of a country's available income over its absorption, leading to an accumulation of "claims on future income (assets) from abroad or vice versa" (Frenkel and Johnson, 1976, p. 22). Importantly, the monetary approach crucially rests on some version of the quantity theory of money and the hypothesis that the domestic flow supply of money can be controlled by the central bank via the money multiplier: "[T]he monetary authority, as the ultimate source of domestic money, controls the rate of change of the domestic component of the monetary base – the other component being international reserves – and thereby the flow supply of money" (ibid., p. 23). The stock supply, however, cannot be controlled according to the authors, as the public may "convert domestic money into goods and securities in the international markets" (ibid). There is a close relationship between the monetary approach to the balance of payments and the classical price-specie flow mechanism; the price-specie flow mechanism is seen as the intellectual origin of the monetary approach (Blejer and Frenkel, 2008, p. 687). David Hume assumed that money and gold were essentially the same, thus making the commodity money assumption typical for classical monetary theory. Frenkel and Johnson (1976) similarly assume that money is a valuable asset, created by the banking system at near zero cost, and that money can physically leave one country and enter the other, thereby inducing a money stock decrease in the importing country and a corresponding increase in the exporting country. Indeed, the following passage by David Hume (1955, pp. 62-3) is widely perceived to be in line with the monetary approach to the balance of payments:

> "Suppose four-fifths of all the money in Great Britain to be annihilated in one night, and the nation reduced to the same condition, with regard to specie, as in the reigns of the HARRYS and EDWARDS, what would be the consequence? Must not the price of all labour and commodities sink in proportion, and every thing be sold as cheap as they were in those ages? What nation could then dispute with us in any foreign market, or pretend to navigate or to sell manufactures at the same price, which to us would afford sufficient profit? In how little time, therefore, must this bring back the

money which we had lost, and raise us to the level of all the neighbouring nations? Where, after we have arrived, we immediately lose the advantage of the cheapness of labour and commodities; and the farther flowing in of money is stopped by our fulness and repletion."

This analysis assumes more or less explicitly that it is the same from a monetary point of view to import from abroad and to destroy part of a country's money supply: "If England's money stock suddenly was reduced by four-fifths, we know from principles of economics that the price level would fall dramatically" (Melvin and Norrbin, 2012, p. 272). Falling prices would improve England's competitive position and induce a trade surplus that would eventually bring the system back to equilibrium.

Two main implications result from the monetary approach (see Gandolfo, 2001, pp. 176-7). First, the monetary authority cannot and should not attempt to control the money supply in a system of fixed exchange rates. Any attempt to increase (decrease) the money supply by more than the public desires will merely lead to a balance of payments deficit (surplus), thereby decreasing (increasing) the monetary base and ultimately the money supply. Secondly, monetary authorities ought not to intervene to correct international imbalances, as the path to equilibrium is automatic. Balance of payments disequilibria are self correcting in the long run:

> "Balance of payments deficits or surpluses are by their very nature transient and self-correcting, requiring no deliberate policy to correct them. […] The reason is simply that deficits reduce money stocks whose excessive size underlies the deficit, and surpluses build up the money stock whose deficiency underlies the surplus." (Johnson, 1976c, p. 16)

In a nutshell, an excess demand for money by the public causes a balance of payments surplus, while an excess supply leads to a deficit. We may now dwell a little on the equilibrating mechanism proposed by the model. Importantly, the model assumes full employment equilibrium and purchasing power parity between countries thanks to instantaneous price and wage adjustments. If, say, there is an excess supply of money, a balance of payments deficit will appear as residents will get rid of the superfluous monetary assets by increasing absorption relative to production. As soon as the desired stock of money is reached, equilibrium is reached. Problems of balance of payments disequilibria are thus reduced to finding the optimum quantity of money within a national economy. Rather than focusing on the nature of imbalances, this approach focuses on individual desires for money stocks that cause flows between countries.

With respect to the compatibility of the different approaches presented up until now, we may quote Mundell (1968, pp. 150-1), who believes that it is "not

meaningful to question the validity of the [elasticity approach, the absorption approach and the monetary approach to the balance of payments]". According to him, "the terms can be defined so that they are all correct and assert identical propositions, even if capital movements are included". Thus, we are made to believe by an originator of the monetary approach of the balance of payments that the string of theories explaining international imbalances are not contradictory, but rather shift the attention from relative prices (elasticity approach) to wealth disequilibria (absorption approach) to money stock disequilibria (monetary approach) as causes for international imbalances.

As we have seen, while post World War II economic literature focused on the integration of Keynesian and equilibrium models and the mechanisms of adjustment under different conditions, the turbulent 1970s changed the emphasis. The increasing rejection of Keynesian methods and the intellectual allure of the Chicago school had a significant impact on research in international macroeconomics. The sudden increase in oil prices in 1973–74 and 1979–80 triggered largely by the altered pricing policy of the Organization of the Petroleum Exporting Countries (OPEC) led to large trade surpluses in petrol exporting countries and corresponding trade deficits in petrol importing countries worldwide. This economic trauma gave rise to an extensive amount of literature focusing on the causes and the sustainability of international imbalances. After 1980, current account imbalances remained stable globally, only to increase again after 1996 (Blanchard and Milesi-Ferretti, 2009, p. 7). The Mexican Tequila-crisis of 1994–95 and the Asian financial crisis that began in 1997 again put current account deficits on the agenda of policymakers. In 2004, the US current account deficit reached over 600 billion US dollars, almost 6 percent of the country's GDP. This deficit corresponded approximately to India's entire GDP in 2004. In 2006, the current account deficit of the United States peaked at around 800 billion US dollars, or approximately 7 percent of its GDP, and has since then become somewhat smaller.

Fears of a disorderly unwinding of the US net debtor position triggered another wave of articles and academic papers. The European Central Bank's (2004, p. 17) December 2004 *Financial Stability Review* acknowledged that "[l]arge and growing US current account deficits have generally been perceived as posing a significant risk for global financial stability, at least since 2000". The deterioration of the US net international investment position, shown in Graph 1.2, is a direct effect of the US current account deficits. According to official statistics, the United States turned into a net debtor to the rest of the world in 1989 (Van den Berg, 2010, p. 82). In 2008, the US net debtor position was estimated at almost 3.5 trillion dollars.[1]

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[1] Despite of this substantial net debtor position, the United States continues to earn positive net asset returns. This paradox has given rise to considerable research. The most famous explanation
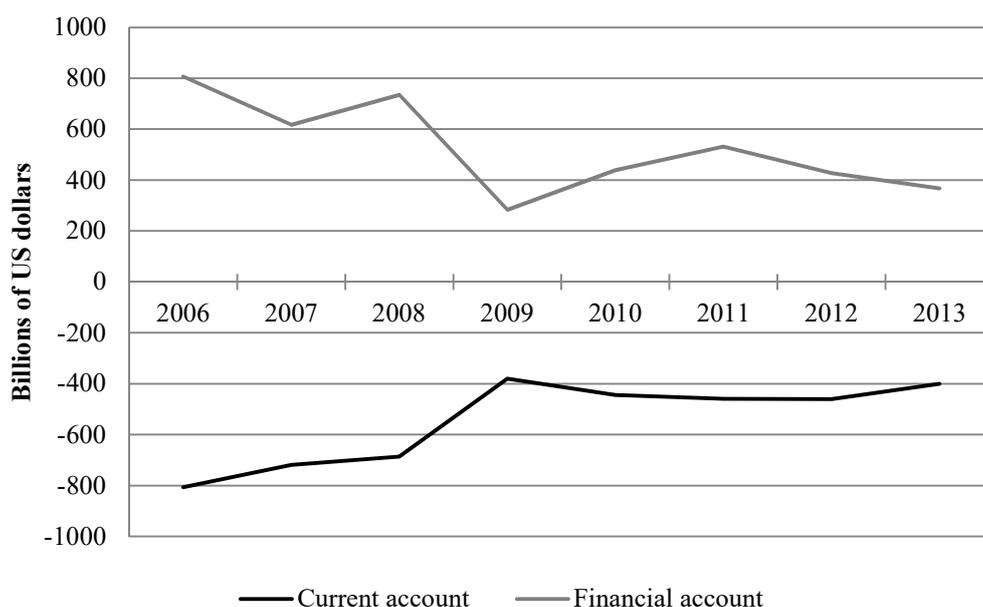
Graph 1.1 The US balance of payments.
Source: Balance of Payments Statistics Yearbook 2014, International Monetary Fund
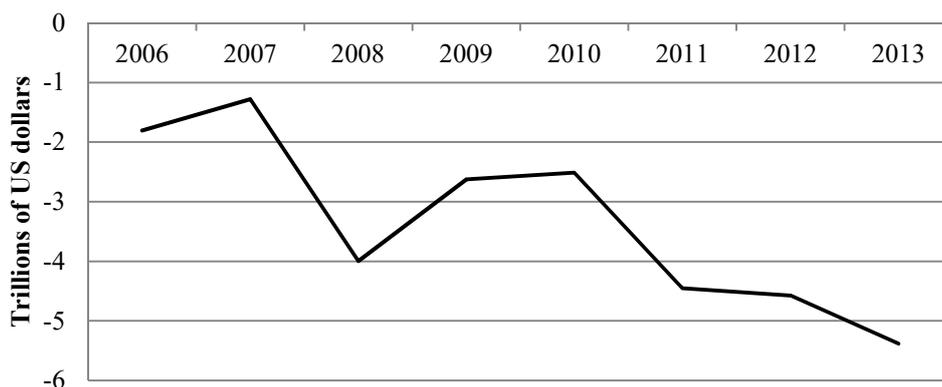
Graph 1.2 The US net international investment position.
Source: Balance of Payments Statistics Yearbook 2014, International Monetary Fund

Current account deficits must be financed by exporting financial assets such as bonds, shares or claims to bank deposits. If the owners of US dollar-denominated financial assets lose their appetite for these assets, they could trigger fire sales around the globe, leading simultaneously to a US stock and bond market crisis, a sharp devaluation of the US dollar and an interest rate hike, thereby seriously harming the US and global economy. The warning calls are understandable, given sudden stops of capital inflows and lower economic growth that have often accompanied major reversals in current account deficits in the past (for a historical account on current account reversals see Edwards, 2004).

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by Hausmann and Sturzenegger (2006) calculated the existence of an invisible but substantial positive net financial value (so-called dark matter) whose existence is evidenced by the positive net returns.

1.1.7   The intertemporal approach

The intertemporal approach to explaining current account imbalances was established in the 1980s, mainly as a result of the works of Buiter (1981), Sachs (1981), and Obstfeld (1982). Similarly to the monetary approach, the intertemporal approach integrates Alexander's (1952) absorption approach and, focusing on individual behaviour, states that current account imbalances are the result of "forward-looking dynamic saving and investment decisions" (Obstfeld and Rogoff, 1995b, p. 1732). An infinitely lived representative agent smoothens her consumption pattern by borrowing from and lending to foreign countries. If output and income are temporarily low owing to some exogenous shock, a nation may rationally increase its aggregate utility by purchasing more than it produces in this period, thereby temporarily running a current account deficit. Compliant with the tradition of methodological individualism, the nation is identified with a representative agent. If the agent absorbs (consumes plus invests) more than she produces within a specified time period, she will have to borrow from another nation the necessary purchasing power in order to acquire the foreign output. The new net borrowing equals the current account balance. Lucas's (1976) rational expectations approach is prevalent in these models of international imbalances. Individuals do not merely take into account historical data in their decision-making, but make their best possible assessment of future developments by analysing the structure of the economy; they immediately adapt to expected future outcomes.

Since the first intertemporal models of the current account emerged, the approach has been extended. To give an example, Bussière et al. (2004) extend the standard intertemporal model with one representative agent by introducing a second agent. While the first agent is liquidity restrained and therefore consumes all of his income in each period, the second agent is able to smoothen his consumption pattern owing to a soft liquidity restraint. So, while details have been added and certain factors stressed, it is still the dominant view that macroeconomic magnitudes must be explained using micro-foundations. By borrowing and lending on international financial markets, countries – defined as the sum of their residents – smoothen their final consumption. Although empirical studies have not been able to validate the intertemporal approach (see Ghosh and Ostry, 1995; Ogaki et al., 1996; Nason and Rogers, 2002), it remains a widely accepted concept to explain changes of the current account.

Feldstein and Horioka (1980) contribute to the debate by asking if an increase in private saving is invested within the country itself or if it flows abroad. Additionally, they raise the question whether an increase in the corporate tax rate merely leads to an outflow of capital. The authors hypothesise that "[w]ith perfect world capital mobility, there should be no relation between domestic saving and domestic investment: saving in each country responds to the worldwide

opportunities for investment while investment in that country is financed by the worldwide pool of capital" (ibid., p. 317). Instead of resulting in increased investment, a one percentage point increase in national saving is supposed to feed into the current account under conditions of perfect capital mobility, not in investment. By proposing that national saving and investment ought to be uncorrelated in a world with perfect capital mobility, the authors assume the essential homogeneity of national currencies. In this view, there is no real difference between separate national currencies, and the savings of one country can just as well be spent or invested in every other country. Their hypothesis engenders an explanation of current account imbalances. Feldstein and Horioka (ibid., p. 320) point out that "the net inflow of foreign investment is equal to the current account deficit". If their hypothesis is correct, this would mean that savings flow to wherever the highest returns to capital are to be found, and that differentials in returns to capital ultimately determine current account imbalances. The current account would have to passively adjust to the saving–investment imbalance within countries.

After testing their hypothesis empirically, the authors find that national investment and national saving tend to correlate rather closely: a one-percentage-point increase in the saving rate goes hand in hand with a near one-percentage-point increase in the investment rate. This is taken as evidence that capital markets are highly imperfect, namely that "portfolio preference and institutional rigidities impede the flow of long-term capital among countries" (ibid., p. 328). The close correlation of national saving and investment was subsequently coined the 'Feldstein–Horioka puzzle' and determined as one of six major puzzles in international macroeconomics by Obstfeld and Rogoff (2001).

As we have seen so far, neoclassical economists today regard the level of saving and investment as the result of individual behaviour, which is why contemporary theories of international imbalances are mostly extensions of microeconomic theories of saving behaviour, extrapolated into the field of international macroeconomics. The current account is modelled "as an outcome of behavior of far-sighted, intertemporally optimising households and firms" (Sachs, 1981, p. 2). The existing research on the determination of saving is itself firmly dedicated to microeconomic foundations. It particularly stresses the role of life-cycle considerations (Modigliani, 1970), precautionary savings (Kimball, 1990), habit formation (Overland et al., 2000), culture (Belton and Uwaifo Oyelere, 2008), and financial underdevelopment (Caballero et al., 2008). These microeconomic concepts feature prominently in the vast literature on current account imbalances, as we repeatedly see in this chapter.

1.1.8   New Open Economy Macroeconomics

The intertemporal approach to explaining current account imbalances with its focus on saving and investment decisions has been consolidated within the framework of New Open Economy Macroeconomics (NOEM), the leading framework mainly attributed to Obstfeld and Rogoff (1995a). NOEM is an equilibrium model with "micro-foundations in combination with nominal rigidities" (Bergin, 2006, p. 675). This "new workhorse model for open-economy macroeconomic analysis" introduces "nominal rigidities and market imperfections into a dynamic general equilibrium model with self specified microfoundations" (Lane, 2001, p. 235). By allowing for market imperfections, economists hope to provide an analytical framework "that is relevant for policy analysis and offers a superior alternative to the Mundell–Fleming model that is still widely employed in policy circles as a theoretical reference point" (ibid., p. 236). Rather than breaking with the past in any important way, NOEM confirms the on-going tendency in economics that all macroeconomics must be based on predictions about human behaviour (so-called microfoundations) and on the concept of equilibrium. To be sure, neither the equilibrium approach nor methodological individualism are new in economics, as they are already clearly established in the works of economists such as Léon Walras or Alfred Marshall. The NOEM framework is intertemporal, meaning that the approach, "in its simplest form, focuses on the optimal saving decision of a representative household as it smooths consumption" (Bergin and Sheffrin, 2000, p. 535). For example, if individuals anticipate that income opportunities will increase in the near future, they will rationally decide to borrow from abroad and thus consume more than they currently produce today, thereby smoothing their consumption pattern.

From a monetary perspective, there is nothing new in this approach. It introduces a vast catalogue of assumptions – the crucial ones have not changed in decades and will be discussed at length in Chapter 4 – and its theoretical results rely on a highly stylised model of the economy. While this pleases those who strive for more rigorous micro-foundations, the results of the model are "highly sensitive to the precise denomination of price stickiness, the specification of preferences and financial market structure. For this reason, any policy recommendations emanating from this literature must be highly qualified" (Lane, 2001, p. 262). Also, frictions and market imperfections are named as those factors preventing national economies from integrating, a characteristic that shows that the approach is based essentially on a real analysis. The lack of an international currency that could bridge the gap between national economic spaces plays no role in this microeconomic approach to international macroeconomics.

1.1.9 The nature and causes of current account imbalances

When are current account imbalances malign, when are they benign? There are roughly two views to be found in the literature. Corden (1994, p. 92) represents the first, smaller group of economists with a 'market good – government bad' approach when he argues that "[a]n increase in a current account deficit that results from a shift in private sector behavior – a rise in investment or a fall in savings – should not be a matter of concern at all". According to Edwards (2004, p. 5), this position has been associated with former Chancellor of the Exchequer under Margaret Thatcher, Nigel Lawson, and is therefore sometimes referred to as 'Lawson's doctrine', or the 'consenting adults' view. In Australia, the idea that current account deficits are benign when they are the results of rational, forward-looking individuals has been labelled the 'Pitchford thesis' (Karunaratne, 2010). Reisen (1998, pp. 12-3) argues that this position has been thoroughly discredited by the Mexican (1994–1995) and Asian (1997) crises, where a precipitous rise in private debt destabilised the economies.

A more general remark is appropriate in order to tackle this approach. Economists who believe that what is caused by private agents must be benign by definition seem to share the idea – similar to Voltaire's sagacious tutor Pangloss in *Candide* – that the marketplace represents the best of all possible worlds. According to this doctrine, everything that happens in a so-called market environment is benign because it happens in a market environment; no more arguments are needed. The fact that an event occurs in a market environment is considered sufficient proof for arguing that the event is necessary and benign, even if we do not quite understand it. In this approach – which can be found in many fields of economics today – nothing should be done against burgeoning current account imbalances, and all is for the best, as long as the imbalances are a result of 'market mechanisms'. All problems will sort themselves out 'in the long run' thanks to market forces, which – although not always well understood by mere human beings – are fundamentally benign by their very nature. There are many problems connected to this approach, the first one being that nobody can exactly define what a free market society would look like. Also, there are libraries full of conditions in which individual utility maximisation leads to sub-optimal outcomes for society as a whole (see Frank, 2011, for an overview). It is scientifically negligent to simply *believe* international imbalances are benign without analysing with care their causes and consequences. *Laissez faire*-ideology poses a significant threat to scientific inquiry, and Eichengreen (2012, p. 181) even believes that the root causes of the 2008 global financial crisis "were an ideology of market fundamentalism and the policies flowing from it". However, after the financial crisis erupted in 2007 and 2008 and the US government bailed out large and badly managed financial institutions, it became increasingly difficult to defend this position, as it rested on "the assumption that advanced-country capital markets, especially those of the United States, were fundamentally perfect"

(Obstfeld and Rogoff, 2009, p. 4). Let us now turn to the more widely accepted position.

The second, larger group of economists promotes what has been labelled the "prudential" or "IMF" view by Blanchard (2006). These scholars reject the idea that international imbalances are purely win-win situations even when they are created in the private sector by 'consenting adults'. As a consequence, these economists also reject a strategy of benign neglect, and call for some form of government action to reduce the imbalances. As Bini Smaghi (2008, Internet) summarises this position, "external imbalances are often a reflection, and even a prediction, of internal imbalances. Therefore economic policies […] should not ignore external balances and just assume that they will sort themselves out". Blanchard and Milesi-Ferretti (2011, p. 10) uphold this position when they argue that "current account balances reflect underlying domestic distortions". Alarmed by the US current account deficits, Roach (2004, Internet) warns that "[a]s long as the US continues to live well beyond its means and as long as the rest of the world fails to live up to its means, this seemingly chronic condition will only get worse". Stiglitz (2005) believes that "America's huge fiscal and trade deficits […] jeopardise future generations' well-being". Wolf (2004) even claims that "the US is now on the comfortable path to ruin". Other notable authors who think global imbalances are a problem that ought to be addressed include Bernanke (2005), Hubbard (2005, 2006), Lane and Milesi-Ferretti (2007), Feldstein (2008), Bergsten (2009), Obstfeld and Rogoff (2009), Krugman (2009a), and Borio and Disyatat (2011). Of course, it is rather simple to point a warning finger at international imbalances; the real difficulty lies in predicting when, why and how these imbalances will most likely unwind. According to Van den Berg (2010, p. 79), the unsustainable US current account deficits will stop growing "when foreigners stop buying US assets in quantities large enough to cover the current account deficit. We have no way of knowing exactly when that will occur […]. Essentially, the United States will have to save more."

While it is fair to say that a critical position on international imbalances is most widely shared, the analyses and proposed policy measures differ substantially. It is generally accepted that "some current account deficits are more problematic than others", but it is hard to say where to draw the line (Freund and Warnock, 2007, p. 133). Summers remarks that 5 percent of GDP marks a danger point for current account deficits and argues that deficits are problematic whenever they are used to finance consumption or government spending instead of investment (Summers, 2004, quoted in Freund and Warnock, 2007, p. 133). Freund and Warnock (ibid., p. 135) argue that "larger deficits take longer to resolve and are associated with relatively slower income growth during recovery". At a G-20 meeting of finance ministers and central bankers in Gyeongju, South Korea, former US treasury secretary Timothy Geithner proposed to reduce trade surpluses and deficits below 4 percent of GDP (Kennedy and Christie, 2010).

Sachs (1981) argues that current account deficits are benign as long as they are a result of high investment relative to saving, instead of the other way around. Blanchard and Milesi-Ferretti (2011, pp. 5-6) adopt what one might call a Manichean approach, dividing the reasons leading to international imbalances into 'good' and 'bad'. Specifically, they argue that international imbalances are 'good' when they reflect "differences in levels of development, demographic patterns, and other underlying fundamentals". They are 'bad' when they reflect "distortions, externalities and risks, at the national and international level". The possible distortions include a lack of social insurance, poor firm governance, asset bubbles, erroneous expectations about the future, excessive public borrowing, poor protection of property rights, lack of competition in the financial system and export-led growth by means of a beggar-thy-neighbour policy.

Let us point out in passing that the concept of 'distortion' is inherently normative, as it presupposes a natural order from which society deviates. Competition, private property and social insurance are human inventions, not the products of a divine or natural law. To call societies lacking some particular institution 'distorted' borders on cultural hegemony unacceptable to a sincere economist's modesty (imagine a bow tie-wearing economist telling a Native American that his ancestors lived in a distorted society because they lacked clear-cut property rights to land). The term 'distortion' is not very helpful for positive analysis, but rather a bit of a smoke screen, as different economists will always entertain different opinions as to what constitutes a distortion owing to their differing world views.

As already made plain, current account deficits and surpluses today are explained as passive responses to individual saving and investment decisions according to the NOEM approach. Therefore, the same factors that explain saving and investment behaviour within countries are used to explain current account imbalances between countries. Engel and Rogers (2006), for example, argue that expectations of relative growth rates of the economy may help to explain the US current account deficit. If the residents in a country expect real GDP to grow in the near future, running a current account deficit may amount to intertemporal optimising behaviour. The authors find that their empirical research, which is based on an equilibrium model, tends to support that view, although "some of our modelling simplifications and assumptions might be wrong in important ways" (ibid., p. 1092).

A standard view of current account imbalances is that "mature industrial economies should be exporting capital to developing countries" (Gruber and Kamin, 2007, p. 502), thereby running a current account surplus. In simpler terms, richer countries should be investing in poorer countries, thereby running current account surpluses. Developed economies tend to have higher capital/labour ratios compared to developing economies. Savings from developed economies – where labour is relatively scarce and capital abundant – ought to flow to developing

countries – where capital is relatively scarce and labour abundant. For developing countries, it would undoubtedly be beneficial to be able to import more from abroad. Especially the US current account deficits and the Asian current account surpluses have thus presented themselves as paradoxes to the scientific community. Despite the large amount of research on the causes, "[t]here is no consensus explanation for the current pattern of international capital flows" (ibid.). In their model, Gruber and Kamin (ibid.) find that the standard determinants in the literature – "per capita income, output growth, fiscal balances, net foreign assets, economic openness, and demographic variables" – fail to explain current account imbalances. However, they support the view that financial crises can explain the large current account surpluses in Asian countries, but they fail to explain the large US current account deficits.

Research in the causes and effects of international imbalances tends to increase with increasing global financial fragility and interdependence. As Ca'Zorzi et al. (2012) point out, the global financial crisis that burst in 2008 has revived empirical research on current account imbalances. The authors agree that finding the determinants of current account imbalances is an empirical task, which in practice means that "there are thousands, if not millions of models, which may lead to different conclusions on whether disequilibria exist and their size" (ibid., p. 1333). This statement is illuminating, and a simple example might help to stress this point. Starting from a system of closed economies, a current account deficit occurs as soon as one person decides to purchase output produced abroad. What factors lead to this import of foreign output? The possible answers, of course, are endless: perhaps the purchased product was not available in the importing country. Perhaps there was a war or a natural catastrophe that destroyed the national factories and thus induced the individual to import foreign output. Perhaps one could find a similar item within the national economy, but the exchange rate was favourable. Perhaps it was a combination of many factors, and not even the purchaser was fully aware why she imported the item. In light of this, it is immediately obvious that in order to understand the determinants of current account imbalances, millions of models could be constructed, and it is certain that no model will suit every country and every time period equally well. This point was also made by Obstfeld and Rogoff (1995b, p. 1742), who argue that "[a] realistic economic model incorporating all elements relevant to the typical country's current account would be hopelessly complex". According to Ca'Zorzi et al. (2012), more thought must therefore go into the methodology of choosing the right model. For example, Iley and Lewis (2007) examine 41 hypotheses and explanatory factors that have been advanced in order to explain the US current account deficit. In this regard, Du and Wei (2010) provide another example of how wide-ranging the explanations of international imbalances can be. The authors argue that current account imbalances are caused by a change in the gender ratio. An increase in the amount of men relative to women will decrease the chances of men finding a partner. This will induce them to increase their

savings in order to ameliorate their social status. The higher saving rate by these men will transform into excess saving and, therefore, current account imbalances.

As this overview of theories of international imbalances makes clear, changes in the theory of international imbalances have reflected economists' desire to predict and influence the direction and understand the effects of these imbalances. The search for adjustment mechanisms and the focus on individual behaviour have determined economic modelling up until now. Keynesian income accounting marked a deviation from the focus on individual behaviour and gave rise to the absorption approach that rests on macroeconomic accounting identities. Since then, the pendulum has swung back in favour of a more micro-founded theory of international imbalances, in which current account imbalances are modelled as the outcome of individuals' saving and investment decisions. There is still no agreement on the maximum size of current account or balance of payments surpluses or deficits.

There are important similarities between all presented models which are not always made explicit: they all assume that money is an asset, an exogenously determined stock of wealth that circulates within and between economies; they all assume that *national* monies can perform as *international* means of payment essentially; and they all assume that international imbalances can be sufficiently understood on the basis of methodological individualism, meaning that the behaviour of individual residents, households, firms and governments are the relevant objects of research. The next section presents Bernanke's (2005) saving glut hypothesis, which is a representative application of state-of-the-art international macroeconomics.

1.2   Bernanke's saving glut hypothesis

In February 2005, Alan Greenspan (2005, Internet) told US Congress that "the broadly unanticipated behavior of world bond markets remains a conundrum". What puzzled the chairman of the US Federal Reserve was the combination of low domestic saving rates with low and declining long-term interest rates in the face of increasing short-term rates. At the same time, Greenspan (ibid.) notices that the current account deficit is troublingly large, although he ultimately trusts market pressures to correct it. Additionally to market pressures, an "increase in net national saving" is central to the adjustment.

'Greenspan's conundrum' was quickly picked up in policy circles and academia. Dooley et al. (2007, p. 105), for example, took the high current account deficits combined with low interest rates as evidence that the "standard theory of open economy macroeconomics [has] been wildly wrong for five years", and "it is likely to be wrong for years more". Two months after Greenspan's testimony, Ben

Bernanke, then member of the Board of Governors of the Federal Reserve System, reacted to Greenspan's puzzlement in his Sandridge lecture.[2] Noticing the large US current account deficit, coupled with low US savings and an increase in external indebtedness, Bernanke argued that it was primarily developing countries' increased propensity to save that caused US long-term interest rates to decline, US savings to drop, and US current account deficit to grow. His analysis was essentially international and macroeconomic and fitted well into contemporary theories of international imbalances. By building his hypothesis around the balance of payments and referring to the saving-investment approach (although the older absorption approach is equally well applicable), Bernanke chose to describe "identities that define relationships among variables rather than describe the behavior of economic agents" (International Monetary Fund, 2009, p. 223). Importantly, Bernanke's (2005, Internet) hypothesis largely abstracts from policies and developments "within the United States itself" and "specific trade-related factors", and so hopes to offer a "global perspective that more fully takes into account events outside the United States". In a nutshell, Bernanke's focal point is that the US current account deficit was *imposed* on the United States by developing countries that chose to hold an excess of savings for reasons outside of US control. Next to the 'Greenspan legacy' that blames loose monetary policy for the asset price bubble and the resulting financial crisis of 2007-08, Bernanke's hypothesis has turned into one of the most popular explanations of the US trade deficit and the financial crisis (see Iley and Lewis, 2013, p. 46).

Bernanke (2005) begins his speech by praising the US economy's strong performance, but points out the burgeoning current account deficit and the decline in the US international investment position. Both phenomena presented themselves to economists as a paradox, given the relative strength of the US economy and its large and humming financial sector. Orthodox economic theory suggests that developed countries with high capital/labour ratios should lend to developing countries with low capital/labour ratios. In this picture, developed countries with large amounts of savings and real capital should exhibit low returns to capital. A marginal increase in investment in developing countries should contribute to productivity, resulting in higher returns to capital in developing countries. Bernanke's (2005, Internet) question at the outset is therefore: "Why is the United States, with the world's largest economy, borrowing heavily on international capital markets – rather than lending, as would seem more natural?" Bernanke finds the answer in the promulgated "excess savings" in the developing world that supposedly crowds out national savings in the United States.

While Bernanke's hypothesis was welcomed as a "novel explanation for the rapid rise of the US trade deficit in the early 21st century" (Krugman, 2009a, Internet), it

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[2] In September 2007, Bernanke updated his Sandridge lecture in a speech held in Berlin, Germany. While details and data changed, "the fundamental elements of the global saving glut remain in place" (2007, Internet).

rests on an orthodox understanding of the loanable funds theory and macroeconomic identities (see, for instance, International Monetary Fund, 1993, p. 163). Most importantly, it hinges on the widely accepted notion that current account imbalances between countries are the mirror image of saving-investment imbalances within countries, an interpretation of international imbalances that has a long tradition in economic thought, as pointed out in section 1.1. With respect to the causalities involved, economists usually point out that current account imbalances are *caused* by imbalances of national saving and national investment. It had apparently never occurred to economists to blame foreign saving-investment decisions for a domestic current account deficit.

Accordingly, it is usually claimed that "the US current account deficit is the product of the precipitous decline in the US national saving rate, which in recent years has fallen to a level that is far from adequate to fund domestic investment" (Bernanke, 2005, Internet). The novelty of Bernanke's saving glut hypothesis lies not in the accounting framework, but in his shifting of causalities, away from domestic households' decisions toward foreign households' decisions. To wit, Bernanke shifts the focus away from domestic saving and investment decisions as driving forces of the US current account imbalance. According to Bernanke (2005, Internet), there exist

> "two alternative ways of thinking about [international imbalances] – one that relates the deficit to the patterns of US trade and a second that focuses on saving, investment and international financial flows. Although these two ways of viewing the current account derive from accounting identities and thus are ultimately two sides of the same coin, each provides a useful lens for examining the issue."

Bernanke (2005, Internet) asserts that "essentially by definition, in each period US net foreign borrowing equals the US current account deficit". Let us illustrate his argument in his 2005 lecture by using accounting identities:

$$GNDY = C + I + CAB \qquad\qquad (4)$$
$$CAB = GNDY - C - I \qquad\qquad (5)$$
$$CAB = S - I \qquad\qquad (6)$$

where GNDY denotes gross national disposable income, C is public and private consumption, I is public and private investment, S is public and private saving, and CAB is the current account balance. In this framework, the excess of domestic saving over domestic investment, $S - I$, must equal the country's current account balance, CAB. If a country saves more than it invests, it lends the excess saving to other countries, thereby increasing its current account surplus. If a country invests more than it saves, it must borrow from abroad in order to finance the gap, leading to a deficit in the current account. Roughly speaking, net

exporting countries are financing US purchases abroad, a constellation that has been coined 'Chimerica' by Ferguson and Schularick (2007).

It is worth citing Frank and Bernanke (2013, pp. 434-5) in order to refine the argument. As the authors point out, the current account balance (CAB) does not merely consist of net exports (NX), but includes net factor income (NFI) and net international transfers (NIT). We can therefore write

$$CAB = NX + NFI + NIT. \tag{7}$$

Net factor income consists of the net flow of income on investments abroad; net international transfers are net nonmarket transfers from residents in one country to residents in another. In their textbook, Frank and Bernanke (2013, p. 435) go on to explain that, in any given period, the current account balance (CAB) and net capital inflows (KI) must sum to zero. The reason for this is that the country with the current account surplus only has two possibilities of how to use the received foreign funds. Either it uses the funds to purchase goods and services from the importing country – in which case net exports equal zero – or it purchases real and financial assets, leading to a capital outflow (–KI) for the importing country. Frank and Bernanke (2013, p. 435) state that "there is a third possibility", namely a foreign exchange transaction, but this merely replaces one foreign currency with another one. In accordance with the logic that the entire current and capital account surplus results in a financial outflow, we may add that even if the net exporting country decides not to spend the foreign currency received, the foreign currency still flows abroad in what constitutes a financial outflow. This apparently contradictory operation will be further discussed in the following chapters.

Let us rearrange the accounting identities (4, 5 and 6) along these lines:

$$CAB = - KI \tag{8}$$
$$CAB = S - I \tag{9}$$
$$S + KI = I \tag{10}$$

Equation (8) reflects the notion that a country with a current account surplus must be experiencing a net capital outflow (corresponding to a negative capital inflow), as it invests outside more than the rest of the world invests in it and vice versa. It is considered by Frank and Bernanke (2013, p. 435) to be "a precise relationship", even "an identity, meaning that it is true by definition". Equation (9) is mirrored in Bernanke's 2005 speech, where he states that "the country's current account deficit equals the excess of its investment over its saving". This view is confirmed by the International Monetary Fund's (2009, p. 23) *Balance of Payments and International Investment Position Manual*, which states that "the current account balance is the gap between saving and investment". According to equation (10),

national investment is determined by national saving plus total capital inflows from abroad.

After having addressed the accounting framework underlying Bernanke's hypothesis, let us now consider the causalities in more detail. Bernanke is quite aware of the difficulties of introducing causalities into his hypothesis, which rests, as he repeats time and again, on accounting identities – he even claims that his exposition is "almost a tautology" (2005, Internet). A number of 'real' causes of the current account deficit are dismissed in his speech (for instance, changes in trade policy and unfair competition). Instead, Bernanke seeks to understand the foreign deficit by looking at financial flows between countries. He embraces the notion that, "in a closed economy, investment would equal saving in each period" (ibid.). In open economies, on the other hand, "saving can cross international borders" and therefore "a country's domestic investment in new capital and its domestic saving need not be equal in each period". Excess *ex ante* saving formed in one country or region (in this case mainly Asia) can be lent 'uphill' in international capital markets to countries where there is more investment than can be financed through domestic saving (like the United States), thereby easing financial conditions in deficit countries. This can be explained, as Iley and Lewis (2013, p. 51) do, with the loanable funds theory, on which Bernanke's hypothesis ultimately rests.

$$I + H = S + \Delta M \tag{11}$$

The left-hand side of equation (11) denotes the demand for loanable funds, and the right hand side denotes the supply of loanable funds. H summarises the hoarding and ΔM denotes the newly created money (see Conard, 1959, p. 161). According to this approach, an increase in the supply of loanable funds in one country that is not matched by a corresponding increase of demand can supposedly spill over into other countries. The equity price upswing in the 1990s attracted foreign funds and increased consumption in the United States. In order to accommodate the global excess saving, the US passively adjusted by supplying the world with relatively safe financial assets. This framework is not all that new, as Bernanke himself notes. In order to explain the high and rising level of the US current account deficit and the country's foreign borrowing, "[m]ost economists […] have emphasised investment–saving behaviour" (Bernanke, 2005, Internet). But while Bernanke acknowledges that domestic saving-investment levels are to be blamed to some extent, he points the main finger of blame to foreign economic forces. In Bernanke's (ibid.) view, "the US current account deficit was fuelled to a significant extent both by increased global saving and the greater interest on the part of foreigners in investing in the United States". He explains the excess saving in many parts of the world with countries' increased saving motive due to (i) an ageing population, (ii) high capital/labour ratios, (iii) low prospective returns on investment in parts of the world, (iv) the sharp rise in oil prices, and (v) the

traumatic series of financial crises many developing countries experienced in the 1990s and in 2002.[3] Bernanke (ibid.) attributes the US current account deficit primarily to point (v). Developing countries piled up foreign exchange reserves in order to provide a buffer against capital outflows, a process caused by developing countries' experiences with financial crises and mirrored in their current account surpluses. These excess savings found their way into the United States as capital inflows (purchases of US financial assets by foreign residents), thereby crowding out domestic saving, and helping to fuel an asset bubble and pushing local house prices upward.[4] The increase in foreign saving pushed up asset prices and pushed down interest rates in the United States, thereby inducing households to save less and inflicting the saving–investment imbalance inside the United States. Instead of investing their excess saving at home, developing countries chose to invest especially in the United States owing to the "attractiveness of the United States as an investment destination" and "the depth and sophistication of the country's financial markets" (ibid.). Needless to say, this last view sharply contrasts with a broad conception in academia that the US financial sector owes its weight to a large extent to predatory activities, using its power to buy legislation and creating information asymmetries that it can then exploit (Black, 2005; Galbraith, 2009; Johnson and Kwak, 2010).

By making foreign excess saving responsible for the US current account deficit and lack of saving, Bernanke (ibid.) reverses the sequence of cause and effect scholars of international macroeconomics were used to. The foreign saving then depresses long-term interest rates in the United States. This is the novelty in his hypothesis. However, it is not certain Bernanke (ibid.) really believes in his own hypothesis. In their textbook, Frank and Bernanke (2013, p. 439) place more weight on the role of the US savings rate when they write that "*a low rate of national saving is the primary cause of trade deficits*". Using equation (6), the causality in Frank and Bernanke's (2013) textbook appears to run the traditional way:

$$S_{US} (\downarrow) - I_{US} \rightarrow CAB_{US} (\downarrow); CAB_{DC} (\uparrow)$$

Thus, a decrease in US savings, S_{US}, *causes* an equivalent decrease in the US current account balance, CAB_{US}, and accordingly an increase in the current account balance of developing countries, CAB_{DC}. On a policy level, this chain of events suggests that US policy should focus on reducing consumption *vis-à-vis* saving (or absorption *vis-à-vis* production), a view that is echoed in the IMF's manual (2009, p. 223):

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[3] Bernanke mentions the crisis in Mexico in 1994, a number of East Asian countries in 1997–98, Russia in 1998, Brazil in 1999 and Argentina in 2002.

[4] In 2009, Bernanke clarifies that the global imbalances were "the joint responsibility of the United States and our trading partners", though "the responsibility to use the resulting capital inflows effectively fell primarily on the receiving countries, particularly the United States".

"The implication of this relationship for balance-of-payments analysis is that improvement in an economy's current account requires a reduction in expenditure relative to income."

In his 2005 lecture, however, Bernanke (2005, Internet) explicitly used a reversed causality when he located "the principal cause of the US current account deficit outside the country's borders". In his first speech on the topic in 2005, low US saving is the passive response to high saving in developing countries and – consequently – high asset prices and low interest rates in the United States. Indeed, it is the focal point of Bernanke's (ibid.) hypothesis that the increased supply of saving – the global saving glut – explains "both the increase in the US current account deficit and the relatively low level of long-term real interest rates in the rest of the world". The causality in his 2005 speech thus runs like this:

$$S_{DC} (\uparrow) - I_{DC} \rightarrow CAB_{DC} (\uparrow), CAB_{US} (\downarrow)$$

In this view, the excess saving in developing countries, S_{DC}, 'spilled over' to US financial markets via the current account of the United States and caused low long-term interest rates, high asset prices and a low US saving rate. Iley and Lewis (2013, p. 54) summarise the mechanism proposed by Bernanke (2005, Internet) as follows:

"Asian and other countries wanted to increase their savings. In the process they flooded the world with loanable funds and drove down world long-term interest rates to such levels that they were willing to overlook long-standing risk margins in their eagerness to secure a reasonable return. For their part, American consumers obligingly responded to the other countries' desire to increase savings by reducing their own, and the US spending that resulted generated the US current account deficit that allowed the rest of the world in aggregate to run a current account surplus."

In the alternative saving-investment story, the US current account deficit was created at home, owing to a lack of national saving relative to investment in the United States.

It is clear by now that Bernanke (2005, Internet) found it difficult to reconcile the accounting framework of his hypothesis with the causalities he proposed. This is no surprise, given that the balance of payments manual of the International Monetary Fund (2009, p. 222) states that, because the major accounts represent accounting identities, "no causation should be inferred". Gandolfo (2001, p. 77) emphasises that the balance of payments is a "mere accounting framework, from which it would be logically invalid to draw causal relations automatically". He notes that, while it can be said that the government budget deficit (G − T) plus

excess investment over saving (I – S) is equal to the current account deficit (– CAB), it would be wrong to infer automatically that government deficits "determine" current account deficits (the so-called twin-deficits hypothesis). On the other hand, it would be wrong to infer that the current account deficit "determines" the government deficit. "In conclusion", Gandolfo (ibid.) summarises, "given an accounting identity, it is logically inadmissible to draw causal relations from it simply by shifting terms from one side to the other of the equality sign". Of course, Bernanke (2005) does just that, and economists should therefore be highly sceptical of his hypothesis. If an exporter in country A sells a product to an importer in country B, was it the excess demand for saving over investment in A that caused country B's current account deficit, or was it country B's spending that caused country A's current account surplus? This is like asking if the sound of clapping hands is created because the right hand hits the left or because the left hand hits the right. The sound that emerges from clapping hands is the result of a coordinated, two-sided movement. Likewise, the US current account deficit and the rest of the world's excess saving are the result of a single transaction.

Importantly, Bernanke (ibid.) remarks that the global saving glut boosted the US market for residential investment, "as low mortgage rates have supported record levels of home construction and strong gains in housing prices". This aspect of Bernanke's (2005) hypothesis turned it into a popular approach for explaining the financial crisis that was triggered by falling housing prices approximately one year later. Bernanke (2009, Internet) himself uses the saving glut hypothesis to explain the financial crisis that broke out in 2007: "In my view, however, it is impossible to understand this crisis without reference to the international imbalances in trade and capital flows that began in the latter half of the 1990s". A number of commentators referred to Bernanke's (2005) speech as evidence that the financial crisis was caused by outside forces. Indeed, the rather self-serving picture painted by many US economists blamed developing countries for the financial crisis. This is captured in one of Wolf's (2008, p. 5) speeches: "As Harvard's Kenneth Rogoff has argued, this is just another emerging market crisis, but this time the emerging market was found inside the US".

Bernanke (2005) names four downsides of this international imbalance. First, he thinks that it is the natural role of developing countries to borrow from more developed countries. Developing countries typically have a rapidly growing workforce and low cost of labour, thus high potential returns to capital. In this picture, developed and developing countries can Pareto-improve their respective situations by sticking to the traditional direction of financial flows. Secondly, the higher the capital inflow into the United States, the more its residents have to service the external debt. Thirdly, the capital inflow overly strengthens the US dollar with respect to other currencies, thereby depressing the country's export

industry. Finally, there is a risk of a disorderly unwinding, which should be avoided by policy-makers if possible.

Bernanke (ibid.) names several policy options to deal with the US current account deficit. As the cause of the problem is primarily located outside the United States according to the former chairman of the Fed, his policy measures mainly address developing nations. To wit, developing countries are advised to pursue well-known neoliberal policies so often handed down to developing countries, namely "increase macroeconomic stability, strengthen property rights, reduce corruption and remove barriers to the free flow of financial capital" (ibid.). This, together with stronger social safety nets and revalued currencies in countries such as China, would induce consumers in saving glut countries to consume more. In the next section, let us look into the academic debate that was triggered by Bernanke's Sandridge lecture.

1.3   Further research and reactions to the saving glut hypothesis

The global saving glut hypothesis received much praise – especially after US housing prices started to drop in 2006, triggering the financial crisis. It led to a series of articles and mainly empirical papers with arguments for and against Bernanke's main points. Authors who used his hypothesis to explain the financial crisis that triggered the Great Recession include Bernanke (2009) himself, the Council of Economic Advisers (2009), Dunaway (2009), *The Economist* (2009), Eichengreen (2009), and Krugman (2009a). Hubbard (2005) and Wolf (2008) agree with Bernanke's (2005) main assertion that Greenspan's conundrum was a result of outside forces, namely excess saving owing to increased economic uncertainty and weak financial institutions in developing countries. Hubbard (2006) believes that eventual adjustment of international imbalances will be gradual. At the time of directing the US think tank *Tax Foundation*, Hubbard argued that "the most salient US channel for adjustment is a gradual increase in US saving", which could be brought about with an "entitlement reform and fundamental tax reform", including "[e]liminating capital income taxation" (ibid., pp. 669-70). Mendoza et al. (2007) underline the poor development of the financial system in emerging market economies and agree with Bernanke (2005) that this causes precautionary excess saving. Krugman (2009a) agrees with Bernanke's (2005, Internet) hypothesis that excess and idle saving emerged in developing economies. He even interprets a more orthodox Keynesian analysis into Bernanke's (2005) hypothesis when he states that the world is "suffering from a global paradox of thrift: around the world, desired saving exceeds the amount businesses are willing to invest" (Krugman, 2009a). Bergsten (2009) sees the inflow of capital into the United States as a major cause for excessive liquidity and underpricing of risk. *The Economist* (2005) agrees with Bernanke's (2005) hypothesis. The magazine further argues that the saving glut weakened America's

economy and claims that "[p]olicymakers bear more responsibility for the thrift shifts, and the international imbalances, than Mr Bernanke cares to admit". Specifically *The Economist* (2009) blames loose US monetary policy for the housing bubble, which turned out to be a widely accepted interpretation of the global financial crisis.

Gruber and Kamin (2007) agree with Bernanke (2005) that there was a global saving glut in Asia, although it remains an open question why the excess saving was not allocated according to orthodox economic theory. The authors explicitly agree with Bernanke's (2005) view that the series of financial crises in East Asia in the late 1990s contributed to the current account surpluses in that region in the following years. Additionally, they expect the Asian surpluses to dissipate as the financial sector fully recovers from the crises in the past. Chinn and Ito (2007) find in an empirical study that the budget balance is positively correlated with the current account balance and that a US saving drought contributed to the US current account deficit. The authors find no evidence for excess domestic saving in the East Asian emerging market economies.

Contrary to Greenspan (2010), authors such as Mohan (2007), Taylor (2008), Truman (2009), and Shin (2011) argue that the US Federal Reserve's monetary policy prior to 2008 is to be blamed for the financial crisis. According to this narrative, the unusually low Federal funds rate after the year 2000 encouraged excessive risk taking behaviour. This story has become rather established, and is today often used in combination with Bernanke's saving glut hypothesis. As Iley and Lewis (2013, p. 73) point out in this regard, it is "possible to combine the global 'glut of savings' and the 'Greenspan legacy' stories". The US Fed's expansionist deviation from the Taylor rule (Taylor, 1999) is supposed to have created excess liquidity that added to Asia's dollar reserves, resulting in a fast growth in global liquidity (see Iley and Lewis, 2013, p. 76).

Greenspan (2010) himself paints an epic picture of the saving glut hypothesis, arguing that the collapse of communism around 1990 unleashed the benign forces of the free market. Countries that formerly suffered under communist rule now became so rich so fast that consumption could not keep up with the growth of income. Investment opportunities in the United States provided a welcome valve for this excess saving. Feldstein (2008) emphasises the privileged position of the US economy owing to the role of the US dollar as a global reserve asset. In effect, the United States was able to import goods for 708 billion US dollars more than it exported in 2007, "and all the US economy had to give in exchange for these net imports was $708 billion of IOUs" (ibid., p. 5). When these new IOUs come due, "the US economy only gives new IOUs in exchange. The same is true for the interest that the US economy owes on the IOUs" (ibid.). Feldstein stresses that this process is unsustainable, and that the US current account at some point in time must go from deficit to surplus in order to reverse the accumulation of US

dollar denominated IOUs. According to Feldstein, this will require an increase in the US national saving rate that will weaken the dollar. With respect to causalities, Feldstein (ibid., p. 10) believes that "[l]ow national saving is the fundamental cause of the US deficit", thereby sticking to a more traditional analysis.

Caballero and Krishnamurthy (2006) also see international imbalances as a source of financial fragility. They argue that the US financial sector created financial assets in order to accommodate global demand for safe debt. By doing so, the US economy was left with toxic assets, such as subprime loans. Obstfeld and Rogoff (2009) agree with Bernanke's (2005) general direction of impact, but argue that the international imbalance was merely a codetermining factor for the excessive leverage and housing bubbles. Additionally, they blame the "fragmented and ineffective system of government prudential oversight" (Obstfeld and Rogoff, 2009, p. 2). A "toxic mix of conditions", such as "the Fed's monetary stance, global real interest rates, credit market distortions, and financial innovation" turned the United States into the "epicenter of the global financial crisis" (ibid., p. 15). Obstfeld and Rogoff (ibid., p. 35) agree that the US external deficit is perilous and argue that China ought to stop its policy of piling up US dollar reserves and manipulating its own currency. According to the authors, developing countries in general ought to develop their inefficient financial markets in the future, which, they claim, lie at the root of their excess of savings. Also, internationally integrated financial markets ought to be regulated more effectively. Dooley et al. (2009, p. 301) agree with Bernanke's view that global savings pushed interest rates down:

> "We have emphasized that capital inflows to the USA from emerging markets associated with managed exchange rates caused persistently low long-term real interest rates in both the USA and generally throughout the industrial world. Low interest rates in turn drove asset prices up, particularly for long duration assets such as equity and real estate."

However, the authors think that net capital flows into the United States neither directly nor indirectly caused the financial crisis. Rather, "the crisis was caused by ineffective supervision and regulation of financial markets in the USA and other industrial countries" (ibid., p. 299). Needless to say, this is a far cry from Bernanke's (2005, Internet) view that the "depth and sophistication" of the US financial system was the reason the United States attracted so much foreign saving. Interestingly, Dooley et al. (2009) believe the Great Recession has fortified, rather than damaged, the post Bretton Woods nonsystem. Finally, addressing the "ultra-low global interest rates", Rogoff (2013, Internet) states:

> "By now, everyone accepts some version of US Federal Reserve Chairman Ben Bernanke's statement in 2005 that a 'global savings glut' is at the root

of the problem. But economists disagree on why we have the glut, how long it will last, and, most fundamentally, on whether it is a good thing".

In fact, not quite everybody accepts the saving glut hypothesis. Borio and Disyatat (2011) disagree with Bernanke's (2005) position that excess saving was an important contributing factor to the financial crisis that erupted in 2007 in the United States. Instead, the authors argue that 'excess financial elasticity' was the main problem. The monetary and financial system lacks a strong anchor and thus accommodated a global credit and asset boom and aggressive risk-taking. Specifically, the authors criticise two hypotheses underlying Bernanke's (2005) hypothesis, namely:

> "(i) net capital flows from current account surplus countries to deficit ones helped to finance credit booms in the latter; and (ii) a rise in *ex ante* global saving relative to *ex ante* investment in surplus countries depressed world interest rates, particularly those on US dollar assets, in which much of the surpluses are seen to have been invested." (Borio and Disyatat, 2011, p. 1)

Interestingly, and contrary to most other contributions, Borio and Disyatat's (2011) criticism of Bernanke's (2005) hypothesis rests not just on empirical grounds. Instead, they disagree with his broader conceptual framework. Their core objection is aimed at hypothesis (i). The authors advocate a more precise distinction between 'saving' and 'financing', a distinction neither Bernanke (2005) nor Feldstein and Horioka (1980) make in their eyes: "Saving […] is simply income (output) not consumed; *financing*, a cash-flow concept, is access to purchasing power in the form of an accepted settlement medium (money), including through borrowing. Investment, and expenditures more generally, require financing, not saving" (Borio and Disyatat, 2011, p. 1). With respect to hypothesis (ii), the two economic experts from the Bank for International Settlements argue that *ex ante* investment and saving determine the *natural* rate of interest, not the *market* rate of interest. While the second is a monetary phenomenon that reflects the interplay of the central bank's policy rate, market expectations and risk premia, the natural rate of interest is an unobservable variable that reflects only real factors. They explicitly refer to the distinction between the (unobservable) natural and the market interest rate already made by Wicksell (1898), and claim that the expansion of credit and asset prices that preceded the 2008 crisis were a sign that the market rate and the natural rate of interest diverged. The authors then argue that Bernanke's (2005) saving glut hypothesis is a form of Schumpeterian real analysis that assumes money and credit are mere "veils of no consequence for economic activity" (Borio and Disyatat, 2011, p. 2). The Bernanke (2005) framework is therefore not adequate to understand a "*monetary* economy" and its "pattern of global financial intermediation, determination of market interest rates and, *a fortiori*, financial instability" (Borio and Disyatat, 2011, p. 2). The inadequate analytical framework

leads Bernanke to "overestimate and miscast" (ibid.) the impact of current account imbalances. Especially, it should not be the first priority of economic policy to reduce current account imbalances; rather, the international monetary and financial system should be strengthened. Borio (2014) clarifies his excess financial elasticity view in a later paper, where he blames liberalised financial systems with monetary regimes that focus on near-term inflation control for the build-up of credit and asset price booms.

The separations Borio and Disyatat (2011) propose between saving, credit, finance, and money is rather unorthodox and bound to confuse mainstream economists. Some remarks concerning these distinctions are therefore potentially illuminating. Claudio Borio – considered by some to be "one of the world's most provocative and interesting monetary economists" (*The Economist*, 2012, Internet) – believes that macroeconomics in general ought to be reformed in such a way as to "*capture more deeply the monetary nature of our economies*" (Borio, 2012, p. 11). First and foremost, this involves acknowledging that money is an endogenous phenomenon created within the banking system: "Deposits are not endowments that precede loan formation; it is loans that create deposits" (ibid.). According to Borio, "better representations of monetary economies" are a necessary stepping-stone to "fully understand the role that monetary policy plays in the macroeconomy. And in all probability, this will require us to move away from equilibrium concepts" (ibid.). With respect to the theoretical framework underlying the saving glut hypothesis, Borio and Disyatat (2011, p. 27) believe that "[t]he role of global current account imbalances in contributing to the recent financial crisis needs to be reconsidered".

One point of criticism that flows out of their analysis concerns Bernanke's (2005) net approach to global imbalances. Indeed, the US current account deficit is identical to its new *net* borrowing. But this view diverts attention away from the explosion of *gross* financial flows in the 1990s. If country A runs a balanced current account with the rest of the world R, A is still able to lend to the rest of the world by purchasing large amounts of foreign securities. R will receive these large amounts of reserve currency, which it spends on foreign bank deposits or securities. In turn, A incurs a debt toward R, which is compensated with a security from A. Both countries' current and financial accounts remain balanced at the end of the period. While there may be much international borrowing and lending going on, from a net perspective, there are no financial flows between the countries. To put it bluntly: just because the United States runs a current account deficit with China does not necessarily mean that China is financing US purchases from China. Given gross financial flows that outstrip net financial flows, the current account imbalances do not shed much light upon global financing patterns. If gross flows are taken into account, it would seem that European financial institutions provided much of the financing for the US housing bubble (Iley and Lewis, 2013, pp. 9-10).

Apart from the theoretical critique, Borio and Disyatat (2011, pp. 4-6) offer compelling empirical evidence that undermines Bernanke's (2005) main points. First, the correlation of the US current account balance and US long term interest rates for ten-year bonds does not apply anymore after 2005. Secondly, the relative attractiveness of US financial assets should have caused a simultaneous strengthening of the US dollar relative to other currencies. The opposite has occurred since 2001. Thirdly, the empirical link between the US current account and US savings seems to be weak. Fourthly, there is no clear link between global saving rates and real interest rates or risk premia. Fifthly, the world economic growth experienced after 2003 is hard to reconcile with an increase in *ex ante* global saving, as this should depress global aggregate demand. Sixthly, current account surplus countries experience credit booms as well. Finally, the saving glut hypothesis could not predict the way the financial crisis of 2008 and the ensuing Great Recession unfolded.

Although the empirical findings are in themselves interesting, the focus here lies on the theoretical questions raised. In this regard, and despite the depth and originality of Borio and Disyatat's (2011) message that managed to convince many other economists (see Iley and Lewis, 2013), their critique leaves open many questions. First, the so-called natural rate of interest is an inherently difficult concept to apply in theory and practice, as it cannot be observed. Since Wicksell (1898) claimed the existence of this non-observable interest rate, many definitions have been suggested. According to the two BIS-economists, the market rate coincides with the natural rate when the economy is in full equilibrium. This does not solve the problem in the least, as it is well known that the concept of economic equilbirium does not exist outside of economists' minds, which is why economists will always have conflicting views of what constitutes an equilibrium. Any hypothesis that rests on the divergence of market and natural rates of interest is therefore unfalsifiable by definition, which raises the legitimate question why this concept should be accepted into scientific discourse in the first place. Similarly, *ex ante* saving and investment are not observable, as the authors themselves readily admit (Borio and Disyatat, 2011, p. 6). If so, it is non-sensical to compare non-observable magnitudes, like *ex ante* and *ex post* saving and investment.

Another problem relates to their treatment of money and credit. According to the two authors (ibid., p. 7), "all financing takes the form of the exchange of goods and services for money (settlement medium) or credit (IOUs)". In this case, is money not an IOU? Can payments not be settled with debits and credits carried out by the banking system? Although Borio and Disyatat claim that a better understanding of finance, saving, money, income and credit will help to illuminate economic processes, they do not offer any satisfying definitions upon which a new approach could be based. For example, is credit or purchasing power

supplied by banks or by the workforce? Are savings a result of or a requirement for investment? Such questions are not really clearly addressed in their paper. An obvious conclusion is that a better understanding of money, credit and savings is critical for a better understanding of the forces at work. This is, in fact, a fundamental point made by Rossi (2007a, p. 22), who notes that "[m]oney and credit have often been mixed up". Indeed, the inconsistent jumble of concepts somehow related to bank credit is a clear evidence of the current vacuum of knowledge in this area. In Snowdon and Vane's (2002) *Encyclopedia of Macroconomics*, the article on "Credit Views in Macroeconomic Theory" (Trautwein, 2002, pp. 156-61) introduces and intermingles 'credit', 'money', 'bank lending', 'base money', 'money to hold', 'loans', 'deposits', 'loanable funds', 'credit money', and 'flow supplies and demands for capital and money', without really explaining any of the concepts, or indeed providing a comprehensive way of separating them. On top of this pile of cloudy concepts, the new Keynesian literature confronts young economists with 'liquidity', 'quasi money', 'high powered money', 'inside money', 'outside money', 'cash balance', 'cash management accounts', 'money substitutes', 'cash-in-advance', 'bank money', 'state money', 'private money', and so on (see Cencini, 2005, p. 95). It is obvious even to the most superficial scholar that this conception of money and credit is too confused to represent a valid and rigorous basis for economic analysis.

Beside the criticism put forward by Borio and Disyatat (2011), Palley (2012, 2014) offers another theoretical critique of Bernanke's (2005) hypothesis, which he scolds as "a brilliant piece of bait-and-switch political economy", "a critical part of neoliberal attempts to explain the crisis" that "masquerades Keynesian economics" (Palley, 2012, pp. 106-7). Palley (2014, p. 7) offers an overview of the mainstream explanations of the trade deficit and global imbalances, before criticising them in turn. His illustration of the various mainstream approaches since Ricardo's theory of comparative advantage provides us with a valuable, ancillary perspective on the development of international macroeconomics.

As a comprehensive analysis of all these approaches clearly lies beyond the scope of this chapter, it will be necessary to limit ourselves here to Palley's analysis of the saving glut hypothesis. As Figure 1.1 shows, the saving glut hypothesis is merely one of several mainstream explanations of international imbalances that emerged between 2000 and 2007. According to the British economist, the saving glut hypothesis suffers from the faulty logic of the loanable funds theory and thus "misunderstands the macroeconomics of the trade deficit" (ibid., p. 109). Specifically, it creates the fiction that China *directly* exchanges products for US bonds, while in reality the trade deficit begins "with an exchange of money for exports, followed by a second exchange of money for bonds" (ibid., p. 107). Instead of excess saving in developing countries, Palley (2012) argues that corporate globalisation and an undervalued renminbi "poached demand" in the

United States and thereby weakened its economy, causing the US Federal Reserve to lower interest rates. From the viewpoint of post Keynesians, the negative aspect of US trade deficits is that they constitute a demand leakage, accompanied by a hollowing out of US productive capacities due to neoliberal globalisation. The demand shortage argument is confirmed by New Keynesian economists, such as Stiglitz and Greenwald (2010, p. 7), who argue that "to supply reserves, the reserve country runs a trade deficit, which subtracts from its aggregate demand. […] The result is a chronically unstable global macroeconomic situation with a strong deflationary bias".
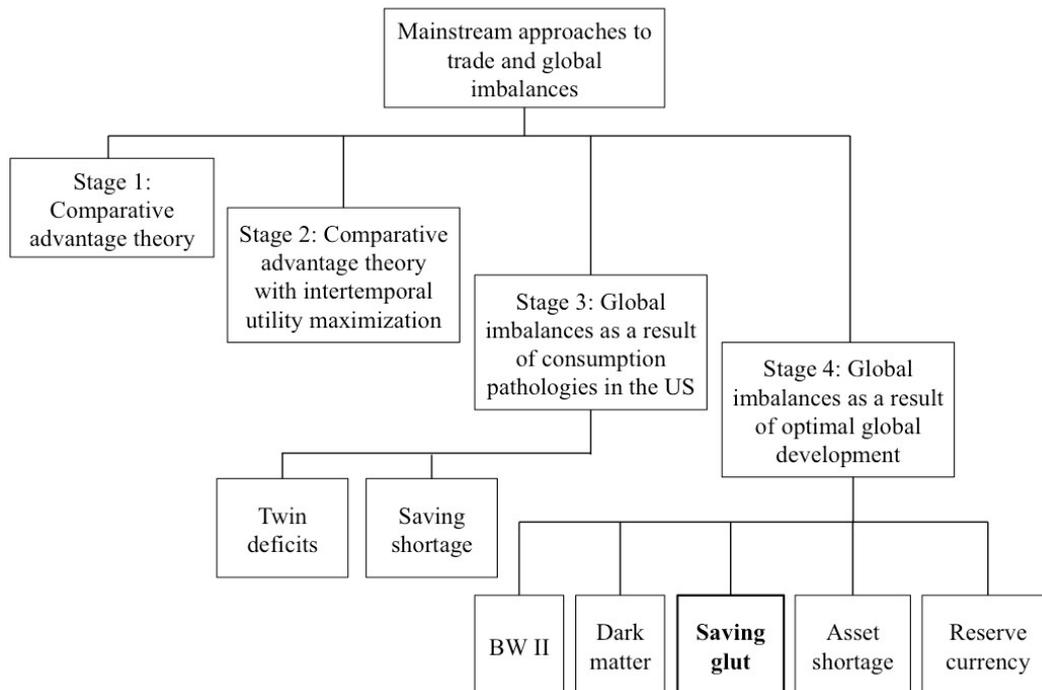
Figure 1.1 Mainstream explanations of the US trade deficit and global financial imbalances.
Source: adapted from Palley, 2014, pp. 5-7

While Palley's (2014) approach can be lauded as a spirited attempt to deconstruct the common thread in mainstream attempts to explain international imbalances, it would be unjust to sweepingly label them as attempts to hush up the negative aspects of neoliberal globalisation. As pointed out above, most mainstream economists picture emerging markets' saving glut and the resulting US current account deficit as an undesirable state of affairs. It is a misrepresentation to state that all stage four-hypotheses (see Figure 1.1) "argue the imbalances are benign or even benevolent" (ibid., p. 9). Iley and Lewis (2013, p. 61) point out that the new synthesis view of the crisis portrays global imbalances as a "clear and present danger for the global financial system". While it can rightly be argued that neoliberal vocabulary has occupied many economics faculties and thereby stifled scientific progress (see Baer, 2012), it would be a gross oversimplification to claim that the whole body of mainstream theories of international imbalances is one big attempt to camouflage actual problems. Also, claiming that "US trade

deficit and China's trade surplus are joint products of neoliberal globalisation" (Palley, 2012, p. 109) is a rather cloudy assessment that unduly mixes economics with politics, and does not serve as a rigorous foundation for criticism.

When the United States runs a trade deficit with China and China uses the acquired US dollars to purchase US treasury bonds, it is true that China (as a whole) is providing purchasing power to the United States in exchange for purchasing power over future output. In this sense, China is financing the US trade deficit. Palley (2014, p. 10), however, argues that this is a misrepresentation. In addition, he believes the saving glut hypothesis does not take into account the "microeconomics of global production" (ibid., p. 11), as a large percentage of Chinese exports was produced by foreign owned companies. But this is beside the point. From a macroeconomic perspective, there is no global production, as world GDP is merely the sum of national GDPs. Output is measured in terms of that particular national currency that is used to pay the wages, irrespective of the nationality of the firms' owners. It is unclear how the nationality of a corporation should falsify Bernanke's (2005) hypothesis. At last, the (post) Keynesian hypothesis that suggests imports cause a 'demand leakage' that needs to be filled up with government deficits is open to doubt. As we will see in Chapters 2 and 3, the entire sum corresponding to the current account deficit needs to be borrowed from abroad, thus suggesting that the payment of the deficit is not financed by domestic income. If so, then it is incorrect to speak of 'demand leakage'. However, it is clearly necessary to shed more light on the financial intermediation resulting from international trade and capital flows.

Davidson (2011, Chapter 14) offers what he labels a 'Keynes-post Keynesian' monetary approach to the balance of payments analysis that complements the heterodox analysis offered by Palley. Davidson stresses the need for liquidity that arises in the face of fundamental uncertainty in international financial markets. By focusing on the motivations why countries opt for holding reserves, Davidson (ibid.) chooses a distinctly microeconomic approach to understanding international imbalances in a so-called non-ergodic environment. All problems of international imbalances would be solved, according to the post Keynesian economist, "[i]f it were possible with perfect certainty to coordinate exactly the time payment of all cash inflows and outflows" (ibid., p. 260). This, of course, derives from the post Keynesian view that money exists because of uncertainty (Davidson, 1972, p. 360). Extrapolating this claim into the field of monetary macroeconomics seems to lead to the conclusion that international imbalances would not exist without uncertainty. This claim is hard – if not impossible – to falsify, since it can safely be stated that human beings will never be able to predict with a high degree of certainty many categories of events.

To sum up, Ben Bernanke's (2005, Internet) saving glut hypothesis offers an instructive and up-to-date snapshot of the current state of the theory of

international imbalances that has already been integrated into recent macroeconomics textbooks (see Jones, 2014, pp. 254-5). In 2011, the former chairman of the US Fed endorsed the hypothesis anew, adding some empirical details on international investors' portfolio preferences and clarifying that "the primary sources of the housing boom and bust" were domestic (Bernanke et al., 2011, p. 13). Among many others, Rogoff (2013), an originator of NOEM, has embraced Bernanke's main points and implications, thereby adding to its prestige and signalling that it is in line with the latest developments in mainstream international macroeconomics. On the policy front, Bernanke's hypothesis of a saving glut was picked up gratefully, perhaps also because part of the blame could be placed with emerging market economies and their manipulation of the exchange rate. Two theoretical points of criticisms of the saving glut hypothesis, put forward by Borio and Disyatat (2011) and Palley (2012, 2014), are particularly noteworthy. While both critiques attack the loanable funds approach that underlies Bernanke's (2005) analysis, neither has been able to offer a rigorous and widely accepted counter-narrative based on endogenous money. Palley's (ibid.) analysis seems to be driven by political views to a significant extent, and he forgets that most mainstream academics do not say that global imbalances are benevolent. Borio and Disyatat (2011) introduce concepts into Bernanke's (2005) national income accounting that are clearly inspired by the endogenous money approach to macroeconomics. While their arguments concerning gross financial flows has been accepted by many, their theoretical framework does not yet possess the analytical force that would allow for a reinterpretation of balance of payments disequilibria with endogenous money. As will be shown at greater length in Chapters 3 and 4, the endogenous money school is a far cry from a unified whole. If economists are to agree on a position in this matter, a fundamental revision of monetary macroeconomics is called for. Specifically, the endogenous nature of money needs to be explored before money's role in international imbalances can be addressed properly.

The main lessons to be gleaned from the concerns raised against Bernanke's (2005) hypothesis is that any analysis of international imbalances must take into account the endogenous nature of bank money (what endogeneity means will be discussed in the two following chapters). This is currently not the case, as economists to this day believe that, in Johnson's (1976c, p. 5) terms, "the difficulty of monetary theory can be seen as [merely] an extra complication of a problem in 'real' or 'barter' theory that has always given economists trouble". Specifically, more thought must go into the effects the current international payment system architecture has on the size and nature of international imbalances, which would imply moving away from the microeconomic approach to a more holistic framework. While the NOEM-framework dominates the academic discussion, experts in the field are far from convinced that it offers suitable predictions. The "well-reasoned forecasts based on consistent models" did not occur (Dooley et al., 2009, p. 299). In order to clarify the theoretical

foundation underlying Bernanke's (2005) hypothesis, the next chapter revisits the balance of payments statistics.

2   The balance of payments revisited

The balance of payments is *the* key concept in international macroeconomics. Despite the exactness of the accounting framework, one should nevertheless be aware that it has been and continues to be subject to many different interpretations. Two common features stick out in mainstream analysis of the balance of payments. First, there is a conscious effort to evaluate the sustainability of certain types and levels of imbalances, usually by relating them to levels of savings, output, interest rates, prices, and so on. Secondly, much work has gone into the identification of equilibrating forces in international trade and capital flows. It is certainly no exaggeration to state that, according to mainstream economics, "[t]he mechanism of adjustment to balance of payments is one of the most important practical problems in international economics" (Melvin and Norrbin, 2012, p. 74). Framing the problem of international imbalances as an adjustment problem has naturally led to a general equilibrium interpretation of balance of payments statistics.

The aim of this chapter is to question this theoretical framework by emphasising structural-monetary aspects of international imbalances, thereby looking for potential sources of monetary disorders that exist irrespective of the presence of a smooth path to international equilibrium. A first step consists in laying out and critically examining some of the core principles and accounts of the balance of payments as defined by the International Monetary Fund (2009). Fundamental identities are then discussed at some length, focusing on the saving-investment relation in the case of open economies. A next step consists in analysing the difficult and often conflicting notions of equilibrium of the balance of payments. For this purpose, it will be of particular importance to thoroughly comprehend the role of official reserves. Pursuing an economic analysis will require some semantic precision, as Machlup (1976e, p. 289) warns:

> "If a commercial firm gives a commercial bank a promissory note […] and receives in exchange a demand deposit […] one may say, alternatively, that the bank 'purchases' the note, 'discounts' the bill, 'lends' to the firm, or 'creates' credit. The alternatives are even more numerous in international transactions, where the presence of at least two currencies complicates matters."

In order to grasp the economic meaning of international transactions, "one cannot use the trade language" (ibid.), but must use a more precise and general parlance. At the time of writing, the sixth edition of the International Monetary Fund's (2009) *Balance of Payments and International Investment Position Manual* (henceforth simply the 'manual') sets the international standard for the conceptual framework underlying balance of payments statistics worldwide. The manual

deals extensively with the underlying principles of international transactions and aims at consistency with the United Nations' system of national accounts (United Nations, 2008). While this chapter draws upon the IMF's manual, contributions from scholars of open economy macroeconomics will deepen the analysis at the appropriate junctures.

2.1 The principles of the balance of payments

The balance of payments is concerned with transactions between residents of one country with residents of other countries (non-residents) within a given period of time, for example a calendar year. While payments involve the exchange of two equal values, the balance of payments also takes into account unilateral transfers of valuable resources and non-monetary transactions, such as barter transactions. It should therefore more aptly be referred to as the *balance of international transactions* (Cumby and Levich, 1992, p. 113). However, we will stick to the title in common usage. Let us consider three important accounting principles of the balance of payments in turn.

a) *Double-entry bookkeeping*. The balance of payments framework is constructed as a double-entry bookkeeping system, in which each transaction "is recorded as consisting of two equal and opposite entries, reflecting the inflow and outflow element to each exchange" (International Monetary Fund, 2009). Credits result from "exports of goods and services, income receivable, reduction in assets, or increase in liabilities" (ibid.). On the other hand, debits result from "imports of goods and services, income payable, increase in assets, or reduction in liabilities" (ibid.). The exactness of the two-entry nature of each transaction means that "the difference between the sum of credit entries and the sum of debit entries is conceptually zero in the balance of payments, that is, in concept, the accounts as a whole are in balance" (ibid.). As Mundell (1968, p. 140) points out, the original meaning of a deficit in the balance of payments is an excess of payments over receipts. Thus, saying that the balance of payments always balances is identical to claiming that every payment received is immediately spent. Each and every transaction thus leads to a credit (+) and a corresponding debit (–) for each of the two countries involved. The typical textbook example refers to an export of commercial goods. The export of these goods leads to a credit (+) in the current account and a debit (–) in the financial account, as the exporting country spends the foreign money on a foreign financial asset. Globally, all current, capital and financial accounts must sum up to zero. Superficially interpreted, this merely suggests that one country's purchases are another country's sales. However, analysis of a unilateral transaction highlights the non-trivial accounting logic of the balance of payments framework. To wit, if a resident in country A transfers a sum of domestic money to residents of country B without a corresponding exchange

value from B to A, the equality of debits and credits still holds for both countries. The very moment country B is credited with the foreign currency, it has no choice but to spend it immediately and automatically on financial assets in A. Every penny transferred from A in B is therefore immediately spent in A, thereby increasing B's claims on A.

b) *Time of recording.* For the sake of statistical clarity, a single point in time must be agreed upon that marks the moment a transaction is deemed to take place. This is merely a question of custom, and while different solutions are possible in practice, the manual (International Monetary Fund, 2009, p. 36) recommends the so-called 'accrual accounting' method. Accrual accounting means that "flows that imply a change of economic ownership are recorded when ownership passes and services are recorded when provided" (ibid., p. 36).

c) *Valuation.* While market prices – defined as the exchange value – are the basis for valuation of flows and positions, the IMF (ibid., p. 40) clarifies how complex cases, like transport costs, export or import taxes or the valuation of financial products, are to be handled. According to the manual, imports and exports of merchandise ought to be recorded at Free On Board (FOB) values, thereby taking into account export taxes. For further information on valuation we refer to the IMF's manual (ibid., pp. 40-6), as this point is not vital for the ensuing analysis.

The important point to emphasise is that the balance of payments is an exact accounting instrument, in which each transaction is entered on both sides of the balance sheet for both countries involved. Understanding why a unilateral transaction defines a credit and a debit for the two involved countries may be facilitated by referring to Schmitt's law, formulated in his *Théorie unitaire de la monnaie, nationale et internationale* (Schmitt, 1975). According to this law, every purchase of economic agent A entails agent A's immediate sale, and every sale of economic agent B entails agent B's immediate purchase. Obviously, this is not the same as stating the somewhat trivial truism that one agent's/country's purchase is another agent's/country's sale. As often noted, this is just a tautology that conveys no important information at all, as it merely restates the same fact from two sides. By contrast, Schmitt's law states that *every sale entails a simultaneous purchase for both the buying and the selling party*. Importantly, Schmitt's law holds true for transactions among individuals within a country and payments between countries regarded as a whole. It also holds when unilateral transfers are taken into account. This is so because of the flow nature of bank money, which cannot but comply with the fundamental principles of double-entry bookkeeping. If a unilateral transaction upholds the principle according to which every transaction involves the debit and credit of both selling and purchasing country, it is clear that financial and commercial transactions can be subdivided further into two separate transactions (see Cencini, 2005, p. 227). In fact, a commercial export represents a debit (–) for the exporting country as a whole, as the domestic output available in

the domestic product market effectively decreases. However, the exporter is compensated with a claim on the foreign importer (+). As soon as the export is paid, capital flows into the exporting country (+), but flows out again immediately as the exporting country purchases (−) a financial asset in the importing country (be it only in the form of a bank deposit). This example emphasises the perfect symmetry of each agent's sales and purchases.

In the typical textbook example, the current account surplus of one country is immediately offset by that same country's purchase of shares or bonds abroad. The current account surplus is thus compensated with a financial outflow. However, this exchange of financial assets against commercial goods is misleading, as it masks *four* separate transactions, each of which is separately entered as a debit and a credit for each country. As Cencini and Citraro (2012, p. 265) point out, "the commercial export and its payment are two distinct transactions giving rise to two separate double-entries". Incidentally, this is also true for transactions that only involve the financial or the capital account. For example, the sale of a country's private or public bonds to non-residents, which defines a financial inflow (a 'capital inflow' according to the definition before 1993), is immediately and automatically balanced by an equivalent purchase of claims on foreign bank deposits, defining a financial outflow. No net foreign investment occurs. By selling its bonds to non-residents, the country is the recipient of a foreign investment, and immediately invests the foreign currency in foreign financial assets. Each and every import of a commercial or financial product thus entails the immediate export of a financial claim. Cencini and Citraro's (2012, p. 267) view therefore seems to be confirmed:

> "The nature of a monetary flow is such that each payment must define both an inflow and an equivalent outflow for its executor and for its recipient. Applied to countries, this means that a country's imports are necessarily equal to and simultaneous with, its exports, and vice versa."

If it is accepted that financial assets can be imported and exported just like products, it immediately follows that the identity of exports and imports always holds even when unilateral transactions and variations in official reserves are included in the analysis (Schmitt, 2012b, p. 251):

Exports ≡ Imports

Obviously, this involves lumping together real products (goods and services) with financial assets. This is not so far-fetched. As Van den Berg (2010, p. 68) explains, the separation between current and financial account must be understood historically, not just theoretically. After World War II, most countries restricted trade in financial assets. European and Japanese citizens were often not allowed to open bank accounts or acquire stock in foreign companies. But from a monetary

perspective, it makes little difference if a country exports securities or real output. In both cases, the result will be an increase in foreign currency that is immediately spent abroad. It is clear that receiving a property right over financial assets is not the same as receiving real goods. The ultimate compensating item of a real, commercial export is another real import of goods or services. However, a security grants its holder the property right over a stream of income in the future. In this sense, a security "provides a bridge between the present and the future; that is to say, between a current account deficit and a current account surplus" (Rossi, 2007a, p. 112). Let us now turn to the accounts that make up the balance of payments.

2.2 The major accounts of the balance of payments

The accounts that summarise the economic relationships between residents and non-residents of a country comprise the international investment position (IIP), the balance of payments and other changes in financial assets and liabilities accounts, like other volume changes and revaluations (International Monetary Fund, 2009, p. 7). While the IIP shows residents' financial claims/liabilities on non-residents at any given *point* in time, plus gold bullion, the balance of payments summarises transactions between residents and non-residents during a *period* of time. The balance of payments consists of the current account, the capital account and the financial account (ibid., p. 9).

- The *current account* "shows flows of goods, services, primary income and secondary income between residents and non-residents" (ibid.). Primary income represents cross-border transactions between residents and non-residents for the provision of labour, financial assets or natural resources. Taxes and subsidies are also part of primary income. Secondary income refers to current transfers between residents and non-residents. While exchanges are transactions that involve the provision of something of value against the other, a transfer is a transaction that moves an economic value in only one direction.

- The *capital account* "shows credit and debit entries for nonproduced nonfinancial assets and capital transfers between residents and non-residents", such as titles to land or licences, as well as capital transfers (ibid.). It is noteworthy that the capital account does not cover cross-border exchanges of what is traditionally called capital. If a firm sells a machine – a *produced* asset – to another country, the transaction is recorded in the goods account of the current account. Accordingly, a cross-border purchase of shares or bonds is recorded in the financial account, not the capital account. Nonproduced, nonfinancial assets consist of a) natural resources, b) contracts, leases, and licenses, and c) marketing assets and goodwill.

- The *financial account* shows "net acquisition and disposal of financial assets and liabilities" (ibid.). The sum of the balances of the current and capital account define a country's net borrowing/lending and is therefore conceptually equal to the balance of the financial account. The financial account consists of direct investments, portfolio investments, financial derivatives and employee stock options, other investments and reserve assets.

So far, there have been devised six editions of the balance of payments manual (1948, 1950, 1961, 1977, 1993, and 2009). Between the fourth and the fifth edition, a number of significant changes were made which are not always accounted for in currently available economics textbooks. To wit, the capital account is still often used to refer to what the IMF has officially been calling the financial and capital accounts since 1993 (see, for example, Gandolfo, 2001, p. 61). The IIP, which captures the stock of external assets/liabilities, was introduced in 1993. The capital account was changed into the capital and financial account in order to make the terminology of the system of national accounts (United Nations, 2008) and the balance of payments statistics (International Monetary Fund, 2009) consistent. Figure 2.1 illustrates the major accounts of the balance of payments statistics (without the IIP) according to the newest terminology.
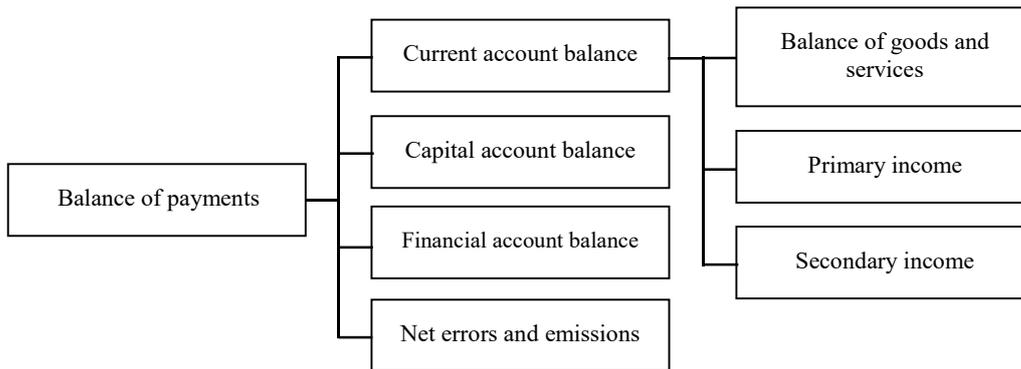
Figure 2.1 The structure of the balance of payments

It is important to highlight the interrelation of the balance of payments and the IIP. A country's net IIP, which may be positive or negative, is the difference between the economy's external financial assets and liabilities. Saying that the sum of current and capital account balance is positive (negative) is equivalent to saying that a particular country has received more (less) than it has paid from trading with goods, services and nonproduced nonfinancial assets and from cross-border transactions of primary and secondary income. This positive (negative) balance must be equal to the financial account deficit (surplus), defining a new net lending (borrowing) for the country as a whole (an increase in financial assets is a debit). The new IIP, or closing position, will consist of the opening position *plus* the net acquisitions of financial assets *plus* other changes in volume *plus* revaluation. Because of the substantial changes in the value of financial assets

over the course of the year, the net international investment position will not correspond exactly to the flows recorded in the balance of payments. Thus, "[t]he current, capital and financial account entries are in balance, in principle", whereas errors and omissions occur because of "imperfections in source data and compilation" (ibid., p. 11). Omitting errors and omissions, we can therefore write

$$\text{Current Account} + \text{Financial Account} + \text{Capital Account} = 0$$

Reserve assets form an important part of the IIP and consist of "monetary gold, SDR holdings, reserve position in the International Monetary Fund, currency and deposits, securities (including debt and equity securities), financial derivatives, and other claims (loans and other financial instruments)" (ibid., p. 113). Reserve assets must be readily available and under the control of the monetary authorities in order to count as reserves. Monetary gold includes – next to the physical gold stored in the authorities' vaults – that readily available gold outside of the country to which a central bank is legally entitled. If a commercial bank receives a foreign bank deposit due to its client's export activities, it does not count as a reserve item as long as the bank decides not to transfer the foreign currency to the central bank. While domestic currency is defined as "legal tender in the economy and issued by the monetary authority for that economy", all other currencies are foreign currencies (ibid., p. 44). Currency includes not only banknotes and coins according to the IMF's (ibid.) manual, but comprises all means of payment issued by financial institutions. Foreign currency "is shown as a currency asset of the resident holder and as a liability of the issuer" (ibid., p. 86). Deposits are claims on central banks, deposit-taking corporations and other institutional units (ibid., p. 86). Foreign currency and deposits held abroad are claims on non-residents that are classified as investments by the International Monetary Fund (ibid., p. 100). Notably, foreign exchange may be used "for meeting balance-of-payments financing needs, for intervention in [foreign] exchange markets […], and for other related purposes" (ibid., p. 111). Gold bullion is also listed in the IIP, although gold bullion is not a financial asset as it is "not a claim and does not have a corresponding liability" (ibid., p. 33). The reason gold bullion is *treated* as a financial asset" (ibid., p. 33, emphasis added) has to do with "its special role as a means of financial exchange in international payments by monetary authorities and as a reserve asset held by monetary authorities". This treatment by the International Monetary Fund makes it clear that currency and real assets such as gold ought to be strictly separated in theory and practice.

Depending on the legal environment, which again depends on the exchange rate regime, a central bank collects foreign exchange from its client commercial banks in exchange for central bank deposits. If the commercial banks transfer their foreign exchange to the central bank, they are credited with a sum of domestic

(central bank) money[5]. Machlup (1976e, p. 283) points out with respect to the United States:

> "Dollar balances of private holders can at any time be sold to their respective central banks and thus be readily transformed into 'official' balances. In monetary statistics, official and private dollar holdings are nevertheless stated separately, and only the official holdings are included in the 'foreign reserve' of the countries concerned."

At the time of writing, foreign currency and deposits controlled by other than central banks are registered under the account "other investment" and form part of the financial account (flow perspective) and the IIP (stock perspective).

2.3 Fundamental identities revisited

Let us highlight the accounting framework underpinning the balance of payments (International Monetary Fund, 2009, Chapter 14) by writing down some of the derived fundamental identities. The net national lending/borrowing of a country that takes place during a period can be expressed as follows:

$$NLB = CAB + KAB = NFA, \tag{12}$$

where NLB denotes net lending or borrowing, CAB is the current account balance, KAB is the capital account balance and NFA is the sum of financial account entries.[6] Equation (12) shows that new net lending during a specific period is identical to the increase in the financial account, including reserve assets. If we define NKF as the sum of net capital and financial account transactions, excluding net reserve assets transactions, RT, we get

$$NKF = NFA + KAB - RT. \tag{13}$$

It is now possible to write

$$CAB = NKF + RT, \tag{14}$$

which shows that the entire current account surplus, CAB, is invested in claims against the rest of the world. Now, as already stated in equation (6), excess domestic saving in a country is perceived to be the mirror image of current

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[5] In fact, the claim on a foreign bank deposit is not transferred – as this implies physical movement – but destroyed and created again to the benefit of the central bank.

[6] The financial account can be represented with negative or positive signs, depending on the approach. If the financial account is presented as a net lending, it is positive (stock perspective). If the financial account illustrates an increase in financial assets (flow perspective), the signs would need to be reversed (see International Monetary Fund, 2009, pp. 224-5).

account imbalances. The current account surplus, CAB, is either spent on nonproduced nonfinancial assets or immediately invested in foreign financial assets, which includes the category of reserve assets. This equation shows that, according to traditional income accounting, the current account balance equals the excess of saving over investment. The equation may now be rewritten as

$$S - I = NKF + RT, \qquad\qquad (15)$$

which states that the excess domestic saving over domestic investment is entirely invested in financial claims against the rest of the world. From (15) we can easily derive

$$CAB - NKF = RT, \qquad\qquad (16)$$

which shows that the part of the current account surplus that does not increase the private economy's financial claims on the rest of the world, NKF, increases the central bank's claims on the rest of the world, RT. According to the manual (ibid., p. 225),

> "a surplus on the current and capital accounts is reflected in an increase in net claims, which may be in the form of acquisitions of reserve assets on the part of the monetary authorities or private claims on non-residents".

A current account surplus thus implies an increase of NKF plus RT and, simultaneously, an excess of domestic saving over domestic investment. In order to test and deepen the above analysis, let us refer to a simple example of a country A running a current account surplus with respect to the rest of the world, R. If country A exports more goods and services than it imports, it receives foreign currency – spent on a claim on a foreign bank deposit recorded either in the ledger of private banks or the central bank – on the basis of which the banking system in A credits its exporting customer in local or foreign currency. For the moment, let us assume that the newly created deposit to the benefit of the exporter may be said to represent a positive domestic saving $(+\Delta S)$ not matched by domestic investment. Yet, as Cencini (2005, p. 228) points out, and in accord with current IMF accounting practice, the saving received from abroad *is* immediately invested. To wit, it is invested in claims on foreign bank deposits, as explicitly confirmed in the International Monetary Fund's (2009) manual. Indeed, the increase in foreign currency through the net export of goods and services defines a foreign investment $(+\Delta I)$ for the country as a whole, clearly evidenced by the increase in its international investment position. The money 'captured' from abroad (+) is thus immediately and mechanically spent abroad (–). It would therefore seem inconsequent to suggest that saving and investment can diverge as soon as current account surpluses are allowed to exist.

However, any experienced neoclassical macroeconomist would immediately point out that a current account surplus is invested *abroad* and thus represents a *foreign* investment $(+\Delta I_F)$ of the exporting country. So, according to the approach adopted by the IMF, a current account surplus increases the net *international* investment position, but it does not increase net *domestic* investment. On the other hand, the foreign savings captured from abroad owing to a current account surplus are assumed to be transformed into *domestic* savings $(+\Delta S_D)$ by the surplus country's national banking system. If this view is correct, then it is certainly true that a current account surplus leads to an excess of *domestic* saving over *domestic* investment, $S_D > I_D$. The answer to the question if saving and investment can differ *ex post*, once international trade is taken into account, seems to lie in the question of 'nationality' of the savings earned abroad.

In order to dig a little deeper into the nationality of the surplus country's savings, we may point out an important empirical fact: the bank deposit representing the deficit country's savings does not, in fact, leave the importing country. Instead, the relevant deposit is still registered in the deficit country's banking system *after* the transaction has taken place. To be sure, the deficit country's deposits owned by non-residents are excluded from national measures of saving. As saving is income not consumed domestically or abroad, imports are deduced from measures of savings in current national income accounting practice, even though the corresponding deposits are still registered in the national banking system. Also, monetary aggregates exclude bank deposits owned by non-residents:

> "National monetary aggregates typically include residents' deposits denominated in both domestic and foreign currencies, while they exclude domestic deposits held by non-residents". (Belke and Polleit, 2009, p. 79)

The income corresponding to the traded item is thus registered as a bank deposit twice: once on the liability side of the importing country's banking system, and once on the liability side of the exporting country's banking system. Due to the current measurement methods, the duplication of deposits is not perceived. However, this unusual process of duplication of bank deposits was already noticed by Charles de Gaulle's economic adviser, Jacques Rueff (1963, p. 324):

> "Thus everything happens as if these currencies had never been exported in the first place. Entering the credit system of the creditor country, but remaining in the debtor country, the claims representing the deficit are thus doubled."

What Jacques Rueff observed was that the importing country does not export the bank deposit itself, but merely the claim on the bank deposit, which is not the same. It is an empirically confirmed fact of accounting that the original bank deposit does not 'jump' out of the banking system's balance sheet, but remains

firmly recorded in the importing country's banking system: "As shown by double-entry bookkeeping, not a single unit of the income formed in [the importing country] is transferred to [the exporting country]" (Baranzini and Cencini, 2001, p. xx). The claim over this bank deposit now features on the asset side of the surplus country's banking system as a loan to the importing country, on the basis of which the banking system is able to credit its customer with a deposit on its liability side. So while it is certainly true that a new bank deposit has been created to the benefit of the exporter, it is also true that a corresponding bank deposit is still registered in the importing country. In this case, the deficit country does not lose income (or output, for that matter) to the surplus country. Rueff's description of the Bretton Woods system is therefore highly topical, as it points out an anomaly that persists in the current post Bretton Woods non-system. While the gold standard ensured a loss of purchasing power for the deficit country as soon as payment was settled in terms of gold,

> "under conditions of the gold exchange standard the total volume of buying power is in no way affected by deficits in balance of payments no matter what their amount." (Rueff, 1963, p. 322)

This, the trained macroeconomist will notice, is Rueff's hypothesis of the deficit without tears, according to which a reserve currency country – in this case the United States – is able to get without paying:

> "Everything took place on the monetary plane just as if the deficit had not existed. This is how the gold exchange standard brought about an immense revolution and produced the secret of a deficit without tears, to the countries in possession of a currency benefiting from international prestige allowing them to give without taking, to lend without borrowing, and to get without paying." (ibid.)

The 'deficit without tears'-hypothesis was coined the "exorbitant privilege" of the key currency country by the French Finance Minister Valéry Giscard d'Estaing (see Eichengreen, 2011, p. 40). Interestingly, Eichengreen seems to agree with Rueff's analysis in principle, but believes – contrary to Rueff – that the United States provides a necessary global public good to the rest of the world by handing over IOUs instead of products when paying for its imports. Problematically, the ability of acquiring real value from abroad without having to hand over an equivalent value is often pictured as a *seigniorage*, a privilege accruing to the issuer of the world currency. Arguably, Rueff's 'deficit without tears'-hypothesis has been misunderstood and transformed, thereby missing its central points. Melvin and Norrbin (2012, p. 36) provide an example of a misrepresentation of Rueff's (1963) original analysis:

> "Seigniorage is a financial reward accruing to the issuer of currency. The central bank's seigniorage is the difference between printing money and the return to the assets it acquires. In addition to such central bank seigniorage, a reserve currency country also receives additional seigniorage when foreign countries demand the currency issued and put those in its vaults, as this reduces the inflationary pressure that money creation causes."

This passage is problematic for at least three reasons. First, it is a well known and established fact that banks *as well as* central banks create money. To wit, it is the daily business of commercial banks to create money by extending loans to firms and to demand interest payments from them. The bank's creditors, on the other hand, usually receive interest payments from the bank that are typically lower than what the bank's debtor needs to pay. It would not occur to levelheaded economists to label commercial banks' earnings as 'seigniorage', and rightly so. But in the role as banks of banks, central banks do the same, and it would be confusing indeed to call the net interest earned by the central bank 'seigniorage', when the net interest earned by commercial banks rests on the same principles. Secondly, the passage states that countries running current account deficits (surpluses) run the risk of deflation (inflation), a hypothesis that is not at all sufficiently proved empirically nor theoretically. Thirdly, it fails to spell out the actual privilege accruing to the reserve currency country, namely, the ability of purchasing valuable items from abroad without having to surrender anything in exchange but the promise to pay in the distant future. We may add here that it is unclear why being able to issue the reserve currency should be labelled a privilege, as the debt incurred to net exporting countries must be paid by the importer eventually.

Let us briefly return to the question of the nationality of savings and examine a case of a reserve currency country running a current account deficit. When a country with a key currency imports more products from abroad than it exports, *ceteris paribus*, it surrenders to the rest of the world the property right over part of its savings in the form of claims on bank deposits. But, as shown above, the savings are not lost to the exporting country. The transfer of a property right over part of a nation's savings to non-residents does not amount to a decrease in savings, if the savings are still recorded in the deficit country's banking system. We are left with the inconvenient suspicion that deficit countries with the power of issuing reserve currencies can import with a buying power they do not lose. According to Cencini (2005, pp. 229-30), equation (6) is therefore both erroneous and misleading:

> "It is erroneous because it suggests that a current account surplus could define a positive saving that is not necessarily invested (or that a current account deficit could not imply a positive borrowing), which is openly in contrast with the nature of money, the actual working of the monetary and

financial system, and the principle behind the concept of the international investment position adopted by the International Monetary Fund. It is misleading because it endorses the belief that current account balance is a matter of equilibrium between the residents' decisions to save and invest."

If the identity of saving and investment holds in open *and* closed economies alike, then Ben Bernanke's saving glut hypothesis must be fundamentally revised. What emerges from Rueff's (1963) analysis is the heterogeneity of national savings, an interpretation of international imbalances which has been substantially extended by Schmitt (1984a). This view contrasts with the orthodox, neoclassical view that national savings can be taken out of their respective national banking system and allocated around the globe, a view that is particularly obvious in Feldstein and Horioka's (1980) paper on the international allocation of national savings. In fact, the neoclassical view rests on the assumption that national monies are financial assets that can be made homogeneous through exchange rates, an assumption that will be further discussed in Chapter 3.

As was pointed out in Chapter 1, both classical and neoclassical economists were heavily influenced by hydraulics when shaping their views of the economy. Indeed, if the monetary effect of the payment of imports is compared to water draining from a hole in a bucket, it is clear why economists to this day think that a current account deficit reduces savings with respect to investment; the 'granular' investments stay in the country, while 'liquid' savings flow out. However, money is not in any way similar to water, and creating false analogies can lead into dead ends. Apparently, the problematic assumption here is the supposed homogeneity of different national incomes. Specifically, there seems to be a widely shared belief that a national income registered in one national banking system can be removed and placed in another country's banking system.

In order to shed some light on the supposed international circulation of national incomes, let us create a numerical example of two countries engaged in trade. Country A, which is in possession of a reserve currency, has produced output worth 100 money units in previous periods. The total savings (income not consumed) registered in banks' software exactly corresponds to the value of output, according to the well-known principles of national income accounting. Therefore, we may say that

$$Y_D \equiv Q_D \equiv 100 \qquad\qquad (17)$$
$$S_D \equiv I_D \equiv 100 \qquad\qquad (18)$$

where Y_D denotes domestic income, Q_D denotes domestic output, S_D denotes domestic savings, and I_D denotes domestic investment. The identity symbol ($\equiv$) emphasises the fact that saving and investment, and income and output, are not separate objects, but in fact the two sides of the same coin. Now suppose the

residents in country A spend their entire domestic income on output from exporting country B. According to the traditional approaches to the balance of payments, the importing country now exhibits a current account deficit of 100 and excess domestic investment over domestic saving of 100.

$$CAB \equiv S_D - I_D \equiv -100 \qquad\qquad\qquad (19)$$

As already pointed out earlier, closer inspection reveals that the entire amount of domestic income is still registered in the deficit country's banking system, where it is lent to those firms that need to finance their production costs; only the property right over this income has been transferred abroad. Additionally, the entire output in deficit country A, produced in the previous period, is still stored in firms' warehouses, waiting to be finally sold, confirming that investment is also still valued at 100 money units. The fact that claims on deposits have been exported to surplus country B does not alter the fact that the income is still registered in deficit country A. In fact, it should be clear that the importing country A has not spent its income, but instead financed its imports by borrowing from the surplus country the entire sum of 100 money units in order to purchase the output from the surplus country. The surplus country's foreign investment finances the deficit country's imports. If the imports were finally paid by country A, A's income would be spent, and there would remain no further debt between the two countries. The fact that country A is indebted as a result of its import shows that the purchase was not financed with country A's income, in which case the debt would have been discharged.

If A's imports are not financed with its own income, is it possible that the income of the surplus country is used up on its own exports? Alas, the answer is again no. True, the surplus country finances its own exports on behalf of the deficit country. As a result of B's loan to A, country B's international investment increases. If the surplus country B decides to keep the foreign currency, none of country B's income is spent in this operation. In Schmitt's (1978, p. 126, our translation) words, the payment is "carried out by nothing and nobody". The problem could apparently be solved if surplus country B spent the foreign currency on a security from A, in which case B would receive something real in exchange for its exports, namely a financial claim on future income from A. In this case, country A's currency is channelled back to country A. Figure 2.2 illustrates the situation before and after trade from the perspective of the importing country A. As a result of the transaction, the deficit country A becomes indebted to the exporting country B. The exporting country B automatically spends the currency received from A on a claim on the importing country's bank deposit. What has changed for the deficit country after the transaction is the *ownership* of the bank deposit registered in A's banking system, which has been transferred to country B. The bank deposit itself, defining country A's income, is still entirely available in country A's financial market, where it is lent to those firms that need to finance

their production costs. Additionally, we may add, the income in A can be spent on financial markets in A, nourished by bank credit, and thereby induce an asset price bubble.

Country A *before* import

Wage earners
(bank deposits)

+100

+

−

+100   −100

Financial magnitudes

Firms
(physical output)

Country A *after* import

Foreign bank
(bank deposits)

+100

+

−

+100   −100

Financial magnitudes

Firms
(physical output)
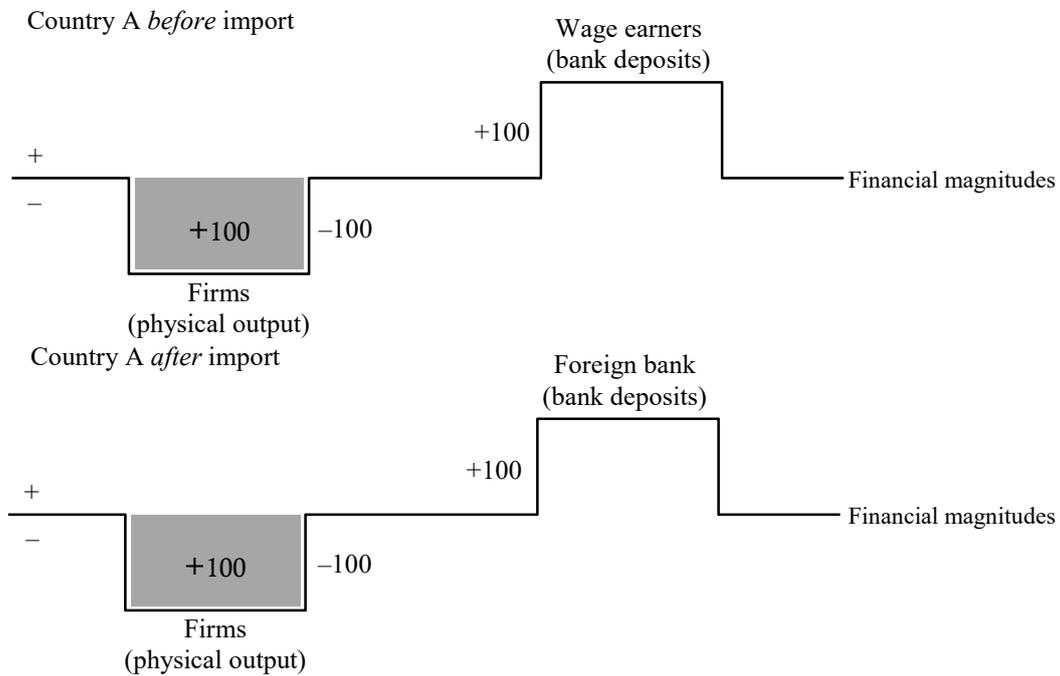
Figure 2.2 The effect of imports on income and output in country A.
Source: adapted from Rossi, 2007a, p. 42

The effect of the same transaction can be observed for country B in Figure 2.3. We assume that, in country B, the initial level of output is valued at 200 money units and that the exchange rate between money A and B is 1:1.

Country B *before* export

Wage earners
(bank deposits)

+200

+

−

+200   −200

Financial magnitudes

Firms
(physical output)

Country B *after* export

Wage earners
(bank deposits)

+200

+

−

+100   −100

Financial magnitudes

Firms
(physical output)
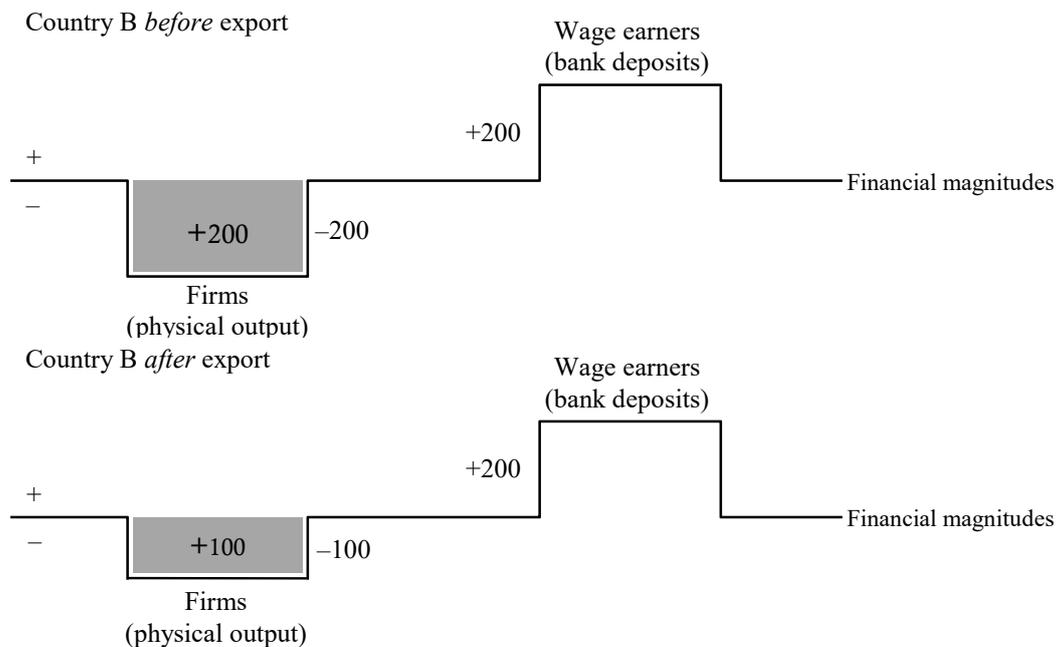
Figure 2.3 The effect of exports on income and output in country B.
Source: adapted from Rossi, 2007a, p. 42

As a result of this international transaction, an exporting firm is credited with 100 money units in domestic money, thereby reducing its net indebtedness toward the domestic banking system in B by 100 money units. The banks in B, in turn, are the beneficiaries of a claim on a foreign bank deposit recorded in country A's banking system, which represent a foreign saving. In current banking practice, this asset is often recorded as a loan to a foreign bank. It turns out, therefore, that assuming national currencies' homogeneity is not a legitimate approach in monetary macroeconomics:

> "The principal reason for the analytical deficiency of the monetarist approach is the paradigmatic acceptance of national currencies' homogeneity, an assumption which is not supported by facts. […] In other words, external income can be added to (or deduced from) internal income only if foreign and national currencies are homogeneous units of measurement." (Cencini, 1995, p. 184)

It must be remembered that the US dollar's homogeneity within national boundaries is not just due to some metaphysical notion of social acceptance, but due to the fact that all dollars are issued by the same centralised and hierarchically organised banking system with interbank clearing and settlement processes. As Cencini (1995, p. 184) points out in accordance with modern payment system literature: "Without any such institution, every private bank would issue a currency totally heterogeneous with regard to the others".

The fact that the payment of net exports can give rise to an increase in the (so-called) money stock in the surplus country without decreasing the money stock in the deficit country serves as a clear warning not to think of monetary economics mechanically. If different currencies were financial assets that can be made homogeneous through exchange rates, a current account deficit of one country would cause its money supply to decrease by the same amount the money supply increases in the surplus country. As the analysis in this and the next chapter shows, this is not the case.

2.4   Identity versus equilibrium in the balance of payments

In order to shed more light upon the current approach to the balance of payments, the meaning and relationship of accounting identities and economic equilibria ought to be further explored. Of course, economic equilibrium is not confined to international macroeconomics. Rather, it is deep-seated in the whole of the modern economics literature. A standard attack brought against macroeconomic theories and hypotheses is that they are merely doctored tautologies. The behavioural analyses that are supposed to explain the direction of causality and thereby turn the tautologies into theories are usually heavily disputed, and very

hard – if not impossible – to prove empirically. For example, Fisher's (1911/1931) quantity equation has often been attacked for being merely a tautology, from which no causalities should be inferred. Similarly, Machlup (1955, 1956) vigorously attacks Alexander's (1952) absorption approach, arguing that it is nothing more than tautological reasoning based on accounting identities. Meade (1951, pp. 3-4) suggests that the accounting identities of the balance of payments are mere truisms, thus adding no relevant economic information:

> "There is, of course, one sense in which the balance-of-payments can never be out of equilibrium. As with any other account, the total receipts of a country are bound to be equal to the total payments of that country, if one includes all the receipts and all the payments of the country in the same account."

This is also the consistent position in the International Monetary Fund's (2009) manual.[7] However, while there is a broad consensus among economists that the overall balance of payments must always sum to zero, there is at the same time a broad consensus that there can be a balance of payments surplus or deficit. The balance of payments is concerned with accounting relationships, and in this sense it is generally accepted that the current, capital and financial accounts together always sum to zero. Gandolfo (2004, p. 63) agrees that the balance of payments must always balance from an accounting point of view. However, in conformity with the mainstream view, he sees ample room for economic disequilibria:

> "Since all economic transactions between residents and non-residents are reported under double-entry bookkeeping, the balance of payments always balances. It is therefore a concept of (economic) equilibrium to which one refers when one talks of equilibrium and disequilibrium of the balance of payments. In order to avoid terminological confusion, we shall use the term equilibrium to denote economic equilibrium, and balance to denote accounting identities. We shall use the terminology surplus and deficit to qualify a disequilibrium of the balance of payments."

What does the author mean when he states that two terms of an equation can determine an accounting identity and, at the same time, an economic disequilibrium? Machlup (1976a, p. 69) is the author who dealt perhaps most extensively with this problem:

> "What is indiscriminately called the balance of payments may be
> (A). a MARKET BALANCE, i.e., a balance of supply and demand; or
> (B). a PROGRAMME BALANCE, i.e., a balance of hopes and desires; or

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[7] It is perhaps noteworthy that the terms 'equilibrium' and 'disequlibrium' do not even appear once in the 371 pages of the IMF's manual.

(C). an ACCOUNTING BALANCE, i.e., a balance of credits and debits."

While market balance and programme balance are both *ex ante* concepts concerned with hypothetical, virtual magnitudes, the accounting balance is an *ex post* concept that shows realised magnitudes. The first two balances are instruments for planning, analysing, forecasting and negotiating. The accounting balance, on the other hand, is simply "a record of all transactions" (ibid., p. 70). According to Machlup (ibid.), "the meaning of a deficit in the balance of payments is [...] categorically different for each of these three basic concepts". It is possible to say that, when one considers *realised* transactions, the balance of payments always balances in accordance with the third type of balance. Yet, when attention is paid to the hopes, desires and plans of economic agents, the balance of payments may be out of equilibrium. A market balance of payments, according to Machlup (ibid.), corresponds to an equilibrium of supply and demand on the market for foreign exchange. If a country demands more foreign currency than other countries are willing to supply at the current rate of exchange, a (market) balance of payments deficit is said to occur.

Unfortunately, economists have no way really of finding out if an excess supply or demand in the above sense is at hand. In accordance with the *revealed preference approach*, economists must wait for the actual transaction to occur in order for demand or supply to be revealed. As each transaction upholds the overall balance of payments, how can economists ever hope to measure a surplus or deficit? This "deliberately vague" approach (ibid.) mirrors the powerful status equilibrium analysis enjoys within economics departments. Although accounting identities are incompatible with the concept of equilibrium, economists dogmatically hold on to it simply because it is a generally accepted tool, thereby letting the method dictate the research programme:

> "Since I believe it is impossible to exclude the terms 'equilibrium' and 'disequilibrium' from the economist's discourse, I propose that they be subjected to a thorough cleaning job". (Machlup, 1976b, p. 110)

While the accounting identities of the balance of payments are theoretical reconstructions of really existing, measurable economic magnitudes, equilibrium is "a 'useful fiction', it serves as a part of a mental experiment designed to analyse causal connections between 'events' or 'changes of variables'" (ibid., p. 111). Thus, incorporating human hopes and desires is deemed more rigorous and promising for understanding an economic system, than analysing the monetary-structural principles that govern international payments.

Imposing the concept of equilibrium on the accounting concept of the balance of payments occupied the specialists of the International Monetary Fund after World War II: "The thought of using an accounting balance of payments as indication or

explanation of difficulties with the market balance of payments is too tempting to be given up lightly" (Machlup, 1976a, p. 85). The balance of payments was to illuminate the "purpose or motive of the operations and the stimuli to which they are supposed to respond" (ibid., p. 86). Thus, the IMF's economists attempted from the very beginning to interpret a microeconomic, behavioural dynamism into the balance of payments, in order to then use it as a tool for economic forecasting.

The effect a theory has on human understanding can be compared to looking through a pair of binoculars. While we are able to see certain aspects of reality clearer by using them, we blend out other aspects. The danger is always that the aspects that are blended out are highly relevant. It is therefore desirable to scrutinise more closely the concept of equilibrium in the balance of payments in order to perceive what might lie outside the field of vision. In a rebuttal of *ex ante*-concepts in macroeconomics, Cencini (2005, p. 230) forcefully argues that

> "before the transaction actually takes place, it would be meaningless to talk about a possible imbalance between current, and capital and financial accounts. Since neither the current nor the capital and financial account transaction has yet occurred, how is it possible for them to be inconsistent?"

Indeed, if equilibrium describes the relationship between *ex ante*, non-realised magnitudes, economists are attempting to compare quantitatively mental images of economic magnitudes that have not yet entered reality. As Borio and Disyatat (2011, p. 6) point out in this regard, "since *ex ante* saving and investment are not observable, it is hard to identify them". The quantitative comparison of non-observable magnitudes is a rather atavistic project for a science that emphasises the need for rigorous analysis. The equilibrium framework has become so powerful over the past century that some economists today even confuse the model with reality: "*An economy is a general equilibrium system* in which independent economic activities involving countless transactions between different institutional units are carried out simultaneously" (United Nations, 2008, p. 3, emphasis added). The confusion of an economic model with reality marks the almost complete victory of the general equilibrium framework. At the time of writing, dynamic stochastic general equilibrium models (DSGE), which are applied general equilibrium models with micro-foundations, are still widely considered to be good representations of the macroeconomy.

While the concept of equilibrium is so universally accepted among economists that it easily represents a methodological dogma, it is at least useful to point out that even expert neoclassical economists still do not agree on what the term 'equilibrium' actually means. Equilibrium is, in fact, a very fuzzy mental construct without any empirical counterpart in reality. In Lucas' (2005, p. 251) words, economic equilibrium is "not a property of reality", an attribute that makes empirical testing rather tricky. But not only does the concept of equilibrium have

no counterpart in reality; the theoretical meaning of the term is also debated. According to a leading neoclassical economist, "[m]uch of the elegant theoretical structure that has been constructed over the last one hundred years in economics will be seen over the next decade to have provided a wrong focus and a misleading and ephemeral idea of what constitutes an equilibrium" (Kirman, 1999, p. 8).

Turning back to accounting identities, let us restate that the key principle of the balance of payments is that "[e]*very international transaction automatically enters the balance of payments twice, once as a credit and once as a debit*" (Krugman and Obstfeld, 2003, p. 314). Clearly, Krugman and Obstfeld think that balance of payments imbalances in the strict sense are impossible: "This principle of payments accounting holds true because every transaction has two sides: if you buy something from a foreigner you must pay him in some way, and the foreigner must then somehow spend or store your payment" (ibid.). This view is also mirrored in Mundell's (1968, p. 141) remarks: "All transactions (sales or purchases) have a dual character – a sale of something implies a purchase of something else". By focusing on the behavioural questions, the analysis of the principles of a payment system is substituted with the analysis of different human motives for transactions. But, as Cencini (2005, p. 232) warns, "[w]hat if the system of international payments itself were a major source of disorder?" In this case, the focus on human motivation could lead economists to overlook those pathologies that are not due to the incentive structure institutionalised by the international monetary architecture, but to the way international transactions are processed within the system.

Machlup (1976c, p. 139) sums up dramatically the problems arising from mixing accounting im/balances and economic dis/equilibrium in the balance of payments:

> "What a terrible semantic mess! It gets worse when one starts using the words 'equilibrium' and 'disequilibrium' for [balance of payments surpluses/deficits]. I shall carefully avoid using these terms to characterize any concrete situation. For we should never forget that these are purely mental constructs without empirical counterparts; one and the same situation is an equilibrium or a disequilibrium in the analyst's mind, depending on what variables he happens to include in his model and what values he gives them in his imagination."

Indeed, the same balance of payments can be interpreted as an equilibrium by one economist and a disequilibrium by the other, depending on the value judgements of the respective economists. Machlup clearly states in the above passage that economic equilibrium has no empirical counterpart. Thus, one economist may *believe* that the balance of payments is in 'disequilibrium' because of 'import restrictions', while the other economist may *believe* the same balance of payments

is in 'equilibrium' thanks to 'protective trade measures' (meaning the same thing). This example shows the inherent malleability and normativity of the concept of equilibrium.

Cumby and Levich (1992, p. 115) explain the problem as follows: "The question of which is the 'proper' defnition of a balance of payments surplus, deficit or balance is one of determining the 'proper' subtotal of transactions or where to draw the line". They then refer to the notions of autonomous and accommodating (or 'compensating') transactions first introduced by Meade (1951). James Meade separates between autonomous and accommodating transactions in order to better grasp the 'path to equilibrium' of the balance of payments. The distinction was taken over by other economists, such as Mundell (1968) and Kindelberger (1969). According to Meade (1951, p. 11), the distinguishing feature of accommodating payments "is that they have taken place only because the other items in the balance of payments are such as to leave a gap of this size to be filled". Accommodating transactions involve (i) the monetary authorities' sale of official reserves to importers in order to finance their purchases, (ii) a loan or a grant of one government to the other for the purpose of financing a balance of payments gap (iii) or the compulsory acquisition by a government of foreign assets owned by its citizens (Meade, 1951, p. 12). In Meade's (ibid.) example, the author sums up the value of all 'normal' transactions that took place because of some genuine and autonomous (consumer or profit) desire and compares them to the transactions that took place in order to finance the gap created by the autonomous transactions. While the balance of autonomous and accommodating transactions is nil at all times, Meade (1951, p. 13) explains that this approach offers a working definition of equilibrium:

> "We are now in a position to define an actual surplus or deficit in the balance of payments of a country. […] In future when we talk of an actual surplus or deficit in the balance of payments we shall have in mind this balance of autonomous trade and transfers. It is this sum which must be matched by what we have called accommodating finance."

The International Monetary Fund (2009, p. 237) still applies this concept in its latest manual in appendix 1 ("exceptional financing transactions"), though it admits that it is an analytic construct and not really based on precise criteria, which is why identifying accommodating transactions "involves a degree of judgment". According to the IMF (ibid.), exceptional financing "brings together financial arrangements made by the authorities […] of an economy to meet balance of payments needs". The experts of the IMF adopt Meade's terminology when they write that autonomous transactions are 'above-the-line' items in the current, capital and financial account that are undertaken for the sake of the transaction. These transactions thereby contribute to an overall balance of

payments deficit or surplus. On the other hand, accommodating transactions are 'below-the-line' transactions that serve to finance the deficit or surplus.

As Cencini and Citraro (2012, p. 268) point out, the distinction between autonomous and accommodating transactions is "blurred and difficult to apply". In Meade's example, autonomous transactions involve exports and imports of goods and services, unrequited receipts and payments, and capital receipts and payments. Accommodating transactions may include exactly the same kinds of transactions. If we were to follow this definition, we would have to determine which exports are undertaken merely to finance an eventual import and which ones originate from an 'autonomous' desire. Obviously, applying this categorisation would overstrain even the smartest of economic analysts. It is therefore no surprise Kindelberger (1969) felt that it is practically impossible to distinguish between the two categories of transactions. However, one fruitful approach seems to lie in isolating those transactions that induce a change in official reserves. Let us therefore investigate further the way reserve assets are treated in the balance of payments literature.

2.5 The role of the official reserves account

As we have seen, turning the balance of payments into an equilibrium concept demands applying Myrdalian *ex ante*-language, thereby introducing non-realised, purely mental magnitudes into an exact accounting framework. A complementary way of imposing an equilibrium concept on the balance of payments is by excluding the official reserves account from all other accounts. Official reserves are then portrayed as balancing items that 'fill the gap'. This is achieved by dividing the balance of payments into the current account, the capital account, the financial account without the official reserves account, and the official reserves account. The relationship can then be formulated with equation (16).

$$CAB - NKF = RT,$$

If CAB > NKF, then there must have been an increase in official reserves, whereas official reserves decrease when the opposite occurs. The IMF (2009, p. 228) turns this identity into a condition of equilibrium by linking it to incentives: "if the current account shifts into deficit, financing must take place either by drawing down the economy's reserve assets or by increasing incentives for attracting private funds". Under a system of fixed exchange rates, an increase of official reserves is interpreted as a decision to maintain parity by purchasing foreign currency (Cumby and Levich, 1992, p. 115), whereas under flexible exchange rates, reserve gains and losses are purely discretionary. This view is mirrored in a passage by Melvin and Norrbin (2012, p. 74):

"In the case of flexible exchange rates, where the exchange rate is determined by free market supply and demand, balance of payments equilibrium is restored by the operation of the free market. Therefore, the official settlements account will be zero."

In other words, in the case of flexible exchange rates, no government intervention is necessary, meaning that there will be no variations in official reserves (CAB = NKF) due to the equilibrating forces of supply and demand. On the other hand, if the exchange rate is pegged, variations of official reserves are portrayed as the net supply and demand for a currency at the particular exchange rates. The balance of reserve assets makes up the difference arising from the three other accounts. Let us illustrate this by showing the balances of these four accounts.

1)	Current account:	+ 10
2)	Capital account:	+ 5
3)	Financial account, excluding reserve assets:	+ 12
4)	Reserve assets:	+3

As is made clear in this simple numerical example, the net credit arising from the current (+10) and capital (+5) account is identical to the debit arising from the increase in the (total) financial account (+15). By defining the balance of payments as 1) + 2) - 3), thereby placing 4) 'below the line', we are able to say that there is a gap to be filled, and that therefore the balance of payments is in surplus.[8] In this case, the monetary authority accumulates three units of foreign exchange. Conversely, if 1) + 2) – 3) is negative, the monetary authority draws down reserves or increases its liabilities to non-residents. Both 3) and 4) represent, if positive, an increase of financial claims against the rest of the world. What is important to emphasise is that the official reserves account is perceived as the balancing item, thereby turning equation (16) into a condition of equilibrium. As Cumby and Levich (1992, p. 114) argue, the identity of equation (16) is merely an *ex post* identity: "ex ante, planned current account and capital account transactions might not have been consistent". This approach is criticised by Cencini (2005, p. 230), who asks "what is a planned current or capital and financial account transaction, and what adjustment can it engender ex ante?" As argued above, the quantitative comparison of two *planned* transactions is a metaphysical attempt, and therefore impossible to measure in practice.

According to Cencini and Citraro (2012, p. 269), it would be better to consider official reserves "as an account summarising the impact of all the transactions entered into the current account, *and* into the capital and financial account". In this view, variations of international reserves are neither balancing nor

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[8] Of course, the International Monetary Fund (2009) defines the balance of payments as 1) + 2) – 3) – 4) = 0. Reserve assets and foreign currency held by private agents are both part of the financial account.

accommodating items, but simply the results of international transactions on a country's international investment position. Today, foreign assets and foreign liabilities of a country's residents are blended together with the foreign assets and liabilities of the country as a whole, defined as the set of residents, in the IMF's international investment position. Provided a conceptual difference is introduced between the sum of a country's residents and the country as an economic entity (see Chapters 3 and 4 for further discussion of this), it would be useful to exclude those foreign assets and liabilities summarising the international investment position of a country as a whole. The impact on the international investment position due to a sale of bonds to a foreign investor may clarify this argument.

If a firm, which is a resident in country A, decides to sell bonds to a foreign investor, who is a resident in country B, country A's IIP is negatively affected as the bond is transferred abroad, defining a financial inflow for country A. At the same time, the IIP of country A increases as the country receives a claim on a foreign bank deposit, which defines a financial outflow. In the case assumed here, A's claim is 'transferred' by the commercial bank to the central bank in exchange for domestic money. The claim on B's bank deposits is now recorded as an increase in official reserves of country A. As country A's increase of the IIP is exactly offset by its decrease, it seems that this operation is neutral for the country's net financial position. Yet, this may only be justified in microeconomic terms.

It is of course true that the bond-issuing firm is now indebted to the foreign investor. In exchange, the firm receives a credit from its bank. However, on top of the firm's credit, country A *as a whole* benefits from a capital inflow in the form of a foreign currency which grants it purchasing power over foreign output, and which the country spends immediately on a foreign bank deposit. This second credit cannot be attributed to any particular resident, and its result must be considered as a financial asset belonging to the country as a whole. Indeed, as country B's money represents the IOU of the country itself outside of its national boundaries, the country as a whole is not just a neutral agent in this transaction. The country is neither just the sum of its residents, nor a resident of itself, which is why its financial asset defines a net gain of the country as a whole not offset by an equivalent loss. On the other side, country B as a whole incurs a new debt which cannot be attributed to any of its individual residents. The firm in A incurred a debt (-) to the foreign investor and is in turn credited (+) by its bank, while the foreign investor is debited (-) by the same amount it receives in the form of securities (+). The new financial debt of both the firm and the investor resulting from this whole operation is therefore strictly zero. At the same time, country B defined as the set of its residents has been burdened with a new external debt that is not compensated with a new financial claim, a fact that can only be adequately explained if countries' indebtedness is conceptually separated from the debts incurred by their residents. While it is the firm in A that sells the bond to the

investor in B, their respective countries' financial position is also affected by the transaction.

If economists are willing to differentiate between the debt of the *set* of residents and the debt of the *sum* of residents – a separation that is only made *rhetorically* today – the official reserves account would have to be carved out of the existing IIP and considered as the country's net financial position. Countries exist as economic as well as juridical, political, and cultural entities. While residents carry out cross-border payments, "the overall result – a net increase or decrease in reserve assets – concerns the country as such and not anyone of its specific residents" (Cencini, 2005, p. 235). For example, the increase in official reserves that results from a commercial export cannot be attributed to the exporter, who is credited in domestic currency, but defines the gain of the set of residents.

With the separation between 'microeconomic' and 'macroeconomic' external assets and liabilities in the IIP, it would be clear that a country as a whole benefitting from a foreign direct investment receives a net capital inflow to which no corresponding macroeconomic debt exists as counterpart. This proposal is in line with Cencini and Citraro's (2012, p. 270) demand that the IIP "as it exists today should be replaced by a new balance sheet recording all the transactions affecting a country's external financial position". Reinterpreted this way, variations of official reserves are not due to accommodating transactions, but rather reflect the impact of international transactions on a country's external indebtedness. Incidentally, a country's net commercial export defines the resident's exports as well as the entire country's exports, as the corresponding goods are no longer available on the country's product market. Indeed, nobody would probably deny that official reserves define a country's wealth that cannot be attributed to any individual resident. Identifying the international investment position with the official reserves account and defining this account as the net external assets/liabilities of the country considered as a whole would enable to deepen the macroeconomic analysis of international imbalances. This is especially important as there exist puzzles in international macroeconomics – such as the 'mystery of the missing surplus' (Krugman and Obstfeld, 2003, p. 314) or the 'double payment of net interest between countries' (Schmitt, 2012b) – that require better macroeconomic instruments for their proper understanding.

To sum up, it is universally accepted by economists that the balance of payments must add up to zero because every international transaction results in both a credit and a debit for each country. This accounting balance is seen as an *ex post* accounting identity. *Ex ante*, there may be a disequilibrium. Disequilibrium does not refer to realised transactions, but to the inconsistent 'hopes and desires' of individuals. It is also widely held that, while the balance of payments always balances, it can be out of balance *even from an accounting perspective*. This semantically somewhat confusing trick is achieved by excluding official reserves

from all other accounts of the balance of payments statistics. In this approach, a balance of payments surplus defines an increase in official reserves. By adopting this approach, economists have decided to interpret the balance of payments as a device that measures the path to equilibrium between countries.

Three points seem to be important to stress. First, the introduction of *ex ante* magnitudes that enabled economists to turn the balance of payments into an equilibrium concept comes at a significant cost. Specifically, *planned* transactions are conceptually upgraded to the point that they are able to change economic magnitudes by inducing an adjustment mechanism. But before transactions take place, it is meaningless to speak of imbalances. All economists admit that planned, non-realised economic magnitudes are not observable. It is highly questionable how a mental image of a non-realised transaction can affect actual transactions, and it is certainly not possible to relate mental images of non-realised transactions to anything – except, that is, if we were to accept that the *idea* of an object can have the same status as the object itself. This clearly violates scientific principles, as Cencini (2005, p. 230) warns:

> "A planned or desired transaction is not yet a transaction and can therefore not be inconsistent with another planned transaction that, like itself, is actually no transaction at all. It is only after a transaction has indeed occurred that it can be defined as such, and when this happens it is too late to find any adjustment between its entries in the current, and capital and financial accounts".

The application of equilibrium analysis has watered down the descriptive power of the balance of payments by turning it into a prescriptive model of the economy. By applying equilibrium analysis, the balance of payments does no longer serve to study the payment infrastructure and the accounting mechanisms of payments, a necessary task in light of the continuing Bretton Woods non-system. Instead, the focus lies on influencing agents' and countries' behaviour in such a way so as to bring about equilibrium.

The second point that emerges from this review is that the current approach to the balance of payments does not properly capture the international saving-investment identity. In the national context, it is already admitted that saving and investment are identical *ex post*. In the international context, neoclassical authors claim that, according to economic theory, "there should be no relation between domestic saving and domestic investment: saving in each country responds to the worldwide opportunities for investment while investment in that country is financed by the worldwide pool of capital" (Feldstein and Horioka, 1980, p. 317). However, not only is domestic saving at all times identical to domestic investment. Also, foreign saving is identical to foreign investment. As was pointed out repeatedly in this chapter, a country running a balance of payments

surplus gets no real funds from abroad in exchange for its products, but mere claims on savings deposited abroad. All incomes created within the national economy continue to be fully available in the national economy, even after the property right over them has been exported. As will be made clearer in Chapter 4, *income has a real as well as an accounting nature*, and the transfer of its property right abroad does not imply the transfer of the income itself. As a consequence, the saving-investment identity is respected nationally as well as internationally. The foreign currency received by the surplus country is immediately spent on a foreign bank deposit or, at a later date, on a foreign security. While the asset recorded in the surplus country's banking system defines its new foreign investment, the foreign saving that corresponds to it is still registered in the deficit country's banking system.

It is true that the surplus country's banking system creates a new bank deposit, denominated in local currency, to the benefit of the exporter. But the object of that bank deposit is not a *domestic* income or output, but an income still stored in the deficit country. The saving attained by the surplus country is therefore still held abroad. This does obviously not imply that the current account of every country must balance as a consequence. Countries' current accounts may be positive or negative, and there are legitimate reasons for this to occur. For instance, it may be rational for a society with a relatively large baby boomer generation in their forties and fifties to increase their savings under certain conditions, as it will otherwise be hard for following generations to pay the baby-boomers' rents once they are retired. Importing less and purchasing foreign financial assets may turn out to be an optimal strategy in this case. It is true that the current account only balances at the global level, while it will usually be out of balance for each separate country. However, it does imply that national saving can never leave its country of origin.

The third point of criticism refers to the balancing role commonly attributed to a country's official reserves. As the term 'balance' suggests, the overall equality of the current, capital and financial account is supposed to be conditional upon monetary authorities' decisions, which again are limited by the specific exchange rate regime. It is argued that the official reserves account is a record of those transactions entered into the current, capital and financial account that affect the country's external financial assets and liabilities held by the foreign bank. This view only partially corresponds to the international investment position, which does not differentiate between the financial position of the sum of residents and that of the set of residents. This last point, which will be analysed further in Chapter 3, is important for understanding the influence the international monetary system has on the real economy. It is a widely accepted opinion that, in today's asymmetrical international monetary system, countries in possession of a key currency (currently mainly the US dollar, the euro, the yen, and the pound) are in a privileged position with regard to the payment of a trade deficit. To wit, a key

currency country can 'pay' for its imports by exporting a claim on domestic bank deposits. Not so the weak-currency country. A non-key currency country has two ways of financing a trade deficit at its disposal: either it decreases its foreign reserves, or it gets hold of foreign currency by selling securities on the international market (Cencini, 1995, pp. 180-1). The need to acquire a key-currency in order to service its debt imposes a malign pressure on developing economies by creating a constant excess supply of their currencies, leading to an additional loss of purchasing power. In order to better understand the dynamism triggered by this on-going asymmetry, it is necessary to go beyond methodological individualism and adopt a more holistic approach that enables studying the effect certain kinds of transactions exert on societies.

3   The assumptions underlying the mainstream view

"There is no denying that views on money are as difficult to describe as shifting clouds."

<div align="right">(Schumpeter, 1954/1994, p. 289)</div>

Besides the damage the global financial crisis that erupted in 2008 has inflicted upon societies, it has also served as an invaluable reality check for economics departments around the world. Severe economic downturns have often led to a Schumpeterian process of creative destruction in economic theory. Many authors today – even some at the top of the academic pyramid – believe that macroeconomic theory is in need of a fundamental revision. The situation is similar to the 1930s and the 1970s, periods in which some of the leading spokesmen and spokeswomen in economics departments worldwide turned against their own profession, attacking not merely specific theories, but the entire axiomatic framework of economics. For example, Buiter (2009, Internet) believes that the past thirty years of graduate macroeconomics and monetary economics teaching might turn out to be "a privately and socially costly waste of time and other resources". Krugman (2009b, Internet) thinks that "the economics profession went astray because economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth" and later claimed that the state of macroeconomics is "rotten" (Krugman, 2012, Internet). Stiglitz (2011a, p. 591) states that "standard macroeconomic models have failed, by all the most important tests of scientific theory". Even before the 2008 crisis, Clower (1989, p. 27), who was a long-time editor of the *American Economic Review*, the most prestigious professional journal in the field, thought that the economics profession would have been better off if most of the papers published in the journal during his time as managing director had not been written or published. Clower (1999, p. 190) even stopped teaching the foundations of neoclassical economics, like elasticity of demand ("garbage") or utility maximisation ("nonsense"), as it does not add to students' understanding of relevant economic problems.

In practice, the confusion in economics departments worldwide is mirrored in the perseverance of the current monetary 'non-system' (Williamson, 1976) that resulted from the collapse of the Bretton Woods arrangement. Outside the ivory tower, policymakers continue to act accordingly to the inaptitude of macroeconomic theory. For example, Gandolfo (2001, p. 2) grudgingly admits that "new international macroeconomics is largely ignored by international policy makers". Portfolio managers rely on alternative economic theories for their forecasts. In an IMF study, Jakab and Kumhof (2013, p. 4) notice that during "the entire post-war period, macroeconomists did not see the private financial system as an important source of vulnerability that required an explicit model of banking". Students all around the world, notably in Paris and Harvard, complain

that they are being 'brainwashed' with unrealistic theories based on stupefying assumptions. Of all people, the Queen of England – not exactly the predestined initiator of science critique – even started to raise questions concerning the soundness of economic theory when she was opening a new building at the London School of Economics in November 2008. Acceptance of the fact that standard theory fails to explain important economic phenomena is the starting point for a serious renewal of macroeconomics. Instead of textbook sections listing theories that 'most economists agree on', textbooks need to reveal their weak spots and open themselves to criticism. This involves dropping the forbidding *façade* of impressive-looking mathematics and stating in plain English the fundamental assumptions that underlie economic theories.

While many economists today agree that macroeconomic theory needs to be fundamentally revised, it is not at all clear today which direction this change will have to take. Palley's (2013) fear in this regard is certainly not misplaced: it is not exaggerated to state that many economics departments worldwide are pursuing a *gattopardo* strategy, creating an illusion of change in order to keep the status quo intact (see also Mirowski, 2013). Despite their meagre performance, economics departments have been able to resist structural adjustment better than many other sectors of the economy. This is also due to the paradoxical situation that, while economic downturns usually reflect badly upon economists, they simultaneously strengthen their role as policy advisers and commentators.

The prudent path for sincere economists is to look for flaws in the foundations upon which the current consensus in macroeconomics rests. This chapter therefore focuses on the underlying assumptions that usually go unmentioned in the macroeconomics literature. The aim is to reveal the deeper groundwork of the current theoretical framework in order to better apprehend how theories of international imbalances are constructed, and where conceptual changes could lead to substantial improvements in theory and practice. The fundamental assumptions of the current framework will then be challenged, hoping that a case can be made for a fundamental revision. Admittedly, it is very improbable that economics departments will revise any time soon the assumptions upon which they construct their hypotheses. One difficulty stems from the fact that many economists seem to believe that good assumptions must be 'wildly inaccurate' in order to make a hypothesis significant, a view expressly held by Milton Friedman (1953, p. 14):

> "Truly important and significant hypotheses will be found to have 'assumptions' that are wildly inaccurate descriptive representations of reality, and, in general, the more significant the theory, the more unrealistic the assumptions (in this sense). The reason is simple. A hypothesis is important if it 'explains' much by little, that is, if it abstracts the common and crucial elements from the mass of complex and detailed circumstances

surrounding the phenomena to be explained and permits valid predictions on the basis of them alone."

This provocative passage led to a sharp rebuttal by Paul Samuelson (1963, p. 232), who seriously doubted the proposition that "the (empirical) unrealism of the theory 'itself', or of its 'assumptions', is quite irrelevant to its validity and worth". However, it is indeed true that good hypotheses must blend out the "mass of complex and detailed circumstances" in order to gain a clearer view of the "common and crucial elements". However, the following sections will hopefully convince the reader that, in modern macroeconomics, the "common and crucial element" has been blended out, that is, money itself. So, while Friedman's (1953) account of the importance of assumptions can be embraced wholeheartedly, it cannot be accepted that money is mistaken for a net asset in a model that attempts to understand money, thereby not only contradicting observed reality, but in fact excluding from the analysis the very object economists are trying to comprehend. The next section provides an analysis and critique of the asset conception of money that underlies almost all economic theories currently taught at universities around the world.

3.1 Money as a net asset

What role does money play in current macroeconomics textbooks? It is no big secret that, until today, "there is no consensus among economists about whether, at least in theory, money is needed at all or, if it is needed, what money is" (Wickens, 2011, p. 186). This echoes Bofinger's (2001, p. 3) claim that "the definition of money can still be regarded as an almost unresolved issue". In an authoritative article, Osborne (1992, p. 602) notes that the definition of money "has been unsettled for many decades and is now more controversial than ever". To add another voice to the canon, Kaldor and Trevithick (1981, p. 11) argue that "[o]ne problem which followers of the quantity theory of money had to face from the beginning is the basic question of how 'money' is to be defined". It should be uncontroversial that a first step in understanding the foundations of contemporary monetary theory consists in comprehending how money is currently defined, and how it is introduced into economic models.

It has become a well known and often repeated point of criticism that the current approach in monetary economics assumes that modern economies are essentially barter systems in which money is just one of many available commodities. Without money, goods and services are directly exchanged against each other, in which case we are faced with a barter economy lacking a common numerical standard. According to Clower (1969, p. 206), "*a barter economy is one in which all commodities are money commodities*". Thus, in a barter economy, all commodities serve as money, and all monies are commodities. David Hume's

price-specie flow mechanism and its extension by the Cunliffe committee are classical examples of barter models, and economists have rightly pointed out the limitations of such models owing to this defect.

In a money-using economy, it is said that exchange becomes indirect. In this case, money serves as a sort of go-between, or intermediate asset, apparently turning the economy from a barter into a monetary system. Money is portrayed as the instrument that splits the essential barter transaction into two chronologically distinct transactions. For those economists who share this concept of a money economy, money merely conceals the direct exchange of real goods (barter exchange) taking place. As a consequence, advocates of this approach often argue that money is a sort of 'veil' that adds no important information to positive analysis. An often-used example refers to the hypothetical case in which the money supply is multiplied by two, while output remains the same. In this case, prices would adjust until, in some loosely defined long-run, the price index rises by 100 percent compared to the *status quo ante*. According to this seemingly compelling story, money – a kind of asset that simulates the value of commodities – can simply be added or subtracted from one side of the equation without changing the fundamental relationship of 'real' supply of and demand for useful products. In this picture, money is an autonomous asset that can be exchanged against goods – another autonomous asset – on markets. Figure 3.1 illustrates the exchange of output and asset money on the product market.
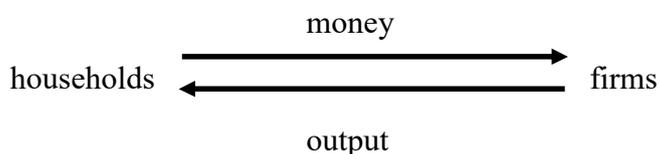
Figure 3.1 The sale of output on the product market.
Source: adapted from Cencini, 1988, p. 14

While many economists accept that money is a veil, often arguing for some version of the neutrality of money – meaning that its exclusion changes nothing essentially about those economic magnitudes that matter to people – they *simultaneously* maintain that money is a valuable asset. Since the time of the Classics, economists have replaced commodity-money with an asset-money conception. However, Clower seems to think that this is not enough to constitute a money economy: "[W]hat presently passes for a theory of money economy is in truth descriptive of a barter economy" (Clower, 1969, p. 205). The criticism is to the point. If money is just another valuable asset (albeit with special properties) that can be produced and exchanged, and barter is the exchange of two valuable assets, then present models of the economy are still essentially models of barter systems. This approach is extrapolated into the field of international monetary theory, where scholars believe that "the classical balance-of-payments adjustment

process [is] a model that can be shown to be reducible in principle to a barter model" (Mundell, 1976, p. 67). Giannini (2011, p. xxv) would certainly accept this diagnosis when he writes that "[t]he mistake that neo-classical theories make is to consider money a commodity".

But what then is a money-using economy? According to Clower (1969, p. 207), "a money-using economy is one in which not all commodities are money". In this case, some commodities *are* money, and some are not. Is this definition really so much different from the barter economy? Cencini (1988, pp. 115-6) thinks not:

> "In reality it could easily be argued that the two definitions proposed by Clower do not fundamentally differ. The fact that money is still considered as a commodity is significant, and underlines the essential similarity between barter and a money economy defined in Clower's terms."

The problem lies in the definitions of money and commodities, as Clower (1969, p. 207) himself maintains: "The natural point of departure for a theory of monetary phenomena is a precise distinction between money and non-money commodities". To be sure, the question of the nature of money and the monetary economy has been at the heart of our science at least since the works of James Steuart and Adam Smith. Let us remember at this point that money is the cornerstone of value theory, and the debate around objective and subjective value theory was a major bone of contention between classical and neoclassical writers. The Classics usually treated money as a commodity in their analyses. The term 'asset' was hardly used in the nineteenth century, and the Classics did not use it to describe money. Graph 3.1 shows how the term 'asset' only took off after 1900. While the word hardly ever appeared in English literature when Keynes was born in 1883, it appeared around 18 times in every 1'000'000 words around the year 2000.

Graph 3.1 The use of the word 'asset' in the English literature between 1800 and 2000.

Source: Google Ngram viewer (this online graphing tool analyses the amount of times a sequence of letters is found in over 5.2 million books digitised by Google)

According to the Classics, the public accepts a commodity as a means of payment if it is sufficiently scarce, durable, divisible, portable, noncounterfeitable, and so on. But classical monetary theory was a far cry from a unified whole. To be sure, classical economists were already aware of some of the trap doors in their concept of commodity money. To begin with, it was clear to many classical authors that bank money was essentially an immaterial thing, as payments were already carried out with credits and debits centuries ago. While commodities physically exist and must be produced in a labour- and time-intensive process, credits and debits are mere book-entries that do not possess any intrinsic value of their own. While commodities are *produced*, money is *issued* with the proverbial stroke of the banker's pen. Also, many classical authors noticed the logical impossibility of defining a material measure of value. Exchanging two physically heterogeneous commodities, commodity A and commodity B, does not provide a *common* measure, as commodity A is commodity B's measure, and *vice versa*. Looking for the invariable and common measure of value, the economist James Steuart (1767/1998, p. 218, emphasis added) pointed to immaterial bank money, in its most obvious form in Amsterdam:

> "A florin banco has a more determinate value than a pound of fine gold, or silver; it is [a] unit which the invention of men, instructed in the arts of commerce, have found out. *This bank money stands invariable like a rock in the sea. According to this ideal standard are the prices of all things regulated*; […] No adulterations in the weight, fineness, or denominations of coin have any effect upon bank money. […] *All is merchandize with respect to this standard*; *consequently, it stands unrivalled in the exercise of its function of a common measure.* […] Money of account, therefore, cannot be fixed to any material substance, the value of which may vary with respect to other things."

When Steuart writes that "[a]ll is merchandize with respect to this standard", he excludes money from the set of commodities available and thereby heralds Adam Smith's (1776/1970, p. 385) famous passage in the *Wealth of Nations* nine years later:

> "The great wheel of circulation [money] is altogether different from the goods which are circulated by means of it. The revenue of the society consists altogether in those goods, and not in the wheel which circulates them. In computing either the gross or the net revenue of any society, we must always, from their whole annual circulation of money and goods, deduct the whole value of the money, of which not a single farthing can ever make any part of either."

For Adam Smith, money only *contains* value in the sense that it circulates the goods produced by the public. Money is not itself the content, but merely the

container. In this passage, money is clearly separated from commodities. If we consider money itself a valuable commodity, Smith warns, logic would oblige us to add the value of money to the value of produced goods in order to assess the total value of the output created by society, thereby doubling gross revenue, or what we today call Gross Domestic Product. David Hume (1752/2003, p. 136) excludes money from the set of commodities when he writes that "money is nothing but the representation of labour and commodities, and serves only as a method of rating or estimating them". David Ricardo (1816/1951, p. 62) pointed out the logical impediments of using a commodity as a standard of value:

> "When two commodities vary in relative value, it is impossible with certainty to say, whether the one rises, or the other falls; so that, if we adopted a currency without a standard, there is no degree of depreciation to which it might not by carried."

These citations clearly show that the physical immateriality of bank money was not only an empirical observation for classical economists, but a logical requirement in their analysis. As Ricardo and other Classics were well aware, it is impossible to determine prices and wages without a purely numerical standard that does not belong to the set of commodities.

Although the most brilliant minds in classical political economy knew of commodity money's trap doors, the incapability of persuasively explaining the connection between commodities, money, value, prices and labour time led to the eventual demise of their economic theory. The Marginalist Revolution in economics – and in particular Léon Walras's concept of the *numéraire* – marked a progress in monetary theory in the sense that it underlined the immaterial nature of money. Indeed, since Walras's *numéraire*, money is considered to be a pure number by neoclassical authors, and economists today usually refrain from labelling money a commodity: "A pound sterling is not a thing at all. It is a name handed down in history" (Pigou, 1949, p. 3). This echoes Walras's (1874/1954, p. 188) slightly mysterious claim that "[t]he word *franc* [denoting a standard of value] is the name of a thing which does not exist". For Walras, money is indeed a dimensionless unit, a numerical thing that enables and measures exchange. Yet, unfortunately, the lack of a clear separation between money and commodities that haunted the Classics continues in Walras's outstanding work. Why is this so?

Although Walras explicitly acknowledges the immaterial nature of money, he treats it like every other commodity in his general equilibrium model. Let us remind ourselves how the great neoclassical author inserts money into the set of *n* commodities in his general equilibrium model: he introduces money by *assuming* that one of the *n* commodities *is* money. Hicks' (1967, p. 3) statement is to the point:

"[A]lthough Walras does take one of his *n* commodities as numéraire (or unit of account) it is an essential part of his theory that the numéraire does not enter into the exchange in any different way from any other of the commodities."

By introducing money in this way, Walras believed that he can reduce the number of relative prices and make the model more realistic. To wit, in a barter economy with, say, $n = 1000$ different commodities, $n(n-1)/2 = 499'500$ relative prices exist, as every commodity is expressed in terms of 999 other commodities. If we assume, along with Walras, that the nth commodity is a *numéraire* through which all prices of commodities are expressed, the number of relative prices is reduced to $n-1 = 999$ (money itself having no price). Thus, the existence of money reduces the amount of price information by the factor $(2/n)$, making the economic system vastly more efficient. Yet, introducing money in this way – which, let us emphasise it, bears no relation to reality – means that Walras's *numéraire* is indistinguishable from all other commodities in every aspect *except* its numerical nature, which he ascribes to the nth commodity by assumption: "Any of the other $n-1$ commodities might have been taken as numéraire" (Hicks, 1967, p. 3). It is therefore to the point to say that, in Walras's general equilibrium model, money becomes "an intermediary which is itself a real asset, so that every exchange between commodities and money is in reality no different from an exchange between commodities" (Cencini, 1988, p. 111). Therefore, the Classics' ambiguous treatment of money continues in Walras's concept of the *numéraire*, which is unfortunately a lot less revolutionary than it might appear.

A conceptual weakness of the Walrasian approach in monetary theory concerns the source of money's purchasing power. In neoclassical economics, relative prices are supposed to be determined on the commodity market *before* the intervention of money. For example, one unit of good A is directly exchanged against two units of good B, which in turn are directly exchanged against three units of good C. In this case with $n = 3$, the relative prices are defined by A = 2B = 3C. By magically turning one (arbitrary) commodity, say A, into a number (A = 1), it is now possible to express the monetary value of B and C in terms of the *numéraire*, A. In this example, the price of two units of B or three units of C equals 1 money unit. In this conception, the absolute prices of commodities B and C are established through their direct exchange with the *numéraire*, while their relative prices are determined before exchange takes place. This contrasts with the classical paradigm, according to which the value of commodities is not determined through exchange on the product market, but rather predetermined on the labour market through the labour-time necessary for their production.

But how is the value of commodity A, the *numéraire*, determined? Clearly, as money is introduced like every other commodity in the Walrasian model, money's value must also be determined through exchange on the product market. Referring to the example above, let us say that one unit of B corresponds to one jumbo jet. What then could possibly induce an aircraft manufacturer to exchange two jumbo jets for a number, or in this case, for a slip of nearly valueless paper with the number "1" scribbled on it? Given that the intrinsic value of a banknote or a simple book-entry in a bank's ledger is nearly equal to zero, it remains an open question why the aircraft manufacturer is supposed to attribute any value to it, let alone hand over two jumbo jets in exchange for a slip of paper. Clearly, in order to understand how money can acquire its purchasing power, we must better understand its emission.

The problem being an obvious one, it has not gone unnoticed. As a consequence of the axiomatic way money is introduced into neoclassical models, "[m]oney has always been something of an embarrassment to economic theory. […] [F]or the most part theory fails to provide a good account of it" (Banerjee and Maskin, 1996, p. 955). One way economists have tried to cope with the problem of defining money since Walras has been to define money socially or by its functions. Thus, instead of describing the nature of money (a commodity, a debt, and so on), definitions usually take on the following structures:

- x is money if society accepts that it is money (social definition), or
- x is money if it fulfils the functions y and z (functional definition).

For example, Fisher (1911/1931, p. 2) opts for a social definition when he claims, in a beautifully circular manner, that for "any commodity to be called 'money' [it] must be *generally acceptable in exchange*, and any commodity generally acceptable in exchange should be called money". Hicks (1967, p. 1), on the other hand, claims that "money is defined by its functions: […] money is what money does". Likewise, Davidson (2011, p. 256) defines money by its "two primary functions", namely as "a medium of spot and forward contractual settlement" and a "liquidity time machine". Only few economists would continue here "and ask what is the nature of that 'thing' that serves these functions" (Wray, 2012, p. 261). Bofinger (2001, p. 4), for one, criticises the functional definition: "If it is not clear what 'money' is, it is also not possible to describe the functions of money". Indeed, acceptance of functional and social definitions of money has enabled economists to circumvent addressing the actual nature of money, while still treating it essentially like a commodity. Economists seem to be intuitively aware that money cannot be a 'commodity', because this would only lead us back to Adam Smith's treacherous problem clearly formulated in the above passage. Courageously, Handa (2009, p. 80) attempts to define money as a 'good', but then defines 'goods' "as something of which an individual desires more rather than less, or less rather than more, *ceteris paribus*". Clearly, this definition seems to

include every single object in the known universe, and is therefore far too broad to provide any suitable answers.

Aware of the difficulties of commodity money in an age of fully digitalised banking, economists today quite consistently use the much broader term 'asset' when describing money. The term 'asset' has the conceptual advantage over commodities in that it can 'carry value' without necessarily being material. Bonds and shares, which are financial assets that provide their owners with a claim on future output, are likewise non-physical, and can easily be exchanged against a bank deposit. It is no exaggeration to state that economists recoil from exact definitions, often arguing that definitions are just social conventions, anyway (Cencini, 1988, pp. 116-7). This opinion is remarkable for science that otherwise insists on rigorous mathematics. Crisp taxonomies are the solid bricks of every scientific theory. Be that as it may, the definition most economists seem to be able to agree on nowadays is that money is an asset: "Though there may be differences of interpretation there can be no doubt that money in this case should be considered as a net asset of the private sector" (Patinkin, 1972, pp. 169-70). In order to better understand this concept, let us quote a lengthy passage on this term from the *New Palgrave Dictionary of Economics* (Boulding, 2008, pp. 261-3):

> "The concepts of assets and liabilities are very closely related. Liabilities can be regarded as negative assets. The term 'assets' is related to the French '*assez*', meaning 'enough'. It emerges as a legal concept, particularly in laws relating to bankruptcy, the question being whether bankruptcy assets are enough to meet all liabilities. […] In accounting, assets and liabilities come into prominence with the invention of double-entry bookkeeping and the balance sheet, a concept which seems to have originated in northern Italy at least by the 12th or 13th century. […] Beyond accounting, assets and liabilities make a very important contribution to the understanding of both the description and the dynamics of the economic system. Every liability is or should be an asset in some other balance sheet, for every debt is an asset to the creditor and a liability to the debtor. […] Bank deposits, of course, are assets to the holder and liabilities to the bank, so if we sum all assets, including banks, deposits would disappear."

It appears, therefore, that the term 'asset' is an accounting concept, and is married to the concept of 'liability'. Thus, consciously or not, economists introduced an accounting concept into economics when they started calling money an asset instead of a commodity. The introduction of accounting concepts into economics has marked a considerable progress compared to classical economic theory. Table 3.1 shows how money is registered in banks according to the mainstream view, and why every liability is or should be an asset in some other balance sheet.

It is quite straightforward that the deposit worth £x in Table 3.1 is an asset for the customer and a liability for the bank. This is a rather uninteresting truism, but it indicates that money could just as well be called a liability, or debt, in neoclassical theory, without changing anything substantially in the analysis.

Table 3.1 Money assets in a bank's balance sheet.

Bank		
Assets		*Liabilities*
	Customer	£x

We may investigate the difference between assets and financial assets more closely. A financial asset for person A (the creditor) is at the same time a financial liability for person B (the debtor). Unlike a commodity, a financial asset is the object of a social relation between two persons, a promise of some sort. The ownership of a commodity implies no such bilateral relation. Depending on the viewpoint, a debt is a financial asset and, at the same time, a financial liability. The same cannot be said of commodities.

Going back to the treatment of money in economic theory, how does the asset-money assumption manifest itself in theories of international imbalances? Where can we find traces of this assumption? In modern neoclassical theory, the pure theory of international trade is a barter model. The problem in those models consists of integrating satisfactorily the real with the monetary dimension. In all modern theories of international imbalances, the money stock is introduced by assumption in the form of initial endowments. Just as in Walras's work, one of the assets traded in the economy is assumed to be money. Also, and in accordance with the monetarist tradition, proponents of the monetary approach to the balance of payments consider money to be "a stock, not a flow, and monetary equilibrium and disequilibrium require analysis of stock equilibrium conditions and stock adjustment processes" (Johnson, 1977, p. 217). The determining factor of the balance of payments is the demand for money. Since, according to Johnson (1976b), money demand is a demand for a stock, variations of the supply of and demand for money associated with deficits and surpluses in the balance of payments work toward an equilibrium. In this picture, a higher demand for money that is not matched by a higher domestic supply of money leads to net exports, which again leads to a net inflow of income according to the equation

total income = national income + (exports – imports).

The net inflow of income increases the domestic money supply, which implies a surplus in the balance of payments. In the case of net imports, on the other hand, a balance of payments deficit leads to a decrease of the domestic money supply. In this case, surpluses and deficits are defined as "changes in the official reserves,

associated with imbalance between the foreign receipts and foreign payments of residents to the country" (Johnson, 1976a, p. 48).

In order to test the general validity of Johnson's claim, it is enough to consider the case in which a resident of a key currency country (country A) purchases shares from a resident in another country (country B) for 100 pounds. According to the proponents of the monetary approach to the balance of payments, the money supply in A will decrease by 100 pounds as a consequence of the transaction, while the money supply in B will increase by 100 pounds, multiplied with the relevant exchange rate. Is this true? According to Cencini (1995, p. 180), "[t]o answer yes would mean to erroneously mix up money with a real asset". As the Swiss monetary theorist explains, the bank's liability that before belonged to the buyer of the shares now belongs to the foreign bank. The transfer of ownership of a bank deposit should not be confused with the transfer of the deposit itself. So, while the ownership of the bank deposit is indeed transferred from A to B in the above case, the bank deposit itself remains recorded in A's banking system. Therefore, it would be wrong to state that a money stock has left the national economy. It is still registered in A's banking system. However, proponents of the monetary approach to the balance of payments do not seem to share this view when they write that it is proper to see "the various accounts of the balance of payments as the 'windows' to the outside world, through which the excesses of domestic flow demands over domestic flow supplies [...] are cleared" (Blejer and Frenkel, 2008, p. 689). This is in conflict with the real working of monetary systems, in which "money cannot leave the banking system from which it has been issued to be transferred (except as an empty duplicate) to another banking system" (Cencini, 1995, p. 180).

Monetarists, who strictly believe money to be a net asset for the economy, claim that money is a stock. But Monetarists are not the only ones to treat money as a stock; post Keynesians, for example, explicitly treat money as a stock when they stress its function as a store of value (see Dalziel, 1999/2000, p. 227). Frenkel and Johnson (1976a, p. 24) are right when they say that, in some respects, their approach "makes exactly the same assumption as the Keynesian theory". All the different strands of Keynesian economics state, for example, that exports cause an outflow of money assets, typically arguing that this leads to a lack of effective demand (see Palley, 2014, p. 5). This mirrors the fact that, while money was a commodity for the Classics and is an asset for neoclassical authors, it is still treated essentially the same way.

We may point out another important implication of the asset money approach. According to the current trend in monetary economics, money is a valuable asset, meaning that it is a financial form of wealth. At the same time, economists concede that money can be created *ex nihilo* by the banking system. In this very primitive conception, money is created outside of the economy by the banking

system, completely detached from the productive process, and thus not unlike Friedman's (1969) description of 'helicopter money'. If this conception of exogenous money creation were in any way accurate, it would mean that the banking system as a whole can create wealth with the mere stroke of a pen. In Cencini's (1988, p. 118) words: "Since people agree to accept [money] as a means of payment, money would therefore be created with an immediate positive purchasing power over the produced goods and services, even though it is issued without cost by banks". In the case of financial assets, like shares or bonds, their value is determined by expected future dividends, interest payments or repayment of the principal. These payments may vary in an uncertain future, which is why their price is volatile. However, nobody would suggest that the usefulness of money rests on expected future interest payments. Instead, money's usefulness originates from the fact that it grants its holder purchasing power over part of available output. The value of a bank deposit stems from the fact that it grants its holder the right to ask his bank to carry out a payment on his behalf. In this sense, shares and bonds are also clearly different from money. But how can an object that is created from nothing by the banking system be endowed with a positive purchasing power? Why does a bank deposit – a pure number recorded in banking software – enable its owner to appropriate output?

Depending on the school of thought, there have been roughly two ways of answering this question (see Rossi, 2007a, pp. 10-22). While a Metallist would argue that the value of money is linked to its metal backing (Menger, 1923), a (Neo-)Chartalist believes the public accepts fiat money because the state accepts it for the settlement of tax liabilities (Knapp, 1924; Wray, 1998; 2012). The traditional Metallist explanation has been thoroughly discredited in the last decades on empirical grounds; money is no longer backed by precious metals, but evidently still has purchasing power. Nonetheless, metallism has survived in the sense that mainstream economists today try to explain money's worth with its scarcity and usefulness. For traditional Metallists, the ultimate source of purchasing power is the precious metal. The less abundant the precious metal and the higher people's utility from possessing it, the higher the value of the precious metal. This is, of course, the same explanation as is used today to explain "fiat"-money's purchasing power. Therefore, advocates of the quantity theory of money – the theory that still constitutes the foundation of neoclassical monetary theory – argue in the Metallist tradition. The almost complete dematerialisation of money has not yet led economists to reconsider their view that the value of an immaterial object that can be produced at near zero cost can be determined simply by its scarcity and usefulness. In fact, a referendum in Switzerland held on 30 November 2014 attempted unsuccessfully to establish gold as an anchor for the Swiss franc (*Neue Zürcher Zeitung*, 2014b). The committee in favour of a 'sound money policy' believed that fiat money derives its ultimate purchasing power from the gold reserves the central bank hoards in its vaults. The referendum was criticised and opposed by the Swiss National Bank's chairman, Thomas Jordan,

who stated clearly that "the stability of the Swiss franc does not depend upon the amount of gold in our balance sheet" (ibid., our translation). However, the referendum was supported by a number of economists, which shows that the Metallist conception of money is still widespread.

The chartalist explanation of purchasing power is, in fact, a theory of social determination of money's purchasing power: because one large agent (the state) in the economy accepts 'fiat money' as a means of payment, all the other agents accept it, too. In its simplest form, the social determination explanation of money's purchasing power is circular: people accept money because people accept money. Because of this obvious danger of circularity, chartalists stress a number of reasons why the state is a very special agent in the economy that cannot be compared to other buyers and sellers in the market, most notably by conceptually merging the treasury and the central bank (see Rochon and Vernengo, 2003).

To sum up, while the shift from classical political economy to neoclassical economics has led to a rebranding of the nature of money – from commodity-money to asset-money – money is still treated essentially the same way in economic models, giving rise to serious confusions within the economics profession. While the distinction made between assets and commodities marks a considerable progress towards a more rigorous accounting approach to money, the exact accounting nature of money is still concealed from economists' understanding, whose vision of the economy is that of a machine or a system of hydraulics regulated by relative price variations. As Johnson (1976a, p. 52) maintains referring to the monetary approach to the balance of payments, "both real goods and securities are alternative assets to domestic money". This approach in monetary economics, which denies a conceptual difference between money and (real or financial) assets, naturally affects the way the process of creation and destruction of money is modelled. If money is an asset, it is an object of supply and demand just like any product, and can be apprehended with the tools applied in the analysis of products. According to most economists, money is an asset that can be exogenously 'pumped' into the economy at zero cost by the banking system. Once created out of thin air, money circulates within and between nations. Despite being in open contradiction with the realities of banking, money is supposed to be an asset capable of leaving one country and entering the other. Although its 'production' is virtually cost-free and its physical form entirely irrelevant for its purchasing power, money is considered a net asset for the private economy that can be created by banks. Despite the absurdity of claiming that some institutions have the power to create valuable net assets for the economy simply by punching buttons on a keyboard, this approach is virtually unquestioned today. Consequently, economists to this day believe that "the difficulty of monetary theory can be seen as [merely] an extra complication of a problem in 'real' or 'barter' theory that has always given economists trouble"

(Johnson, 1976c, p. 5). The endogenous birth and death of money as an accounting record and the intimate association of this record with the process of production are neglected. Smithin (2013, p. 36), who strongly suggests that the banking system creates money endogenously to meet the demands of the real economy, laments that "it has to be said that a great deal of formal economic theory (perhaps most of it over the last years) has made the opposite assumption that the money supply is fixed".

The purpose of this section was to point out the ambiguous treatment of money in economic literature. While money was treated as a commodity for a long time, economists now label it an asset. While this marks a progress, the accounting nature of modern bank money and its intricate link with production remains to be explored.

3.1.1 The quantity theory of money

The monetarist understanding of the balance of payments is based on the quantity theory of money, which again is based on an asset conception of money and forms a central part of neoclassical economics. Hume (1955, pp. 41-2) is often said to be the first to have clearly stated that "the prices of every thing depend on the proportion between commodities and money […] Encrease the commodities, they become cheaper; encrease the money, they rise in their value". As Humphrey (2002, p. 39) confirms with respect to the monetary approach to the balance of payments, "[i]n the case of the closed world aggregate, all the familiar propositions of the closed-economy quantity theory hold". Indeed, the quantity theory of money is the foundation of neoclassical monetary theory (Rossi, 2001). The quantity theory explicitly separates the study of money from the study of the 'real' economy, to use the Schumpeterian (1954/1994) term. In Friedman's (1969, p. 52) words, the quantity theory of money "is not a theory of output, or of money income, or of the price level". It assumes that "money is one kind of asset, one way of holding wealth" (ibid., p. 52). In accordance with Walras's general equilibrium approach, the quantity theory of money treats money like any other commodity in the economy: "The analysis of the demand for money on the part of the ultimate wealth-owning units in the society can be made formally identical with that of the demand for a consumption service" (ibid., p. 52). Thus, money is essentially treated as a commodity that can be created and 'pumped' into the 'real' economy. Indeed, the terms used by monetarists – such as 'quantity', 'mass', 'velocity of circulation', 'hoarding' and 'liquidity' – reveal their mechanistic approach to understanding monetary phenomena.

Rossi (2001, Chapter 3) offers a lucid analysis of the quantity theory of money, and it is worth tracking its most salient points in order to better contrast the views

expressed here from the current approach in mainstream monetary theory. The starting point is Fisher's (1911/1931, p. 195) famous equation:

$$MV \equiv PT \qquad\qquad (20)$$

where M is the quantity of money in the economy, V is the velocity of circulation, P is the price level, and T is the volume of trade. By referring extensively to the literature, Rossi (2001, pp. 68-70) highlights the age-long debate on whether the relationship should be interpreted as an identity ($\equiv$) or a condition of equilibrium ($=$). If it is understood as an identity, it ultimately calls into question the legitimacy of interpreting causalities into it. Handa (2009, pp. 37-8) separates between the tautological quantity *equation*, $MV \equiv PT$, and the quantity *theory*, which rests on $MV = PT$, and explains that "[a]n identity is different from an equilibrium condition that holds only if there is equilibrium but not otherwise". In order to enable the two terms of the identity to deviate (note that this is, in fact, an oxymoron), Fisher (1911/1931) has to add behavioural assumptions in order to turn the quantity equation into an equilibrium condition that gives some wiggle room for causalities. Specifically, he assumes that the velocity of circulation, V, is independent of the quantity of money, M, and the price level, P, and that output, T, is independent of the quantity of money, M. These assumptions are highly dubitable. It is hard to imagine an increase of M that is not initiated by a transaction, V. Also, it is difficult to imagine the creation of new output that is not monetised with a sum of money. Indeed, it is only through its integration with money that a new output is created. However, according to Handa (2009, p. 41), Fisher's assumptions "may or may not be valid". Indeed, the issue of the legitimacy of Fisher's treatment of the equation has never really settled, though in practice the desire to turn the Fisher equation into a basis for policymaking led economists to interpret the equation into a condition of equilibrium. Incidentally, this diagnosis applies also to the Cambridge equation

$$M^d \equiv kPT, \qquad\qquad (21)$$

where k can be interpreted as the reciprocal of V. As is made clear, the Cambridge equation is not a new theory, but merely an adaptation of the quantity theory that does not conflict with (20) according to Pigou's (1917, p. 39) assessment. Problematically, and despite hundreds of years of research carried out by quantity theorists, "neither a fully fledged measure of transactions nor a comprehensive price index related to them" has ever been established (Rossi, 2001, p. 72). As a result, the Monetarists attempted to relate the product of money and its velocity to current national income:

$$MV \equiv Y. \qquad\qquad (22)$$

In this framework, a variation of the money supply *causes* proportional changes in money incomes after taking into account a time lag: "What happens to money today affects what is going to happen to income in the future" (Friedman, 1987, p. 16). Even after looking over the fact that Friedman again interprets causalities into an accounting identity, the problem with this equation is that it remains unclear how much of the money increase goes into the increase of real income, and how much goes into price increases (see Davidson and Weintraub, 1973, p. 1120). Acceptance of equation (22) ultimately led to the adoption of monetarist policies in the 1970s, according to which the growth of the money supply minus the real growth rate should be maintained stable in order to produce constant, and therefore predictable, rates of inflation. Extensions of this theory involved the incorporation of rational expectations and overlapping-generations models, which increasingly attempted to improve the microeconomic foundations of macroeconomic analysis. Analysis of these concepts lies beyond the scope of this work, and is indeed unnecessary at this point, as it does not question the basic assumptions that money is essentially a net asset created by the banking system, and that acts as a medium of exchange. As pointed out by Rossi (2001, p. 76), all these extensions "share the belief – unanimously held by neoclassical economists – in a dichotomous world, where money is introduced in an Arrow-Debreu (general-equilibrium) framework of inquiry to accommodate some portrayed frictions in factor as well as in goods markets". This axiomatic approach is detached from money's integration with production as it occurs in the real world. Consequently, monetary analysis "has lost track of the 'axioms' along its trail by which its rigour can be established", making it harder in this area to separate "the foolish from the fertile" (Mundell, 1976, p. 65).

The dichotomous representation of monetary economics (Rossi, 2001, pp. 76-84) refers to the divide between the real and the monetary sphere. While relative prices are determined in the 'real' sphere according to output's scarcity and people's subjective utility, the absolute level of prices is determined in the monetary sphere by means of the supply and demand for money. This 'classical dichotomy' (Johnson, in Mayer et al., 1978, pp. 127-8) is in fact the ultimate theoretical source of the neutrality of money and the homogeneity postulate. In practice, the proposed neutrality of money raises questions about the effectiveness of counter-cyclical monetary policy. Usually, money is portrayed as non-neutral only if the changes in the money supply are larger or smaller than expected by market participants. However, there are important theoretical implications of accepting this separation wall between the real and the monetary spheres, as Rossi (2001, p. 78) points out: "How can output be valued – not to say exist – as an economic object, if it is abstracted from money […]?" Most economists would agree today that an increase in the money supply affects real variables in the short run. Indeed, a large part of the past fifty years of economic theorising has been an effort to link the two spheres in a more convincing general framework that stresses the interdependence of the two spheres. The transmission mechanisms

through which the monetary sphere is supposed to affect the real sphere is, however, based on individuals' and firms' behaviour in all of these approaches. Figure 3.2 shows how the divide between the real and monetary side is bridged in today's economics textbooks.

Real side   Monetary side
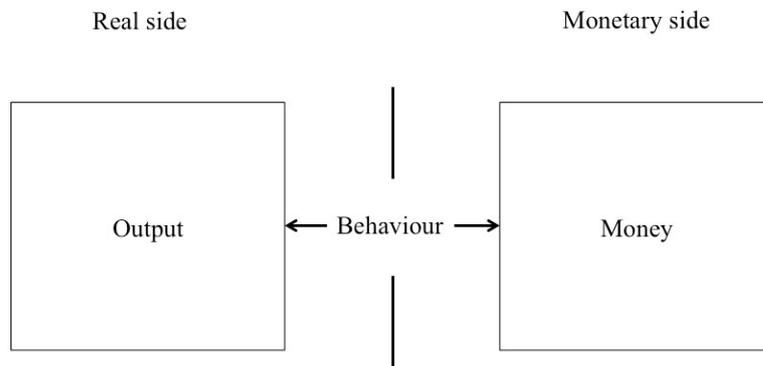
Figure 3.2 The attempt to bridge the classical dichotomy by focusing on behaviour.

For example, Krugman et al. (2014, p. 536) explain the short-run non-neutrality of money with the inability or unwillingness of firms and employees to adjust prices (due to menu costs) and wages (due to collective bargaining and long-term contracts) quickly and a resulting time lag until money demand catches up with the increased money supply. In the short interval before prices and wages adapt, spending increases, thereby boosting output and employment. As sticky prices and wages slowly adjust to the increased supply of money, the demand for money increases, until equilibrium in the money market is reached, $M^S = M^D$.

A more detailed representation of the various transmission mechanisms is provided by Boivin et al. (2011). The most traditional channel involves the impact of interest rates on business and household investment spending behaviour. The most recent generation of microfounded DSGE models typically make spending depend on expected short-run interest rates. Tobin's q is another approach linking investment spending to the interest rates by making investment decisions depend on the market value of firms divided by the replacement cost of capital (Tobin, 1969). Other transmission mechanisms stress how monetary policy affects consumption spending, which then affects the real variables output and employment. For example, the wealth effect describes how consumers will increase consumption when the value of their assets increases owing to lower interest rates (Boivin et al., 2011, p. 379). The intertemporal substitution effect takes into account that low short-term interest rates relative to long-term interest rates will tend to incentivise consumers to shift their consumption from the future into the present.

It is unnecessary to go through all the other presumed transmission mechanisms, as what we are stressing here is that all of these approaches create a link between

the real and the monetary side of the economy by focusing on spending behaviour, as illustrated in Figure 3.2. In fact, there is a deeper problem that has been blended out owing to the unwarranted assumptions that money is an asset created by the banking system, and that all forms of output can be aggregated because of their assumed commensurability. Referring again to the stock of money and the stock of output in Figure 3.2, it remains a mystery how the stock of output is supposed to be measured without the interference of money in the first place. Clearly, output needs to be measured in a common unit if it is to be made homogeneous. Without money, there is no common economic measure of output. Debreu (1959, p. 30) was quite aware of this when he saw himself forced to circumvent the problem of heterogeneity by ridiculously assuming that "[a] quantity of well-defined trucks is an integer", followed by the excuse that this assumption "is imposed by the present stage of development in economics".

Not only is it impossible to determine in any economically meaningful sense the stock of output without the intervention of money; if the stock of money is determined independently of the amount of output available in the economy, how is it possible to determine the purchasing power of money without resorting to a *petitio principii*? In a nutshell, neoclassical economics proposes that it is somehow possible to determine the stock of output independently of money, and that the stock of money is determined outside of the productive sector, thereby leaving the value of money indeterminate. As a consequence, "[t]here is no way to know in advance the real value of the monetary services associated with a given quantity of money" (Giannini, 2011, p. 249). Summarised, "established models of monetary production economies feature an unmeasured (immeasurable) output as well as an unvalued (unvaluable) stock of money" (Rossi, 2001, p. 82).

One obvious way of integrating the real and the monetary side of the economy is by focusing on the payment of wages, in which bank money and real output merge into a new (single) object, defining at the same time output and its alter ego, income. If money and output are integrated in this way, "a simple analysis shows that under no circumstances can behaviour alter the relationship between money and produced output" (Cencini, 2015, p. 249). If followed through rigorously, this approach questions the most basic concepts of current monetary theory. According to the adherents of this new school of thought which was developed mainly by Bernard Schmitt in the second half of the twentieth century, it would be misguided to identify money with a 'mass' or a 'quantity' in the first place, as money is issued as a valueless number by banks in order to vehiculate payments on markets. Its lifespan being restricted to the duration of a payment, the 'quantity' of money in circulation is strictly zero in every moment in time. By integrating the strict accounting logic of payments – which leaves for very little scientific wiggle room – with production, adherents of this new school of thought are able to offer an objective explanation for the purchasing power of money that does not rely on circular concepts or on assumptions removed from reality.

3.2 National monies can be used as international means of payment

According to the current consensus in international economics, national monies can be used for national *and* international payments. That is, residents of one country can purchase foreign output by using their national currency. Apart from the frictions and transaction costs involved, there is no fundamental difference between purchasing domestic or foreign output. At the same time, economists generally agree that a payment is a monetary transaction that leads to the discharge of a debt between payer and payee:

> "Final payment is made whenever a seller of a good, or service, or another asset, receives something of equal value from the purchaser, *which leaves the seller with no further claim on the buyer*. Money is the asset which specialises in this role, being used generally for the settlement of transactions." (Goodhart, 1975, p. 2, emphasis added)

This quote directly implies that no buying party can finally pay by incurring a debt to the payee, and that every payment involves the exchange of equal values. If person A receives a product from B and A compensates B with A's private IOU, B has effectively not been paid. Instead, A has promised to pay sometime in the future. Claiming that the transfer of A's IOU to B amounts to a payment thus constitutes a *contradictio in adiecto*. It is to say that promising to pay in the future is the same as paying now, an obviously wrong statement. For this reason, no private IOU issued by a purchaser can be regarded as money.

If we accept Goodhart's definition of final payment, it is a matter of fact that purchases of foreign products with national money cannot qualify as the final settlement of a payment. For example, referring to the United States' "exorbitant privilege", Eichengreen (2011, pp. 3-4) notices that "[i]t costs only a few cents for the Bureau of Engraving and Printing to produce a $100 bill, but other countries have to pony up $100 of actual goods and services in order to obtain one". What Eichengreen – as many others before him – notices here is that the exporting country *as a whole* does not receive anything of equal value for its output, but merely a *promise* of a real value in the future. Davidson (2011, p. 257) is another economist to clearly state that "local currency cannot be directly used to settle an international obligation denominated in terms of another currency". But if this is so, how can we classify international transactions that use national monies as payment?

It is certainly true that, in the above case, the relevant actor in the exporting country *feels* as if he had been paid. In light of this, it seems odd to propose that the resident's nation as a whole has not been paid. However, this is a narrowly microeconomic analysis of a macroeconomic phenomenon. If all problems in the field of economics could be understood by quickly glancing at superficial

phenomena, it would raise the legitimate question why an economic science is needed. It is exactly because 'monetary tumors' can be buried underneath seemingly benign and trivial surface phenomena that economics as a science proper is called for. In Rossi's (2009, p. 3) view, if the 'non-payment' of US imports described superficially by Eichengreen (2011, pp. 3-4) were spelt out explicitly, no country around the world would accept this state of affairs.

Ever since the era of the gold standard, it has been a major question in international economics if national currencies *ought to be* used as an international means of payment. In the mainstream of the economics profession, it was hardly ever asked if national monies *can be* international means of payment at all. During the gold standard, most economists thought money *can*, but *should not* be used as a means of international payment, and gold was understood as the ultimate medium of settling international debt. During the era of the Bretton Woods regime and afterward, the answer turned increasingly to the positive; reserve currencies can and should serve as an international means of payment. Economists such as Tobin opposed the idea of using national currencies as international means of payment. However, Tobin did not question the more fundamental assumption, namely that national monies have the power to offset international debt. Economists belonging to the school of money emissions ask this age-old question differently: *Can national currencies be a means of final payment between countries?*

To wit, the International Monetary Fund (1993, p. 8) already acknowledges that international transactions are not necessarily payments in its *Balance of Payments Manual*. However, this reservation only refers to unilateral monetary transfers and barter, which are also captured in the balance of payments statistics. The IMF does not directly question if international transactions carried out with national money constitute a payment. It is indeed a belief unquestioned by most economists that a *national* means of payment can offset *international* debts. Rossi's (2007a, p. 91) critique in this regard is therefore particularly noteworthy:

> "To be sure, no national currency (even the US dollar) can be a means of final payment internationally; that is to say, between countries pertaining to different currency areas, because […] it represents an acknowledgment of debt of the country (or currency area) issuing it, and as such it is only a promise to pay for a current or a capital account transaction […]; it is notably not a means of discharging debt finally."

In this view, the means of payment function of national money is restricted to its monetary space, to wit, the national economy. Cencini and Schmitt's (1991, p. 53) arguments point in the same direction. They stress that the monetary approach to the balance of payments "rests on the implicit assumption that international transactions are essentially similar to inter-regional exchanges". From the point of

view of payment finality, this assumption is open to doubt. As advocates of the monetary approach to the balance of payments will concur, an excess of payments over receipts increases the indebtedness of the importing country toward the rest of the world. But if the result of a payment is a new net indebtedness of one country toward the other, how can we speak of a payment from a macroeconomic perspective? To repeat this simple but important point, a payment leads to the *discharge* of debt between payer and payee, not to the confirmation of debt. The individual payer and the payee have been debited and credited, respectively. What is the significance of the debt 'stuck' between the banking systems of the two countries involved as a result of this international transaction? Rossi (2009, p. 8) points out that some economists implicitly agree that reserve countries do not pay their current account deficits: "The supply of reserve currencies to other nations depends on *payments* deficits incurred by the reserve countries" (Machlup, 1963, p. 256, emphasis added). This quote is remarkable, as it suggests that payments that give rise to official reserves abroad are actually not payments at all. In order to improve our understanding of this phenomenon, we may look into the difference between inter-regional and international payments. For this, we must investigate further the economic concept of the country, or nation.[9]

According to Gandolfo (1994, p. 3), the need for a specific treatment of international economics primarily springs from the notion that "the factors of production are generally less mobile between countries than within a single country". Different national currencies only seem meaningful in neoclassical economics because the money supply is controlled by distinct political entities, not because national monies are fundamentally heterogeneous. Current international macroeconomics further distinguishes between "the *pure theory of international trade* and *international monetary economics*" (ibid.). The pure theory of international trade assumes "that trade takes place in the form of barter", while international monetary theory "deals with the problems deriving from balance-of-payments disequilibria in a monetary economy" (ibid., p. 4; see also Taylor, 1990, p. 1). Gandolfo's textbook then treats "the pure theory of international trade separately from international monetary theory, thus following the standard practice of international textbooks and courses" (Gandolfo, 1994, p. 4). It is a troubling sign that the current 'pure' theory of international trade assumes away the existence of money. If nations are not defined monetarily in economic theory, in terms of currency areas, then how should they be defined? In an updated book by Gandolfo (2004, pp. 2-3), it is confirmed that "[t]he distinctive feature of the theory of international trade is the assumption that trade takes place in the form of barter (or that money, if present, is only a veil having no influence on the underlying real variables but serving only as a reference unit, the *numéraire*)."

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[9] The words "nations" and "countries" will be used synonymously henceforth.

This approach is, as Gandolfo asserts, common to neoclassical textbooks. In standard textbooks, two nations are considered to be two *geographic* spaces within which two different technologies, two different factor endowments, two different productivities and (therefore) two different sets of relative prices reign. Countries are not separate economic entities, but merely areas within which economic agents operate. In this picture, international economics is different from national economics because goods, services and financial assets are better substitutes within countries than between them (Wickens, 2011, p. 153). Meade (1951, p. 17) explicitly states that countries are not separate economic entities, but merely the sum of residents. According to this author, the use of the word 'country' in an economics text is a matter of linguistic *habitus*, rather than an imperative of economic analysis.

Consequently, international trade theory is hardly distinguishable from inter-*regional* trade theory. If countries and international trade are defined like this, trade between northern and southern Italy, or even between two neighbouring villages, could just as well be labelled 'international' in pure trade theory. Calling to mind David Ricardo's theory of comparative advantage, it could equally well be applied to two villages within the same country, each specialising in the production of a specific commodity. There is no convincing reason for teaching Ricardo's model of comparative advantage in an *international* economics course. By definition, all the differences mentioned above exist between economic regions, as well.

Of course, what really defines international economics is that at least two countries are involved *that use different currencies* (see Cencini and Schmitt, 1991, p. 15). While two regions within the same country use the same currency, two countries can have different currencies (see Goodhart, 1975, p. 291). The existence of international reserves is a clear indication of the existence of economic nations. In a hypothetical world with a single world currency, the notion of foreign reserves makes no sense. Countries are not simply the sum of their residents. This is only tacitly accepted by Goodhart (1975, p. 268) when he states that "[t]he concern in each individual country over the adequacy of its stock of international reserves simply has no counterpart in inter-regional transactions". Foreign reserves are registered on the asset side of a central bank's balance sheet and represent the ownership over a bank deposit registered on the liabilities side of a foreign bank's ledger. This reserve asset is denominated in a foreign currency and therefore does not belong to the same set of currency as the domestic money. Additionally, reserve assets constitute a public wealth that cannot be assigned to any particular individual in the economy. The existence of exchange rates in a multi-currency world is another indubitable indicator that different countries are categorically heterogeneous from a monetary perspective. In a world with a single currency, exchange rates do not exist, and it would be absurd to claim that currencies could be bought and sold in such a system. In a single currency world,

money would be – in accordance with its 'official' function – a pure *means of payment*, not an object of trade, as it happens today in foreign exchange markets.

Cencini and Schmitt (1991, pp. 15-19) therefore lay out the problem as follows: are regions or countries autonomous economic entities or are they not? That is to say, can "the debt of a resident entail the debt of an entity (the region or the nation) which cannot be identified with the sum of residents" (ibid., p. 15)? In other words: is there a difference *in kind* between inter-regional and international payments, or merely a difference *in degree*? In order to shed some light on this, we can look at the way Goodhart (1975) treats regions and nations. For Goodhart (ibid., p. 262), differentiating between regions and countries is necessary for understanding their different paths to equilibrium when confronted with exogenous shocks: "The two issues are, first, the process of regional adjustment between regions who share a single currency (and monetary authority) and, secondly, the question of the effects of alternative possible monetary relationships between individual countries with their own separate distinct currencies". Goodhart (ibid., p. 264) mentions how "[n]obody doubts that regions do run current-account surpluses (or deficits) in trade with each other". He observes that some economists often claim "that in inter-regional transactions – as compared and contrasted with international transactions – there are no balance-of-payments problems, or at least that these are of a qualitatively different kind". But for Goodhart, it merely means that deficits can be financed easier (with lower transaction costs) within the same country than when they occur between countries, thus turning the difference between international debt and inter-regional debt into a difference in degree:

> "The ease of inter-regional financial adjustment results from the high degree of substitution between financial claims issued in the different regions. This may be contrasted with a significantly lower degree of substitution between financial claims issued in different countries, e.g. because of unfamiliarity with each other's laws and customs, because of the possibility of conflict between autonomous governments, because of concern over exchange rates, etc." (ibid., p. 265)

According to Goodhart, the difference between inter-regional and international current account deficits would completely disappear if the degree of substitution between financial assets were uniform worldwide: "The higher degree of substitution between countries' financial assets (e.g. via an integration of capital markets), the greater the ease of financing current-account imbalances" (ibid., p. 266). The difference between economic regions and economic nations is thus merely a difference in degree: between regions, the elasticity of substitution between financial assets is high. Between countries, it is low. No real qualitative distinction is allowed for in this gradualistic approach to monetary economics.

Let us turn to another towering expert of currency areas, Robert Mundell. Mundell (1968, p. 178) explains that a single currency implies a single central bank that supplies the inter-regional means of payment. The supply of an international means of payment in an area comprising more then one currency, however, "is conditional upon the cooperation of many central banks". This statement in Mundell's famous article on optimal currency areas is puzzling, as it is a well known fact that, until today, no such international means of payment exists – even when central banks cooperate and expand their liabilities in lockstep. As students of monetary economics are well aware, the last proposal for an international currency was Keynes's *bancor*, an idea that was consciously turned down by the American delegation under Harry Dexter White in 1944. Since then, national monies have been used in international transactions according to the principles laid down at Bretton Woods. The fact that key currencies today are *used* in international transactions, however, does not automatically turn them into international means of payments. When Mundell lumps national and international money together into the same category, he is implicitly working with the assumption that the difference between national monies is a difference in degree, not in kind. Like Goodhart (1975), Mundell believes that national monies are just different kinds of assets that can be made homogeneous through the exchange rate and therefore can perform as international means of payment. Accordingly, in Mundell's (1968, p. 177) view, a currency area is "a domain within which exchange rates are fixed".

Harry G. Johnson (1976b, p. 162) shares the belief that national currencies can offset international debt. He builds his model by introducing "a reserve currency country whose currency is held as a substitute for the basic international money", thereby tacitly agreeing that national and international monies are different in degree. This position is also accepted by Meade (1951, p. 18), who asserts that each international transaction "is a payment [...] for the residents in one country" and simultaneously "a receipt for the residents in another country".

If economic nations define separate economic entities, it has to be shown analytically that a nation is not merely the sum of its residents. If a country were simply the sum of its residents, transactions between or within countries carried out by their respective residents would not differ substantially. In this case, only the individual residents of a country could be indebted to residents abroad. The country itself could not be indebted. If a country can be indebted on top of its residents, a country defines a separate economic entity, and a new analysis is necessary that respects this fact. We may note here that Knut Wicksell (1935/2010, p. 92, emphasis added) analytically separated between micro- and macroeconomic transactions, although he did not quite seem to trust his judgement:

"Although [foreign claims and debts] as a rule represent personal business transactions and consequently do not affect that country as a whole any more than do internal business transactions of the same amount, yet they nevertheless sometimes affect the currency of the country and have to some extent *the same effect as if the country as a whole had these claims or debts abroad*."

This contrasts with the microeconomic view that states how "[i]n a world system of open economies and developed international capital markets, savings are relatively free to cross international borders and a country's savings and investment need not be equal in each period" (Iley and Lewis, 2013, p. 47). In order to find an answer to this question, we may begin by asking which accounts in the balance of payments statistics would not exist in an inter-regional, single-currency setting. Of course, the only account that comes to mind is the official reserves account: "[A]n increase in official reserves resulting from a current account surplus defines an international gain for the country itself: neither its formation nor its ownership can be attributed to anyone of [the country's] residents" (Cencini, 2005, p. 258).

Table 3.2 shows a transaction that leads to the formation of international reserves. In this example, country A's resident sells to a resident of a key-currency country (the United States) a product, as a result of which a commercial bank in A is credited with $10 million. A's commercial bank then immediately credits its exporting client with x units of MA, the equivalent of $10 million after taking into account the relevant exchange rate. The commercial bank now transfers the claim to $10 million to its central bank, which credits the commercial bank with the appropriate sum of domestic money.

Table 3.2 The formation of official reserves.

A's central bank			
Assets			*Liabilities*
Official reserves	$10 million	Commercial banks	x MA
A's commercial bank			
Assets			*Liabilities*
Central bank	x MA	Exporter	x MA

Source: Cencini, 2005, p. 249

The banking systems of both countries act as financial intermediaries in this transaction. The credit of the payee is thus mediated by several banks to the benefit of the debtor. We can clearly see from this operation that the exporting resident has been credited with x units of domestic money (MA). As an ancillary effect of this transaction, the central bank in A now owns a deposit worth $10 million. Logically, only the exporting party ought to be credited as a result of the export. However, this is not the case. *On top of the resident's credit by his*

commercial bank, the central bank has received a credit against the key-currency country. Who owns the official reserves? The answer is that no individual residents are entitled to the official reserves – they represent national wealth and therefore constitute a credit for the country *as a whole*. Country A, defined as the set of residents, is now in a net creditor position with respect to the United States. So, on top of the credit the exporting resident has received, the country as a whole is in a net creditor position toward the United States. The fact thus clearly surfaces that, from a monetary point of view, nations are not merely the sum of their residents, but lead an economic existence of their own. Also, we confirm that key-currency country B *as a whole* has not paid for the import from A, as it is indebted to the exporting country as a result of the transaction. Likewise, country A as a whole has merely received an IOU, the promise of a future payment, rather than a payment itself, and thus has effectively not been paid.

Let us contrast the international (non)payment using national currencies with the case of inter-regional payment in a two-tier banking system. Of course, regions can and often do run current account deficits and become indebted with respect to other regions within a single currency area. However, in the inter-regional setting, the net indebtedness of the *sum* of individual residents does not entail an *additional* indebtedness of the *set* of residents defined as a separate economic entity. If resident in region A sells products worth CHF 10 million to a resident in region B, the result of the transaction will be a newly acquired bank deposit in A's commercial bank to the benefit of the exporter in A. A's commercial bank, in turn, is credited by its central bank. The same central bank debits B's commercial bank, which again debits its client in region B. As a result of this payment, region A has increased its net claims toward the central bank, which acts as a monetary and financial intermediary between the respective regions. While the resident in B is indebted as a result of the payment, the region itself is not indebted toward region A. Payment is thus not only final from the viewpoint of the individual resident, but also from the viewpoint of both regions.

Table 3.3 The result of an inter-regional payment.

Region A and B's central bank			
Assets			*Liabilities*
Bank B	CHF 10 million	Bank A	CHF 10 million
A's commercial bank			
Assets			*Liabilities*
Central bank	CHF 10 million	Seller in region A	CHF 10 million
B's commercial bank			
Assets			*Liabilities*
Buyer in region B	CHF 10 million	Central bank	CHF 10 million

As we clearly perceive, all neoclassical theories of international imbalances make the unwarranted assumption that national monies can and do act as international

means of payment. The only differences between inter-regional and international trade are, according to the theories resulting from this assumption, 'real' factors. Accordingly, economists in past decades have often interpreted the US dollar as an international money (McKinnon, 1969, p. 3), just because it is used in international transactions. As Blejer and Frenkel (2008, p. 687) explain, the monetary approach to the balance of payments "assumes full integration of domestic and foreign goods and capital markets". This assumption is unwarranted, as Cencini and Schmitt (1991, p. 42) point out: "For a country it is not the same thing to be paid in dollars as in gold since dollars are a mere IOU issued by the American banking system whereas gold is a true real asset". Indeed, since the 'payment' of net imports of (real or financial) products leads to the indebtedness of the importing country as a whole and does not compensate the exporting country with a product of equal value, national monies do not offset international debt, and therefore cannot be considered international means of payments. While regions do not constitute separate economic entities, countries lead a separate, though interrelated existence relative to their residents. This forces us to agree with Cencini and Schmitt's (1991, p. 18) statement:

> "As is confirmed by factual observation the debt of a region is a linguistic, if not a poetic, licence which has no effective counterpart in the real world, whereas international debt is a sad reality which characterizes our international monetary system more and more."

Now, it can be plausibly argued that as soon as the exporting country uses the acquired foreign reserve currency in order to import from a third country, the US dollar discharges the debt between the importing and the exporting country. Therefore, it is reasonable to ask if a reserve currency turns into an international means of payment as soon as third party countries receive it.

In order to refute this proposition, we can refer to Schmitt's (1978, p. 21) distinction between 'first grade' and 'second grade' debt (our translation). According to the French economist, first grade debt is debt issued by a buying party. If a buying party receives from a selling party a service or a commercial or financial product that can be related to some unit of account, the buying party is consequently indebted to the selling party by that amount. By contrast, second grade debt is issued by a party that is neither buyer nor seller in the transaction, that is, a bank. An institution that incurs a debt without receiving anything in exchange is a money-issuing bank, and second grade debt is therefore bank money (ibid.). We may illustrate what happens when a reserve currency country's national currency circulates in Figure 3.3.
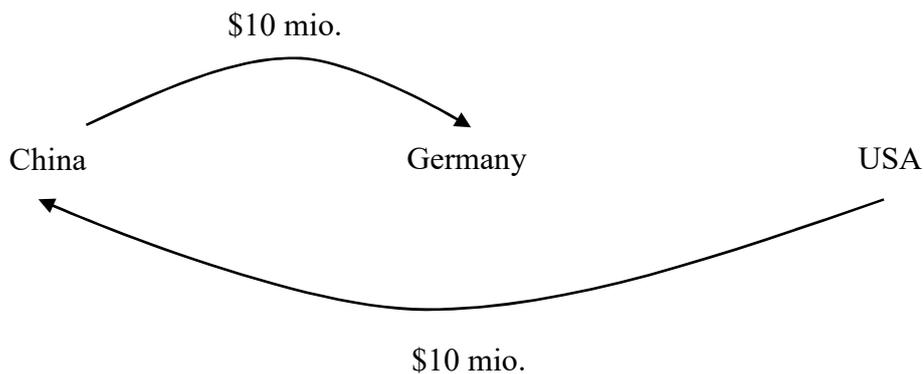
Figure 3.3 A payment with first grade debt by the United States.
Source: adapted from Schmitt, 1978, p. 16

In this example, the United States is the importing country and hands over dollar IOUs worth $10 million to China. It is clear from the above analysis that this constitutes a non-payment, as the United States as a country is indebted as a result of this operation, and the relevant US dollars have been subjected to a process of duplication. Considered as the set of its residents, the United States constitutes the buying party and, at the same time, the party issuing the debt. So while dollars constitute money within the United States, dollars change their nature as soon as they leave their national banking system: "The national second grade debt is degraded into (the country's) first grade debt as soon as it is exported" (Schmitt, 1978, p. 53, our translation). But what if China now uses this first grade debt in order to import, say, from Germany? Is it not true that the debt between China and Germany is discharged by means of the US dollar? While it is certainly true that there is no remaining debt between China and Germany in this case, it is also true that Germany has not yet received anything in exchange for its exports other than a promise to pay in the future. To wit, there is now a debt hanging between Germany and the United States, confirming that Germany has not been paid finally. This conclusion does not change even if Germany decides to spend its dollars on imports from the United States, a situation that Figure 3.4 illustrates.

In this case, Germany returns the United States' acknowledgment of debt in exchange for US commercial or financial products, thereby discharging the remaining debt between Germany and the United States. It seems, therefore, that the US dollar has finally turned into international money. As Schmitt (ibid., p. 17, our translation) points out, "this conclusion is wrong, because there are two ways for a debtor to free himself from his debt: either he pays his debt, or he withdraws it without paying". In this case, the United States does not pay its debt to Germany with money, but withdraws its circulating IOU by handing over a (financial) output to the creditor. It must be remembered that Germany is returning mere duplicates of dollars – in the form of Eurodollars – to the United States. So even if national currencies circulate internationally, all international debt is finally discharged only once the country hands over real output, turning it

into a money-using barter system of international trade. The result of this analysis is that "not a single national money is an international means of payment" (Schmitt, 1978, p. 55, our translation).

$10 mio. $10 mio.

China   Germany   USA

$10 mio.
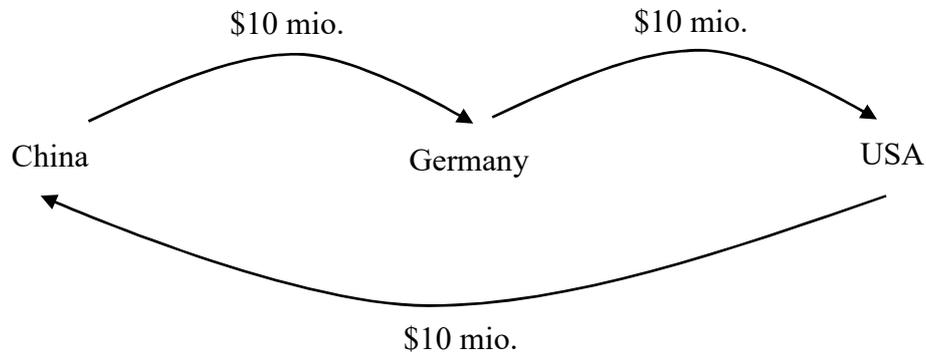
Figure 3.4 The circular use of a first grade debt.
Source: adapted from Schmitt, 1978, p. 17

To date, two fundamental asymmetries pose a considerable threat to the stability of the global monetary framework (see Cencini and Schmitt, 1991, pp. 54-5). The first fundamental asymmetry is due to the fact that, while national payments are carried out with national money, *inter*national payments today are also carried out with national money. The second fundamental asymmetry is due to the parallel existence of key-currency and non-key-currency countries. While key currencies are universally accepted IOUs and thus enable the issuing country to import labour-intensive products without giving up any resources in exchange, non-key-currency countries must acquire key currencies (by exporting products or receiving a foreign loan) in order to import from abroad. The combination of these two fundamental asymmetries results in a hugely complex and highly volatile situation, in which national currencies are turned into objects of trade (indeed, of speculation) on global currency markets, leading to unpredictably fluctuating exchange rates, thereby hampering economic growth and increasing unemployment worldwide. It is widely known today that the transaction volumes on currency markets exceed the volume of commercial trade by far. This clearly indicates that currency transactions are not directly related to current trade or financial flows, but rather to speculation ('hedging' is, of course, merely a kind of defensive speculation). Economists' belief that national currencies are different assets that can be made homogenous through exchange rates has hindered analytical progress. To wit, a mechanistic vision of the economy in line with neoclassical economists' explicit intentions of copying hydraulics has led many to believe that national money is an asset whose means-of-payment-function merely depends on its social acceptance, irrespective of the country in which it circulates. The analysis of different payment architectures, especially important for questions of payment finality within and between countries, has consequently been neglected.

If money were an asset created at zero cost by some (central) bank, and this money then physically circulated within and between nations, we could light-heartedly agree with the assumption that national money can serve both as national *and* international means of payment, as long as it is generally accepted. However, to confuse money with a net asset created by some banking system is theoretically and empirically unsound. As banking practices confirm millions of times a day around the globe, money is issued as an asset-liability every single time a payment is carried out. Furthermore, bank practice confirms that money deposited in banks cannot leave the banking system that gives rise to it. Even if a banknote physically leaves the country of emission, the corresponding liability is still registered in the central bank's balance sheet. The assumption that national monies can carry out international payments is a corollary of the assumption that money is simply a financial asset.

3.3   *Ex ante* and *ex post* analysis

Bernanke constructs his saving glut hypothesis on the basis of accounting identities. This means that the two sides of an identity "are ultimately the two sides of the same coin" (Bernanke, 2005, Internet). But if saving and investment are the two sides of the same coin, how can saving exceed investment even for a second and induce the interest rate to drop, causing investment to rise in the long run, as the loanable funds theory suggests? Quite obviously, in order to inject causalities into the rigid accounting framework, Bernanke needs room to manoeuvre. By referring to 'desired' saving, Bernanke is able to introduce this necessary space for behavioural dynamism. *The Economist* (2005, Internet) clarifies the relationship between 'desired' and '*ex post*' saving in an article on Bernanke's saving glut hypothesis:

> "To use the language of economics, saving and investment are an 'ex-post' identity, but the world's 'ex-ante' appetite to save and invest may well be out of balance. Actual saving and investment must be equal. Desired saving and investment may not be."

According to economists' magazine of choice, one must only choose the right timeframe in order to get saving and investment to deviate:

> "In the long term, saving and investment will be brought into line by the cost of capital. But in the short term, firms' appetite to invest is volatile, and policymakers may need to step in to shore up demand. Thus, although saving and investment are equal ex-post, economic theory leaves plenty of room for an ex-ante saving glut." (ibid.)

Ex ante and *ex post* vocabulary developed in the so-called Stockholm School in the 1930s when difficulties arose of consolidating accounting identities with equilibrium concepts. The two concepts did not seem to go together well. On the one hand, there was the opinion that certain economic magnitudes (that is, savings and investment, output and income) are the two sides of the same coin. This view is mirrored in the following passage of the *General Theory* (Keynes, 1936/1973, p. 81):

> "The prevalence of the idea that saving and investment, taken in their straightforward sense, can differ from one another, is to be explained, I think, by an optical illusion due to regarding an individual depositor's relation to his bank as being a one-sided transaction, instead of seeing it as a two-sided transaction, which it actually is."

In this often quoted passage, Keynes clearly suggests that saving and investment "taken in their straightforward sense" cannot differ from one another. This view has, in a way, been endorsed by mainstream economics textbooks, which clearly state that, *ex post*, saving and investment are accounting identities. The other view (which Keynes also endorsed) states that certain economic forces lead to a constant process of adjustment between economic magnitudes (that is, saving and investment, output and income). In this picture, saving and investment can constantly fluctuate around a long-run equilibrium. The incoherence of the two approaches is apparent, and a solution to this problem is accredited to Gunnar Myrdal (1939, pp. 46-7):

> "An important distinction exists between prospective and retrospective methods of calculating economic quantities such as incomes, savings, and investments; and [...] a corresponding distinction of great theoretical importance must be drawn between two alternative methods of defining these quantities. Quantities defined in terms of measurements made at the end of the period in question are referred to as *ex post*; quantities defined in terms of action planned at the beginning of the period in question are referred to as *ex ante*."

By separating the period of time during which the saving and investment decisions are being processed inside the human brain (*ex ante*) from the actual appearance of saving and investment (*ex post*), Myrdal attempted to bridge the conceptual gap between accounting identities and equilibrium:

> "There is in fact no contradiction at all between the statement of an exact bookkeeping balance *ex post* and the obvious inference that in a situation when saving is increasing without a corresponding increase of investment, or perhaps with an adverse movement in investment, there must be a tendency *ex ante* to a disparity." (Myrdal, 1939, p. 46)

The desire to turn the saving-investment identity into an equilibrium condition is rooted in economists' belief that accounting identities are merely tautologies that do not convey any valuable information. It is possible to illustrate Myrdal's distinction between *ex ante* and *ex post* magnitudes with Figure 3.5. As is made clear, time is separated into a period before and after the transaction takes place.
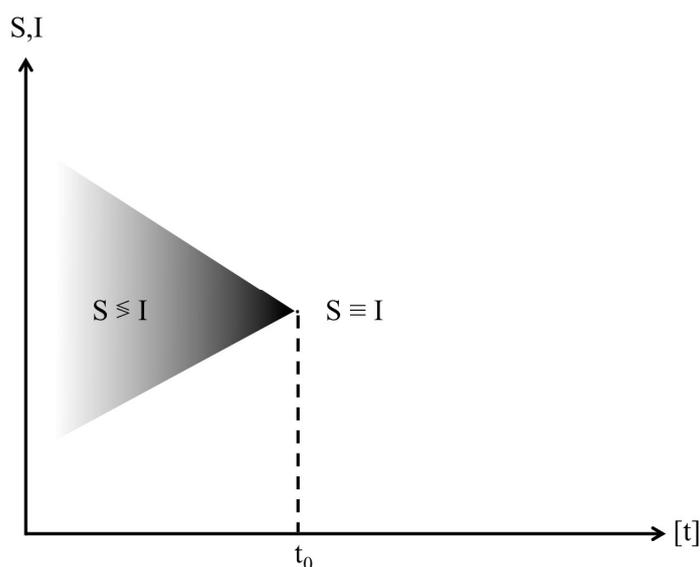
Figure 3.5 The *ex post* and *ex ante* separation of time.

Gnos (2004, p. 336) points out that Myrdal's analysis has become a standard tool in macroeconomic theory, a fact that is confirmed by Bernanke's (2005) constant referral to *desired* savings. Indeed, Myrdal's *ex ante* approach is necessary in order to turn macroeconomic accounting identities into conditions of equilibrium. Shackle (1972, p. 440) makes it clear that the distinction between *ex ante* and *ex post* was "one of the most transforming insights that theoretical economics has had". It was so successful that even economists who are quite willing to question fundamental assumptions in economic theory, such as Stiglitz and Greenwald (2010, p. 2), decide to "analyse the impact of alternative reserve systems within a global general equilibrium model". The term '*ex ante*' is often also called 'desired', meaning essentially the same thing. '*Ex post*' is often replaced with the terms 'realised' or 'actual'. In Bernanke's (2005, Internet) speech on the global savings glut he uses the terms 'desired' or '*ex ante*' eight times; he uses the terms 'actual' or 'realised' three times.

It is interesting to note that, after having used it for some time in 1931 and 1932, Keynes (1937/1973, p. 184) explicitly dismissed *ex ante* / *ex post* analysis on logical grounds:

"My reason for giving it up was owing to my failure to establish any definite unit of time, and I found that that made very artificial any attempt to state the theory precisely. So, after writing out many chapters along what were evidently the Swedish lines, I scrapped the lot and felt that my new treatment was much safer and sounder from the logical point of view."

Thus, the posthumous publication of Keynes's lecture notes calls into question the legitimacy of *ex ante* and *ex post* analysis. Let us dwell a little on Keynes's conception of effective demand and entrepreneurs' decisions in order to better understand this line of reasoning. According to Keynes (ibid., p. 25), effective demand is where the aggregate supply curve intersects with the aggregate demand curve. The aggregate supply curve is an upward-sloping function of employment; the aggregate demand curve is a downward-sloping function of employment. The intersection of the curves indicates the amount of income that results from entrepreneurs' calculations of future sales (Keynes, 1936/1973, p. 24). For Keynes, it is the entrepreneurs' decisions and calculations that determine effective demand, not the public's decision to save (see Gnos, 2004, p. 340). Keynes (1937/1973, pp. 216-7) reasserts this position a year after writing the *General Theory*: "There is [...] no [...] necessity for individuals to decide, contemporaneously with the investment decisions of the entrepreneurs, how much of their future income they are going to save". The public is in no position to demand goods before it has income, so there is no adjustment process between supply and demand.

We may follow Gnos's (2004, p. 341) line of reasoning further and investigate Keynes's contentious *finance motive*, the meaning of which has given rise to debate lately (see Davidson, 2002). Before firms actually invest, they estimate future costs, in order to then ask a bank for credit lines or overdraft facilities if they have not sufficient funds at their disposal. This does explicitly not involve collecting pre-existing savings, as the loanable funds theory would erroneously suggest. Indeed, finance "has nothing to do with saving. [...] It does not absorb or exhaust any resources" (Keynes, 1937/1973, p. 209). Entrepreneurs make their decisions based on estimations of proceeds and costs and ask a bank for a credit line. "At this point, households have not yet received the income they will spend and save. It is only at the second stage, when factor cost is paid, that income is received" (Gnos, 2004, p. 341). However, as soon as factor costs are paid, income appears and adds to the stock of saving available in the system. Saving thus passively adjusts to whatever firms decide to invest. In Basil Moore's (2006, p. 156) words, saving is therefore "the accounting record of investment". Because saving is a result, and not a necessary pre-condition for investment to occur, "there will always be enough ex post saving to take up the ex post investment and to release the finance" (Keynes, 1937/1973, p. 222). From this, Gnos (2004, p. 342) concludes that "aggregate supply and demand are not subject to any adjustment process: they are necessarily equal". Gnos then proceeds to develop a

distributional theory that develops Keynes's principle of effective demand further. This is not the focus of the present section, and we may skip this analysis.

Of course, applying *ex ante* analysis to saving-investment relations, as Ben Bernanke (2005) does so masterly, is not only dubious because it mimics Keynesian viewpoints Keynes himself clearly disapproved of in his later work; this would amount to an illegitimate *argumentum ad verecundiam*, which is the kind of intellectual sloppiness from which post-Keynesians especially need to distance themselves. While Keynes certainly was a highly original thinker who deserves credit, his views were also contradictory and confused. Bernanke's application of desired saving is problematic because it mixes two radically different categories of savings: desired and actual savings. It should be quite straightforward to state that desired and actual savings pertain to two very different spheres. While the first is a psychological, immeasurable concept, the second is an economic, measurable one. By concentrating on the period *ex ante*, economists are attributing more significance to human thoughts and desires than to actual, measurable economic magnitudes. This was explicitly accepted by Pigou (1949, p. 19), who believed that "[i]n the deepest sense economic reality comprises states of mind – the satisfactions and dissatisfactions of human beings – and nothing else".

According to Bernanke (2005), national saving and national investment are equal in each period. It seems therefore that Bernanke accepts Moore's (2006, p. 161) standpoint that "ex post *comprises the PRESENT as well as the past*". But because saving can cross international borders, saving and investment may still diverge according to Bernanke's analysis. In this narrative, developing countries were holding excess savings that subsequently flooded economically more developed countries. But then how did the excess saving in developing countries come into existence? As *The Economist* (2005, Internet) rightly points out, it must have been *desired* savings that outstripped *desired* investment in developing countries, because actual saving and investment are always identical according to the mainstream view. So does Bernanke want to have us believe that virtual savings flooded world capital markets and pushed interest rates down? This sounds spectacularly improbable, but a thorough reading of Bernanke's hypothesis leaves us with this interpretation.

The theoretical question can be broken down as follows: how can we relate undetermined, non-existing magnitudes to each other? Obviously, *ex ante* magnitudes have not entered economic reality yet. They are purely mental, *planned* magnitudes. What is the meaning of saying that *desired* saving flooded the world capital markets? How should we be able to identify savings that have not yet materialised? It is tautological, and therefore obviously true, to state that saving and investment only come into existence once they are formed. This cannot be seriously questioned. The relevant criterion in order to distinguish *ex*

ante saving from actual saving is that the former category of 'savings' merely exists as a mental representation in humans' minds, while the latter exists outside the human imagination, in actual reality, independently of what happens in people's minds. It would therefore be futile to quantify *ex ante* savings, as Borio and Disyatat (2011, p. 6) notice: "Ultimately, since ex ante saving and investment are not observable, it is hard to identify them". We may go even further and claim that, not only is it 'hard' to identify them, but it is actually *impossible* to identify them, as saving and investment only come into existence once they are formed. The relevant criterion in order to distinguish *ex ante* saving from actual saving is that the former exists merely as a mental representation in economists' minds, while the latter has been realised in economic reality, independently of what happens in economists' minds.

We may ask at this point why so many economists, including Keynes, recoiled from pursuing an analysis of accounting identities and instead strove for an analysis of functional relationships between unrealised, behavioural magnitudes. For this purpose, let us for a moment suppose that saving and investment were indeed accounting identities that can never diverge. In this case, in moment t_0, saving and investment would both equal 10. A little later, in moment t_1, both would equal 12. From a strictly (chrono)logical point of view, the only 'movement' that could lead to an increase of both investment and saving at the same time is an instantaneous operation – a (monetary) transaction. All that is left to the economist, in this case, is to study transactions and their resulting macroeconomic magnitudes (income, output, consumption, investment). There would, it seems, be no room left for studying causalities or human behaviour; macroeconomics would turn into a quite different science, abstracting from behaviour. Methodologically speaking, it would turn macroeconomics into a science concerned with the logic of payments on different markets and their consequences for the well-being of society. Calculus as the mathematical method of analysing infinitesimally small changes would to give way to some sort of non-continuous analysis, where economic changes do not happen marginally, but in leaps. Few neoclassical authors, like Robert Clower (1999, p. 180), have already formed an intuition in this direction: "I'm doutbtful about highly technical mathematics and I don't think there is much use for advanced calculus even though economists use it extensively". As soon as economists realise how much can be gained from understanding the strict logic of national and international payments, the methodological individualism that marks neoclassical analysis will make way for an analysis of the economic system, independent of individual behaviour. This is indeed Cencini's (2005) idea of identities. Apart from the fuzziness of the positive analysis that results from comparing non-realised, non-observable magnitudes (that is, utility, the 'willingness' to save or the 'willingness' to invest), there are normative issues that result from using such a vague concept. Machlup (1976b, pp. 111-2) openly concedes that economic equilibrium is often used as value-laden concept.

"[T]he notion of equilibrium as a balance of forces acquires a connotation of 'appropriateness' when the balance is thought of as one of 'natural forces', or even a connotation of 'goodness' when that balance is thought of as 'harmony'."

Needless to say, it is deeply problematic that a cornerstone of neoclassical economics – the concept of equilibrium – is prone to value judgements (see Ward, 1972). It is widely known that different economists can have different opinions of what constitutes an equilibrium. In chemistry, dynamic equilibria are phenomena that can actually be observed and measured. If reactants are converted into products and those products are converted back into reactants at an equal and constant rate, chemists speak of a dynamic equilibrium. Static equilibria in physics describe the situation in which all parties in the reaction are at rest, there is no motion between reactants and products. While these forms of equilibria can be observed and measured, economic equilibrium is nothing that exists in the outside world. It simply has no correspondence in the real world, but exists merely in economists' heads. Additionally, equilibrium presupposes certain patterns of human behaviour. This is highly problematic, as humans have a well-known tendency to adapt their behaviour to the way they are treated.

Remember, for instance, the way the Bishop of Digne treats Jean Valjean in Act I of Victor Hugo's *Les Misérables*. Despite the fact Jean Valjean acts like a criminal by stealing the Bishop's silver, the Bishop treats him like a companion after Valjean is caught and brought back, thereby triggering Valjean's Soliloquy in which he resolves to redeem his sins. If economists assume the personality traits of the *homo oeconomicus* in their models, they are positing that the average human being has much in common with a sociopath, who is known to be untruthful, antisocial, egocentric, emotionally empty and respectless toward social norms. Athreya (2013, p. 357) points out that "modern macroeconomics is almost, but not perfectly, dystopian. It remains maximally cynical about the behaviour of people". While behavioural economists have managed to improve the standard model substantially, it remains problematic *in principle* that economists presuppose a specific pattern of human behaviour in their positive analysis.

Clearly, current theories in international macroeconomics rest on a series of assumptions and hypotheses that are highly contentious. To be sure, the necessity of making assumptions or building theories on top of tautologies is not questioned. Instead, it is recommended that a series of assumptions and hypotheses that are taken for granted by most economists ought to be revisited. Above all, substance should be dictating methods, not the other way around. At present, mathematical form is still a necessary prerequisite for any economic hypothesis to be widely read and accepted in important journals. Yet, there are certain concepts which cannot efficiently be expressed in the language of

mathematics. Take, for example, the assumption discussed in section 3.1. In an economy with n-1 non-monetary assets, money is assumed to be the nth (monetary) asset. While this axiomatic way of introducing money certainly simplifies mathematical formulation, it does not pay tribute to money's nature or its emission by the banking sector. Money's emission takes the form of a book-entry, which cannot be modelled using calculus. Money is not an asset, either, as every book-entry takes the form of an asset-liability. Money is woven into the real economy through payments, which take place on the factor, product and financial markets and are (or at least ought to be) always linked to real output. Introducing money into the economy like manna from heaven is not such a simplifying assumption, but in fact assumes away the thing that needs to be scientifically explored. With respect to the assumption explained in section 3.2, mathematical formulation has disguised, rather than detected the qualitative difference that exists between a national and an international payment. This is due to the fact that the nature of a payment must not only be understood numerically, but also conceptually. Calculus has little, if anything, to say about the nature of a payment. The last assumption, discussed in section 3.3, is a clear indication of the ongoing tension (to say the least) between macroeconomics and microeconomics. Keynesian macroeconomics rests on a foundation of accounting identities. If methodological individualism was to regain its status after Keynes, Keynes's rigid identities had to be broken up and transformed into mere conditions of equilibrium, a development that was to large part caused by Keynes himself. Myrdalian *ex ante* analysis managed to do that. Again, the desire to base economic theory on behavioural principles and to formulate economic theories in the language of calculus determined definitions and concepts, thereby missing a big part of the picture.

3.4   The use of calculus in monetary theory

It is a well-known fact that purely 'verbal' contributions in economics are frowned upon by many economists at the top of the academic pyramid. The dominant perception is that the gist of every important economic idea can be represented with a formula, relying on the powerful language of calculus, thus adding rigor and removing ambiguity (see Laidler, 2003).

It would be very hard indeed to argue against the desire for rigor and clarity. While ambiguity may be constructive in some fields of research, the author of the present thesis believes, above all, in rigor and simplicity. If this is the case, why are mathematical formulae largely excluded from this work? The simple answer to this question is that it would introduce unnecessary ambiguities. If one is interested in the effects of certain categories of payments within a monetary architecture, positive analysis must cover at least three economic situations. First, it must analyse the state of affairs *before* payment has taken place. Secondly, it

must analyse the payment itself. Thirdly, it must analyse the state of affairs *after* payment takes place. What interests the economist concerned with monetary structural flaws in the payments system is which categories of payments give rise to an anomalous, unstable situation. While microeconomists are right to use calculus in order to describe the transition from one state of affairs to the other, the monetary macroeconomist does not enjoy the privilege of using this powerful and elegant mathematical tool. Analysing the *status quo* before payment takes place involves qualitative, descriptive reasoning that is carried out most efficiently and rigorously by using words and numbers in balance sheets. The same is true for analysing the *status quo* after payment takes place. The payment itself is a highly complex economic 'movement' that causes the transition from one *status quo* to the other. Importantly, a payment occupies zero time. It is empricially confirmed millions of times a day that a payment takes the form of a book-entry that divides time into a *before* and an *after*, without occupying any time itself. Importantly, the logic of payments cannot be understood with a formula. As such, a payment unfortunately escapes the elegant logic of calculus, which is concerned with infinitesimally small transitions in time. The difference between zero time and an infinitesimally small period of time is naturally quite small. It is therefore not surprising that economists to this day attribute little importance to it.

Legend has it that Lord Kelvin advised his students not to pursue an academic career in physics, as all the great problems had already been solved. All that was needed was more precise measurement, which would only take up a few more years. The two dark clouds remaining by the end of the nineteenth century were the Michelson–Morley experiment and black body radiation. Ironically, solving these two problems gave rise to two new theories that shook the foundations of physics in the twentieth century: the former gave rise to the theory of relativity, the latter gave rise to quantum mechanics. The alleged statement by Lord Kelvin warns us not to believe that we have reached a scientific end of history. However, already in 1965, Solow (1965, p. 146) stated that "most economists feel that short-run economic analysis is pretty well in hand. [...] The basic outlines of the dominant theory have not changed in years. All that is left is the trivial job of filling in the empty boxes, and that will take no more than 50 years of concentrated effort at a maximum". Recurring financial crises, the volatility of exchange rates, the persistent problems of inflation and unemployment and the sovereign debt crisis are, perhaps, the economic counterparts of the Michelson–Morley experiment and black body radiation. Getting to grips with these phenomena involves looking for new research methods beyond the mechanistic approach that has dominated our science ever since Cournot and Walras.

3.5   Micro-foundations of macroeconomics

In the past decades, behavioural aspects that depart from rational choice models – such as fairness considerations, social relationships or status considerations – have increasingly been introduced in many parts of macroeconomics (Driscoll and Holden, 2014, p. 133). This process is likely to go on for a while, as there are quite obviously many insights from behavioural psychology that could substantially improve the overly simplistic *homo oeconomicus*. The discipline has leaned so far over to behavioural questions that Frank (2011, p. xii) believes "economists a hundred years from now will be more likely to name Charles Darwin than Adam Smith as the intellectual founder of their discipline". However, improving the *homo oeconomicus* is really beside the point from a macroeconomic perspective. When John Stuart Mill (1874/1948, pp. 137-8) introduced the 'economic man', he described his behaviour as follows:

> "[Political economy] does not treat the whole of man's nature as modified by the social state, nor of the whole conduct of man in society. It is concerned with him solely as a being who desires to possess wealth, and who is capable of judging […] the comparative efficacy of means for obtaining that end. […] It makes entire abstraction of every other human passion or motive; except those which may be regarded as perpetually antagonizing principles to the desire of wealth, namely, aversion to labour, and desire of the present enjoyment of costly indulgences."

Being an educated man of the enlightenment, Mill (ibid., p. 139) of course realised himself that this was "an arbitrary definition of man", and that no political economist "was ever so absurd as to suppose that mankind are really thus constituted". Rather, Mill created the economic man because, in his mind, "this is the mode in which science must necessarily proceed" (ibid.). This is rather important, for it tells us that the economic man was never intended as a hypothesis that could be verified or falsified. Mill could not have been more outspoken about the fact that human beings often *do not* behave like his economic man. It would probably not have occured to him even to empirically test his model of human behaviour, given that he discarded this pattern of behaviour in the same passage that he formulated it. Far more, it was Mill's *methodological* choice that led him to create this cardboard cutout of a human being. As many economists before and after him, Mill (ibid.) favoured copying the methods adopted by classical physics, emphasising similarities between laws that govern "the motions of earth and planets" and those that govern the "conduct of man in society".

Modern economists are, of course, right in stating that this model of human behaviour is unrealistic. In fact, they are merely repeating what the originators of the concept knew over 140 years ago. If the *homo oeconomicus* is still a cornerstone of economic theory, it is not because it is a realistic model, but because it allows us to reduce economic problems to problems that can be neatly solved by using calculus. This, of course, requires maximising, minimising and

optimising behaviour. What keeps the *homo oeconomicus* alive is not its closeness to reality, but economists' desire to model human behaviour by using calculus. Because of this, it is quite beside the point to try to improve the rational choice model in the hope of improving macroeconomic modelling. The more fundamental question that needs to be addressed is whether or not the methodological choice is correct in the first place. To wit, the question must be asked whether or not macroeconomics as a social science can rely on principles and laws that transcend individual behaviour. If not, then it is thoroughly justified to continue providing a rigorous microeconomic framework for macroeconomics, and microeconomists should continue to look for ways of translating human behaviour into mathematic language. If, on the other hand, there are principles and laws that transcend human behaviour, then macroeconomics must be made coherent with these principles. This reasoning echoes Van den Berg's (2010, p. 28) demand for a more holistic approach in macroeconomics. As he explains, "[h]olism is the recognition that the components cannot be understood in isolation and their functions cannot be predicted without knowing the environment in which they exist". It is clear to the author that "economics and policymakers should have been more holistic in describing and overseeing our complex international financial system" (ibid.). Indeed, establishing a clearer understanding for the relationship between the whole and its component parts is an endeavour common to all the sciences. Chapter 4 attempts to show this might be achieved in economics.

4   The macroeconomic foundations of an alternative view

"[…] *marginal product is of finite quantum type rather than of smooth-partial-derivative type.*"

<div align="right">(Samuelson, 1973, p. 332)</div>

After having presented the assumptions underlying theories of international imbalances, we suggest an alternative view that promises to increase our knowledge and that offers practical solutions to current macroeconomic problems. For this purpose, it is necessary to explain the macroeconomic foundations of this view at some length. Although the aim is to explain the main aspects of the theory of money emissions in a positive manner, highlighting the differences between the new and the neoclassical approach will require some attention.

First and foremost, an alternative view of what constitutes the nature of money is necessary. Based on this new conception, the meaning of income and production must be revisited. As money, income and production are economic concepts that cannot be understood independently of each other, the different sections necessarily overlap. The significance of economic equilibria will then be juxtaposed in opposition to the concept of identity with the aim of clarifying the criticism of the equilibrium concept scattered around Chapters 2 and 3. The functions of banks and central banks will then be outlined and interwoven with the process of production, thereby overcoming the dichotomy between the real and the monetary sphere that still encumbers mainstream economic theory. At last, a theory of exchange rates that focuses on the working of international payment and settlement system infrastructure is indicated.

4.1   Money: an asset–liability

The nature of money may be apprehended best by analytically distinguishing between bank deposits and money, a separation first made explicitly by Schmitt (1966). The distinction between bank deposits and money amounts to the distinction between stocks and flows. Figure 4.1, depicting the payment of a wage bill on the labour market, will help to illustrate this.

As is already universally acknowledged by economists, money is a means of payment between a payer and a payee, as well as a unit of account. As a result of the payment, the outstanding debt between payer and payee is cancelled. This settlement of a debt is only possible because a bank, which belongs neither to the categories of payer nor payee in this operation, offers its own acknowledgment of debt – its 'I owe you' – for the payment. In fact, money is a bank's acknowledgment of debt, which is why "[t]he idea of money is derived from the idea of a debt. […] To separate the debt from the money with which it is payable

seems as transcendental an operation as to separate the grin from the Cheshire Cat" (Hawtrey, 1933, pp. 2-3). One consequence of this definition of money is that every payment must constitute a tripolar operation, consisting of payer, payee and a one- or multi-tier banking system that supplies its IOUs. While the transaction itself is instantaneous from a logical point of view, we may dissect it in more detail and thus analyse more accurately what happens when payments take place in theory and practice.
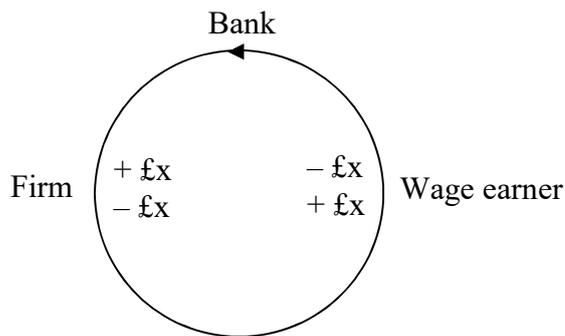
Figure 4.1 The emission of money as a flow on the labour market.
Source: Rossi, 2007a, p. 37

After the firm successfully asks its bank for the necessary sum of money to settle its debt toward the wage earner, the bank issues its IOU to the benefit of the firm (+£x). The firm then hands over the bank's IOU (–£x) to the wage earner (+£x), who has no choice but to immediately spend it on a bank deposit (–£x).[10] After the payment has taken place, the bank's IOU instantaneously passed through the hands of the firm and the wage earner, only to end up at its point of emission – the money-issuing bank. In Cencini's (2001, p. 27) words, "money is simultaneously issued by [the bank], lent to the payer, transferred to the payee and given back to [the bank], where it is immediately destroyed". For each and every agent in this tripolar operation, money is an asset and a liability at the same time. As no worldly being can ever hope to create anything from nothing, it is only logical that the creation of money by banks defines the simultaneous creation of a positive as well as a negative quantity, thus defining a zero-sum operation. Note that this operation does not depend upon any specific human behaviour, but is a result of money's accounting nature. As a consequence of the instantaneous operation, the firm is left with a debt and the wage earner is left with a credit toward the banking system. Now, it is important to distinguish money – a bank's IOU issued every time a payment takes place – from the result of money's emission: bank deposits. Money is indeed not an asset created out of thin air by the banking system that then circulates until it finally disappears again into nothingness once the loan is

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[10] It may help to imagine that the bank hands over an actual piece of paper with "the bank's IOU" written on it to the firm, which then hands over the IOU to the wage earner, who hands it back to the bank within a split second. However, this action is carried out using computers in today's practice, and can also be understood conceptually without the help of paper and pencil.

repaid. Rather, it is a purely immaterial means of payment, a vehicle of transaction supplied at zero cost by the banking system, thereby monetising the production taking place in what is sometimes called the 'real' economy.

Needless to say, no wealth is created in this monetary operation over and above the output created through the labour of the wage earner. To be true, and if looked at from a pure accounting perspective, the economy as a whole has not become wealthier because of the nominal emission of money by banks. Basic knowledge of accounting suffices to realise that the worker's *positive* bank deposit (negative from the bank's perspective) is exactly offset by the firm's *negative* bank deposit (positive from the bank's perspective). The fact that every single payment carried out is registered as an asset *and* a liability in banks' balance sheets suggests money's nature as an *asset–liability*. As the IOU issued by the banking sector possesses a numerical nature, money serves to measure numerically – and thereby to homogenise economically – the output generated by the workforce, an output which would otherwise remain fundamentally heterogeneous (Cencini, 2005, p. 110). The new net wealth in the economy as a whole does not consist of newly created money – which is just a valueless, numerical form, created and destroyed within the operation – but in the new output (income) produced by the workforce and measured by the payment. It is production that creates income, not the creation of money by banks, as economists working for the United Nations (2008, p. 3) at least implicitly confirm: "Incomes are generated by production". The only new and valuable net asset created for the economy as a whole is the wage earner's output (income). Money itself serves as a vehicle, issued by the banking sector at near zero cost, enabling the payment of wages on the labour market and leading to the creation of a positive and a negative bank deposit.

The circular flow of money depicted in Figure 4.1 implies that every creation of money is followed by its immediate destruction within the same operation: "It is double-entry bookkeeping that requires a perfect and instantaneous balance between creation and destruction" (Cencini, 2001, p. 69). In this novel approach, bookkeeping is not merely a function of money, but an ascribed feature of it (see Spahn, 2007, p. 160). In other words, the use of money in payments does not merely *lead to* a book-entry; money *is* a book-entry – albeit a very special one. Throughout history, the payment process has been carried out with a wide array of different materials representing the banks' debt. Most notably, during the gold standard era, the paper money was supposed to represent the stock of physical gold in the vaults of banks. In retrospect, it is understandable that, under such a system, the quantity theory of money could emerge. The quantity of money was of course identified with the stock of gold circulating within and between economies. Today, gold has lost its status of guarantor of financial stability. Furthermore, practically minded economists have come to realise that there is no connection whatsoever between the purchasing power of bank money and the amount of gold in (central) banks' vaults. Indeed, it remains to be explained why

digging up of gold in Africa and transferring it to Europe where it is reburied is supposed to stabilise a highly sophisticated and digitalised monetary system. Thanks to technological progress, a payment process today can be carried out far more efficiently within a split second using only electronic impulses. Gold must not anymore be shipped back and forth in order to offset trade imbalances between nations. This technological progress may, in due time, help to boost theoretical progress in monetary theory, as it is becoming increasingly obvious even to the most superficial observers that physical analogies in monetary theory, such as 'liquidity' or 'velocity of circulation', conceal the essence of money, rather than illuminating it. For example, it must be clear that, while payments can take several seconds or even minutes in practice, a payment occupies zero time from a strictly logical point of view. Let us expand on this example of a gap between conceptual logical and factual observation, as it calls into question the mechanistic worldview still permeating some economists' minds.

It is unquestioned in economic theory and banking practice that a payment offsets debt between economic agents (Committee on Payment and Settlement Systems, 2003b). If this is so, what timespan can a payment occupy logically? Perhaps the most simple way of answering this question is by creating an *argumentum ad absurdum* and stating that a payment can last a positive interval of time. Assume that a firm A is indebted toward the wage earner B owing to the wage earner's fulfilment of his contractual obligation. From the viewpoint of firm A, their economic relation defines a (non-monetised) debt, from the viewpoint of wage earner B it defines a (non-monetised) credit. Now, if the wage payment occupies a positive interval of time, one of the following statements must be true:

1. During a positive interval of time, firm A is still indebted toward B, although B has already been paid or
2. during a positive interval of time, firm A is not indebted toward B anymore, but B has not yet been paid.

Of course, both statements are openly absurd. A debt–credit relation is a relation that exists or does not exist for both creditor *and* debtor at the same time. It cannot even for a nanosecond exist only for the debtor without existing for the creditor at the same time, and *vice versa*. This means that – from a logical point of view – a payment becomes effective for both parties at the exact same point in time. This forces us to agree with Schmitt (1996b, p. 88): "Money and payments are one and the same thing. No money, if correctly defined, exists either before or after a given payment."

To return to banks' emission of money, it should by now have become apparent that the confusion of money with credit amounts to confusing flows with stocks. The theory of money emissions proposes a novel distinction in stock-flow analysis. While stocks have a positive duration in time, flows are 'movements'

that only exist during an instant: "The usual insipid definitions of stocks versus flows are stated the wrong way around and are poised for a complete reversal; in fact, monetary flows are instantaneous events while stocks last for positive durations" (Schmitt, 1996a, p. 136). Money is therefore not merely a stock "on the wing", as Robertson (1937, p. 29) – Bernard Schmitt's supervisor at Cambridge – believed. Money does not flow, money *is* itself a flow. As the flow of money is limited to the duration of the payment, and a payment occupies zero time from a logical point of view, it directly follows that the 'velocity' of money's circulation is infinite. Now, if money or its flow were physical phenomena, this would obviously present us with a serious problem, as no physical object can, as far as we know today, move faster than the speed of light. However, we are not faced with a physical flow, but a conceptual one, and the creation of bank numbers must not be confused with a physical creation.

A bookkeeping representation of the effect the payment of a wage bill has on a bank's balance sheet may further deepen and clarify the analysis. Before doing so, the assumptions must be made explicit. First, it may be assumed that the firm and the wage earner are both customers of the same bank. This simplifies matters, as it eliminates the necessity of introducing an interbank market at this point, which would only add complexity without introducing any substance to the question at hand. Furthermore, this assumption will be dropped once the interbank market is introduced in section 4.6. Secondly, we start our analysis from *tabula rasa*, meaning that no bank deposits exist before the wage payment takes place. In fact, this is more of a theoretical necessity than an assumption, as it makes sure the analysis does not presuppose the very phenomenon we are attempting to explain (see Rossi, 2007a, p. 35). From the *tabula rasa* condition it directly follows that the firm must obtain a loan from its bank in order for it to remunerate its worker, as it has no funds at its disposal in the beginning. Issuing the firm's own IOU to the benefit of the wage earner would not constitute a payment, but merely a promise of payment, confirming the principle that nobody can pay by getting indebted. Note that the existence of funds at the firm's disposal would force the theorist sympathetic to logical reasoning to explain the origin of these funds, leading him/her further down the rabbit hole every time s/he commits this *petitio principii*. It is clear, therefore, that a sober analysis must start from *tabula rasa*.

Table 4.1 Loans and deposits resulting from the opening of a credit line.

Bank			
Assets			*Liabilities*
Loan to the firm	+£x	Deposit of the firm	+£x

Source: Rossi, 2007a, p. 23

In practice, before a bank makes a payment on behalf of a firm, the bank opens a line of credit at the firm's request. This off-balance-sheet record results in the creation of a debit and a credit for the firm, shown in Table 4.1. The firm's credit

registered as the bank's liability results from the firm being the beneficiary of the bank's IOU, an acknowledgment of debt which can eventually be spent in order to remunerate the factors of production. The firm's debt testifies that the firm must at some point return the IOU it received from the bank. This operation is mirrored in Keynes's (1930/1971, p. 37) statement that "unused overdraft facilities – since they represent a liability of the bank – ought […] to appear on both sides of the account". Notice that this purely nominal creation of money, which is not even entered in banks' books in modern banking practice, entails the simultaneous creation of an asset and a liability. Additionally, this book-entry measures numerically both the credit and the debit of the recipient's credit line. The operation, however, does not constitute a payment and has no economic output to refer to. As blank this operation may be, it is not deprived of meaning, as it underlines the nature of purely nominal money as an asset–liability, issued by banks to the benefit of their clients (see Rossi, 2007a, p. 23). Once the firm uses its credit line in order to remunerate its wage earner, the deposit of the firm is destroyed and simultaneously created to the benefit of the wage earner, resulting in the situation depicted in Table 4.2.

Table 4.2 Loans and deposits resulting from the payment of the current wage bill.

Bank		
Assets		*Liabilities*
Loan to the firm	+£x Deposit of the wage earner	+£x

Source: Rossi, 2007a, p. 35

As Lavoie (2003, p. 508) explains, "[w]hen the credit line is being pulled upon, the additional loan which is awarded to the borrower has an immediate counterpart in the liabilities of the bank, by the creation of an equivalent additional deposit". As is made clear in Table 4.2, the loan granted by the bank to the firm is registered on the bank's asset side and constitutes the firm's debt toward the bank. As a consequence of this payment, the wage earner is the beneficiary of a positive bank deposit, registered on the liabilities side of the bank's balance sheet. This process of monetary intermediation illustrates and indeed confirms the loans-make-deposits causality shared by most heterodox economists. First spelled out by Withers (1909/1930), the loans-create-deposits narrative today is embraced by economists such as Davidson (2002), Lavoie (2003), Wray (2012), and Keen (2014). Apart from such notable voices at the fringes of mainstream, a number of institutional economists in prominent positions have subscribed to it. Most notably, the Head of the Monetary and Economic Department at the Bank for International Settlement (BIS) (see Borio and Disyatat, 2011) and the Bank of England's (BoE) Monetary Analysis Directorate (see McLeay et al., 2014) have publicly embraced this contentious causality. In the words of the monetary analysts of the Bank of England (ibid., p. 1):

"Whenever a bank makes a loan, it simultaneously creates a matching deposit in the borrower's account, thereby creating new money. […] Rather than banks receiving deposits when households save and then lending them out, bank lending creates deposits."

While prominent economists' acknowledgment of the endogeneity of money is an important improvement with respect to the *status quo*, it has not yet led to any significant changes in mainstream economic theory or policy. This is mainly due to the fact that the meaning of money's endogeneity is still contended among those who have embraced it. While endogenous money defines a shared trench for heterodox economists from which they launch their attacks on the mainstream, Rochon (2012, p. 294) is right in pointing out that "[t]he notion of endogenous money has divided heterodox economists for some time". According to Dow (1996, p. 174), endogeneity of the money supply "refers to the capacity for institutions to create new monetary instruments, or for new financial institutions to emerge, to satisfy excess demand for money". This is still a very vague definition, hardly distinguishable from the orthodox exogenous view that builds on the quantity theory of money. Further analysis is thus needed.

Rochon and Rossi (2003, p. xxx) point out that the modern endogenous money view "is encumbered by a number of differences that stand in the way to build a unified, and consistent, theory of money and monetary economies". Along with Rochon (2012, pp. 294-5), we may argue that two main debates are taking place within endogenous money circles. The first debate, going on between Horizontalists on the one side and Structuralists on the other, focuses on the shape of the money supply curve, the availability of reserves and the liquidity of banks. While Structuralists claim that money is sometimes endogenous and sometimes not, Horizontalists think it is always endogenous. This debate has found its way into some economics textbooks, where the structuralist conception seems to be favoured: "In reality, money supply is partly exogenous and partly endogenous" (Sloman et al., 2009, p. 547). In their mainstream textbook on monetary theory, Belke and Polleit (2009, pp. 55-8) argue that the question of endogeneity versus exogeneity "is typically decided either by theoretical or statistical procedures", and then claim that "[u]nder today's government money supply monopoly the money stock should be considered exogenous: It is the central bank that has the power to determine the stock of money in the hands of the public (abstracting from control problems)". The 'extreme' Keynesian view (a horizontal money supply curve) and the 'extreme' monetarist view (vertical money supply curve) are thus juxtaposed at the opposite ends of a spectrum, and it is conveniently assumed that the reality must lie somewhere in the continuum in between.

The second debate is more interesting for the purposes of the present thesis. It is taking place between post–Keynesians (both Horizontalists and Structuralists alike) and Circuitists on the one side and adherents of the theory of money

emissions (also called the Dijon-Fribourg School) on the other, and it is concerned with the nature of money (see Rochon and Rossi, 2003, for an excellent summary). While the first debate asks if money is a thing that *behaves* exogenously or endogenously, the second debate asks if money *is* an endogenous thing. This second debate is more fundamental than the first, which is why our focus will lie here. Clearly, questions about the shape of the money supply curve and the conditions of bank lending are secondary compared to defining money in the first place.[11]

In Table 4.1, both the bank and the firm are credited and debited with the exact same sum of money. In Table 4.2, the firm becomes a net debtor to the benefit of the wage earner, who in turn becomes a net creditor in the economy. The bank, besides supplying the means of payment to its clients in an act of *monetary* intermediation, additionally acts as a *financial* intermediary between payer and payee. Indeed, settlement of the debt through payment between firm and wage earner means that the bank acts as the mere go-between for the firm's debt toward the wage earner. Money thus leaves its mark on both sides of banks' balance sheets, confirming Schmitt's (1975, p. 13) claim that money is issued as an asset–liability every time a payment is made. While this proposition may seem totally new and radical at first, it cannot be seriously doubted in the face of millions of payments carried out every day confirming this basic fact. Indeed, money's 'two-sidedness' has already been clearly noticed by Keynes (1936/1973, pp. 81-2):

> "The prevalence of the idea that saving and investment, taken in their straightforward sense, can differ from one another, is to be explained, I think, by an optical illusion due to regarding an individual depositor's relation to his bank as being a one-sided transaction, instead of seeing it as the two-sided transaction which it actually is. [...] The notion that the creation of credit by the banking system allows investment to take place to which 'no genuine saving' corresponds can only be the result of isolating one of the consequences of the increased bank-credit to the exclusion of the others."

A quick glance at Table 4.2 confirms Keynes's profound insight. Indeed, the wage earner's deposit – his savings – and the firm's debt are the two sides of the same coin. As Cencini (1984, p. 34) clarifies, the central point of this famous passage is that saving is not an unspent income. Rather, "consumption and saving are two different ways of spending a given income". Income can be finally spent on a

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[11] One school of thought, established by Heinsohn and Steiger (1983), stresses how monetary economies require property as collateral. While it is certainly true that the existence of collateral makes banks more willing to grant loans for obvious reasons, the existence of collateral is not a necessary condition for a monetary production economy. Banks can and often do grant zero collateral loans, which is why the existence of collateral does not serve as a theoretical foundation of a monetary theory.

consumption good, or it can be spent on a capital or financial good. The meaning of money's endogeneity – a highly contentious and difficult concept indeed – can only partially be grasped by analysing the book-entries resulting from banks' loans. An analysis of these book-entries unveils the two-sided accounting nature of money. However, monetary theory does not simply boil down to accounting, and endogeneity has a deeper meaning than the fact that money can be issued by the banking system free of cost with the proverbial scratch of a pen. Economics is a science concerned with production and exchange,[12] and money's endogeneity can only be fully grasped when it is linked to production.

Before analysing more deeply the meaning of income and production, let us focus on the related question of the purchasing power of money. As was shown in section 3.1, it is a widely held view today that money is a net asset that bankers are able to create simply by punching keys on a keyboard. Thanks to money's social acceptance, this newly generated financial asset is loaded with a positive purchasing power and then circulates in the economy until it is finally destroyed when the loan is reimbursed to the bank. Thus, money's purchasing power is perceived to be a *result* of its universal acceptability: "The seller accepts money because he knows others will accept it from him" (Schmitt, 1972, p. 139). The possibility of a reversed causality is flatly dismissed. But is it not possible that money is universally accepted *because* it contains a positive purchasing power, independently of people's believes (see Rossi, 2003, p. 341)? The classical economists in favour of a theory of objective value would typically have answered this question to the positive, claiming that money is a commodity whose value is (roughly) proportional to the amount of labour necessary for its production, independently of people's subjective desires. Progress in economic theory as well as technological advances in modern banking forbids us from describing money as a produced commodity. Money is indeed a numerical thing, a *numéraire*. Numbers are not material; they are anthropogenic creations of the mind, invented symbols that may serve to structure and understand our surrounding world and ultimately ourselves. Claiming that the creation of numbers in banks' balance sheets is a time- and labour-intensive process is clearly absurd. Bank numbers do not possess purchasing power because they are the result of human labour.

As we have seen, money is issued as a positive and negative number, a zero-sum every time banks carry out payments for their clients. But how can money contain a positive purchasing power if it is issued as a zero-sum? Bank money is always, with not a single exception, issued as an asset–liability by banks. Money creation thus implies that a bank "creates +x and –x units of money in one and the same

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[12] Note that this definition deviates from Robbins's (1932) approach, but is closer to John Stuart Mill's (1874/1948, p. 133) definition, who claimed that political economy is the science concerned with "the production and distribution of wealth, so far as they depend upon the laws of human nature".

'impulse'" (Schmitt, 1996a, p. 134). If it were true that banks create wealth in form of a net asset simply by double-entry bookkeeping, this would be both miraculous and scandalous. It would be miraculous because banks would be endowed with the power of creating something from nothing – a power reserved to divine beings. It would be scandalous because it would provide banks with an outrageous privilege of seignorage. Luckily, reality is more profane. In reality, every positive sum registered in the bank's ledger is instantaneously balanced with an equivalent negative sum. Bank money is a unit of account and a means of payment; it is not a store of value in the sense that it is valuable in itself. In Schmitt's (2012a, p. 74) terms, "[b]ank numbers are just numbers, and numbers are valueless". Money is merely the envelope of national output. While the envelope is a purely numerical shell, its content is physical.

The solution of reconciling money's immaterial accounting nature with its purchasing power over output lies in the distinction between money and bank deposits announced at the outset of this chapter. While money is the numerical vehicle issued by banks at zero cost and as a zero-sum, bank deposits are the results of this payment that give the income generated by production its monetary form. While money is a flow, a means of payment between economic agents, bank deposits are the objects of that payment, capable of storing purchasing power to the benefit of their owners. As Rossi (2003, p. 345) emphasises, this does not simply mean that money is a 'moving stock'. Bank deposits are stocks existing in continuous time. Money's existence, on the other hand, is limited to an infinitely small dot on the timeline. While this novel distinction may seem pedantic at first, it adds the conceptual precision necessary for a macroeconomic explanation of purchasing power that does not rely upon convenient but vague social contract fictions, such as the fiction of universal acceptability. By firmly linking the process of monetary creation by banks to the process of production, advocates of the theory of money emissions offer an alternative to theories resting on fuzzy explanations.

Returning to the question of endogeneity versus exogeneity of money, we may conclude with Cencini (2001, pp. 76-7) that "the traditional concepts of endogenous and exogenous money are both essentially wrong". The idea underlying the exogenous view is that there exists a stock of money produced and 'pushed' into the economy by some monetary authority. Endogenous-money approaches, on the other hand, believe that the same stock of money is 'pulled' into the economy in order to match the needs of the real sector. Thus, both approaches rest on a stock (or net asset) definition of money not warranted by reality. Post–Keynesians and Circuitists alike agree that the main form in which money exists is bank deposits, and that a bank deposit is a stock that can be created by banks and central banks. Looked at from a physical perspective, bank deposits are merely numbers registered in a bank's software. How is it possible to say that the book-entry that leads to the creation and destruction of bank deposits

is a stock? Is a stock not something physical, an unsold product of some sort? Alas, such conceptual questions concerning the nature of money and bank deposits are not even addressed by post–Keynesian writers. By contrast, advocates of the theory of money emissions introduce a novel way of distinguishing between stocks and flows in economic theory by splitting the operation (payment) from its result (bank deposits). By integrating an accounting analysis of money and payments with a theory of production, Bernard Schmitt and his followers hope to overcome the age-old dualism in economic theory that separates the study of money from the study of the 'real' economy. The relationship between money, income and output can only be fully grasped once production is fully taken into account.

4.2   Income and production

A first problem worth pointing out is that income is an ill-defined concept in mainstream economic theory. The editors of the *New Palgrave Dictionary of Economics* (2008) do not even attempt to define it. According to Barr (2012, p. 102), "the theoretical concept of income is complex and the literature vast". Indeed, the terms 'money' and 'money income' are casually used next to each other in many economics textbooks without clearly distinguishing between the two. Does a worker receive money or money income for his efforts? It does not seem to unsettle economists that they could agree to both terms. At the same time, money is (usually) described as a stock magnitude, while income, saving and investment are described as flow magnitudes. However, why should economics textbooks use two terms if they are largely interchangeable in neoclassical theory? While money is usually portrayed as some sort of net asset that can be created by central banks and/or banks, money income is portrayed as a flow of money deriving from a stock of wealth (ibid.). The stock of wealth is made up of physical and financial wealth, and human capital. If money income is a flow, then how is it possible for the wage earner to store it in his bank account? Would it be correct to state that income is a stock as soon as it 'rests', rather than a flow?
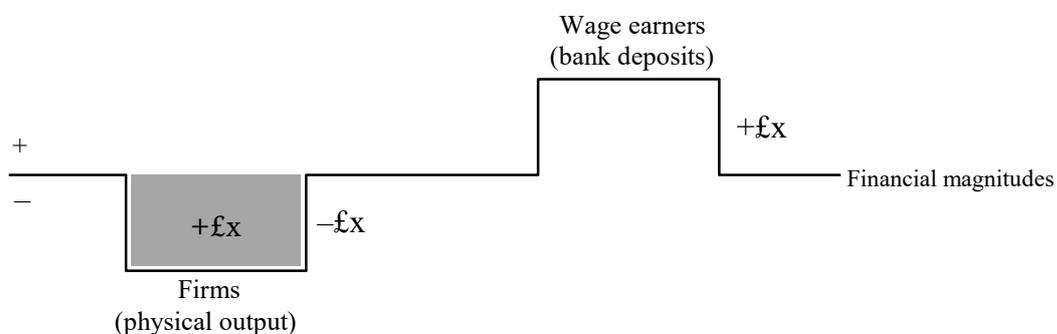
Figure 4.2 The result of an absolute exchange on the labour market.
Source: Rossi, 2007a, p. 42

Understanding the nature of income requires clearly distinguishing it from money and understanding its creation, its transfer and its destruction. At the outset, it is worth mentioning that it is universally accepted – though not consistently followed through – that production creates income. Standard economics textbooks regularly confirm that the total value of output is exactly identical to the total amount of income generated in the economy. An increase in output must therefore simultaneously lead to an exactly identical increase in income. Of course, output is created on the labour market, which is why we must look into the payment of wages in order to understand the emergence of income. Figure 4.1 illustrates the circular flow of money on the labour market. Table 4.2 shows the accounting *result* of a payment of wages on the labour market. We may at this point add Figure 4.2, which clarifies the intimate relationship between bank deposits, income and output.

As soon the firm uses its credit line in order to remunerate the wage earner, the latter receives the purchasing power over his produced output in the form of a positive bank deposit. Hawtrey (1933, p. 41, emphasis added) came very close to describing this process in the same way: "If […] lending is increased, the additional money lent is quickly used by the borrowers [firms] in the production of goods and *becomes* the income of those who take part in producing the goods". Schumpeter (1934, p. 106) notices that, when banks grant a loan to entrepreneurs, this is not "the transfer of existing purchasing power", but "the creation of a new purchasing power out of nothing […] which is added to the existing circulation". The money lent by the bank *becomes* income once it is associated with output on the labour market. The payment of the wage bill refers to the relevant time period within which matter and energy are manipulated by human labour in order to increase the subjective value-in-use for prospective consumers. In case the physical process of production is not yet completed when wages are paid, the bank deposit the wage earner is entitled to corresponds to the value of those financial claims that firms issued in order to finance production (see Schmitt, 1984a, pp. 94-105). From the fact that income and output are stock magnitudes (meaning simply that they have a positive duration in time), and output and income increase (and decrease) in lockstep according even to orthodox economic theory, it follows that the wage payment gives rise to both a new output and a new income defining the purchasing power corresponding to said output.

Questions now immediately arise in the alert mind concerning the nature of exchange between income and output. According to the traditional circuit of income and output expounded in neoclassical textbooks, the payment of wages defines the exchange of households' productive services against (pre-existent) income held by firms. This raises at least two questions. The first question concerns the difference between labour and output, which is the difference between a time-consuming process and its result. Indeed, it may be *legally* correct in many cases to state that firms purchase labour services on the labour market, as

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the wage payment is not tied to a specific result.[13] However, it can hardly be denied that, from an *economic* point of view, the firm receives the fruits of the wage earners' productive services. What is in fact exchanged on the labour market is therefore the *result* of labour, and not labour itself. Labour is no commodity, and wages are therefore not the price of labour, as labour is only insofar the object of a payment as it is identified with output. The second question concerns the pre-existence of income that is more or less explicitly assumed in neoclassical theory. As shown in Table 4.2 and Figure 4.2, the income received by the wage earner does not exist before the wage payment takes place. Indeed, it follows directly from national income accounting that a *new* macroeconomic output must be accompanied by a *new* macroeconomic income. As output is undoubtedly created on the labour market, and income and output define the two sides of an accounting identity, income cannot possibly exist before the wage payment takes place.

Once it is acknowledged that income cannot precede the wage payment, we may ask if output can precede it. If this question was put to a physicist, the answer would be clear. A physicist would flatly reject the notion of 'creating' entirely new objects, drawing on the laws of thermodynamics and Einstein's theory of the equivalence between matter and energy. For the physicist, all the matter and energy necessary for the production of goods and services already existed before the wage payment took place. However, we are concerned with economic theory, where 'creation' and 'destruction' of output are useful and indeed necessary concepts. To wit, it is the payment of wages that turns the physical process of production into a macroeconomic process, namely by identifying the output produced with a sum of money vehiculating the exchange. Only once physical output is associated with money issued by the banking system do the jumbles of atoms and molecules receive a common *economic* dimension, turning them into *economic* output and therefore into an object of *economic* research.

> "Thus, the macroeconomic nature of every single instance of production follows […] from the fact that each single payment of wages increases the amount of national income currently formed. It is thus clear that both the concept of 'net output' and of 'macroeconomic event' would not be possible if production were considered only as a physical process and if bank money were not identified with a dimensionless entity (a purely numerical form)". (Cencini, 2005, p. 123)

It follows that income *and* output are created and exchanged the instant the wage payment takes place on the labour market. According to Schmitt (1972, p. 143), the substance of the new income theory can be conveyed in the sentence: "*Firms do not lose money incomes gained by factors of production*". One is bound to

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[13] This is the case in Swiss law.

notice this peculiar conception of this exchange, which has been coined 'absolute' by Bernard Schmitt, in contrast to the notion of 'relative exchange' that still dominates economics textbooks. Let us expand on the nature of this absolute exchange.

As we have seen, banks issue the *means* of payment necessary to settle the wage bill. The *object* of the payment is made up entirely of the output created through production. Income, being identical to output, is output's *alter ego*. In Cencini's (2005, p. 120) words, "output and income are the result of the same process, the dual side of the same coin". This means that a payment on the labour market does not define the exchange of two distinct objects that exist before and after exchange takes place. Instead, a wage payment is "a transaction through which output is *changed* into a sum of money income" (ibid., p. 121). Looked at from a purely nominal perspective, the wage earner's positive bank deposit (+£x) is perfectly balanced by the firm's negative deposit (–£x). However, the firms' debt "is compensated for instantaneously with the physical output deposited in their inventories" (Rossi, 2007a, p. 42), meaning that the wage payment has caused an increase in net wealth for the national economy as a whole. What has been gained by the wage earner was not lost by the firm, which is why the payment of wages defines a net increase of output for the economy as a whole (see Schmitt, 1960, p. 64). This is the reason why, *sensu stricto*, it is not the firm that pays the worker. Because every payment must be financed with income, and the workforce provides the income necessary for payment, the workers in fact pay themselves when they receive their wages (Schmitt, 2012a, p. 82).

Let us reiterate that it would be wrong to claim that income and output are two separate objects. Adding the value of the newly created income to the value of the newly created output would force us to believe that the value generated in a production period equals two times GDP. The absurdity of this proposition bears witness to the fact that income and output are indeed not two separate objects, but the two sides of one and the same reality. Every payment of wages thus creates the output as well as the entire purchasing power necessary to finally purchase the output available on the product market. In monetary production economies, firms do not pay their workers with products, as it may happen in barter economies (if ever such a society existed historically). Instead, firms must ask a third party – a bank – for its IOU in order to remunerate the wage earner. The firm will have to return the bank's IOU in due time, forcing it to finally sell its output, thereby recovering the bank's IOU paid out earlier to workers. As Schmitt (1972, p. 144) states, "the purchasing power of these bills cannot be smaller than the real output of the labor force paid in money".

Note that the wage payment does not constitute a *final* sale of output. When workers are compensated for their labour services, the firm's debit is compensated for with the products they receive. The firm is not the final owner of the stored

output. In order to repay their debt to the banking system, the firms must sell their output on the product market, thereby recovering the banks' IOUs they took out when remunerating labour. The workers, on the other hand, receive the monetary definition of their output, which grants them the drawing right over that very output.

Let us pause here for a moment and recapitulate what has been proposed so far. First, money is a flow that vehiculates exchange, and it is issued as an asset–liability by banks every time a payment is carried out. The money flow originates from the bank, passes through the payer and the payee respectively, only to end up again at its point of emission. While money is a bank's acknowledgment of debt supplied to economic agents at virtually zero cost, purely nominal money is transformed into real money (income) once it is associated with output on the labour market. When wages are paid, income and output emerge as the dual aspects – numerical and physical – of the same object, thereby confirming the identity already upheld today by traditional national income accounting. Income is deposited on the bank's liability side in the form of a positive bank deposit. The wage earner's bank deposit is perfectly balanced by the firm's debt, registered on the bank's asset side, and containing the output resulting from production.

Now, if income theory allows new income to be created alongside production, the opposite operation – consumption – must logically lead to its destruction. Alas, this is not the case in modern economics textbooks. Indeed, neoclassical income theory suggests that income is *transferred* from firms to wage earners on the labour market, from savers to investors on the financial market, and from consumers to firms on the product market. In Schmitt's (1972, p. 141) terms, the traditional theory in neoclassical textbooks "may be summed up in a single sentence. *Firms transfer value to factors of production*". In this circular 'chicken-and-egg theory of income', the net creation and destruction of income for the economy as a whole must necessarily remain a mystery (see Baer, 2012, p. 261). If it is agreed upon that production entails the creation of income, but income is conserved when spent on product markets, it must be obvious that income will accumulate over time indefinitely. Clearly, if income is created by production, it must be destroyed by consumption. The traditional circuit of income is thus in need of a fundamental revision.

Only when combined with a consistent theory of production does monetary theory fall into its proper place. This, of course, is the weakness of neoclassical theory that has ultimately given rise to the dichotomous 'real versus monetary' view of economic reality. In neoclassical theory, production – the so-called 'real' side of the economy – is modelled using a Cobb–Douglas production function, which explains output (Y) as a function of labour (L), capital (C) and total factor productivity (A). Thus, the formation of output is explained in real terms, excluding money from the analysis entirely. The input factors – labour and capital

– pertain to the same conceptual level; no hierarchy is established between them, although real capital is clearly a result of human labour, not the other way around. The money supply (*M*), on the other side, is modelled as a function of high-powered base money, provided exogenously by central banks, and some money multiplier mechanism. If this dichotomy were accurate, the real and the monetary sides of the economy would indeed be determined separately, and the only task for monetary economists would be to mechanically adjust the money supply to the pace at which the real economy produces goods and services by tweaking reserve requirements and fiddling with interest rates.

However, this is not how money and output are created in reality. As for the monetary side, by now even the monetary specialists of the Bank of England (McLeay et al., 2014, p. 2) concede that the money multiplier "is not an accurate description of how money is created in reality". Similarly, economists at the Bank for International Settlements state that "the concept of the money multiplier is flawed" (Disyatat, 2010, p. 2). Almost three decades of monetarist experimentation have forcefully demonstrated that no monetary aggregate – not even M0 – can be directly controlled by the central bank (Rochon and Rossi, 2007, p. 4). Central bank reserves are not necessary for commercial bank lending. A number of countries has abandoned reserve policy altogether (ibid., p. 5). Also, the abandonment of central bank money would not lead to the vanishing of bank money, as the money multiplier would suggest. In reality, money is not introduced exogenously into the economy like manna from heaven. Luckily, the consensus view has moved away from the hopelessly primitive views of 'helicopter money' championed by Milton Friedman (1969, pp. 4-5) and his disciples. The new consensus view increasingly attempts to integrate the endogeneity of money by making bank lending more elastic. At the policy level, monetary targeting has been replaced in many countries with some form of inflation targeting regime (Schuberth, 2015, pp. 351-2).

Turning back to banks' monetary intermediation process and its relation to production, money enters the stage when banks carry out payment orders for their clients. These payments have a definitive object with which they are associated. When a payment occurs on the labour market, money is integrated with a newly created output, thereby giving output a common economic measure. With respect to the real side, output (measured in currency) is not the mathematical product of labour (measured in labour time units), capital (measured in currency) and total factor productivity (no meaningful unit of measurement). As is well known, creating a relationship between the factors of the Cobb–Douglas function rests on the unwarranted assumption that their dimensions can be made homogeneous. In this approach, a quantity of labour and quantity of capital are 'mixed together' in order to produce a quantity of output. This conjuring trick is achieved simply by assuming that labour and capital can be made homogenous. As Hicks (1973, p. 178) states with respect to this problem: "The equipment, of course, is

heterogeneous. This has often been thought to be a difficulty, but – as is common practice, a practice that has been followed in this book – I shall assume it away". While it is perfectly legitimate and indeed necessary to operate with assumptions in any science, and the validity of these assumptions is always to some extent based on their acceptance among academics, it is important to point out the consequences of those assumptions for the quality of the theory. Indeed, it can hardly be doubted that, in reality, output is made homogenous through its monetisation by banks. By assuming away the problem of physical output's heterogeneity, the fundamental role of the labour market as the institution in which money and output are integrated is wiped out of the picture. As pointed out by Cencini (2001, pp. 104-5), "[t]he heterogeneity problem is the first that our science needs to tackle. Classical as well as neoclassical economists are perfectly aware of this fact, as shown by the importance they give to the search for a consistent theory of value". Needless to say, this diagnosis is not restricted to the Cobb–Douglas production function, but applies to any type of production theory that expounds a functional relationship between different factors of production and output.

In reality, the wage payment creates simultaneously both the product and its monetary form. Homogenisation is thus achieved through the integration of money and output on the labour market; no assumption is needed where a reality-driven explanation is at hand. As novel as this approach may seem, it was already suggested – though not consistently followed through – by Keynes (1936/1973, p. 41) in his *General Theory*. By defining the wage unit as the fundamental unit of measurement in macroeconomics, Keynes managed to sketch out a highly original *monetary* theory of production that solves the problem of heterogeneity without resorting to unrealistic and highly distorting assumptions.

> "In dealing with the theory of employment I propose […] to make use of only two fundamental units of quantity, namely, quantities of money-value and quantities of employment. […] We shall call the unit in which the quantity of employment is measured the labour-unit; and the money-wage of a labour-unit we shall call the wage-unit."

Because it is the wage payment that transforms physical output into its numerical form, wages are indeed the predestined unit of measurement in macroeconomics. The widespread idea that Keynes failed to integrate the monetary and the real sectors of a closed economy is only true if Keynes's contribution is reduced to the neoclassical interpretation of the *General Theory* (see Mundell, 1976, p. 66). His twin claims that labour is the sole factor of production, and that the essential unit of measurement in economics is the wage unit, have both been lost owing to the encrypted and forbidding style of his work. Keynes's choice of units is theoretically sound, as the payment of wages logically precedes the formation of profits or the payment of rent or interest, which is why the wage unit is indeed the

primary measure of value in economics. The operation that gives rise to new money income also gives rise to output. Money is the vehicle enabling this absolute exchange, which is why every theory of production must necessarily entail a monetary theory, and *vice versa*. In Schmitt's (1972, p. 151) own words, "[i]ncome is not due to the spending of money by firms, but to the spending of effort by workers". Keynes's (1933/1973, pp. 408-11) early intuition of attempting to combine the monetary and the real side in a "monetary theory of production" was – although still burdened with the intellectual heritage of Marshallian analysis – to the point. Divorcing the pure science of economics from monetary theory means performing Hamlet without the prince.

An economist might plausibly enquire why this analysis is supposed to be *macro*economic. This is so because production creates an entirely new net output available to the national economy as a whole (Cencini, 2005, p. 123). The output (income) created by the wage earner is not taken from anyone else; it is no zero-sum for the national economy as a whole. Indeed, any agent willing and able to spend his or her income or draw on a consumer loan can purchase the output available on the product market:

> "Each singular 'monetized' output is therefore a *net* product, since the positive formation of the new income – resulting precisely from the association between money and output – is not counterbalanced by any negative formation of income." (Cencini, 2005, p. 123)

Once output is consumed on the product market, income and output are brought together and finally destroyed in an operation defining another absolute exchange, thereby reducing the amount of output and income available in the economy. Stating that wage earners' incomes define the purchasing power over produced output does not mean that wage earners are able to purchase the entire output. "Workers and, in general, the public's real drawing rights are constrained whenever microeconomic prices stand above factor cost" (Schmitt, 1972, p. 148). In this case, firms make a profit, which is to say that part of the wage earners' incomes are transferred to the firms' benefit as soon as prices are marked up over and above factor costs.

It is obvious by now that the theory of money emissions forces us to reconsider the way production and income are understood. Value theory, which is concerned with the relationship between physical output and numbers, is the place where theories of money and theories of production meet. Followed through, the theory of money emissions firmly establishes human labour as the unique source of macroeconomic value (Cencini, 2001, p. 28), thereby confirming and deepening Keynes's (1936/1973, pp. 213-4) intuition that "[i]t is preferable to regard labour […] as the sole factor of production". This is not intended as a step back to the classical labour theory of value, which argues that economic value is materialised

labour, and that the value of output grows in proportion to the amount of labour 'contained' in it. To be sure, the classical labour theory of value has obvious flaws that led to its well-deserved demise at the end of the nineteenth century. Nor does the novel quantum-theoretical approach intend to belittle the important roles played by capital and land (or nature in general) in assisting the production process carried out by human labour. However, it cannot be denied that both consumer and capital goods result from labour. The existence of profits and rents necessary to remunerate capitalists and rentiers requires the prior formation of wages that can be spent on the market for goods and services. It cannot be seriously doubted that profits arise on the product market, and that the labour market logically precedes the product market. While capital is a commodity that can be purchased, labour is remunerated. The wage payment is the primordial phenomenon in economic theory, as it necessarily precedes the final spending of income and the formation of profits. Economic value is neither simply a measure of the utility and/or scarcity for economic agents, nor is it the materialisation of labour.

Following Cencini's (2012b, pp. 42-3) example, consider an economy in which a certain amount of cars are produced. The total wages paid to all workers manufacturing the cars amount to 100 wage units. The value of the cars exactly and objectively equals 100 wage units, *independently of the subjective utility consumers experience from using the cars or the scarcity of the required raw materials or labour services*. The wage payment that integrates money and output establishes a numerical equivalence between the output and the macroeconomic costs incurred through its production. It is meaningless to state that the wage units are 'valuable' without the existence of output, or that output in itself is 'valuable' without the existence of wages. Instead, modern monetary macroeconomics shows definitively that *value is a relationship* established by the christening of output with money (Schmitt, 2012a, p. 74). Value is not a relationship between output and the subjective needs of consumers, neither is it a relationship between output and scarcity or the physical trouble with which it was produced. Instead, the term 'value' describes the relation of bank numbers with output.

At a higher level of abstraction, it is necessary to introduce time into production and monetary theory in an entirely new and unusual way. As is well known, integrating time satisfactorily into economic modelling has occupied the greatest economists' minds throughout the history of our science. The Classics struggled with the concept of labour time. Marshall (1948, p. ii) famously believed that "the element of time […] is the centre of the chief difficulty of almost every economic problem". Bortis's (2003) integration of Keynesian short-run analysis with classical long-run (Ricardian) analysis into a classical–Keynesian political economy can be interpreted as an attempt to integrate two time dimensions into one coherent economic framework. Time plays a central role in Böhm-Bawerk's (1959) capital theory, and there is an on-going and conscious effort to integrate

time into models of equilibrium (see, for instance, Diamond, 1994). Mainstream economics textbooks often divide the chapters into "The Short Run", "The Medium Run" and "The Long Run" (see Blanchard, 2009, p. 5). Time and uncertainty are also the cornerstones of post–Keynesian economics (see Fontana, 2009). In contrast to other conceptions of time in the different schools of thought – including heterodox schools – the theory of money emissions rejects the assumption of continuity of time in favour of a quantum theoretical approach. To be sure, the difference between continuous time and quantum time is not merely poetic, and it is necessary to spend some words on it.

It has been established in this chapter that the *physical* process of production needs to be strictly separated from the *economic* process of production. From an economic point of view, output and its numerical *alter ego*, income, emerge only once wages are paid. Before the wage payment, output is just a heterogeneous heap of material, not yet integrated with money and therefore devoid of economic value properly understood (though not necessarily devoid of value-in-use). As the wage payment is an instantaneous operation, production itself is an instantaneous operation from an economic point of view. While production is an instantaneous flow that occurs together with a monetary flow on the labour market, it is also true that the wage payment refers to and measures a finite period of time during which production takes place. In Cencini's (2005, p. 122) words, "if production is a flow it must necessarily be a quantum flow, since if a finite period of time is covered instantaneously this can only mean that it is emitted as an indivisible span of time: a quantum of time". The wage payment defines an absolute exchange between output and income and simultaneously a quantum of time. Income *is* output – its monetary definition – and output is issued as a quantum of time: "At the very moment an income takes the place of physical output […], a period of time […] is thus issued as a quantum" (Cencini, 2005, p. 125). A comparison of the physical and economic creation of a pair of shoes will help to clarify the analysis (Figure 4.3).

From the physical perspective, it is possible to regard the production of a pair of shoes as a function of time. Note that it is necessary to assume the homogeneity of output in the graph on the left of Figure 4.3, in accordance with neoclassical custom. This means that it is supposed to be useful to propose that one unit of shoes and one unit of sugar have a common economic dimension, and consequently are commensurable quantities of output. Also, it means that an infinite amount of such units of output exists, so that the increase in production can be modelled with a continuous and differentiable curve. If these venturous assumptions are accepted, each additional second will increase the 'shoeness' of the pair of shoes (for lack of a proper dimension), until finally, the pair of shoes in question is complete. The becoming of a pair of shoes can therefore be modelled with some sort of upward sloping curve, the slope of the curve indicating the 'velocity' of production. In each infinitesimally small fragment of time, it is then

possible to determine this 'production velocity' by applying the standard tools of calculus developed in the seventeenth century by Gottfried Leibniz and Isaac Newton. The analogy between economics and classical mechanics seems to be complete.

If production is analysed from an economic perspective, the comparison with classical mechanics breaks down. Here, the production of economic output falls together with the payment of wages, which is an instantaneous operation. By issuing money, the banking system supplies the economy with the necessary unit of account that measures the pair of shoes produced by the workforce. Before the wage payment, the shoes do not exist at all *economically*. That is, they do not form a part of GDP, and no income corresponds to them. From an economic perspective, the production of output therefore cannot be modelled as a function of time. Instead, no more than an instant is necessary for the production of output. The assumption of continuous time is thus rejected and replaced by a pixelated image of the economy. Instead of describing production as a process occurring in continuous time that ultimately creates output, production is said to "quantize time; that is, *to capture instantaneously a slice of continuous time*: the first result of production is therefore the definition of a quantum of time. Output is not deposited in time; it *is* time" (Schmitt, 1984a, cited and translated by Cencini, 2001, p. 116).
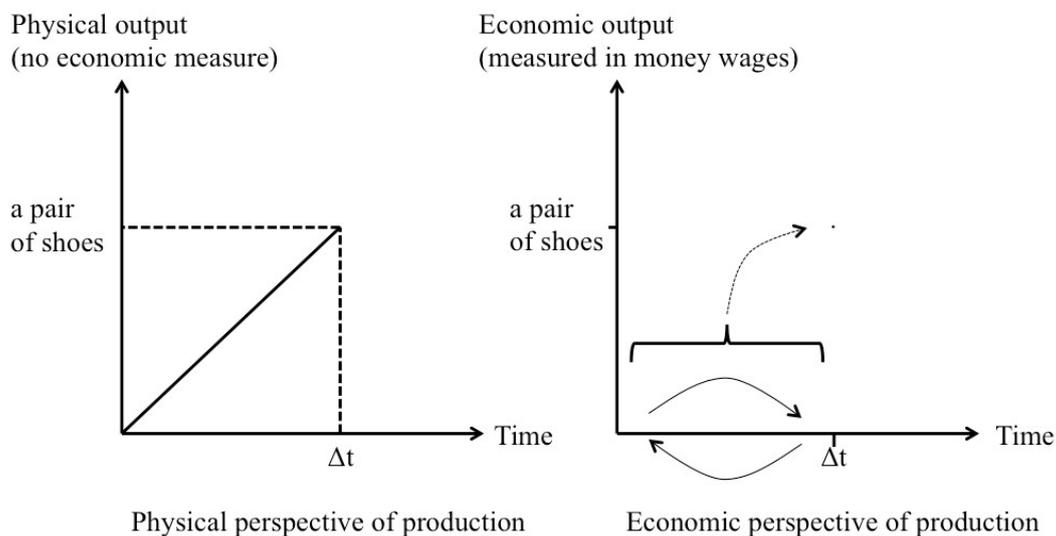
Figure 4.3 The production of a pair of shoes.
Sources: adapted from Cencini, 2001, pp. 109-10 and Cencini, 2005, p. 124

Consumption – the opposite operation with respect to the wage payment – also defines an instantaneous event, causing the economic destruction of output and income through an absolute exchange: "*While physical consumption entails the 'disappearance' of physical output, economic consumption entails the 'disappearance' of economic output*" (Cencini, 2005, p. 128). Just as a vehicle has

its content, a payment has its object. In the case of consumption, the content is the output consumed by households. Thus, the same output – and therefore the same quantum of time – is the object of two emissions of money. The first emission leads to its creation, the second emission leads to its destruction. Again, the quantum theory of money emissions abstracts from physical accidentals and insists on a purely economic treatment of consumption: "This means that consumption – the final purchase of output – is an instantaneous event that, despite taking place at a different point in time with respect to production, coincides retroactively with it" (Baranzini and Cencini, 2001, p. xiv).

Note in passing that the notion of 'income destruction through consumption' (in contrast to 'earning through spending') defeats the theory of the income multiplier that still contaminates economics textbooks. According to the theory of the income multiplier, spending an income on any market conserves that very income and thus eventually multiplies the original income. The multiplier thus rests on the crucial assumptions that consumption conserves incomes, and that savings do not exert a positive demand on output (see Cencini, 2005, p. 127). The first assumption is self-contradictory, as the neoclassical point of view is that production creates new incomes. If this is true, the opposite operation – consumption – must logically lead to income's destruction, not to its conservation. It is an evidence of incapacity that neoclassical theory purports to explain the creation of income through production, but fails to explain at which point income is destroyed – although the solution is quite obvious. The second notion is inconsistent with the neoclassical claim that savings and investment are *ex post* identities. If this is so, then all the saving in the economy is necessarily spent on investment, and it would surely be wrong even according to neoclassical theory to state that investment does not exert a positive demand. For a more thorough refutation of the multiplier see Schmitt (1972), Cencini (1984), and Gnos (2008).

If the analysis of production and consumption is carried further still, it appears that production and consumption are the twin aspects of a single emission, as both production and consumption are emissions capturing the same quantum of time. This means that, in quantum time (in contrast to continuous time), production and consumption coincide: "Consumption defines in fact, negatively, the same income specified, positively, by production" (Cencini, 2005, p. 129). Thus, the object of economic analysis is not production of output followed by its ultimate consumption, but a unique operation of production-consumption (Schmitt, 1984a, p. 447).

This treatment of time in economic analysis is admittedly counter-intuitive and will appear unnecessarily 'philosophical' to a reader unfamiliar with this line of reasoning. However, the relevance and rigor of quantum mechanics has been an undisputed fact for many decades and has led to significant new insights in physics. The wide-ranging consequences of quantum mechanics greatly troubled

those physicists involved with its development. It was clear from the very beginning of quantum mechanics that the notion of quanta would have considerable repercussions in most other sciences. Having said this, quantum analysis in economics – while it benefits from the insights of quantum physicists – does not try to emulate physical models. Economics is not physics. The primary objects of research in economics are production, exchange, money and income. These are objects that transcend the realm of physics, and understanding them requires a science with its own research methods.

4.3   Capital and time

Quantum time is an important aspect of macroeconomic theory that enables a fresh interpretation of capital and time. As has been made clear above, the very moment wages are paid to wage earners, income is created and lent to the firm in order for it to finance the initial (as opposed to final) purchase of current output in form of a stock. Wage earners are now entitled to a bank deposit, which is the financial claim over a part of current or future output. This is the first form of capital – best called *capital-time* according to Schmitt (1984a) – which exists both in real and in financial terms. In real terms, capital-time refers to the stock of products firms hold ready to finally sell on the product market. In financial terms, capital is the income created by wage earners and lent to firms in order for the latter to finance their production costs. We are thus well-advised to quote Hicks (1974, p. 309):

> "If it is capital in the volume sense that is being measured, capital is physical goods; but in the value sense capital is not physical goods. It is a sum of values which may conveniently be described as a Fund."

As soon as wage earners decide to spend their income, income and output enter a renewed absolute exchange on the product market and are consequently destroyed economically. Thus, this first form of capital in the form of capital-time defines a reversible transformation of income (Cencini, 2005, p. 135).[14] Let us point out that capital-time has a positive existence in chronological time, though not in quantum time. As production and consumption are the positive and negative aspects of a single emission, income is created and destroyed simultaneously in quantum time.

The second category of capital is related to the formation of profits and is called *fixed capital* by Schmitt (1984a). Importantly, the purchase of fixed capital requires the formation of profits on the product market at some point. This profit can be advanced – in the form of an operating loan if the firm does not yet own

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[14] This first form of capital ought not to be called "circulating capital", as every act of production leads to the creation of an entirely new capital (Cencini, 2001, p. 124).

the funds necessary, in which case banks can forward a purchasing power to the firm – or already earned with the sale of goods or services on the product market. In quantum time, the formation of income and its final spending on capital goods coincide. Firms cannot create purchasing power without the workers' labour services; the only way firms can capture part of wage earners' income is by selling their products with a mark-up on the product market, thereby realising a profit, or by taking out a loan – which they will have to pay back sooner or later with profits. That part of profits not distributed to capitalists for consumption purposes, but spent on fixed capital, is called *macroeconomic saving* (Cencini, 2005, p. 139). Indeed, if quantum analysis is applied consistently, it appears that all purchases of fixed capital must be financed with undistributed profits. Macroeconomic saving corresponds to the sacrifice a society must make as it diverts its labour force away from the production of consumer goods to the production of fixed capital: "A stock of consumption goods is the prerequisite for the production of capital goods" (Cencini, 2005, p. 140). In order to provide the workers in the capital goods sector with consumer goods, firms in the consumer goods sector must capture a part of wage earners' incomes by marking up prices above factor costs, thereby keeping back that part of produced output corresponding to profits. The purchasing power lost by workers in the consumer goods sector to the benefit of their firms is then transferred to workers in the capital goods sector, who now own the purchasing power over those consumer goods still stored in firms' warehouses.

What is particularly remarkable about the payment for capital goods is the fact that, unlike in the consumer goods sector, the workers in the capital goods sector do not receive the purchasing power over their produced output. Instead, the firm making the investment directly appropriates the output produced in this sector. Production and consumption of capital goods thus fall together within a single payment. By contrast, if a firm in the consumer goods sector remunerates its worker from a circulating wage fund accumulated thanks to marking up its prices in the past, the wage payment gives rise to a new income and an output that can be bought by the wage earner on the product market at a later point in time. This is not the case when the wage fund is used for the purchase of capital goods. Here, the new output produced on the labour market is immediately appropriated on the product market by the investing firm. The wage earner's bank deposit is therefore empty. However, the emptiness of the wage earner's deposit remains undetected as it is immediately 'filled up' with that part of consumer goods firms were unable to sell to wage earners owing to the marking up of prices over factor costs. Therefore, "despite the fact that the investment of profits 'empties' wages of their real content, it does not immediately lead to a monetary disorder" (Cencini, 2001, p. 203).

The pathological effect of this payment of wages using pre-existent income only surfaces once capital goods are replaced and repaired with amortisation goods.

While the novel explanation of profits, capital and interest is one of the theory of money emissions' strengths, its significance lies outside the scope of this thesis. The process was first fully described by Schmitt in his 1984 book *Inflation, chômage et malformations du capital*. In it, Schmitt explains how capital goods are appropriated by a set of disembodied firms, generating empty deposits that are then spent on consumer goods. The extra profits resulting in the consumption goods sector are consequently invested, giving rise to a pathological capital. This new analysis allows us to approach the age-old illnesses of the economic system – inflation and unemployment – in an entirely new way.

4.4   Equilibrium and identity

Virtually all economic theories taught at universities around the globe today rest on the concept of equilibrium. The theory of money emissions marks a notable exception to this rule. Instead of resorting to equilibrium analysis, the theory of money emissions relies on accounting identities, which derive not from behavioural relationships, but directly from the double-entry bookkeeping nature of modern bank money (Cencini, 2005, p. 279). This has far reaching implications for the definition and focus of macroeconomics as a science proper. Instead of being concerned with human behaviour and incentives that bring about (dis)equilibria in different markets, the theory of money emissions is concerned with the monetary-structural framework within which economic agents make their decisions. To the modern economist used to a huge diversity of topics, the theory of money emissions' focus may appear narrow. To be sure, Lionel Robbins's (1932) by now widely accepted definition of economics as the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses has opened up the gates to a seemingly unlimited field of research for neoclassical authors. Adherents of the theory of money emissions narrow down this definition, stating that economics in general is the study of production and exchange, while macroeconomics is "concerned with what we may call the monetary organization of the economy" (Cencini, 2005, p. 280).

What this means can be explained by clarifying the identity between macroeconomic supply and macroeconomic demand. Supply is made up of a nation's current output. Supply is thus the result of the production taking place within a given period of time. Without its association with money on the labour market, output would remain fundamentally heterogeneous, and macroeconomics would lose the common standard necessary for quantitative analysis. Wages and prices could not exist at all, and economics would be bereft of its objects of research. Luckily, money's existence is a reality confirmed every time banks issue it as an asset–liability for the economy as a whole. From a macroeconomic point of view, the total cost incurred by the economic system is identical to the remuneration of the factor of production – labour – within that economy. When

inter-firm payments are cancelled out within an economy, it becomes immediately obvious that all production costs in an economy are ultimately wage costs. It follows that "macroeconomic supply is unambiguously expressed by the total amount of wages paid, directly or indirectly, to all the workers whose activity is socially recognized as being productive" (ibid., p. 282).

Let us focus on the contentious concept of demand. *Micro*economic demand can be said to be a psychological condition of economic agents, relying on such subjective and non-numerical concepts as 'willingness' or 'desire', combined with a potential purchasing power in the form of cash in pockets. This kind of *potential* demand, though impossible to measure exactly, exists as a mere possibility before transactions take place. As Alfred Marshall (1948, p. 39) pointed out in this regard, "[w]e cannot indeed measure motives of any kind, whether high or low, as they are in themselves: we can measure only their moving force". Currently, a microeconomic conception of demand is still being used in macroeconomics textbooks when it is stated that saving and investment are *ex post* accounting identities. *Ex ante*, it is said, saving and investment can diverge, as people's *willingness* to save (invest) can exceed the actual amount of saving (investment). Thus, a numerically exact monetary relationship is turned into a vague behavioural relationship for the sake of equilibrium analysis. However, everyone would agree that realised demand is not the same as potential demand. *Current demand is determined by the amount of income available in the economy*. Thus, macroeconomic demand is determined independently of individual agents' will. It does not matter if economic agents are more or less willing to spend their income in order for it to exert a positive demand. To wit, what is not spent on the product market is lent on the financial market to firms that have not yet been able to sell their goods and services. This does not necessarily mean that everything produced can immediately be finally sold. It is certainly true that, as long as income is not spent on the product market, some firms will be unable to sell some of their goods and services. It is also possible that, if income holders decide, for whatever reason, to spend a smaller part of their income and to save more, some firms may come under pressure and reduce their productive activities, eventually resulting in unemployment. Income saved is the result of the payment of the factors of production, increasing firms' net indebtedness toward the banking system and giving rise to a new output. As long as this income is not finally spent, all of it is lent via the banking system to those firms that need to finance their production costs. In contrast to the loanable funds theory, the decision to lend the wage earners' income to indebted firms does not have to be made by economic agents. Rather, it is a consequence of money's two-sided accounting nature. Because all income is deposited in banks, it is mechanically lent to firms in order to finance production. Because of this, it would be erroneous to state that saving (or 'hoarding', for that matter) reduces current demand. The wage payment that defines economic production gives rise to output (supply) and income (demand) as the two sides of the same coin.

Economists familiar with the history of economic thought will immediately recognise Say's law in the above passage. Indeed, the theory of money emissions provides theoretical support for the validity of (a version of) Say's law. Sowell (1972, p. 4) captures the essence of Say's law as follows:

> "The basic idea behind Say's law is both simple and important. The production of goods (including services) causes incomes to be paid to suppliers of the factors (labour, capital, land, etc.) used in producing the goods. […] An increased supply of output means an increase in the income necessary to create a demand for that output. Supply creates its own demand."

Arguably, the reason why classical as well as neoclassical authors struggled with Say's law lies in the flawed definition of income (demand) and output (supply), the very cornerstones of economic theory. As Sowell (ibid., p. 119) points out cogently, the Classics suffered from the same deficiency, as they had no generally accepted definition of supply and demand. Because of this conceptual weakness, it was inevitable that there were many unproductive debates and different interpretations on the validity of Say's law. As long as income (demand) and output (supply) are not defined rigorously and consistently, economists will continue fruitless debates on whether Say's law holds or not. Neither neoclassical economists nor Keynes were able to loosen this Gordian knot: on the one side, Keynes famously stated that income (Y) is identical to the amount spent on consumption goods (C) and investment goods (I). If this proposition is taken seriously, it would undoubtedly confirm Say's law, as demand is defined by the total income available in the economy. However, it is a well-known fact that one of Keynes's main intentions in his *General Theory* was to refute Say's law. He attempted to do this by resorting to the concept of hoarding, which "may be regarded as a first approximation to the concept of liquidity preference" (1936/1973, p. 174). By introducing the concept of hoarding, Keynes tried to show that part of income can 'leak' out of the circuit and thereby drain demand from the system. Keynes's income theory and his treatment of identities leaves much to be desired, as Samuelson (1946, p. 1529) pointed out:

> "Moreover, there is reason to believe that Keynes' thinking remained fuzzy on one important analytical matter throughout all his days: the relationship between 'identity' and functional (or equilibrium-schedule) equality; between 'virtual' and observervable movements; between causality and concomitance; between tautology and hypothesis."

Alas, the notion of hoarding so central to Keynesian (and post-Keynesian) theory suffers from fundamental flaws that become apparent as soon as money's accounting nature is enunciated. If hoarding is identified with saving (in the form

of physical banknotes, coins or bank deposits), it must be immediately obvious that Say's law still holds even according to Keynes's own theory. The identity of saving and investment advocated by Keynes (1936/1973, p. 81) himself clearly implies that every penny saved is immediately invested and thus exerts a positive demand on the financial market. His logical identities thus cannot be reconciled with his notion of hoarding. Keynes (1980, p. 273) seemed to realise this himself: "If an individual hoards his income […] by keeping a bank deposit, this bank deposit is not withdrawn from circulation but provides his banker with the means of making loans to those who need them". While he argued that saving and investment are always logically identically equivalent, he also wrote that an autonomous increase in investment will induce savings to adapt until they are made equal (1936/1973, p. 184). Despite his immense talent for economics, Keynes was therefore not able to offer a consistent and intelligible solution to the question of Say's law. As Cencini (2012a, p. 202) clarifies with respect to Keynes's attack on Say's law, his opposition was in fact confined to the idea that apparently derives from this law, namely that economies tend to a full-employment equilibrium. The principle according to which all savings are necessarily invested was already known before Keynes's *General Theory* appeared, as a passage by Hawtrey (1933, p. 10) makes clear:

> "The national income of [Britain] is estimated at £4'000 millions, or say £11'000'000 a day. That means that the total demand for goods and services of all kinds averages £11'000'000 a day. But, it may be asked, do not people save a part of this. Indeed […]. But what they save is directly or indirectly spent. For money is spent on fixed capital, such as houses, railways, industrial plant, etc."

Because all savings are lent via banks and non-bank financial intermediaries, total demand in terms of income must be identical to total supply in terms of output. This should come as no surprise at this stage, as income and output are the twin effects of the production monetised when wages are paid on the labour market. The definition of income and output as the dual sides of the same phenomenon can be interpreted as reconciliation between supply- and demand-side economics. In fact, it is true that demand creates its own supply, just as it is true that supply creates its own demand. A macroeconomic analysis of payments shows that, defined correctly, *supply and demand are the twin results of the same operation*. In other words, supply and demand create each other, as they are the two necessary components of every payment. From a macroeconomic viewpoint, the search for causalities is therefore in vain, as supply and demand are the two indivisible sides of the same operation, an operation measured by a singular sum of money units. The identity between supply and demand does not require any micro-foundations; it does not depend upon certain altruistic or egoistic patterns of behaviour or upon a competitive environment. Instead, it is the result of the macroeconomic nature of every single act of production.

4.5   The role of banks

Banks offer a wide array of services, many of which can be carried out by non-bank financial intermediaries just as well. Two functions of banks are relevant to a monetary, macroeconomic analysis. First, banks issue money and thereby carry out payments for their clients (monetary intermediation). Secondly, banks make loans and collect deposits (financial intermediation). This distinction was already made by Fischer (1983, p. 4), although in the reverse order: "Banks do two things in this economy. First, they act as financial intermediaries. […] Second, they provide transaction services, making payments as demanded by the households". What distinguishes banks from non-bank financial intermediaries is their capacity of carrying out payments for their clients. As explained by Rossi (2007a, p. 33), "banks, and banks only, can carry out transactions services for the non-bank public through their being able to issue the means of final payment". Non-bank financial intermediaries are also capable of transferring and storing money balances. However, as the creation of bank deposits through monetary intermediation is logically prior to their transfer and their destruction, the analysis of banks in macroeconomics ought to precede the analysis of non-bank financial intermediaries.

Monetary intermediation means that banks issue the means of payment for non-bank agents. As a result of this monetary intermediation, bank deposits are created, transferred or destroyed according to the principles of double-entry bookkeeping. Thus, the distinction between monetary and financial intermediation is only possible when one is willing to distinguish between stocks and flows. As both functions are necessary for successful payment and money has been considered a stock throughout history, it is only natural that the distinction between monetary and financial intermediation has not always been clearly perceived in theory, let alone in practice. Indeed, for a payment to become final, it must not only be carried out with a bank's IOU. Payments also need to be stored in the form of bank deposits. As Cencini (2005, p. 110) points out in this regard, "[t]he reason why this all-important [monetary] intermediation goes unnoticed is because it is always associated with a financial intermediation". However, it can hardly be denied that, while payment is an instantaneous operation (see Figure 4.1), the existence of money balances (see Table 4.1) is a state of affairs *resulting* from this operation. Importantly, monetary intermediation confirms beyond doubt the loans-create-deposits view held by an increasing number of economists. However, the financial intermediation confirms the reverse view: deposits create loans. Let us expand on this, as this point is vital for understanding the endogeneity of money and the distinction between money and credit.

When a bank extends a loan to a firm in order for the latter to cover its production costs, the monetary intermediation carried out by the bank settles the debt between firm and wage earner. The direction of this *monetary* flow goes from the

bank to the firm to the wage earner and back to the bank, implying that firms' loans logically (though not chronologically) precede wage earners' deposits. Now, *paying* wages is not the same as *financing* production costs. While the first is an instantaneous operation dependent upon banks' monetary intermediation, the second is a process in continuous time dependent upon income holders lending their money balances to firms directly or via a financial intermediary. Thus, the firm borrows on the financial market a positive amount of income that enables it to hold on to its products (without finally purchasing them) before finally selling them on the product market at a later date. As shown in the previous sections, it is the wage earner that creates income, not banks. Banks merely *monetise* production and channel the credit supplied by income holders to borrowers simply by recording debits and credits in their books. Therefore, it is clear that the wage earner creates and provides his credit to the firm by depositing his income in a bank – even if the wage earner is unaware of this. Borio and Disyatat (2011, p. 7, emphasis added) explain the process as follows:

> "For example, in an economy where firms pay wages after production, *workers are effectively extending trade credit to firms.* The proportion in which the resulting output is consumed determines saving and investment for the economy in that period."

Thus, the direction of financial intermediation – defining the logical circuit of income – runs from the wage earner to the bank to the firm, only to end up with the wage earner in the form of a claim on a bank deposit. It is not the bank that creates credit, as Borio and Disyatat (2011) confirm, but the wage earner who deposits his income with his bank. *Financial* intermediation thus confirms the deposits-create-loans causality, though not in the sense of the neoclassical loanable funds theory. Neither is a conscious decision of the bank or the bank's client necessary for the financial intermediation to occur, nor does the adaptation of saving and investment rest on some sort of groping mechanism. Instead, accounting principles ensure automatically that the entire amount of saving (income not finally spent) is lent. Mixing up monetary and financial intermediation directly leads to the ill-fated belief that banks cannot only create the empty vessel, but also its content. It is a simple matter of fact that money is created by banks every time payment orders are carried out. The content of that payment – output – is supplied by the national workforce. Because of the confusion in this area, even economists at the International Monetary Fund sympathetic to endogenous–money views believe that "the key function of banks is the provision of *financing*, or the creation of new monetary purchasing power through loans, for a single agent that is both borrower and depositor. […] The bank therefore can create its own funding, deposits, through lending" (Jakab and Kumhof, 2013, p. 4). It is true that the monetisation of production creates output and its corresponding purchasing power in the form of income. However, output (and therefore purchasing power) is created by the labour force, not banks.

The neoclassical deposits-create-loans view is captured in the loanable funds theory, a term first used by Bernard Schmitt's supervisor at Cambridge, Dennis Robertson (1940). According to this theory – which draws heavily on hydraulic metaphors and rests on a mechanistic conception of the monetary system – money and income are considered one and the same thing. While the bulk of money circulates constantly from households to firms (consumption) and from firms to households (factor remuneration), "[a] part of the money […] is observed to be constantly being diverted into a side stream leading to the money market, where it constitutes the supply of loanable funds" (Tsiang, 2008, p. 171). These idle money balances lying around "like stagnant puddles lying off the main stream of the money flow" (ibid.) can flow into the money market, thus influencing the interest rate. The function of the money market "is to match the flow demands for loanable funds to the flow supplies, and the instrument with which it operates to achieve equilibrium between the two sides is the vector of interest rates" (ibid., p. 172). The mechanism that brings about equilibrium between investment and saving is the interest rate. However, an analysis of the mechanism of monetary and financial intermediation shows that *all* incomes in the national economy, irrespective of the interest rate, are lent automatically and mechanically via banks to those firms not yet able to cover their production costs. No bank deposits are ever idle as a result of the accounting nature of money and payments. Thus, the equality of saving (supply of funds) and investment (demand for funds) is not conditional upon behaviour influenced by the level of interest rates. Instead, it is an accounting identity that follows from the two-sided nature of income. To sum up, monetary intermediation confirms the view that loans create deposits, while the accompanying financial intermediation confirms that deposits create loans.

An analysis of payments on the financial market provides further insight into the nature of banks and non-bank financial institutions. When a firm needs to raise funds in order to finance its productive activities, one possibility is to ask a bank for a loan on the credit market. In this case, no pre-existing income is needed, as the income necessary for financing the firm's outlays will consist of the income generated in said payment. This is consistent with post–Keynesian claims that "saving is the accounting record of investment" (Moore, 2006, p. 156), a statement clearly confirmed in Table 4.2. Moore's claim is by now even adopted by economists of the IMF, who agree for some circumstances that "saving is a consequence, not a cause, of investment" (Jakab and Kumhof, 2013, p. 5). As Borio and Disyatat (2011, p. 7) from the Bank for International Settlements [BIS] point out, "the only way to save in a given period is to *produce* something that is not consumed, i.e. to invest. Because saving and investment are the mirror image of each other, it is misleading to say that saving is needed to finance investment". Now, this is true in so far as the authors refer to pre-existent saving. Every payment is financed with income, and whenever firms resort to a bank loan in order to pay a wage bill, an income is needed to finance the payment. It is true,

however, that no *pre-existent* saving is needed, as the wage payment generates the income necessary to finance the payment. As Cencini (1995, p. 71) points out, thanks to the financial intermediation of banks, "savings are instantaneously lent by their initial owners and spent by their borrowers".

However, it is also true that firms may issue and sell securities on the primary financial market – debt certificates or equity shares – to any individuals or non-bank institutions willing to exchange their liquid store of value (a bank deposit) against a less liquid security with a potentially higher yield. In this case, the pre-existence of income is a logical requirement (Rossi, 2007a, p. 45). When the security is sold, the income is transferred to the issuer of the security.[15] Note that no investment has yet taken place, despite the common misconception that the purchase of securities constitutes an investment. Now, when the issuing firm uses the newly acquired funds in order to pay for its production costs, this payment is not financed with the pre-existing income (ibid., p. 46). This is not so obvious, since the pre-existence of income is indeed a requirement for this kind of payment on the financial market. But although income must already have come into existence before the payment, it is the new income resulting from the new output that finances the payment. In general, the purchase of a financial asset on the financial market defines a microeconomic event, as it implies a transfer of income from one element of the macroeconomic set to the other. No additional income is created or destroyed; it is merely shifted around between macroeconomic agents.

As Rossi (2007a, pp. 47-9) explains, there is one exception to this general rule: "[T]his occurs when a bank, or the banking system as a whole, advances purchasing power […] that will be the result of future production". In this case, firms sell securities to banks, who in turn credit the firms with the corresponding sum of money. In this case, the credit is still mediated by a bank or a non-bank financial institution, but it is not provided to the firm by wage earners. Instead, the credit is provided by future deposit holders: "Bank advances give rise to bank deposits that are the financial definition of output yet to be physically produced" (ibid., p. 48). Banks provide the economy with a bridge between the present and the future by making available to the public a bank deposit corresponding to output that will be produced sometime in the future. Before production takes place, the income generated provides the firm with the purchasing power over the security issued and deposited on the bank's asset side of the balance sheet. The security is therefore the financial form of future output. This leads us to accept Schmitt's (2012a, p. 79) claim that "the category of real goods is not made up solely of current output: financial assets are as real as any currently produced commodity". Following Rossi (2007a, p. 49), national income accounting can therefore be extended in the following way.

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[15] More exactly, a bank deposit is destroyed on its original holder and simultaneously created on its current holder (Rossi, 2007a, p. 45).

"Total demand for output = the total sum of bank deposits in the banking system
Total supply of output = produced output + financial claims on future production"

Once the firm benefitting from the bank's credit transfers its bank deposit for paying out workers, future output is exchanged for current output. This approach of including future output into national income accounting should come as no surprise if we remember that we are modelling the economy in quantum time. Output is defined by two monetary operations: production *and* consumption. While consumption occurs after production in continuous time, they occur simultaneously in quantum time. This can be explained further with the example of a worker receiving his wage payment, say, on January 1st, before he starts to work. Is the worker the beneficiary of a positive income although no physical production has yet taken place in the economy? The answer is yes. As long as no physical production has taken place, the worker's income grants him the purchasing power over the firm's debt to the bank, which will be filled up with a real content as soon as the worker completes his work. This explains also why the total sum of bank deposits must not necessarily correspond to the current output in the system.

It may be illuminating to look into a special case of physical destruction of output in order to better understand the identity of output and income. Assume an isolated factory that pays out the total sum of £1 million over a period of one month to its workers. The complete output of this month is stored in the factory's inventories. The output's value is determined by the sum of wages paid out to the workforce, £1 million. Thus, the workers have received the purchasing power over all output produced. If output were sold without a mark-up at a price of £1 million, every unit of output could be sold to the workers. Now imagine a fire destroys half of the output stored in the inventories. As income and output are the two sides of the same object, this means that the fire equally destroys the corresponding sum of money income. Although the workers still own bank deposits worth £1 million after the fire, the purchasing power contained in those bank deposits has been effectively halved. If we assume away any insurance sector, the only way the factory can fully recover financially is by marking up the remaining output by 100 percent. By selling the output worth £500'000 for the price of £1 million, the remaining income and output is economically destroyed, and the firm recovers the entire costs of production of £1 million. Alternatively, the factory could sell its remaining output without a mark-up and borrow £500'000 from the workers to cover the entire cost of production.

4.6   The role of central banks

After having identified and explained banks' dual function – monetary and financial intermediation – let us now turn to the functions of central banks. As the problems in macroeconomic theory and practice are protracted, it will be necessary to question even the most fundamental propositions concerning central banks' function and role in the modern economy. As Howitt (2011, p. 21) remarks with respect to the *status quo* of our science, "macroeconomic theory has more to learn from central bankers than it has to teach them". According to the former editor of the *Journal of Money, Credit and Banking*, what is needed is

> "a broader variety of approaches, so that [central bankers] can see their problems from more than one angle, especially those problems that are hard to address using the currently popular mainstream approach." (ibid.)

It is in this spirit that we will proceed, relying not only on economic literature, but also on payment system literature in order to verify our claims. As explained in section 4.1, every commercial bank has the capacity of issuing its own money for the settlement purposes of non-bank agents in the form of commercial bank IOUs. By managing commercial banks' accounts for interbank settlement purposes, the central bank acts as a settlement institution between banks. Importantly, the funds commercial banks hold with the central bank are denominated in central bank money. When one commercial bank is indebted to the other, the central bank settles the debt by issuing a sum of central bank money, thereby bestowing a common status on the otherwise heterogeneous IOUs issued by the two commercial banks. Let us remind ourselves that no economic agent can finally pay by surrendering an acknowledgment of debt against himself, in which case the debt is merely confirmed, not discharged. Needless to say, a promise to pay is not the same as payment itself. In so far as the central bank is in charge of organising the central settlement institution, as is the case in all advanced economies today, it is in charge of guaranteeing final payment within the national economy.

> "The settlement institution is in the unique position of being able to create a centralised source of settlement funds to the participants of the system. This source is called centralised because the settlement institution is the only counterparty that can influence the total amount of settlement assets that participants hold (apart from transfers of funds between systems …) If the settlement institution is a central bank, the funds are deposits in central bank money". (Committee on Payment and Settlement Systems, 2005, p. 15)

In order to illustrate why a system with two secondary banks lacking a central settlement institution cannot guarantee final payment between commercial banks'

clients, let us look at a wage payment where the firm is a client of bank A and the wage earner is a client of bank B.[16]

Table 4.3 The result of a wage payment between two clients of distinct banks without a central bank.
Source: adapted from Rossi, 2007a, p. 70

Bank A			
Assets			*Liabilities*
Loan to the firm	+£x	Deposit of bank B	+£x

Bank B			
Assets			*Liabilities*
Deposit with bank A	+£x	Deposit of wage earner	+£x

Starting from *tabula rasa* as before, it is immediately clear that bank A owes bank B a positive sum of money as a result of the payment. This corresponds to the bilateral arrangements with correspondent accounts between banks (see Giannini, 2011, p. 223). While the payment is final from the firm's and the wage earner's (microeconomic) viewpoint, it is not final for the two banks involved (or for the economy as a whole, as it were). In order to finalise payment, a third bank must intervene. As payment system literature confirms, "banks do not accept bank money in interbank transactions, but ultimately require their claims to be settled in central bank money" (Deutsche Bundesbank, 1994, p. 46). Payment via bank money is therefore a process that ultimately demands "definitive settlement in monetary base in the form of liabilities, or money, of the central bank" (Giannini, 2011, p. 221). This amounts to saying that commercial banks' IOUs are not an accepted means of payment between banks. A national payment system with one currency and more than one bank thus needs to be a two-tier system, with secondary banks at the bottom and a central settlement institution – usually the central bank – at the top. Practitioners of central banking therefore assert that "[i]n most cases, […] commercial banks settle through accounts with the central bank (called centralized accounts), which puts the latter at the apex of the pyramid" (ibid., p. 223). We are thus able to agree with Rossi (2007a, p. 67):

> "The 'singleness' of money in any national economy […] is provided by the central bank, which homogenizes the various means of payment issued by private banks by issuing its own means of payment (that is to say, central bank money in the form of an asset–liability that is recorded in the central bank's ledger), which is notably used as a vehicle to finally settle debts at interbank level."

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[16] 'Final' means irrevocable and unconditional.

The composite use of central and commercial bank money in a unified payment system ensures the 'singleness' of money within a national monetary system, which is the necessary condition "for a currency to become 'the' measure of economic value, or the unit of account, shared by members of a modern economy, with the associated advantages of efficiency and safety in trade" (Committee on Payment and Settlement Systems, 2003a, p. 1). Additionally, a monetary system with a centralised settlement party significantly reduces transaction and information costs. In a closed economy with $n = 300$ banks – this corresponds roughly to the amount of banks currently registered in Switzerland – without a centralised settlement system, $[n(n\text{-}1)/2] = 44'850$ individual bilateral arrangements can exist in a gross settlement system. In a gross settlement system, each payment is processed one by one (Martin, 2005). Sound risk management demands that, in such a system, every bank would have to monitor every other bank's solvency and liquidity. With a central settlement agency, the 44'850 bilateral arrangements are replaced with a multilateral arrangement with merely 300 connections, where each payment is processed via the central bank. A system of competing commercial banks each issuing their own IOU with a central bank on top that finalises payment between banks and thereby homogenises banks' monies is perceived by the analysts of the BIS to combine the best of two worlds: competition and monetary homogeneity. The two alternative corner solutions sometimes suggested by political pundits are thereby dismissed (ibid., p. 2). The 'monobank'-model, not unlike the Soviet Union's *Gosbank* that existed between the 1930s until 1987, is dismissed because of the lack of competition that would result. At the other extreme, the 'free banking' model, implying the abolishment of central banks in favour of a competitive system of commercial banks trying to maximise profit, is rejected because of the resulting lack of monetary 'singleness', which contributes to substantially reducing transaction costs in the economy.

Let us stress here that both commercial bank money *and* central bank money are means of payment. There is, of course, the possibility for non-banks of using central bank money in the form of cash for payments on factor, product and financial markets. In this case, the central bank provides the public with notes and coins. The cash in the public's pocket then represents a claim on a deposit registered on the liabilities side of the central bank. Therefore, one form of bank liability is exchanged against another in what constitutes a blank operation between commercial and central banks (for an in-depth analysis of cash operations between banks and central banks see Rossi, 2007a, pp. 85-8). If payer and payee are clients of two different commercial banks, the interbank credit–debt relation created as a result of the transaction between the two clients needs to be settled with central bank money in order to guarantee finality of payment. This does not mean that commercial bank money is not a means of payment by itself. It is sometimes argued that central bank money is the only means of payment, and that 'bank credit' is merely a kind of substitute. One way of realising that this view is not warranted by reality is by noticing that the payment between two

clients of the same commercial bank can be finalised without the intervention of a central settlement institution in what amounts to an in-house settlement (Rossi, 2007a, p. 70). It is only when payer and payee are clients of two separate banks that central bank money must bridge the monetary space and finalise payment. However, this just means that central bank money and commercial bank money are the *complementary elements of a single monetary flow*. This view is confirmed by the Committee on Payment and Settlement Systems (2003a, p. 9), which states that "transfers generally take place within organised 'payment systems' where commercial and central bank money often complement each other in more complex chains of payments". Table 4.4 shows what happens when the central bank intervenes to settle a debt between bank A and bank B by issuing a sum of central bank money. In the simple and most common case described here, both the debtor and the creditor banks already own a positive bank deposit with the central bank.

Table 4.4 Central bank money as the means of final payment at the interbank level.

Bank A			
Assets			*Liabilities*
1) Loan to the firm	+£x	1) Deposit of bank B	+£x
2) Deposit with central bank	–£x	2) Deposit of bank B	–£x

Central bank			
Assets			*Liabilities*
		2) Deposit of bank B	+£x
		2) Deposit of bank A	–£x

Bank B			
Assets			*Liabilities*
1) Deposit with bank A	+£x	1) Deposit of wage earner	+£x
2) Deposit with bank A	–£x		
2) Deposit with central bank	+£x		

In this transaction on the interbank market, the central bank acts as a monetary intermediary by issuing a sum of central bank money at the request of its commercial bank clients. In entries 1), bank A grants its business client a loan in order for it to remunerate the wage earner, who is bank B's client. As a consequence, the firm becomes a net debtor to the banking system by the same amount the wage earner – bank B's client – becomes its net creditor. Credit is therefore *supplied* by the wage earner, *demanded* by the firm and *mediated* by two commercial banks whose net position is not altered by the transaction. Money, on the other hand, is supplied by the two commercial banks. Now, if payment ended here it would leave bank B with a significant settlement risk. To wit, if bank A files for bankruptcy, bank B's deposit with A would likely be lost, thus

confirming that bank B has effectively not yet been paid. Therefore, a second emission of money supplied by the central bank is required that complements the commercial banks' emissions and thereby finalises payment. By taking the interbank debt-credit relation onto the central bank's books, bank B's credit risk is effectively minimised to zero.

Central bank

Paying bank A
$+ £x$
$- £x$
$- £x$
$+ £x$
Receiving bank B
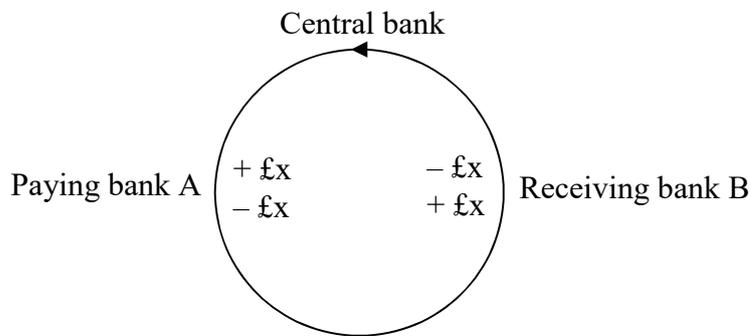
Figure 4.4 The emission of central bank money on the interbank market.
Source: Rossi, 2007a, p. 72

Figure 4.4 illustrates the emission of money on the interbank market, the result of which can be seen in entries 2) in Table 4.4. It is helpful again to distinguish clearly between central bank money and central bank deposits: "Money and credit are indeed two separate things, at both commercial bank and central bank level" (Rossi, 2007a, p. 73). Let us first focus on the monetary intermediation. As soon as the central bank settles the interbank debt in its accounts, it credits and debits bank A and bank B with a sum of central bank money, thus finalising the payment at the interbank level and simultaneously homogenising the two separate acknowledgments of debt issued by the commercial banks. This confirms the role of central bank money as means of final payment, confirming Goodlet's (1997, p. 50) assertion that "payments must be processed by a clearing and settlement system before the transaction between the buyer and the seller is finally completed". As the monetary experts of the Bank of England (McLeay et al., 2014, p. 5) point out, the firm's bank A is now left "with fewer reserves and more loans relative to its deposits than before. This is potentially problematic for the bank since it increases the risk that it would not be able to meet all of its likely outflows". In order to improve their reserve position with the central bank, commercial banks "try to attract or retain additional liabilities to accompany their new loans" (ibid.). Commercial banks therefore try to attract funds from new depositors in order for them to be able to expand lending. This is so because they need a sufficient amount of deposits with the central bank for interbank settlement purposes. That is the meaning of Keynes's (1930/1971, p. 23) claim that there is no limit to bank money creation "*provided that they move forward in step.* […] Every movement forward by an individual bank weakens it, but every such movement by one of its neighbour banks strengthens it; so that if all move forward together, no one is weakened on balance."

Just like three banks of the same banking system issue the monetary flow, the financial intermediation in this operation now involves three banks. The income necessary to finance the firm's borrowing is produced by the wage earner and deposited with bank B, which lends it to the central bank, that in turn hands it over to bank A. Bank A lends the wage earner's income to the firm, which borrows it in order to finance its production costs. The wage earner receives a claim on a bank deposit in return for his credit to the firm. In conclusion, every emission of central bank money entails a financial intermediation just like at the commercial bank level.

However, by acting as bank of banks, the central bank has the additional capacity of homogenising commercial bank monies by finalising payments on factor, product and financial markets. The case discussed so far is indeed the simplest form of monetary and financial intermediation carried out in a two-tier banking system. The Committee on Payment and Settlement Systems (2003a, p. 9) summarises this as follows:

> "The paying and receiving banks are both direct participants in the interbank payment system and hold accounts at the settlement institution, and the settlement is effected by a debit from the account of the paying bank and a credit to the account of the receiving bank."

More complex cases are imaginable in which a commercial bank needs to settle its debt with another bank but has no funds readily available with the central bank. In this case, "which very often occurs through either intra-day or end-of-day credit, settlement of interbank debt elicits in fact two distinct emissions of central bank money" (Rossi, 2007a, p. 73). The first monetary flow settles the interbank debt and runs from the central bank issuing its IOU to the paying bank (+£x), which hands it on (–£x) the receiving bank (+£x), which again returns the IOU back to its point of emission (–£x): the central bank. The second monetary flow occurs when the paying bank obtains a credit in order for it to settle its obligation. As regards this second emission, two cases can be differentiated. In the first case, which amounts to a delivery-versus-payment operation, the debtor bank pays by transferring a security to the creditor bank. In order to accommodate this transaction, the central bank provides the means of final payment. In the second case, the debtor bank cannot find another commercial bank willing or able to provide the funds necessary to pay the creditor bank finally. In this case, the central bank may activate its function of lender of last resort and extend its own credit to the debtor bank. For a detailed analysis of this settlement process we refer to Rossi (2007a, pp. 74-8).

What is important here is to underline the important role central banks play in guaranteeing payment finality and monetary homogeneity for an economy with

more than one bank. Fullwiler (2003, pp. 852-3) rightly points out that "the payments system, rather than reserve requirements, is the proper starting point for analysis". Economists' desire for mathematical formulation has blocked any sort of progress in payment system analysis. Final payment and payment systems in general are concepts that escape the language of calculus. Practitioners of central banks know that "the primary objective of all central banks is to ensure the smooth functioning of their payment systems" (Government Accounting Office, 2002, p. 2). The recent study by the Bank of England's (McLeay et al., 2014) Monetary Analysis Directorate has emphasised that commercial banks' monetary base held with the central bank serves the payment needs between banks, not the regulation of the money supply. Let us expand on this.

The monetary base is made up of bank notes held by the public and commercial banks' balances with the central bank. Needless to say, the central bank does not have the power to create net assets in its function as monetary intermediary, as every emission of money involves the creation of an asset and the corresponding liability. Central banks thus issue money as a purely nominal form, the content of which (output) must be provided by the national workforce. According to the principle that every payment must be financed with income, central banks can only finally purchase (financial) products by getting hold of income, that is by earning interest or dividends from their financial intermediation (Cencini, 2001, p. 95). The principle that nobody can finally pay by becoming indebted also holds for central banks.

Although central bank authorities have moved away from trying to control the money supply by fiddling with minimum reserve requirements for commercial banks owing to a complete lack of empirical support, this theoretical zombie can still be found in many economics textbooks. Despite the fact that "many neoclassical economists know that [the money multiplier] doesn't exist [and] its non-existence is empirically obvious" (Keen, 2011, p. 313), many economists go on pretending that no serious renewal of the theory of money creation is needed.[17] A recent paper by the Federal Reserve associates Carpenter and Demiralp (2010, p. 29) merely hints at the problem when they write that "the narrow, textbook multiplier does not appear to be a useful means of assessing the implications of monetary policy for future money growth or bank lending". This is rather an embarrassment for the economics profession, and only lately have leading economists in the mainstream started to disentangle the theoretical inadequacies of the so-called credit or money multiplier theory (see, for instance, McLeay et al., 2014). This "Mickey Mouse model" of money creation (Bofinger, 2012,

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[17] Economists' failure to provide a clear understanding of the money creation process has led to a flurry of conspiratorial theories regarding money. While the human creativity giving rise to these theories is laudable, they are often misguided and potentially damaging, as a (failed) referendum on central banks' minimal gold requirements in Switzerland reminds us (see *Neue Zürcher Zeitung*, 2014).

Internet) states that banks can lend thanks to an initial amount of bank deposits – where this initial endowment comes from is delegated to readers' creativity. Every time the deposits lent out return to the bank, the bank must put some fraction of that amount into its vaults and may lend out the rest, and so on, until the upper boundary where the total supply of money equals one divided by the reserve requirements ratio multiplied with the amount of high powered money. We may refer the interested reader to Cencini's (2001, pp. 110-5) criticism of the money multiplier and simply restate here that commercial banks' deposits with the central bank must be understood as an instrument for supplying to the public with the means for interbank payment purposes, thereby enabling final payment between commercial banks.

4.7 Exchange rate fluctuations

A science defines itself mainly through its research object. Once the object is identified, scientists search for a methodology that best enables them to study the object in question. As obvious as this may seem, it is not sure many economists would accept this approach for our own science. Oddly enough, economics has turned into a science that primarily defines itself through its tools, not its object. Following Lionel Robbins's (1932) definition of our science, economics has become a lens through which all conditions may be analysed in which human beings are faced with ends and scarce means that have alternative uses – an obviously ubiquitous situation. Consequently, economic tools are applied to questions ranging from inflation prediction to why drug dealers still live with their mothers. These tools involve, among others, the marginalist approach and the related concept of equilibrium, ordinal and cardinal measures of utility, rational expectations, game theory, methodological individualism, and the *homo oeconomicus*. It may turn out to be rewarding for economists to reconsider the traditional approach that is being followed by all other sciences and start by encircling a research object.

If we choose to do so, what then is the research object in macroeconomics? The term 'economics' indicates that we are confronted with production and exchange of goods and services – exchange being one special cultural habit of organising the distribution of products within a society. Both production and exchange are monetary phenomena, as production is monetised through the payment of wages and exchange is carried out with money in any modern economy. Without a monetised economy, neither wages nor prices would exist, not to mention the concept of balance of payments. Macroeconomics is a subcategory of economics, the other subcategory being microeconomics. The legitimacy of macroeconomics rests on the notion that there are laws, or principles, that can be studied independently of individual agents' specific behaviour. Only if it is possible to reach conclusions one could not reach in a microeconomic framework can we

rightly speak of macroeconomics as a separate branch of economics. This view contrasts with today's perception that "all macrophenomena are the aggregate of many microphenomena; in that sense macroeconomics is inevitably founded in microeconomics" (Mankiw, 2005, p. 434).

Now, as we have already seen in this chapter, the concepts of absolute exchange and logical identities hold true independently of individuals' behaviour. These concepts follow directly from the bookkeeping nature of money and are the building blocks of macroeconomics. The foundations of macroeconomics are therefore themselves macroeconomic, as Cencini (2005) forcefully argues. One can go even further and suggest a macroeconomic foundation of microeconomics, as several phenomena highly relevant to microeconomic analysis – that is, inflation, unemployment or exchange rates – have macroeconomic causes and effects. The numerical exactness of payments with respect to the physical output they measure puts macroeconomics in a unique position in the social sciences. Performing as a unit of account, money establishes a precise correlation between numbers and physical objects (economic output), turning macroeconomics into a hard science. At the same time, the debt–credit defining the financial intermediation between economic agents implies a social relation that has ramifications far beyond the field of macroeconomics.

Now that the meaning of macroeconomics is clearer, the focus lies on the difference between national and international macroeconomics. In order to understand the economic concept of nation, we may follow Cencini and Schmitt (1991) in considering the difference between economic regions and nations, or countries: "What mainly distinguishes regions from countries is the use of a common currency" (ibid., p. 15). From an economic standpoint, countries are not merely geographically defined. Instead, they are currency areas, logically defined spaces within which monetary homogeneity reigns. Within a nation, there exist regions for which it is impossible "to be in a debt position relative to the other regions of the same country" (ibid.). Of course, it is possible for every single individual of one region to be indebted to individuals of another region via their banks. However, the indebtedness of the *sum* of a region's residents does not imply the *additional* indebtedness of the *set* of residents, defined as a separate economic entity. Yet, the net indebtedness of a country as a whole with respect to other nations is a reality confirmed by the existence of international reserve positions. The economy as a whole defined as the *set* of residents in an economy is indeed not the same as the *sum* of residents within that economy. If the economy were merely the sum of its individual parts, it would be correct to look for micro-foundations of macroeconomics – indeed, the existence of macroeconomics as a separate branch of economics would have to be questioned. The economy as a whole has a life of its own, and its systemic structure is defined by accounting principles adhered by the banking system. Cantor's set theory, although belonging to the field of mathematics, supplies economists with a useful

tool that helps to define the whole of a country's economy: "[A] macroeconomic set is made up of macroeconomic agents operating within the same economic system. All these elements coexist and are part of that reality known as the macroeconomy" (Cencini, 2012b, p. 55). Eichengreen (2007, p. 3) reminds us of the system-character of the international macroeconomy when stating that "there is such a thing as the international monetary *system* and that the global balance of payments inclusive of reserve changes must sum to zero, something that should have implications for how we thing about the world". Studying this system can be separated from studying agents' behaviour operating within this system, because the system is built on principles that transcend behaviour.

Economic production is defined by the wage payment, which gives rise to income and output in one and the same moment. By definition, the wage payment must be carried out with some sort of national currency. Thus, production is always defined in terms of a *national* currency. *Sensu stricto*, international production therefore does not exist (Cencini, 2005, p. 179). Because of this, international macroeconomics is not concerned with production, but merely with different categories of exchange between currency areas. The explanation of exchange rate movements is one of the major difficulties in international macroeconomics. The theory of money emissions offers a novel approach to understanding erratic exchange rate fluctuations and suggests remedies that could once and for all eliminate them. Let us briefly outline this theory in a positive manner, contrasting it with neoclassical theories where necessary.

According to the theory of money emissions first established by Schmitt (1960, 1966, 1984a), foreign exchange transactions are the only category of transaction capable of altering the exchange rate (see also Cencini, 2005, p. 220). Within a national economy, a currency is used as a means of payment according to its accounting nature. As soon as two national economies open their current, financial and capital accounts, foreign exchange transactions become possible. In this situation, a currency can turn from a *means of payment* into an *object of trade*. As has been repeatedly demonstrated throughout this chapter, money is a pure accounting tool that vehiculates the exchange of output, without being itself the object of the payment. However, in today's foreign exchange markets, national monies are bought and sold *as if* they were assets. The process of transformation of national monies was first described by Jacques Rueff (1963, pp. 323-4). According to the French economist, payment of the net commercial deficit by key–currency countries gives rise to a pathological duplication of key currencies, in which the financial claims representing the deficit are recorded in both the deficit and the surplus country. Because the output (and therefore the income) defining the duplicated claim is still deposited in the importing country, the exporting country is in fact the owner of an empty vessel, and consequently has not been paid according to the accepted definitions of payment and exchange. It is no payment since 'payment' of the commercial deficit by a key–currency country

leads to the indebtedness of the deficit country as a whole. But neither individuals nor entire nations can pay by promising to pay in the future. Nor does the 'payment' of the net deficit define a proper exchange, since economic exchange defines the exchange of equal values. The transfer of an empty vessel can hardly be defined as an exchange of equal values – experts in international macroecononmics, such as Eichengreen (2011), accept this last point at least tacitly. Neoclassical theory attempts to predict and explain the direction of exchange rate variations by finding a correct exchange rate between two currencies. Advocates of the theory of money emissions, on the other hand, explain the formation of a pathological stock of capital outside of the national banking system that enables speculation to occur in the first place.

> "The central point is that [currency] speculation exists because it is fuelled by an ever increasing pathological capital. […] *Speculation is the effect and not the cause of speculative capital, and speculative capital is the direct result of currency duplication.*" (Cencini, 2005, p. 229)

For advocates of the theory of money emissions, the question of the 'right' exchange rate is beside the point, as every exchange rate rests on value judgments. The duplicated currencies – 'Xeno-currencies' in Machlup's (1970) words – held by surplus countries can be made available on foreign exchange markets: "From the moment currencies are sold and purchased as if they were (real) assets, exchange rates become the expression of their (relative) prices and are made to vary according to the interaction of supply and demand" (Cencini, 2005, p. 222). As there is no objectively correct relative price of two currencies, speculators have to make their best guess by forecasting other speculators' forecasts, resulting in a complex and indeed unpredictable situation most aptly described by Keynes's (1936/1973, p. 156) metaphor of the beauty contest.

So-called 'fundamentals' (purchasing power parity, relative competitiveness, inflation and interest rate differentials, trade and capital balance, government debt, and so on) certainly have an indirect effect on exchange rates inasmuch as they affect the decision-making process of buyers and sellers on foreign exchange markets. They do not directly affect the level of the exchange rate (see Cencini, 2005, p. 210-19). The theory of money emissions thus offers a valuable complement to neoclassical analysis. As soon as national monies are used in international transactions, a country subjects its money to a process of duplication. To be sure, this is true for the post-Bretton Woods regime as it was true during Bretton Woods. Instead of transferring a value in exchange for the net commercial imports, the net importing country merely transfers a claim on its deposits. These claims then erratically circulate, damaging the development of economies around the world. What is therefore needed is a truly international means of payment capable of bridging the gap between national monetary spheres.

5   Towards a new international payments architecture

"The problem lies […] with the absurdities associated with the use of *national* currencies as *international* reserves."

(Triffin, 1960, p. 10)

Keynes (1980, p. 21) realised during World War II that "[t]he problem of maintaining equilibrium in the balance of payments between countries has never been solved, since methods of barter gave way to the use of money and bills of exchange". It is fair to say that this situation persists today. While the microeconomic impetus of recent years has enabled economists to better understand individuals' complex decision-making, it has blinded just as many for the *systemic* risks facing economies considered as a whole. The leading scholar of international macroeconomics and monetary systems, Barry Eichengreen (2007, pp. 2-3), laments that "[w]hile systematic analyses were once commonplace in the literature on the international monetary and financial system, these have fallen out of fashion in recent years". This is unfortunate. Extending Lionel Robbins's (1932, p. 15) famous definition of economics somewhat clumsily, we may suggest that economics is the science which studies human behaviour as a relationship between ends and scarce means with alternative uses *within an institutional framework adhering to principles that transcend individual behaviour*. With respect to the monetary-institutional framework, "[a] payment system is a collection of technologies, laws, and contracts that allow payments to occur and determine when a payment effects a settlement" (Roberds, 2008, p. 337). The different architectures used by societies historically to process payments within and between currency areas are both non-trivial and non-neutral. Relying on nebulous 'market forces' instead of scientific inquiry is a dangerous endeavour, as Keynes (1980, pp. 21-2) already warned:

> "To suppose that there exists some smoothly functioning automatic mechanism of adjustment which preserves equilibrium if we only trust to methods of *laissez-faire* is a doctrinaire delusion which disregards the lessons of historical experience without having behind it the support of sound theory."

Depending on the monetary architecture, certain transactions can have destabilising effects that cannot be blamed on individual agents' behaviour. Despite the on-going financial fragility, central banks today generally do not have a policy on how particular payments should be made (Committee on Payment and Settlement Systems, 2003a). While monetary theorists have largely relegated problems of the payment system to the rank of mere technical questions, central bank practitioners know how important payment finality is, and demand building economic analysis "around the concept of 'payment technology', meaning the set

of conventions, objects and procedures that allow obligations arising from trade to be extinguished" (Giannini, 2011, p. xxv). A systematic, macroeconomic approach that focuses on money and payments is therefore thoroughly justified from the viewpoints of theorists and practitioners. Recent calls for fundamental reform ought to incentivise economists to question even the most firmly held beliefs. Dooley et al. (2009, p. 300) recognise that today's international monetary and financial system is in need of drastic reform:

> "The international monetary and financial systems are clearly in trouble, and reforms are called for. […] The most important and controversial issues are the role of international capital flows associated with current account imbalances and the failure of regulatory policies in the USA and elsewhere to maintain stable domestic financial systems".

While the authors identify international capital flows as a potential risk, they do not believe that these are at the root of the Great Recession. They argue that acceptance of this might lead to a demonization of capital flows, triggering potentially catastrophic protectionist policies that would eventually bring down the post–Bretton Woods system. While one may feel obliged to honour this conservative stance, it should nevertheless be remembered that the present post–Bretton Woods monetary system is actually a 'nonsystem' (Williamson, 1976). Goux's statement in Schmitt (1984c, p. 9, our translation) is therefore to the point: "The international monetary system is not in crisis: the system does not exist". To wit, today's international monetary non-system is the unintended bastard phoenix that rose from the ashes of a *planned* monetary system. The original Bretton Woods arrangement, we may add, was not the product of consenting adults, but rather the outcome of the arm-twisting between a new world power (the United States) and an old one (Great Britain). This negative view of the current international monetary architecture can be complemented with Mervyn King's (2010, p. 18) critique of present-day banking: "Of all the ways of organising banking, the worst is the one we have today".

The measures for reforming the international monetary system proposed here are the same measures proposed by advocates of the theory of money emissions. *Summa summarum*, a truly international means of payment needs to be introduced that has the power to finalise payments between countries. The proposed reform may be seen as a necessary element of a new, macroprudential global policy in line with the International Monetary Fund's (2013, p. 1) publicly stated goal:

> "To ensure macroeconomic stability, policy has to include financial stability as an additional objective. But a new objective demands new tools: macroprudential tools that can target specific sources of financial imbalances."

To date, *national* currencies are used to carry out *international* transactions. This is rather unproblematic insofar as the exports of a country are matched by its imports, thereby establishing a coincidental equilibrium. However, a country cannot hope to finally pay for its *net* imports by transferring claims on national deposits abroad. In this case, a pathological duplication of currencies occurs that has adverse effects on the smooth functioning of national and international monetary systems.

The fact that a country *as a whole* cannot pay by incurring a debt to another country is an important outcome of positive analysis. A problem arises when the duplicated foreign currency representing the claims on foreign bank deposits is used on the foreign exchange market to 'purchase' other currencies. In this moment, money changes its nature from a *means of payment* to an *object of trade*. This mirrors Jacques Rueff's (1963) fundamental criticism of the asymmetrical international monetary arrangement with the US dollar at its centre. Unfortunately, the French economist's criticism was not taken seriously by leading US scholars, but simply rejected on superficial grounds, arguing that the French position was motivated by nationalism, ultimately targeting the US intervention in Vietnam (see Machlup, 1966b).

Before the reform of the international payments architecture is explained at the end of this chapter, some remarks on the most important historical developments and reform plans are in order. It cannot be the goal to offer a comprehensive study of the gold standard, the Bretton Woods system and the post-Bretton Woods non-system in a single chapter. Instead, the crucial elements of each system and of important reform plans will be highlighted that enable the reader to better understand the main merits and demerits of various international monetary arrangements from the viewpoint of the theory of money emissions. By referring to the open economy policy trilemma, the solution proposed attempts to combine the benefits of different monetary architectures without taking over their weaknesses.

5.1   The international gold standard

The main elements of the international gold standard that emerged in Western Europe after 1870 and then slowly spread to the greater part of the world during an exceptional period of peace in Europe were already addressed in section 1.1.1, though some further remarks are pertinent. In this system, governments were committed to allow a free flow of gold between countries and to convert domestic currency into fixed quantities of gold. Eichengreen (2008, pp. 24-5) summarises the basic mechanism as follows:

"Each time merchandise was exported, the exporter received payment in gold, which he took to the mint to have coined. Each time an importer purchased merchandise abroad, he made payment by exporting gold. For a country with a trade deficit, the second set of transactions exceeded the first. It experienced a gold outflow, which set in motion a self-correcting chain of events. With less money (gold coin) circulating internally, prices fell in the deficit country. With more money (gold coin) circulating abroad, prices rose in the surplus country. The specie flow thereby produced a change in relative prices (hence the name 'price-specie flow model')."

Note that this passage describes the *theoretical* mechanism of the gold standard. In reality, only a fraction of the international trade was settled with shipments of gold, and the pound sterling was accepted by exporting countries instead of enforcing real payment of the debt. Schmitt (1984b) shows how David Ricardo's advocacy for a gold bullion standard can be interpreted as an attempt to prove that international payments need to be carried out in real terms through the circular use of gold. For example, in his reply to Bosanquet, Ricardo (1809/1951, p. 206) notes that England cannot hope to purchase gold from the United States with banknotes, as the gold will instantly flow back once the US merchants demand real payment. Instead, "it is with goods we must purchase [gold]". Ricardo (ibid., emphasis added) generalises his fundamental insight when he claims that Britain has

"discharged a debt in Europe by the exportation of goods to some other part of the world, and *the balance of payments, however large it may be, must ultimately be paid by the produce of the labour of the people of this country*. Bills of exchange never discharge a debt from one country to another".

In Ricardo's view, sums of national currency "effect a transfer of a debt, but do not discharge it" (ibid.). The system favoured by David Ricardo therefore demands the *automatic* and *immediate* settlement in gold of every commercial deficit in order for the international transaction to be transformed into a payment in kind (see Cencini and Schmitt, 1991, p. 41). An import of commercial goods needs to be balanced at once by an export of gold. Stated more generally, every country needs to pay for its imports of goods and services by automatically exporting its own goods and services. If this strict mechanism advocated by Ricardo were adopted, it would imply that all national currencies spent on imports would instantaneously be retrieved as the exporting country spends the foreign currency on gold from the importing country. Were this Ricardian principle respected, nothing would speak against an international gold standard *in theory* – while the inelasticity and bulkiness of gold makes the settlement mechanism highly inefficient *in practice*.

Of course, the 'pure' international gold standard as proposed by Ricardo and described in the above passage was never put in place in this rigid form. To wit, only four countries at the centre of the system – England, Germany, France and the United States – adopted a rather strict gold standard with both domestic circulation and reserves partially in terms of gold. In other countries, money in circulation took the form of paper, silver and token coin (Eichengreen, 2008, pp. 19-21). Some (though not all) central banks – usually privately owned, profit-orientated institutions in those days – kept a reserve of gold ready on demand. In many countries, notable amounts of gold were not held as reserves by central banks at all. Countries like Japan, Russia or India held reserves in the form of financial claims on countries whose currencies were convertible into gold (mainly Great Britain). Among others, Eichengreen (2008, p. 22) therefore notices that the classical gold standard was a *de facto* pound sterling standard, as the pound sterling "accounted for perhaps 40 percent of all exchange reserves at the end of [1913] […]. French francs and German marks together accounted for another 40 percent". David Hume's price-specie flow mechanism is therefore not only an abstract model of reality, but an abstract model of an idealised reality that never happened in practice. However, it is true that the provision of gold as a universally accepted settlement asset meant that fewer national currencies circulated internationally, leading to less exchange rate volatility. Bertil Ohlin (1936, p. 34) went as far as to claim that capital movements of a "disturbing sort" practically did not exist before 1913, a rather bold claim according to Eichengreen (2008, p. 31). The relative stability was also due to investors' unrelenting belief in gold convertibility until the advent of World War I, and because central banks and governments cooperated in helping distressed central banks many times by harmonising global credit conditions (Eichengreen, 2008, Chapter 2).

The first international gold standard was interrupted in most countries[18] in 1914 due to World War I in order for them to gain more flexibility in paying for the war efforts, only to be resurrected again in the second half of the 1920s in the form of a gold exchange standard. In this new interwar gold standard, the United States and the United Kingdom held reserves only in gold, and the other countries could hold reserves in US dollars or sterling. However, the extension of democratic rights to the poor (suffrage) and the workforce (unions) made it more difficult for the economic elites to place the burden of adjustment resulting from an inelastic gold supply onto the common man: "[B]ureaucratized labor relations, politicized monetary policymaking and the other distinctive features of the twentieth century environment" (Eichengreen, 2008, p. 44) are supposed to inhibit the return of a gold standard. The conference of Genoa in 1922, led by Great Britain, was one of many attempts after the Great War to reinstate the pre-war gold standard. The declared goal at Genoa was for central banks to coordinate their policies in order

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[18] A notable exception was the United States.

to prevent exchange rate fluctuations and consumer price instability in member countries. Great Britain and most European countries reintroduced the gold standard despite Keynes's (1972, p. 214) warnings that the pound sterling was about ten percent overvalued with respect to the US dollar, and that reinstating the pre-war system would lead to a deflationary spiral in Great Britain. Keynes turned out to be right. The United Kingdom faced significant capital and gold outflows as investors began predicting a devaluation of the pound sterling. The Great Depression finally shattered the interwar gold exchange standard, and complying with the rigid monetary corset of the interwar gold standard further deepened the Great Depression. While close to fifty countries had reintroduced the gold standard up until Great Britain's devaluation of the sterling in 1931, it had entirely collapsed by September 1936 (Eichengreen, 2008, p. 46). Meier (1982, p. 28) summarises the exit from gold as follows:

> "One country after the other left the gold standard during the deepening depression of the 1930s. By 1936, France and a few other countries constituting the gold bloc were forced to abandon gold. The international financial system collapsed. Countries resorted to direct controls over the use of foreign exchange, to trade restrictions, and to multiple exchange rates."

The situation remained chaotic until the end of World War II, with countries resorting to beggar-thy-neighbour policies of competitive devaluation in order to gather reserves, boost exports and fight unemployment. It was not until 1944 that 730 delegates representing 44 countries met at Bretton Woods, New Hampshire, to discuss an international monetary framework based on what were supposed to be rational principles and binding laws beneficial to all member countries. The disturbing experience of highly volatile exchange rates, especially suffered by France throughout the 1920s, would have a profound impact on the post–World War II monetary system. A bold statement by Robert Mundell (2000, p. 331) captures the importance economists attribute to international monetary arrangements and the failure of the interwar gold standard to safeguard economic prosperity:

> "Had the price of gold been raised in the late 1920s, or, alternatively, had central banks pursued policies of price stability instead of adhering to the gold standard, there would have been no Great Depression, no Nazi revolution, and no World War II."

5.1.1 Strengths and weaknesses of the gold standard

On a positive note, exchange rates were relatively stable during the gold standard era, thereby reducing uncertainty and enabling a smooth development of international trade. By serving as a settlement asset between currency areas, gold

contributed to keeping down large pockets of duplicated currencies around the globe. In Triffin's (1960, p. 27) words, the gold standard provided stability owing to "the fact that the emergence of *major* imbalances was *prevented ex ante* by the institutional monetary and banking framework of the times, rather than *corrected ex post* by large price and income adjustments". Net imports were partially cleared by exporting gold (or claims to gold), thereby offsetting international debt–credit relations and restoring the balance of payments. Hawtrey (1933, p. 40) describes gold's function as follows:

> "Without the gold standard, the clearing process [between countries] is incomplete. As we saw, there is continually a residual balance to or from any country which cannot immediately be cleared, in the sense of being cancelled against a contrary balance. The market can only deal with the residual balance by so adjusting its quotations for the currency in question that the balance will be absorbed by a suitable modification of exports and imports. […] The residual balance can be paid in gold."

However, commercial deficits only have to be compensated with gold exports up to the amount that they are not already offset by capital imports. A country experiencing a commercial deficit can sell securities to the surplus countries and thereby close its balance of payments deficit. Only that part of the current and capital account deficit not neutralised by a financial account surplus needs to be settled with an export of gold. But, as Cencini and Schmitt (1991, p. 39) point out, "even when residual commercial deficits would have required the use of gold, the transfer of the key currency of the times was often preferred to that of the precious metal". This is confirmed by Melvin and Norrbin (2012, p. 27), who note how the pound "served as a world money" during the gold standard era.

The theoretical analysis that led Ricardo to advocate the gold bullion standard is closely related to the analysis of the theory of money emissions. In the eyes of the British-Portuguese economist, every international transaction needs to be settled in real, not in monetary terms. By acting as an international standard, gold rendered national currencies homogeneous. Without an international standard, currency A is the measure of currency B, and currency B is the measure of currency A. With no common measure, no international standard exists to homogenise the various national currencies. In Ricardo's time, gold performed as a common measure and was adopted as a settlement asset owing to its favourable characteristics, above all its universal acceptance. In reality, however, gold was rarely used in the strict Ricardian sense, mainly because of insurance and shipping cost, and because many countries accepted pound sterling as a substitute for gold.

A constant concern during the gold standard era was whether world gold supplies would be sufficiently elastic to meet the needs of an ever expanding world economy. If the real growth rate of world GDP is, say, four percent, while the

growth rate of gold supply is in the order of 0.5 percent, it is obvious that periodic adjustments are necessary in order to take into account the scarcity of physical gold. The devaluation of the pound sterling in 1931 by 30 percent with respect to the US dollar that led to the demise of the interwar international gold standard is a testimony to the allergic reaction countries suffer when facing such devaluations. Moreover, many economists realised that technological progress in banking had led to a massive increase of book-entry bank money totally unrelated to the gold stocked in central banks' vaults (see Michie, 1986, p. 170). It was credit money created by banks that dominated world markets during the gold standard, not gold flows. Triffin (1968, p. 54) points out that after 1872, "95% of the expansion of world money was derived from bank money, as against 5% from silver and gold together". Also, central banks held an increasing amount of reserves in the form of foreign exchange; according to Peter Lindert's estimates, the percentage of foreign exchange relative to global international reserves rose from ten percent in 1880 to roughly 25 percent in the 1920s (Lindert, 1969).

Another serious drawback are the resource costs caused by an international gold standard. Mining, storing and transporting gold to net exporting countries for settlement purposes is spectacularly costly. Not only should the economic cost of gold's production be taken into account, but also the human cost suffered in the world's gold mines. The anachronism of gold was summarised elegantly by Triffin (1963b, p. 422):

> "It would seem somewhat paradoxical and ludicrous to claim that the most rational and economic system of international settlements conceivable in this second half of the twentieth century consists in digging holes, at immense cost, in distant corners of the earth for the sole purpose of extracting gold from them, transporting it across the oceans and reburying it immediately afterwards in other deep holes, especially excavated to receive it and heavily guarded to protect it."

The preference of many countries for holding financial claims on net importing countries is partly due to the considerable transaction costs that mining, storing and shipping the bulky metal causes.

5.2   Bretton Woods

It was the aim of the US secretary of the treasury, Henry Morgenthau, to make the US dollar the basic unit of exchange for the whole world after the war (Steil, 2013, p. 126). The American plan succeeded: the summit at Bretton Woods directly led to the International Monetary Fund, the World Bank, the General Agreement on Tariffs and Trade (GATT) and the adoption of the US dollar exchange standard according largely to the plans of the US delegation. While the

pound sterling played the role of the main key currency prior to World War I, the US dollar now formally replaced the pound at the centre of the world monetary system. To wit, every member state of the Bretton Woods system was supposed to maintain an adjustable peg of its currency with respect to the US dollar, and in turn the US government guaranteed gold convertibility at a rate of $35 per ounce of gold. In principle (though not in practice), every currency of member countries was convertible into gold *via* the US dollar. Parity adjustments with respect to the US dollar were only allowed by the IMF in the face of 'fundamental disequilibrium', a term that was never exactly defined (in accordance, we may say, with economic theory, which to this day cannot really say what is meant by economic equilibrium, as explained at length in Chapters 2, 3 and 4). In practice, especially less developed countries frequently devalued their currencies with respect to the US dollar, and the US dollar was widely regarded as good as gold. Convertibility of US dollars into gold was restricted to member central banks. However, the function of gold for safeguarding payment finality between countries was even less important than during the international gold standard. Generalised convertibility was in fact only actuated in 1959, reducing the life span of the Bretton Woods system *de facto* to twelve years (Gandolfo, 2004, p. 38). And even in those twelve years, the system was not really based on gold:

> "Under the Bretton Woods system it was generally accepted that the dollar came to fulfil the function of world money more efficiently than gold, and its convertibility was not only theoretically limited […], but practically useless." (Cencini and Schmitt, 1991, p. 42)

This means that payment imbalances between countries were not settled with gold. Instead, countries at the periphery accumulated financial claims denominated in US dollars. Parenthetically, we may add that this mechanism was incoherent with Harry Dexter White's theoretical position. In a manuscript written prior to the meeting at Bretton Woods titled "The Future of Gold", White was explicitly in favour of settling balances between countries with gold akin to the (theoretical) gold standard (Steil, 2013, p. 129).

The Bretton Woods system amounted to a *de facto* US dollar standard, in which the member states operated currency boards that traded currency (mainly in US dollars, the *intervention currency*) in foreign exchange markets in order to regulate the exchange rate with the US dollar. After the breakdown of Bretton Woods, monetary authorities decided to let exchange rates float and instead exercised control over the quantity of money in order to maintain a stable price level according to monetarist principles. While monetary targeting gave way to inflation targeting owing to the poor performance of monetarist policies, the theoretical mind-set concerning domestic monetary policy has not yet changed substantially (see Rossi, 2007a, Chapter 5).

5.2.1   Strengths and weaknesses of Bretton Woods

Referring to the policy trilemma (Obstfeld and Taylor, 1997), the most obvious benefit of the Bretton Woods system was the fixed exchange rates among trading member countries, which made planning for firms easier by reducing uncertainty in the system. The second benefit was the monetary authorities' ability to conduct a relatively independent interest rate policy that accommodated to national economies' needs.

Despite these notable benefits, the Bretton Woods system was not able to satisfy in the long run countries' demands for a monetary system that allowed for free trade while safeguarding internal (consumer price) and external (exchange rate) stability. Although gold was not generally used for the settlement of international debt arising from payments imbalances, it was soon obvious to observers that gold convertibility was a highly unrealistic social fiction at the fixed price of $35 per ounce of gold. The growing US commercial deficit, usually associated with the US invasion of Vietnam, destroyed the confidence in the key currency, and the discrepancy between the gold held by US authorities and the US dollar liabilities circulating internationally was so evident by the 1960s that the closing of the gold window by president Nixon in 1971 was anticipated by market observers. In order for the rest of the world to be able to accumulate foreign exchange in the form of claims on US dollar deposits, the United States had to run persistent balance of payments deficits, thereby casting into doubt the dollar's role as reserve currency in the first place. In other words, the process that enabled the US dollar to become the global reserve currency in the first place was the same process that subverted the world's confidence in the dollar: US balance of payments deficits. This obviously unsustainable dynamic was coined the 'Triffin dilemma', so called because the first to clearly state it was Robert Triffin (1960). Gandolfo (2004, p. 39) summarises the Triffin dilemma as follows:

> "Hence the dilemma: if the US allow the increase in international liquidity through deficits in their balance of payments, the international monetary system is bound to collapse for a confidence crisis; if, on the other hand, they do not allow such an increase, the world is condemned to deflation."

The asymmetrical role of the US dollar allowed the United States to import without surrendering any real object of value in return other than the promise of future payment, a fact noticed by the attentive economist Jacques Ruff in the de Gaulle government. As Eichengreen (2008, p. 115) correctly points out, "the de Gaulle and Triffin problems were related". The accumulation of US dollar reserves – claims on the US economy held by rest of the world – depends on increasing US trade deficits, a fact noticed by Triffin (1963a, p. 17). Precisely because the United States is allowed to 'pay' for its imports by getting indebted does the US economy become a large net debtor toward the rest of the world:

"The supply of reserve currencies to other nations depends on payment deficits incurred by the reserve countries" (Machlup, 1963, p. 256). Non-key–currency countries afraid of large book-losses in case of fire sales of dollar denominated financial assets and a subsequent US dollar devaluation soon looked for a new global reserve asset that would circumvent dollar dependency and thereby provide an instrument for asset diversification. This led to the creation of Special Drawing Rights (SDRs) at an annual meeting of the IMF in Rio de Janeiro in 1967, an invention that will be discussed at some length below.

Dollar's convertibility into gold was officially suspended on 15 August 1971. The Group of Ten reached a settlement at the Smithsonian Institution in Washington DC, according to which the US dollar was devalued by about eight percent with respect to gold. New parities for the major currencies were established, and a 2.25 percent margin of exchange rate fluctuation was defined with respect to the new central rates (Melvin and Norrbin, 2012, p. 33). In February 1973, Japan and the EEC countries let their currencies float against the US dollar. For many commentators, this event marks an epochal change, as it severed an age-old link between legal tender money and a precious metal (see Fazio, 2000). However, and as already discussed in Chapter 3, this metallist view is highly dubitable. Economists in the eighteenth century already realised that bank money's purchasing power does not necessarily rely upon precious metals (see Steuart, 1767/1998, p. 218). For all we know today, the existence of pure credit money predates the existence of metal coins and banknotes by hundreds, if not thousands of years (Graeber, 2011). A monetary system with a metallic backing is more of a historical exception, rather than the general rule.

There was a competing proposal put forth at Bretton Woods: that of the British delegation, led by John Maynard Keynes, known as the Keynes plan. In the next section, Keynes's proposal is analysed more closely, as it contains some important lessons for international monetary systems of the future.

5.2.2   Keynes's International Clearing Union

As Grubel (1963, p. 7) points out cogently, the Keynes plan is "of historic interest as an effort to construct a system of world payments that can efficiently meet the needs of a growing world economy". As early as 1941, Keynes (1980) put forward his plans for the creation of an International Clearing Union (ICU), an idea that can be traced back to his *Treatise on Money* (Keynes, 1930/1971, Chapter 36). Keynes's proposal was completed in 1943 and presented at Bretton Woods in 1944. In the history of economic thought, Keynes's plan is revolutionary because it initiated the idea of an international payment system based on book-entry money (instead of a physical settlement asset), which "might become the pivot of the future economic government of the world" (Keynes,

1980, p. 189). As is well known, Keynes's proposal for monetary reform was rejected in favour of the plan of the American delegation led by Harry Dexter White. Like his US negotiating partner, Keynes attempted to stop excessive global payments imbalances from emerging. But while White's plan encompassed an asymmetrical monetary system with the US dollar at its centre, Keynes wanted to create a symmetrical world monetary system by introducing an international currency. Keynes's idea encompasses the creation of an international means of payment fixed in terms of gold, the *bancor*, circulating between countries in order to finalise payments for commercial and financial transactions:

> "We need an instrument of international currency having general acceptability between nations, so that blocked balances and bilateral clearings are unnecessary; that is to say, an instrument of currency used by each nation in its transactions with other nations, operating through whatever national organ, such as a Treasury or a central bank, is most appropriate, private individuals, businesses and banks other than central banks, each continuing to use their own national currency as heretofore." (ibid., p. 168)

The purpose of the bancor was to settle international balances in a timely manner. The new international money was supposed to enable exporting countries to spend the money they earned in any other country, thus establishing, in Keynes's (ibid., p. 270) own words, a "system of multilateral clearing". Keynes's (ibid., p. 171) idea flowed directly from his understanding of modern bank money: "The idea underlying such a union is simple, namely, to generalise the essential principle of banking as it is exhibited within any closed system. This principle is the necessary equality of debits and credits". Costabile (2011, p. 195) is right in stating that "[t]he fundamental idea of the Keynes Plan is that no national currency should work as the international money". Now, Keynes's comments on the essential principle of banking are rather unrefined, but nonetheless illuminating, as they stress his monetary macroeconomic view of the economy. To be sure, the international clearing union was not designed in the first place to manage people's incentives, but to bring the payment system technically in line with the accounting logic of bank money. As Aglietta (2004, p. 52) notes:

> "Keynes observed that the logic of bank money implied the hierarchical structure of banking systems. Within countries inter-bank settlements are daily proceeded in central bank money […]. Keynes thought that the same logic could be forwarded to international settlements, if a third stage was built in linking national banking systems together."

Arguably, one of the most powerful ideas in Keynes's proposal is that the introduction of an international bank of central banks is merely the logical extension of the national monetary system into the international sphere. Just like

the central bank acts as a bank of commercial banks, the international bank would act as a bank of central banks: "In short, the analogy with a national banking system is complete" (Keynes, 1980, p. 177). Additionally, it was the goal of Keynes's reform to copy the *structure* of the gold standard system (Rossi, 2007b, p. 98). According to the British economist, a truly international standard needs to be put in place that copies Ricardo's principle of *real* settlement explained above. Lacking an international unit of account that measures the various national currencies, currencies can but measure each other, leaving them hopelessly heterogeneous without a common standard analogous to the case of a barter system lacking a common unit of account.

Although Keynes's original proposal was never put into practice, its spiritual and contentual proximity to the proposal put forth at the end of this chapter makes it an ideal object of research. A closer study of Keynes's proposal is also extremely topical, as there have recently been many calls for reconsidering the idea of a international money by renowned economists, putting Keynes's bancor back on the reform agenda of monetary policy experts. For example, Dadkhah (2009, p. 260) believes that "it is time to think of a single currency for the coalition of willing countries and a world central bank to manage the international money". In a speech delivered in March 2009, the governor of the People's Bank of China, Zhou Xiaochuan (2009, Internet), called Keynes's idea "farsighted", as it removed "the inherent deficiencies caused by using credit-based national currencies" in the international sphere, and explicitly lamented the fact that the White plan won over Keynes's proposal at Bretton Woods in 1944. Similar comments have been made in reports of the United Nations' (2009) *Experts on reforms of the international monetary and financial system* as well as by Moghadam (International Monetary Fund, 2010). Given the fact that international money is already discussed at the highest levels between practical economists and central bankers, the idea is certainly less utopian than it would seem.

So how would Keynes's clearing union have operated? In fact, this question is not so simple to answer, which is not surprising given the fact that economists still find it hard to define what money is (see Chapter 3). Is the 'bitcoin' money? Was Keynes's bancor an international money? Are Special Drawing Rights money? Xiaochuan (2009) seems to believe that SDRs and bancor are essentially the same, although the IMF explicitly states that SDRs are not a currency. In order to clarify this matter, an analysis of the way bancor and SDRs are issued is necessary.

According to the proposal put forth by the great British economist, in the international sphere, "all transactions [have] to be cleared between central banks, operating on their accounts with an International Clearing Bank" (Keynes, 1980, p. 34). The international clearing bank therefore assumes the role between central banks that central banks occupy between commercial banks, namely, functioning

as a settlement institution. The bancor lent by the ICU would be spent by the importing country to the benefit of the exporting country, whose accounts with the ICU would be credited by the amount the importing country's accounts are debited. To date, neither the IMF nor the BIS fulfil this requirement (see Rossi, 2007a, p. 104). In the regime proposed by Keynes, the central bank of every country would hold an account with the ICU through which the country as a whole is remunerated for its exports in terms of an international bank-money: "Countries having a favourable balance of payments with the rest of the world as a whole would find themselves in possession of a credit with the Clearing Union, and those having an unfavourable balance would have a debit account" (Keynes, 1980, p. 171). The bancor would be fixed in terms of gold and it would be possible for central banks to receive any amount of bancor in exchange for gold. Keynes never specified how many bancor would have to be created. However, the framework would not give central banks the right to demand gold from the ICU in exchange for bancor balances. Penalties on the amount of credits and debits a country can hold were supposed to stop the over-accumulation of current account imbalances and introduce an equilibrating mechanism into the system. Importantly, Keynes wanted debtor *and* creditor countries alike to share the burden of adjustment, a conceptual novelty that significantly led to the rejection of this plan by creditor countries (mainly the US delegation). To be precise, creditor countries were supposed to pay 'interest' of one percent on the excess of the average balance, "whether credit or debit", above a quarter of the country's quota on their bancor balance with the ICU. Another percent would be charged for the excess balance above half of its quota. This instrument, which Keynes (1980, p. 173) called "not absolutely essential to the scheme", was quickly rejected by the Americans, who as a country at that time were running current account surpluses.

Table 5.1 Allocations of bancor by the ICU.

Central bank of a member country A			
Assets			*Liabilities*
Bancor holdings	+x bancor	Bancor allocation	+x bancor
International Clearing Union			
Assets			*Liabilities*
Bancor allocation	+x bancor	Bancor holdings	+x bancor

At a theoretical level, the problem of the bancor is its asset-conception underlying the analysis. Consequently, "[t]he Keynes plan for world monetary reform does not distinguish explicitly between money and credit in so far as the working of the [International Central Bank] is concerned" (Rossi, 2007b, p. 100). This can be seen in the way the bancor would have been introduced by the ICU according to Keynes's original proposal. To wit, a sum of bancor would have been created and 'allocated' to each member state approximately in proportion to each country's average exports and imports in the last three years (Keynes, 1980, pp. 172-3).

Keynes neglected to illustrate the book-entries of his idea, but it is reasonable to assume that initial endowments of bancor would have been entered into the books essentially the same way as SDRs are entered today (see next section). Table 5.1 shows how the allocation of bancor could be entered from an accounting perspective.

It is worth pointing out some differences and similarities between Keynes's bancor and the Special Drawing Rights introduced by the IMF in 1969. The value of the bancor was supposed to be defined in terms of gold, just like SDRs were between 1969 and 1973. The book-entries necessary for the allocation of bancor to member central banks would probably have been identical to the allocation of SDRs, creating an asset *and* a corresponding liability attached to it for the issuing institution as well as for the member central bank. The creation of a liability corresponding to the asset can be justified in three ways. First, countries in possession of positive and negative bancor balances relative to their quota would be obliged to pay interest to the ICU; paying interest for an asset one owns (instead of a liability) would be a very peculiar arrangement indeed. Secondly, the credit in terms of bancor would have to be paid back if a member country decided, for whatever reason, to leave the arrangement, indicating that the initial endowment of bancor is not an unrequited transfer, but in fact a special credit line from the ICU that ultimately demands repayment. Thirdly, a country whose bancor balance drops below 50 percent of its allocated quota has to deposit "suitable collateral against its debit balance" according to Keynes's (ibid., p. 61) original proposal. This provision of collateral of course means that member central banks are indebted toward the ICU up to the amount of their initial allocation of bancor.

Both bancor and SDRs require their member central banks to accept payments of currency balances by a transfer of SDRs/bancor. Yet, while net imports/exports of a country lead to a corresponding debit/credit in terms of bancor, the SDR is merely a conduit for central banks to receive or provide national currencies to or from other member central banks. In Keynes's (ibid., p. 181) terms, the ICU is not set up for the transaction of daily business, but "for the settlement of the ultimate outstanding balances between central banks". Member countries in possession of SDRs may withdraw from other countries an amount of specified national currencies at a given exchange rate, an operation that would have been possible with the bancor, as well.

Let us show the book-entries resulting from an import of a resident in country A from country R in Table 5.2, using Keynes's bancor. As is made clear, the central bank in A is debited by the International Clearing Union (–x bancor) and in turn debits the importer's commercial bank (–y MA). The ICU accordingly debits the central bank of the importing country (–x bancor) and credits the exporting country's central bank (+x bancor). Finally, the central bank in country R receives

an amount of x bancor from the ICU, on the basis of which it creates a positive deposit (+z MR) for the exporter's commercial bank.

Table 5.2 The result of country A's imports using bancor.

Central bank of member country A			
Assets			*Liabilities*
Bancor holdings	–x bancor	Deposit of importer's bank	–y MA
International Clearing Union			
Assets			*Liabilities*
		Bancor holdings of A	–x bancor
		Bancor holdings of R	+x bancor
Central bank of member country R			
Assets			*Liabilities*
Bancor holdings	+x bancor	Deposit of exporter's bank	+z MR

Two remarks are apposite, the first one concerning (the lack of) payment finality in this transaction. Left with a positive sum of bancor, country R as a whole has effectively not been paid in this transaction. Instead, country R is a net creditor with respect to the ICU, while country A is a net debtor. Payment requires the transfer of an economic value that has the power to discharge debt finally. Country R, however, has merely been credited with a sum of bancor, which does not even grant it the drawing right over any amount of gold owing to Keynes's one-sided convertibility clause. The gold promised to the creditor country R remains but a promise, as Keynes (ibid., p. 184) intended to slowly supplant the position of gold: "No member state would be entitled to demand gold from the Clearing Union against its balance of bancor; for bancor is available only for transfer to another clearing account". It is easy to understand why Bretton Woods delegates were not convinced by Keynes's idea of accepting a bancor deposit whose value depended on a commodity that was *de facto* outside of the countries' reach. Furthermore, the currency union's gold would probably have been stored in the United States and Great Britain, thereby creating a politically asymmetric situation unacceptable for smaller states.

Most importantly, Keynes's International Clearing Union would not have been an international *monetary* intermediary that issues the means to offset international debt, but merely an international *financial* intermediary. As already pointed out, the fundamental problem with Keynes's plan is that it does not distinguish between money and credit. If a country uses bancor for its net imports, the ultimate creditor of this financial operation is the exporting country, which lends – via the International Clearing Union – the amount needed to the importing country. It is therefore only superficially correct to state that "countries would not become indebted to each other" (Costabile, 2011, p. 195). Instead, as Lutz (1963, p. 241) clearly realises, it is the exporting country which is really giving the credit to the importing country, with the ICU as a financial – though not a monetary –

intermediary in between. For the bancor to receive the status of a means of payment, it must be capable of *discharging* the debt between the two trading countries. Keynes's ICU would simply *mediate* the debt.

While money is issued as an asset–liability by banks, money is wrongly perceived to be a net asset with an already attached positive purchasing power that can be created by the banking system at will. This misconception in closed economy macroeconomics is tragically extrapolated into the field of international macroeconomics. If the international liquidity problem is analysed with the false premise that money is a net asset, it is a logical consequence that economists try to solve the problem by creating more financial assets out of thin air. As Table 5.2 clearly shows, the creation of a sum of bancor engenders the creation of an asset and a corresponding liability for both ICU and receiver. No net asset is therefore created when bancor are created. While national currency is issued as an asset–liability as well, in an orderly working system it is associated with production through the payment of wages. Unlike national currencies, the bancor would not serve to monetise national production. Its purchasing power would therefore remain hopelessly indeterminate, and therefore quite arbitrary. As pointed out above, national macroeconomics is concerned with production and exchange, while international macroeconomics is concerned only with exchange, as no international production can ever occur. The fact that the entire world GDP is merely the sum of national GDPs, measured in terms of national currencies, confirms this. While the content of money in the national sphere is thus easily explained – national production – the allocation of bancor as proposed by Keynes is devoid of any real content, and its purchasing power must be legally tied to some sort of 'real' value. This means the 'international liquidity' cannot be improved by creating bancor along Keynes's lines, if international liquidity is supposed to define countries' "capacity to pay promptly" (Machlup, 1976f, p. 252).

Money only containing value through its association with production, the newly created bancor have to be linked to some quantity of output according to a mathematical formula that will always be somewhat accidental. According to Keynes, the ICU is in the position to create a new purchasing power by issuing a global currency. This is confirmed by Machlup (1966a, p. 6): "The proposals for the creation of an international reserve center with power to create additional reserves for national monetary authorities are opposed partly because of their inflationary potentialities". How is the origin of this purchasing power explained? Obviously, the bancor cannot be directly associated with production on the labour market, as it is supposed to serve merely as an international means of payment. While national currencies are the vehicle of national output and gain their purchasing power through their association with output on the labour market, no truly international production exists. As a consequence, "[t]otal indeterminacy, if

not absolute arbitrariness, is therefore the only possible answer to our question" (Cencini and Schmitt, 1991, p. 109).

If it is correct that the international monetary system simply lacks sufficient amounts of internationally tradable financial assets, it would be true that the creation of all sorts of internationally tradable financial assets offers the solution. On top of SDRs that grant their owners the drawing right over the underlying currencies (or, for that matter, bancor that grant drawing rights over gold), the IMF could then simply create another layer of financial assets granting drawing rights over SDRs, and so forth until a thick layer of financial assets saturates the global demand for liquid assets.[19] However, money is not a financial asset, and the international monetary system does not need another layer of financial assets. For the payment system to be able to convey payments between currency areas, a *vehicle* of exchange is needed, not yet another financial object of trade.

Before analysing more closely the current post-Bretton Woods non-system, it is worth looking into Ernst Friedrich Schumacher's (1943) proposal for reform of the international monetary system. It is known today that Schumacher's proposal of a multilateral clearing system greatly inspired Keynes's proposal at Bretton Woods merely some months later to the extent that Keynes borrowed certain passages almost *verbatim*. According to Schumacher's (ibid., p. 151) plan, every country needs to establish a so-called 'National Clearing Fund' (NCF) under the auspices of a central 'International Clearing Office' (ICO) in order to carry out international transactions properly. When a resident imports products from abroad, he or she transfers the necessary sum of local money to its NCF. Once the NCF of the importing country receives payment, it informs the NCF of the exporting country, which in turn transfers the adequate sum of local money to the exporter after taking into account the fixed exchange rate. At the end of the chosen period, the NCF of the deficit country is left with a positive sum of national money, which it owes entirely to the NCF of the exporting country. All positive balances of national monies are thereby pooled, and the property shares over this common pool are distributed among the surplus countries according to the size of their surplus (hence the term "Pool Clearing"). The spilling over of national currencies is thereby seemingly thwarted, as "[e]ach National Clearing Fund […] receives and disburses only national currency". The positive balances in deficit countries that ultimately belong to the surplus countries can then be spent by the National Clearing Funds in the deficit countries on treasury bills in the open market, thus generating interest earnings that ultimately accrue to the surplus countries.

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[19] The International Monetary Fund (2011a, p. 4) has, as a matter of fact, already taken the possibility of creating SDR-denominated financial assets into account.

The equilibrating mechanism envisioned by Schumacher may partially explain Keynes's sympathy for the proposal: the onerous burden of adjustment is not simply delegated to the deficit countries, who have no choice but to adjust their economy. One possibility of adjustment mentioned in the proposal is that the surplus country's NCF can only "run into debt with the internal money market up to a specified amount". After that, each export of goods and services needs to be matched by an equivalent import. Alternatively, deficit countries could be furnished with a maximum limit of positive balances beyond which every import needs to be matched by an equivalent export. Note that this is not an equilibrium mechanism *sensu stricto*, but rather an upper or lower boundary for surplus and deficit countries. Schumacher (ibid., p. 157) deems the second alternative the more workable one. The drawbacks of such hard boundaries are potentially severe. After a certain trade deficit has been reached, imports of the deficit country can only be made if it previously exports an equivalent amount, thereby potentially punishing both surplus and deficit countries and regressing into a multilateral yet contractionary barter system.

Schumacher mentions another equilibrating mechanism. He stresses that the positive balances in the funds are rather "unprofitable and risky" because "the Pool's assets are always the weakest currencies in the world: the currencies of the countries that have been unable to earn as much as they have spent" (ibid., p. 157). The unattractiveness of the Pool's currencies – similar to the idea of a bad bank in today's terms – would create an equilibrating force toward balance of payments, as surplus countries would rightly mistrust the quality of the pool's assets and try to get rid of their property shares by increasing their imports.

Schumacher's proposal does not entail the creation of an international currency, as his system of multilateral clearing makes this instrument unnecessary in his view. Instead of a sum of international currency, a surplus country receives a property right to the undifferentiated pool of national currencies held by the deficit countries. Be that as it may, Schumacher comes very close to construing an international currency when he claims that, by pooling the balances of national currencies, they "have lost their identity" (ibid., p. 153). As we will see, it takes only a little step from Schumacher's idea of transferring to a surplus country a share to a pool of national currencies to the idea of transferring to a surplus country a sum of international money.

Schumacher's multilateral clearing system concentrates on the balance of trade in goods and services, thereby excluding trade in financial products. This is a clear drawback in his analysis. The main problem of Schumacher's proposition, however, is captured in this sentence: "Let us say we make a start with this system and give every country the right to discharge all its cash obligations to the rest of the world simply by paying its own national currency into its National Clearing Fund" (ibid., p. 156). The *contradictio in adiecto* in this passage – the possibility

of paying the exporting country by promising to pay in the future – bears witness to the inadequacy of Schumacher's proposal. Putting all positive balances of national currencies into one common pool and handing out shares to the surplus countries that grant them the drawing right over a fraction of this pool of funds is no substitute for final payment, but merely a promise of future payment. Furthermore, if the national clearing offices in the deficit countries are allowed to purchase securities from abroad in order to diversify their portfolio, national currencies will spill over into other currency areas, thereby breaching the principle that national currencies ought to remain in their countries of origin. Any international payment system ought to safeguard the final payment of goods and services *as well* as securities.

In an attempt to point out historical similarities, we may compare Schumacher's proposal to the bilateral clearing between Holland and England through the intermediation of merchants, described by Ricardo (1809/1951, p. 19). Ricardo explains a typical nineteenth century international transaction as follows: the English importer transfers a sum of English money to an English merchant, who orders his correspondent in Holland to pay the exporter in Dutch money. In both Ricardo's and Schumacher's example, the import has not really been paid. Instead, the two merchants (or in Schumacher's case, the two Clearing Funds) are the two agents of a debt–credit relation as a result of the transaction. Financial intermediation is merely shifted from importer/exporter to merchants, while monetary intermediation between the two countries is entirely lacking.

To sum up, Keynes's proposal, which drew on Schumacher's ideas, was rejected at Bretton Woods in favour of the proposal put forth by the American delegation. The most original message of the British proposal was thereby neglected and to some extent lost: that the world needs an international means of payment able to finally settle transactions involving two national currencies. Instead, the US dollar was now designated as the primary means of payment on the international stage, and its value abroad was justified with its proclaimed convertibility into gold. In the next section, the IMF's Special Drawing Rights (SDRs) are analysed more closely. The main point of issue is their supposed ability to settle trade imbalances between currency areas as well as their contribution to the stability of the global monetary system.

5.2.3   Special Drawing Rights

The academic origin of SDRs lies in the mistrust of economists such as Keynes, Rueff, Triffin and others against using national currencies in an international context. The US government was initially opposed to the creation of SDRs because it feared it would undermine the US dollar's privileged position at the centre of the world monetary system (Eichengreen, 2008, p. 117). The French

government, quite consistently opposing every sort of asymmetrical monetary system since the Genoa conference in April 1922, supported the creation of SDRs. The United States swayed in 1965, and in 1967 an agreement was reached in Rio de Janeiro that was put into force in 1969. While its value was fixed in terms of gold in the first four years, the value of one SDR relies on a weighted basket of four national currencies (euro, yen, US dollar, and the pound sterling) today, aiming at higher stability and hence attractiveness as a reserve currency. In contrast to foreign reserve currencies, SDRs are only allowed to circulate among central banks and governments, not among private agents. The development of a private, more liquid market for SDRs was thereby effectively thwarted. The progressive substitution of national currencies with SDRs was supposed to reform the international monetary system by replacing the US dollar standard with a true international monetary standard. Under the Articles of Agreement, members of the IMF have an obligation to collaborate with the IMF and other members in order to make SDRs the principal reserve asset in the international monetary system. However, Cencini (1995, p. 218) points out that "the money-basket neither enjoys a status independent from that of its components, nor a value of its own".

It is necessary to walk slowly through the questions of definition, as even experienced economists fall into the trap and erroneously call SDRs an international (fiat) money (see, for instance, Gandolfo, 2001, p. 378). As Williamson (2009, p. 1) explains, the reason for the anodyne name of this financial instrument was "a continuing disagreement over whether the new reserve asset should be called money ('paper gold') or credit". The mysterious nature of SDRs is mirrored in this short passage by Gold (1970, p. 28):

> "The characteristics of special drawing rights are not the result of any single approach. They are the distillation of chemistry – some might say an alchemy – in which many theories and many compromises, economic, legal, and political, went into the alembic. The product cannot be classified according to such familiar categories as 'legal tender', 'money', or 'credit'. Special drawing rights are *sui generis*."

According to the official definition, SDRs are "entries in the IMF ledger that allow deficit countries to settle part of their payments imbalances with allotments of SDRs" (Meier, 1982, p. 90). As confirmed by the IMF, the SDR is neither a currency, nor a claim on the IMF: "Rather, it is a potential claim on the freely usable currencies of IMF members" (International Monetary Fund, 2014, Internet). This definition is further elaborated by Rossi (2007a, p. 98), who points out that "SDRs are just a conduit to obtaining a number of national currencies like the US dollar and the pound sterling, with which any given country pays its foreign trade deficit eventually – but not finally". When a country transfers SDRs to the benefit of another country in exchange for foreign currency (in practice

usually the US dollar), the country receiving SDRs is effectively not paid. Rather, it obtains a drawing right over some specified sum of national currencies. The country is merely promised a sum of underlying currencies (which, let us stress it, neither settles the international debt finally). In addition, IMF members may hand over SDRs to the IMF in exchange for some variable amount of national currency. However, SDRs cannot be used to directly purchase goods and services on the market. Rossi (2007a, p. 98) further clarifies the nature of SDRs:

> "As such, SDRs are special credit lines rather than money, provided multilaterally under the aegis of the IMF. More precisely, SDRs were a new form of financial assistance to deficit countries, which obtain a special right to withdraw a specified amount of some national currencies, which they surrender in payment of the commercial or financial deficit they have with the rest of the world."

In order to understand why the transfer of SDRs does not constitute a payment, one can look at the process of initial endowment. While the world supply of US dollars to the rest of the world rests on US balance of payments deficits, the IMF *allocates* SDRs according to a given percentage of a member countries' quota (ibid., p. 98). Since their creation in 1969, there have been three general allocations and one special allocation of SDRs. The special allocation, conducted in September 2009, aimed at enabling formerly excluded members of the IMF to participate in the SDR system (International Monetary Fund, 2014). Table 5.3 shows the book-entries of the creation and allocation of Special Drawing Rights by the IMF's SDR Department to the central bank of a member country.

Starting from *tabula rasa*, it can be observed how the SDR Department of the IMF enters in its books an amount of Special Drawing Rights to the benefit of a member central bank. Note that the entries correspond to the way bancor allocations would probably have been entered. The central bank must simultaneously enter the SDRs as assets and liabilities toward the IMF "because of a requirement to repay the allocation in certain circumstances, and also because interest accrues" (International Monetary Fund, 2009, p. 86). Member countries of the IMF today "record the liability side of the SDR allocation in the balance sheet of the monetary authorities, and the International Accounting Standards accounting framework explicitly recognises such treatment" (ibid., p. 6). If a country sells all of its SDR holdings registered on its asset side in exchange for foreign currency, it turns into a net debtor toward the IMF's SDR Department and must pay interest on the loan that will be forwarded to the net creditors of the system. Table 5.3 thus confirms that "[h]oldings of SDRs by an IMF member are recorded as an asset, while the allocation of SDRs is recorded as the incurrence of a liability of the member receiving them".

Table 5.3 Allocations of SDRs by the IMF.

Central bank of a member country A			
Assets			*Liabilities*
SDR holdings	+x	SDR allocation	+x
SDR Department of the IMF			
Assets			*Liabilities*
SDR allocation	+x	SDR holdings	+x

Note, however, that this approach is rather new. In the UN's *System of National Accounts of 1993* (SNA 1993) and the IMF's *Balance of Payments Manual 5 (BPM5)*, SDRs are still classified as assets without a corresponding liability attached (International Monetary Fund, 2005, p. 1), thus causing an increase in the *shares and other equity*-position on the liabilities side of the balance sheet when SDRs are allocated. This reflected the view that "the allocation [of SDRs] is in the nature of an unrequited transfer" (International Monetary Fund, 2005, p. 3). Today, the IMF's *Monetary and Financial Statistics Manual* recommends that the value of allocated SDRs is shown on the assets *and* liabilities side of central banks (ibid.). So although "IMF members […] do not have an actual (unconditional) liability to repay their Special Drawing Rights […] allocations" (United Nations, 1993, p. 324), SDR holdings can be regarded as assets *and* liabilities for the owner. Note that this assessment of the allocation mechanism contrasts with Cencini and Schmitt's (1991, p. 85) assessment, which states that the allocation of SDRs would be entered on the asset side of the central bank's balance sheet and, on the liabilities side, as an inflationary credit in domestic money for the state by an equivalent amount. The fact that "SDR is an unusual instrument, creating difficulty in the determination of its treatment in the accounts" (International Monetary Fund, 2005, p. 4) bears witness to economists' confusion when it comes to the architecture of payments systems, which completely escape the logic of equilibrium analysis.

It will be unnecessary at this point to illustrate the accounting of a transaction with SDRs. According to the 1978 amendments to the Rio Agreements, the IMF's executive board decided to extend the functions of SDRs by permitting member countries to settle financial obligations and make loans between them with SDRs. This implies that any member country "could equally well be allowed to use SDRs directly for the settlement of its commercial transactions" (Cencini and Schmitt, 1991, p. 82). It also means that the transaction mechanism is essentially the same as with Keynes's bancor. While these policies might increase acceptability of SDRs, they would change nothing about the fact that SDRs are not a currency and do not have the power to offset international debt. Point 1, article V of the Rio Agreement states that

"A participant will be entitled, in accordance with the provisions of article V, to use special drawing rights to acquire an equivalent amount of a

currency convertible in fact. A participant which thus provides currency will receive an equivalent amount of a currency convertible in special drawing rights".

Let us differentiate clearly between money and SDRs at this point. When a country receives SDRs by exchanging the foreign currency earned through exports, it receives a claim on currency, which is the same as saying that the country has not been paid for its exports. Money and SDRs are therefore to be strictly separated at a conceptual level. International money is a means of payment that offsets debt between countries. SDRs are neither commodities, nor money. The value of one SDR does not derive from its direct association with production, but from its mathematical association with national currencies, combined with a legal drawing right. Rather than money, an SDR is equivalent to a token that legally promises its holder a basket of underlying bank deposits. Therefore, it is correct to say that national monies still perform the function of international means of payment, as SDRs do not offset international debt finally, but merely promise their holders some amount of underlying national currencies. The problem of erratic fluctuations of the exchange rate that feeds the desire for a stable, international reserve currency in the first place is not solved by introducing a globally accepted reserve asset.

As pointed out by Cencini and Schmitt (1991, p. 82), "the 1978 amendments to the Rio Agreements were appropriate to transform the dollar-exchange standard in an SDRs standard". While it is still not possible to purchase goods and services with SDRs directly, it is now possible for countries to settle financial obligations and make loans with SDRs. This is quite remarkable, considering that SDRs are created *ex nihilo* by the IMF and are then allocated among IMF member states free of cost. As a direct result, 'payments' with SDRs cannot be final, as there exists no direct association of SDRs with national output that would grant them the status of vehicular money. If we accept that SDRs are a form of credit supplied by the IMF to member countries, it is immediately obvious that any discriminatory allocation mechanism gives rise to heated debates. In turn, the fact that member states cannot easily agree on an allocation mechanism constitutes a major obstacle for replacing the US dollar with SDRs.

However, it may be emphasised that the creation of SDRs was a novelty inasmuch as it introduced the first international reserve asset created through a simple book-entry by an international organisation. But despite the introduction of SDRs, the US dollar today remains at the centre of the world monetary system, accompanied by smaller currencies like the yen, the euro, the pound sterling and the Swiss franc. The US dollar's supremacy is thus confirmed to this day, though many commentators have recently heralded its imminent downfall. The SDR represents about 4 percent of global reserves according to the International Monetary Fund (2011a, p. 6) – less than half as much than in the 1970s (8.4 percent). In contrast

to the US dollar, SDRs are not actively traded. The (failed) plan of introducing 'substitution accounts' within the IMF is a sign of the continuing key position of the US dollar in the world monetary system (see Gandolfo, 2001, p. 379). Countries could transfer US dollar deposits to the IMF in exchange for claims denominated in SDRs. However, the official holders preferred to hold on to their US dollars, and the plan was dropped.

As maintained by Cencini and Schmitt (1991, p. 83), letting countries pay their debts by means of an asset created by the IMF offers no solution:

> "In reality, the use of SDRs as *final payment* is not essentially different from the use of dollars made by the USA: in both cases a book-entry of no real value is given in exchange for a positive amount of national resources."

This view contrasts with the IMF's view, which believes that the IMF's SDR Department has the power to create positive economic value with the stroke of a pen: "As noted above, the SDR holdings are considered to be a store of economic value, and so their creation should arguably result in a transaction being recorded in the system" (International Monetary Fund, 2005, p. 5). Indeed, how can a newly allocated SDR be a store of value if SDR allocations, according to an IMF (ibid., p. 6) expert group, "have no impact on GDP"? Common sense suggests that a financial asset created without a corresponding output is merely an empty vessel. It is more realistic to define SDRs as an empty book-entry, a purely nominal asset–liability deprived of content. The distribution among central banks comes with a corresponding debt toward the IMF, "and so the liability is created at the same time as the asset" (International Monetary Fund, 2005, p. 5). Their creation being completely divorced from any real production, SDRs are devoid of purchasing power as they are not associated with output on the labour market the way national monies are. This means, of course, that the domestic money central banks create on the basis of SDRs is inflationary.

After the governor of the central bank of China praised Keynes's idea of a world currency in form of the bancor, he ended up recommending a greater role for the SDR without differentiating between the two concepts. But while it is well known that Keynes's bancor was *supposed* to be an international money proper, it is widely acknowledged today that SDRs are not money. Xiaochuan (2009) does not make it clear in his speech if what he wants is a true means of international payments, or merely the expansion of an internationally traded reserve asset. It is probable that, owing to an orthodox understanding of monetary theory, he believes the SDR can be turned into a means of payment if member countries agree to set up a settlement system between the SDR and other currencies and thereby expand the role of SDRs. However, there is a difference between international money and international credit. Once this distinction is understood, it

is then possible to distinguish between international reserve assets and an international means of payment.

Some economists argue that the Bank for International Settlements, located in Basel, Switzerland, is in charge of settling international payments. This is not the case. The BIS has never been an international settlement institution. Although the BIS claims to be a bank to central banks, it does not issue its own currency – as central banks do – and is therefore not in the position of homogenising national currencies. Instead, "it has been keeping a large ledger in which it records all debts and credits that the member countries' central banks have one with respect to another" (Rossi, 2007a, p. 94). The accounts are held in terms of SDRs and settled in terms of either gold or national currencies.

It should now be clear that neither US dollars, nor bancor, nor SDRs constitute an international means of payment. The creation of SDRs was perceived as a quasi-implementation of Keynes's plan of 1944. However, economic commentators overlooked the fact that the Keynes plan was concerned with monetary, not financial intermediation. This is a direct consequence of the on-going confusion between money and credit. Granting the IMF the right to create a financial asset with no real production tied to it does not solve the more fundamental problem that there does not exist an international means of payment to this day. While it has become easier for countries to *finance* purchases from abroad, countries are still forced to use national monies for international transactions. The IMF today acts as a *financial* intermediary – providing special credit facilities to central banks via its SDR Department – but not as a *monetary* intermediary. This latter intermediation would require the IMF to issue an international means of payment that discharges the debt between the respective currency areas. In contrast, the transfer of SDRs today merely *postpones* payment by transferring to the creditor country claims on the underlying national currencies:

> "Generally speaking, therefore, all international payments involve national currencies as objects of trade in the current regime, which subjects their exchange rates to a structural disorder as they are taken into a set of relative, not absolute, exchanges, contrary to the absolute exchanges that occur all over the world domestically". (Rossi, 2007a, p. 98)

The lack of an international means of payment was an important contributor to the instability of the Bretton Woods arrangement. Before looking into the settlement mechanism resulting from the implementation of an international money, it is worth spending some words on the current post Bretton Woods non-system.

5.3   The current post-Bretton Woods non-system

The accepted options for world monetary reform during the Bretton Woods era encompassed a) an extension of the gold exchange standard, b) mutual assistance among central banks, c) centralisation of monetary reserves and reserve creation, d) an increase in the price of gold and e) freely flexible exchange rates (Machlup, 1963, p. 255). A patchwork of these points was adopted after the breakdown of Bretton Woods, and Machlup (1976e, p. 299) was certainly right when he predicted that the global community will most likely pursue a policy of "'muddling through', with only small repairs to the worst cracks and breaks in the system". Eichengreen (2007, p. 1) summarises today's world monetary system as follows:

> "Today, as forty years ago, the international system is composed of core and peripheral economies. The core has the exorbitant privilege of issuing the currency used as international reserves and a tendency to live beyond its means. The periphery, which has a long way to go in catching up to the core, is committed to export-led growth based on the maintenance of an undervalued exchange rate, a corollary of which is its massive accumulation of low-yielding international reserves issued by and denominated in the currency of the center country."

The non-system that replaced the Bretton Woods arrangement in the 1970s lacks a coherent framework that follows a binding set of rules or an explicit exchange rate regime. The post war system's essential problems were inherited by the new non-system. Neither the need for substantial reserve holdings, nor the asymmetrical role of the US dollar at the centre of the system have changed since the breakdown of the Bretton Woods regime. The Jamaica Agreement of 1976 severed the link between currencies and gold (the so-called 'demonetisation' of gold), thereby turning gold into a commodity like every other with respect to the monetary and financial system. Some countries have since then adopted hard peg regimes, others have let their currencies float within certain limits, some have pure floating regimes. In general, the financial nexus that has evolved since the breakdown of Bretton Woods is "quite different than that envisioned by Keynes or White – one that allows considerable freedom for capital movements, gives the major currency areas freedom to pursue internal goals, but largely leaves their mutual exchange rates as the equilibrating residual" (Obstfeld and Taylor, 1997, p. 3). This framework has not worked equally well for all countries. Over the last decades, emerging markets with more or less managed floats suffered from a series of capital floods and subsequent sudden stops, forcing them to devalue their currencies in order to then run current account surpluses, thereby accumulating foreign exchange reserves for safety reasons (Stiglitz, 2002). In order to calm those foreign investors who doubt the stability of the value of the currency in a less developed country, it has become a dominant strategy of such countries to

accumulate foreign reserves. This has led to a dangerous situation that can be compared to a prisoners' dilemma, in which reserve accumulating countries intend to optimise their output while considering the probable reactions of the other relevant actors. Figure 5.1 offers a graphic illustration of the decisions reserve accumulating countries – in this case China – face in a simplified way.

		Rest of the world	
		Strategy 1: Continue to accumulate dollar denominated financial assets.	Strategy 2: Sell US dollar denominated financial assets.
China	Strategy A: Continue to accumulate US dollar denominated financial assets.	**Value of Chinese reserves remains stable** **Value of the rest of the world's reserves remains stable**	Value of Chinese reserves drops Rest of the world can convert part of its US dollar reserves
	Strategy B: Sells US dollar denominated financial assets.	China can convert part of its US dollar reserves Value of the rest of the world's reserves drops	*Value of Chinese reserves drops* *Value of rest of the world's reserves drops*

Figure 5.1 The prisoners' dilemma for reserve accumulating countries.

From an individual country's perspective, we may soon reach a point at which it is optimal to sell large parts of US dollar denominated financial assets (Strategy B). The probable result would be fire sales of US dollar denominated financial assets around the world, negatively impacting the value of US dollar reserve assets (strategy in italics at the bottom right). This scenario is summarised by Roubini (2005, Internet) as follows:

> "So, the point is that, at some point China may pull the plug as the cost of continuing [the post-Bretton Woods non-system] become[s] too high or, equivalently, it is enough that it starts to accumulate less US dollar reserves to trigger the unravel[l]ing and have everyone else in BW2 periphery jump off the sinking [post-Bretton Woods non-system] titanic."

Luckily, the strategy in bold letters is still dominant. In fact, Iley and Lewis (2013, p. 8) are right in stating that "the financial crisis has highlighted that the rest of the world's reliance on the US dollar is much greater than was previously thought". Still, the stability is on a knife-edge. A country with large US dollar reserves may decide to sell them quickly before other countries have the time to react. The fact that the Chinese government does not publish the amount of US dollar reserves it holds and is actively lobbying for an alternative to the US dollar

indicates that they are attempting to reassure market participants while seeking a smooth transition to a more stable international financial environment. In fact, China, France and Russia have been vocal about their desire for a new international monetary and financial system, while the United States has not endorsed the discussion yet (Stiglitz and Greenwald, 2010, p. 2).

Reactions to the speculative fluctuations of exchange rates have taken mainly two complementary forms. One reaction has been a sharp build-up of international reserves on central banks' asset side of the balance sheet. The international reserves are held as a buffer stock in the case of rapid capital outflow. In the case of capital flight, a central bank holding reserves can sell its securities for foreign currency and then sell the foreign currency for domestic money, thereby strengthening its own currency and safeguarding imports at a reasonable price. By and large, it is fair to say that global reserve accumulation is a positive function of the frequency and severity of global financial crises. The second reaction to the instable international monetary framework has been the abandonment of national currencies altogether. Namely, the euro can easily be interpreted as a reaction to the uncertainty of global financial markets and exchange rate volatility. In what follows, an alternative monetary system is proposed that rests on the principle of final payment.

5.4   Principles of a new international monetary framework

In the past, it has been a prerogative of powerful states to make their national currencies circulate internationally. Persaud (2004, Internet) lists eight reserve currencies in international use before the pound sterling and the US dollar, and remarks that "reserve currencies come and go. They don't last forever". One may generalise the principle and note that it has always been the aim of empires to be able to run commercial trade deficits with the rest of the world, thereby gaining more flexibility and accumulating wealth in the heartland. This strategy can be pursued by way of force, as the Roman Empire did, acquiring foreign capital with the sword for the purpose of collecting taxes and duties that will ultimately finance the trade deficits of the core. It can be done like Spain, namely by colonising societies unfortunate enough to sit on natural gold deposits, which are then exploited and shipped to the heartland in order for the latter to be able to purchase commodities abroad.

A more peaceful – but nonetheless pathological – method of running constant trade deficits is by issuing a reserve currency, thereby enabling the country at the centre of the system to purchase without effectively paying. Naturally, this is an unsustainable state of affairs, because "no matter what is the technical set-up, every country must pay for what it buys, which means, in the long run, that it must achieve a position in which it can supply as much in goods and services to

the rest of the world as it receives" (Schumacher, 1943, p. 155). In the meantime, as has been repeatedly pointed out, the reserve currency mutates from its natural role of means of payment into an object of trade, causing erratic fluctuations of exchange rates incompatible with the overriding demands for a stable macroeconomic environment. In light of this, it is no surprise Keynes (1980, p. 195) demanded a "greater readiness to accept super-national arrangements" after World War II and described his proposal as a "measure of financial disarmament" that needs to be put in place in order to promote peace and order. Today, 71 years after the Bretton Woods conference, international financial cooperation is still in high demand in light of the persisting financial turmoil.

Free capital flows

a)   c)

Fixed exchange rates   b)   Sovereign monetary policy

Figure 5.2 The macroeconomic policy trilemma.

The overarching principle for a new international monetary framework is a principle already fully respected today within nations' borders: *the principle of final payment,* enabled by a two tiered and pyramidal structure of the national banking system. The last 150 years of international monetary systems teach us that the method by which international payments are conducted has far-reaching consequences for the global financial system as a whole. A payment mechanism is needed that allows, at the same time, for economic expansion through global trade in (financial) products and stable price levels and exchange rates. This, of course, is the famous policy trilemma of international economics (Obstfeld and Taylor, 1997) that can be illustrated in Figure 5.2.

According to this 'impossible trinity', only two of three policy goals can be achieved at the same time. Typically, the international gold standard era (ca. 1870-1914) is portrayed as a time of free capital flows and fixed exchange rates, but no sovereign monetary policy (choice a)). In this setting, interest rate changes due to the monetary authority's intervention lead to capital flows that exactly offset that intervention. The Bretton–Woods era (ca. 1946-1971) is an example of fixed exchange rates and sovereign monetary policy at the cost of capital controls (choice b)). Here, the monetary authority can break ranks with foreign interest rates thanks to capital controls and set interest rates independently. The post–Bretton Woods non-system (ca. 1971-today) is an example for position c), in

which capital can flow freely between countries and central banks can have a sovereign monetary policy at the cost of volatile exchange rates.

Gold contributed to exchange rate stability during the gold standard, but its supply inelasticity and the costs caused by insurance, shipment and storage led most countries to prefer key currencies to gold. The strategy of making the US dollar the key currency has severe drawbacks, as discussed above. Today, the need for action is almost universally acknowledged, but the proposals discussed are mostly extensions of instruments already put in place (for example, increasing the volume of SDRs and handing them over to private actors). What is needed is a truly international currency, which does not exist to date. At the time of writing, the international monetary framework does not yet provide an instrument for settling international debt by means of book-entry money. Within a country, payments are carried out by one or several banks emitting the necessary sum of national money through the use of double-entry bookkeeping. Payer and payee are both credited and debited in the process, leaving the payee with no further claims on the payer. Most importantly, the payee's bank is credited by the same centralised settlement institution that debits the payer's bank. The debt between the banks is thus monetised and mediated through a nationally accepted, centralised settlement institution.

In the international setting, the mechanism is radically different. Instead of receiving an equivalent value in exchange for labour-intensive resources it provides, a net exporting country today receives a mere IOU from the importing country's banking system. While payments by definition cause a discharge of debt between payer and payee, the 'payment' of net imports carried out with a key currency confirms, rather than discharges, a debt between paying and receiving country. While the principle of final payment is already upheld within the national framework, no centralised, pyramidal settlement institution exists on the international stage that could finalise payments internationally. Instead, cross-border payments rely on a rather inefficient and decentralised payment structure that relies on national currencies:

> "[T]he pyramid model only really covers domestic payments within each country. In the absence of a supranational central bank, the model cannot handle cross-border payments, which generally involve foreign exchange transactions. […] But even today, as a rule every bank must have, for its cross-border payments, correspondent accounts with as many foreign banks as there are countries with which it ordinarily does business." (Giannini, 2011, p. 226)

Let us reiterate that imports (exports) of a country only give rise to an anomaly insofar as they are not matched by equivalent exports (imports). Indeed, if a country can rid itself of the claim on the foreign bank deposit earned in the

process of selling domestic (financial) products by purchasing an equivalent amount of foreign (financial) products, the existing framework already enables the clearing and settlement of the reciprocal debt–credit relation. A critical reader may therefore throw in that the net credit of an exporting country will *eventually* be settled, as the same country will run a deficit sooner or later. Furthermore, one could plausibly argue that payment finality is already guaranteed for the most part of international trade. To be sure, a surplus country today is perfectly able to deposit its reserves with the Bank for International Settlements and then settle its claims on other countries to the extent that other countries own claims on bank deposits against the surplus country. In this rare case of balanced exports and imports, no problem of payment finality necessarily emerges. However, the fact that an import is only settled by a later and coincidental export shows that we are dealing with a money-using system of delayed barter, rather than with a proper international payment system. In reality, in the unlikely case of perfectly balanced exports and imports within a calendar year, payment finality between countries is not guaranteed by the monetary system itself, providing a vehicle to offset international debt, but by barter. The imports of a country are never paid for with a sum of money, but only once the same country exports products of the same value at a later date. It is thus not the vehicular use of money that offsets the debt. Under the present international monetary regime, national monies therefore lose their means of payment-function once they leave their currency area. By analogy, the same is true for the temporary delay of final payment of net imports by running a surplus sometime in the future. So, while settlement of net imports can be achieved eventually even under the present non-system, the instrument through which this settlement is achieved is non-neutral, as Jacques Rueff (1963, p. 322) already warned:

> "The method through which one gives is not less important than the object of the gift, especially when it is of a nature profoundly affecting the stability, even the existence of the giver and the receiver."

Things change once countries are net importers/exporters with respect to the rest of the world. Two cases may be distinguished. In the first case, the net importing country issues a key currency accepted by most other (central) banks around the world. In this case, the net importing country credits the net exporting country. Its imports of real goods and services are thus balanced by an equivalent export of claims on the importing country's key–currency bank deposits. In the second case, the importing country is a non-key–currency country. In this case, the importing country must pay the exporting country by transferring a key currency. Because it cannot issue the key currency itself, it has the choice of drawing on its reserves or of obtaining a loan from a key–currency country. The accumulated reserves are the result of exports of financial or commercial items in the past, so that the real exchange taking place in the second case is in fact an exchange of commercial or financial goods. Note that all of these transactions leave the exchange rates

unaffected, as each unit of national money supplied is at the same time demanded (see Baranzini and Cencini, 2001, p. xx). However, the first kind of transaction leads to the creation of an international, speculative capital, as claims on national bank deposits are exported to foreign banking systems, from where they can easily enter the foreign exchange market and cause erratic fluctuations of exchange rates. This process of duplication is not yet clearly perceived by many economists, partly because domestic bank deposits belonging to foreign residents are excluded from national measures of saving and national monetary aggregates.

Positive analysis therefore confirms Jacques Rueff's (1963) early warning. Today's international monetary infrastructure "represents a severe limitation of cross-border transactions, because they lack eventually a structurally sound monetary and institutional framework within which international payments can occur without generating destabilising effects on exchange rates, interest rates, current and capital accounts, which then affect economic performance negatively" (Rossi, 2007a, p. 95). Unfortunately, academic economists have largely left the question of payment finality and payment systems in the hands of lawyers, IT-experts, and practical central bankers. Roberds's (2008, p. 337) remark on economists' disinterest in payments systems is to the point:

> "Despite their ubiquity and their obviously central role in modern economies, payments have only recently begun to make their way into mainstream economic theory. Payment systems do not exist in Arrow-Debreu economies, where transfers may always be made in kind, and promises to transfer are enforced by a social planner."

A major scientific obstacle lies in the neoclassical methodology, which *de facto* makes the use of equilibrium concepts a requirement for the acceptance of a theory. However, the equilibrium approach entirely blends out the accounting nature of money and payments, as well as the monetary nature of production (Schmitt, 1984a; Cencini, 2005; Rossi, 2007a). Baer (2012, p. 259) summarises the inadequacy of equilibrium analysis as follows:

> "The accounting logic of payment systems in general and money in particular efficiently repels every attempt to understand it using a general equilibrium approach. Payments are carried out by banks' book-entries, causing instantaneous changes of economic magnitudes. Equilibrium economics deals with infinitesimal changes of economic magnitudes, which is why money will never be properly understood through the lens of equilibrium analysis."

The next step consists of presenting the plans for reform proposed by the theory of money emissions. As Rossi (2007a, p. 103) points out, the aims of the proposal are the same as those of the great architect of international monetary systems,

Ernst Friedrich Schumacher (1943). First, the international monetary system must make sure that all international transactions are finally settled. Secondly, deficit countries must receive the means necessary to finance their imbalance. Thirdly, we may add, the international monetary system should not unnecessarily promote or prohibit international trade, but merely provide an incentive-neutral vehicle for its orderly settlement. Of course, provision of a final means of payment and means of finance are not ends in themselves. Rather, they are the natural features of an orderly international monetary and financial system that respects the vehicular nature of bank money and does not stand in the way of economic activity. We can therefore agree wholeheartedly with Borio (2014, p. 1) when he writes that "[o]ne of the perennial questions in economics is how to design international monetary and financial arrangements that facilitate the achievement of sustained, non-inflationary and balanced growth". However, the mechanism of adjustment differs from that proposed by other schools of economic thought, and also from the one proposed by Schumacher (1943) and Keynes (1980).

So, while the reform proposed by adherents of the theory of money emissions relies on a radically new understanding of modern bank money, it is important to stress how this proposal is closely related to other monetary architectures. It is not at all necessary to burn the haystack in order to find the needle; on the contrary, the reform picks up and synthesises different mainstream approaches and insights. In a nutshell, it fully acknowledges David Ricardo's (1809/1951) sound idea behind the gold standard, namely that all trade must be finally settled in real terms, not merely by transferring an IOU overseas. The proposal also takes into account Keynes's (1980), Triffin's (1947) and Rueff's (1963) desire for *symmetry* in the international monetary system, in which the use of national currencies is restricted to the national monetary space and international transactions are conducted with international money. Finally, it fully takes into account money's endogeneity. Beside the theoretical similarities, the reform respects practitioners' desire for an efficient, safe, and fully digitalised monetary system that does not depend upon costly shipments of gold, or some other bulky settlement asset. The archaic idea of a metallic standard is entirely put away with in favour of a centralised and efficient payment system in line with modern, digitalised banking. International transactions are to be processed using existing real-time gross-settlement systems (RTGS) and delivery-versus-payment (DVP) protocols in accordance with today's best practices at the national level.

Besides minimising settlement risk, stable (as opposed to 'fixed') exchange rates are a main result of the reform. In contrast to currency boards that guarantee fixed exchange rates by intervening in the foreign exchange markets – much like powerful speculators themselves – exchange rate stability results from the inability of national currencies to spill out of their monetary space. The proposed reform makes sure no net demand for or supply of a national currency can ever

come into existence, as every currency demanded is automatically supplied, and *vice versa*, making sure exchange rate fluctuations are a pathology of the past.

In a symmetrical international monetary system with several national currencies, trade between two countries must necessarily be settled by crediting the exporting country in its local currency and by debiting the importing country in its local currency, through the intermediation of an international currency. If the pathological duplication of national bank deposits is to be averted in the process, "[t]his requires setting up in every country an institution that acts as a catalyst in any international payments resulting from cross-border transactions on either product or financial markets" (Rossi, 2007a, p. 103). The required institution must be an international settlement institution for national central banks, just as today central banks are national settlement institutions for commercial banks. Before proceeding to some technical aspects, let us stress that the introduction of an international currency is inflation-neutral and leaves the sovereignty of national monetary policy fully in tact; it even increases it considerably. Sums of international bank money will not circulate within national economies, as there is no international production to provide these deposits with content. Rather, the international money is a pure accounting tool that aims at stopping claims on national bank deposits from leaving their country of origin. The introduction of an international money that bridges national monetary spaces is not the same as replacing national currencies with a single world currency, the latter being a rather utopian idea.

The reform we are exploring involves holding on to the present system of national currencies while ensuring final payment for cross-border transactions by *complementing* national currencies with an international currency. It should therefore not be confused with Basil Moore's (2004) proposal of *substituting* national currencies with US dollars and euros. In the reform proposed here, the current regime of relative exchange rates makes way for a system of absolute exchanges, in which each national currency is changed into itself through a purely vehicular emission of an international means of payment. Let us expand on this with the help of a stylised example, illustrated in Figure 5.3. It is a graphic illustration of the designated settlement process in a three-tier payment system with two countries, country A on the left and the rest of the world R on the right, divided by a solid line down the centre marking the national boundary that separates the two currency areas. The arrows denote the transfer of property rights on products or bank deposits. The outer circle is made up of national commercial banks belonging to the countries A (B A) and R (B R). The inner circle constitutes the second tier, central banks of country A and R, CB A and CB R. In the centre of the international payment system – constituting the third tier – is the international central bank (ICB). Notice that the two-directional monetary flow vehiculates a two-directional real flow. While country A imports from R an amount of goods or securities, country R imports an equivalent amount of

securities from A after taking into account the relevant exchange rate. Notice also that the second transaction may involve the private or the public sector, as the private sector might not be able to buy or sell the securities required to finalise payment. Let us look into the monetary flow of this transaction more closely.

When the commercial or financial importer in country A purchases a product from resident in R, the importer's bank, B A, issues the sum of money necessary to vehiculate the payment, MA. This sum of money passes on to the exporter, who deposits MA in his local bank, B R. B R then passes MA on to its central bank, CB R. CB R hands over MA to the international central bank. If the payment were stopped here, it would not be complete, as country R is now merely the creditor of the international central bank, and has not been finally paid by country A. In order to finalise payment and complete the circular flow of MA, R must spend the equivalent amount on a security in country A, thereby triggering a flow of MR that ensures final payment for each country.

Figure 5.3 Absolute exchange in the international monetary system.
Source: adapted from Cencini, 2005, p. 330 and Rossi, 2007a, p. 106

Both countries instantly recover the sum of domestic money spent. What the commercial or financial importer spends (–MA) is instantly recovered by the exporter of securities (+MA), who belongs to the same country. What is received by the commercial or financial exporter (+MR) is spent by the importer of securities (–MR). No positive net demand or supply for a national currency can ever come into existence, making sure erratic exchange rate fluctuations are a menace of the past. Every import of (financial) products is immediately balanced

by an equivalent export, guaranteeing the perfect symmetry of the system. In this system, securities hold a similar position as gold did in the international gold standard. Both MA and MR must be expressed in terms of an international monetary unit (imu), making all national monies participating in this multilateral clearing and settlement process homogeneous. To wit, when the exporter in R deposits MA in his or her banking system, the foreign currency is transferred to the external department of its central bank, where it is transformed into a claim against the international central bank in terms of a sum of imu.

Table 5.4 International money as the means of final payment between countries, step 1. Source: Rossi, 2007a, p. 108

Central bank of country A		
Domestic Department (DD)		
Assets		*Liabilities*
	Deposits of bank A	–x MA
	Deposits of ED	+x MA
Central bank of country A		
External Department (ED)		
Assets		*Liabilities*
Deposit with ICB	–z imu	
Deposit with DD	+z imu	
International Central Bank		
Assets		*Liabilities*
	Deposit of country A (ED)	–z imu
	Deposit of country R (ED)	+z imu
Central bank of country R		
External Department (ED)		
Assets		*Liabilities*
Deposit with DD	–z imu	
Deposit with ICB	+z imu	
Central bank of country R		
Domestic Department (DD)		
Assets		*Liabilities*
	Deposit of ED	–y MR
	Deposit of bank R	+y MR

Table 5.4 illustrates the book-entries required in the first phase of the international settlement process. These book-entries are the result of A's purchase of commercial or financial products depicted in Figure 5.3.

The central banks' books are separated into a domestic and an external department for the sake of analytical clarity, and to make sure domestic currency is transformed into international currency in practice. We assume that the exchange rate is such that x MA = z imu = y MR. In this example, both countries A and R are debited and credited with their national monies, while the

international central bank issues the corresponding sum of international money units, z imu.

If the settlement process were stopped at this point, it would be very similar to Keynes's proposal of 1944 (see Rossi, 2007a, p. 109). Davidson's (2011, Chapter 15) proposal, which follows the Keynes plan rather closely, also stops here.[20] To wit, the exporting country R is credited by an international organisation with a sum of nominal money devoid of any real content. If the payment process would end here, it is certainly true that net exporting countries could "hoard" bank deposits denominated in international money units, as Keynes's (1980, p. 273) feared:

> "[Trading difficulties] may be caused in a most acute form if a creditor country is constantly withdrawing international money from circulation and hoarding it, instead of putting it back again into circulation, thus refusing to spend its income from abroad either on goods for home consumption or on investment overseas."

Worst of all, payment would not be complete, and country A as a whole purchases a labour-intensive product from R without having to give up any real value in exchange. Country A is now simply indebted to the international central bank. Country R's deposit with the ICB is necessarily empty, as no international production exists that would 'fill it up' and thereby justify its positive duration in continuous time. Furthermore, the positive bank deposit (y MR) created on the basis of z imu has no corresponding output to back it up within country R, thereby disrupting the money–output relation. In order for the payment to be completed, the first (autonomous) transaction must induce a second transaction that replicates on the international stage a delivery-versus-payment mechanism already prevalent within national economies (see Rossi, 2007a, Chapter 3). A delivery-versus-payment mechanism is "a link between a securities transfer system and a funds transfer system that ensures that delivery occurs if, and only if, payment occurs" (Committee on Payment and Settlement Systems, 2003b, p. 20). To wit, as soon as the relevant authorities of a surplus country are informed that the country is entitled to a positive sum of imu, registered in the international central bank, they must decide if they want to lend it directly to the deficit country A, or if they want to purchase a security on the international financial market from some other deficit country (Rossi, 2007a, p. 110). Figure 5.3 illustrates the first case: a private or public actor in surplus country R lends the positive sum of imu to a borrower in deficit country A (an exporter of securities). The securities A hands over to R serve to finance A's current account deficit. Table 5.5 shows the book-entries that result from this second, induced transaction. Notice that the ledger of the ICB is

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[20] Lavoie (2014, p. 505) is quite right in pointing out the great similarities existing between Davidson's (2011) plans for international payment system reform and the TARGET2 clearing and settlement system put in place in the eurozone.

empty after the second transactions, as the two book-entries of stage 1 and 2 exactly offset each other. Indeed, no payment imbalance results from this monetary intermediation, as country A's deficit is matched by R's financial account surplus. All three monies involved become the complementary elements of one single monetary emission that serve to vehiculate the exchange of two equivalent values (output versus output-to-be).

Table 5.5 International money as the means of final payment between countries, step 2. Source: Rossi, 2007a, p. 111

Central bank of country A		
Domestic Department (DD)		
Assets		*Liabilities*
Financial assets	–x MA Deposit of ED	–x MA
Central bank of country A		
External Department (ED)		
Assets		*Liabilities*
Deposit with DD	–z imu	
Deposit with ICB	+z imu	
International Central Bank		
Assets		*Liabilities*
	Deposit of country R (ED)	–z imu
	Deposit of country A (ED)	+ z imu
Central bank of country R		
External Department (ED)		
Assets		*Liabilities*
Deposit with ICB	–z imu	
Deposit with DD	+z imu	
Central bank of country R		
Domestic Department (DD)		
Assets		*Liabilities*
Financial assets	+y MR Deposit of ED	+y MR

How are securities the financial definition of output? Securities provide their owners with a claim over interest or dividends in the future. These funds are a slice of national income that grant their beneficiaries the purchasing power over part of national production. By transferring a security to R, country A has not provided an ultimate export item, which can only really be supplied by exporting real goods or services. The selling of securities, however, "provides a bridge between the present and the future; that is to say, between a current account deficit and a current account surplus recorded by the country considered" (Rossi, 2007a, p. 112). Securities serve as a settlement asset, but one which is superior to gold: compared to gold, securities have the advantage of being immaterial, more voluminous and far more elastic.

If we were only concerned with international monetary intermediation, the reform could stop after this second step. However, in order to accommodate the legitimate economic growth ambitions of some countries, it may be sensible to enable the ICB to act as a financial *as well as* monetary intermediary, that is, as a *lender of last resort* (Rossi, 2007a, p. 112). This possibility emerges when surplus countries with positive balances of imu (for instance at the end of the day) do not wish to lend these balances to the set of deficit countries. Through the ICB, deficit countries may be allowed to finance their increased demand for investment. Let us say, for example, that an economically less developed country finds large pockets of oil which it cannot pump up for lack of skill and equipment, and does not find a foreign investor willing to finance the project directly. In this case, it could make sense for that particular country to borrow via the ICB the necessary funds today in order to reap the benefits from oil production in the future. What can the ICB do in its role as an international financial intermediary? If the country concerned decides to import large amounts of investment goods from abroad, it is debited by the ICB, as already shown in Table 5.4. Instead of inducing a second transaction that would trigger the sale of the importing country's securities, the importing country may decide to sell the equivalent amount of securities to the ICB. The ICB, on the other hand, would finance this acquisition by selling a corresponding amount of ICB debt certificates to surplus countries. As Rossi (2007a, p. 113) points out,

> "[t]hese securities may indeed be denominated in either local currencies (MA, MR or any third country's currency) or international money, the important point being that the final payment of these financial transactions between countries occurs using international money as a vehicle".

Overall, surplus countries would end up owning securities – though not imu deposits – while deficit countries are forwarded the purchasing power necessary for enhancing their production possibilities. The surplus country's saving is thus destroyed and created on the liabilities side of the ICB, which forwards the income to the country incurring the deficit by purchasing its securities. Starting from Table 5.4, we may show the impressions such a financial intermediation by the ICB would leave behind in Table 5.6.

As is made clear, country A must sell securities to the ICB in order to recover z imu. The ICB must then sell an interest yielding bond – let us call it an 'ICB bill' – to a surplus country, thereby absorbing again the international money country R received when selling its output to country A. As a result of this transaction, country A is indebted to country R via the international central bank. The ICB thus operates as a financial *as well as* a monetary intermediary in this operation. Note in passing that the ICB could sell its ICB bills to all surplus countries, which is tantamount to saying that this system constitutes a multilateral monetary and financial system.

Table 5.6 Result of a financial intermediation by the ICB.

Central bank of country A		
Domestic Department (DD)		
Assets		*Liabilities*
Financial assets	–x MA Deposit of ED	–x MA
Central bank of country A		
External Department (ED)		
Assets		*Liabilities*
Deposit with DD	–z imu	
Deposit with ICB	+z imu	
International Central Bank		
Assets		*Liabilities*
Financial assets	+x MA Deposit of ICB bill holder	+y MR
Central bank of country R		
External Department (ED)		
Assets		*Liabilities*
Deposit with ICB	–z imu	
Deposit with DD	+z imu	
Central bank of country R		
Domestic Department (DD)		
Assets		*Liabilities*
ICB bill	+y MR Deposit of ED	+y MR

In case this financial intermediation were allowed in the new monetary and financial framework, the ICB bills would accumulate in surplus countries up to a level sound risk assessment will allow. Extrapolating central banks' experience, it is clear that this process of financial intermediation will require setting up best practices and sound risk management, as the asset risk on the international central bank's ledger will ultimately fall back on its net lending (surplus) member countries. As a general rule, it would be preferable for deficit countries to look for finance first within the same country, secondly abroad directly, and thirdly abroad indirectly *via* the ICB. Similar to today's worries concerning the European Central Bank's (ECB) weak asset position due to Greek government bonds, which could ultimately turn the ECB into a bad bank and burden eurozone members with financial liabilities incompatible with the EU's constitution, an international central bank would face the same threat as soon as it acts as a financial intermediary. In fact, Rossi (2007a, p. 114) warns that "the quality of securities sold by deficit countries to the [ICB] […] might not match the quality of the [ICB's] securities sold to surplus countries". A number of mechanisms could be adopted to counter the solvency risk involved. The first one would be a 'market mechanism'; surplus countries and the ICB would automatically demand higher interest rates from countries with high and persistent current account deficits and high external debt, thereby disciplining countries that decide to overspend. Other mechanisms – such as limits proportional to GDP or trade volume – could be

written into the statutes of the ICB. Mild penalties for surplus and deficit countries could be introduced, similar to the ones Keynes's wanted to put in place at Bretton Woods, though this might render the reform politically inacceptable. At last, countries with large current account deficits can devalue their national currency with respect to the international currency (and thereby toward all other currencies).

The reform proposed here provides for stable and adjustable (not fixed) exchange rates and free trade and capital movements. At the same time, monetary sovereignty is guaranteed up to a degree never achieved before, even compared to the current post–Bretton–Woods era. The reform therefore promises to effectively eliminate the policy trilemma that has dominated the academic discussion at least since the 1990s. We may explain this by referring to a slightly adapted version of the policy trilemma (Figure 5.4).

Free capital and trade flows

a)   c)

Stable exchange rates   b)   Sovereign monetary policy

Figure 5.4 The adapted policy trilemma.

After the proposed reform, exchange rate stability does not result from central banks' interventions in foreign exchange markets in the attempt to strengthen or weaken their respective currencies. Instead, spill-overs of national currencies into foreign markets are prevented *ex ante*. While this may sound radical and even illiberal to some, it is important to stress that this reform merely respects money's nature as a pure *means* of payment. Both nationally and internationally, money is an *instrument*, not an *object* of payment. Already respected within two-tier national banking systems, an international monetary system requires introducing a third tier on top of commercial and central banks. In the current post–Bretton–Woods regime, the purchase of a foreign security by a key currency country leads to the creation of a duplicated currency in the exporting country. If this transaction is not offset by another transaction, this claim on a foreign bank deposit may be supplied on the foreign exchange market, thereby causing a positive net supply of one currency that will tend to put a downward pressure on its exchange rate. While it seems that the last hundred years have proven "the basic incompatibility of open capital markets with a regime that aims to attain both exchange rate stability and domestic employment or growth objectives"

(Obstfeld and Taylor, 1997, p. 44), recent developments in the analysis of money and payments show that this incompatibility may be overcome if a new international settlement mechanism is introduced. This would – for the first time in history – introduce an *international* means of payment, meaning an accounting instrument that has the power of discharging debt between currency areas:

> "Clearly, the monetary order induced by final payment within countries now has to be reproduced between them, to make sure that the international economy becomes a monetary system – instead of being a money-using barter trade regime as it is to date, which denatures money into an object of (foreign) trade against its own nature of means of payment". (Rossi, 2012, p. 236)

Specifically, the proposed reform would prevent the duplication of currencies from occurring, as the exporting country would be instantaneously induced to spend its foreign currency on a foreign security. The duplicated deposit is thereby prevented *ex ante* from entering the foreign exchange market, where it would enter into a relative exchange with other national currencies. When the reform is adopted, stable exchange rates will result even with the free movement of capital, and national central banks could follow a sovereign monetary policy directed at preventing inflation and unemployment (see Rossi, 2007b, p. 96). The periodic parity adjustments decided by a representative body of delegates from member states and administered by the international central bank are speculation-neutral, as the various currencies cannot be traded directly against each other in anticipation of the change of exchange rates (Schmitt, 1978, p. 185). The current account balance or the trade balance may serve as a useful criterion to decide on parity adjustments (ibid., p. 124). The reform would abolish currency speculation. As Friedman (Friedman and Roosa, 1967, pp. 20-1) points out cogently, it is indeed hard to support the view that currency speculation is destabilising. Reasonable people can argue that speculation corrects prices until they better reflect certain underlying fundamentals of the international monetary system, just as it can be argued that currency speculation destabilises the international monetary system. The proposed reform solves this Gordian knot, as it stabilises the international monetary system at the same time as it disables currency speculation, thereby relieving us from daunting task of determining the direction of causality.

As a last point, note that the foreign exchange market will not be eliminated for the relatively small trade with physical coins and notes. With this reform in place, exchange offices run by banks or non-bank financial intermediaries may still acquire foreign bank notes and coins by selling securities in order to satisfy their customers' needs for foreign cash (mainly, but not exclusively, for tourism). When dealing with foreign cash, the exchange offices will adapt their bid and offer price to the current rate defined in terms of the international currency. If,

say, £1 = 2 imu = $3, then the exchange offices in the United States will sell £1 for a little more than $3, and they will buy $3 for a little less than £1. The customer would not even perceive the existence of the new international currency, which would be a pure unit of account and means of final payment between central banks, working smoothly in the background. The new international money would not be inflationary, as people would not be able to accumulate savings in the form of imu deposits. As no global production exists, the existence of imu-denominated bank deposits would be a pathological situation, as the deposit could not contain any income. All output, and therefore all income, must be denominated in terms of national currencies. Consequently, it would not be possible to purchase any amount of imu, thereby confirming the principle that money – national or international – is not a commodity and cannot be bought or sold. Finally, a passage by Schmitt (1978, p. 148, our translation) points out the obstacle that still needs to be overcome before carrying out the suggested reform of the international monetary system:

> "The most important obstacle hindering the introduction of an international currency is of an intellectual nature. […] It is the general perception that money is an asset, the *ultimate* asset, and even scientists accept this 'half-truth'. […] The completed transformation from commodity money to credit money will soon reach the economics science, that will then recognize the 'entire truth', namely that money is an asset–liability. At once, the problem of the creation of a international currency will present itself clearly; it is all just a question of time."

The proposed reform will bring the international monetary framework in line with the stated G-10 core principles for systematically important payments systems 4 and 8, which state that a payment system "should provide prompt final settlement on the day of value, preferably during the day and, at a minimum, at the end of the day", and that a payment system "should provide a means of making payments which is practical for its users and efficient for the economy" (Committee on Payment and Settlement Systems, 2001). The institution most suited for the task of accommodating this international system of payments would be the International Monetary Fund, as it would merely bring its actual policy into line with the IMF's articles of agreement (International Monetary Fund, 2011b). According to article 1, the IMF has the purpose of promoting exchange stability and maintaining orderly exchange arrangements among members. Additionally, it is the IMF's role to "assist in the establishment of a multilateral system of payments in respect of current transactions between members". The proposed reform undoubtedly contributes to this important aim.

6 The case of Switzerland

Recent events in Switzerland provide a relevant case study that underlines dramatically the need for the reform suggested in Chapter 5. By linking the general analysis presented in this thesis to a specific problem set of one country, it will be argued that the proposed payment system reform with the international currency at its centre could have prevented the Swiss franc's exchange rate volatility from which the Swiss economy has been suffering since the global financial crisis erupted in 2008.

6.1 The Swiss franc's appreciation and the SNB's reaction

On 15 January 2015, the Swiss National Bank (SNB) unexpectedly lifted its exchange rate floor of CHF 1.20 against the euro, thereby shocking markets worldwide. The price floor had been put in place on 6 September 2011, after the collapse of Lehman Brothers in the United States and the euro-area crisis led investors worldwide to consider the Swiss franc as a safe haven.
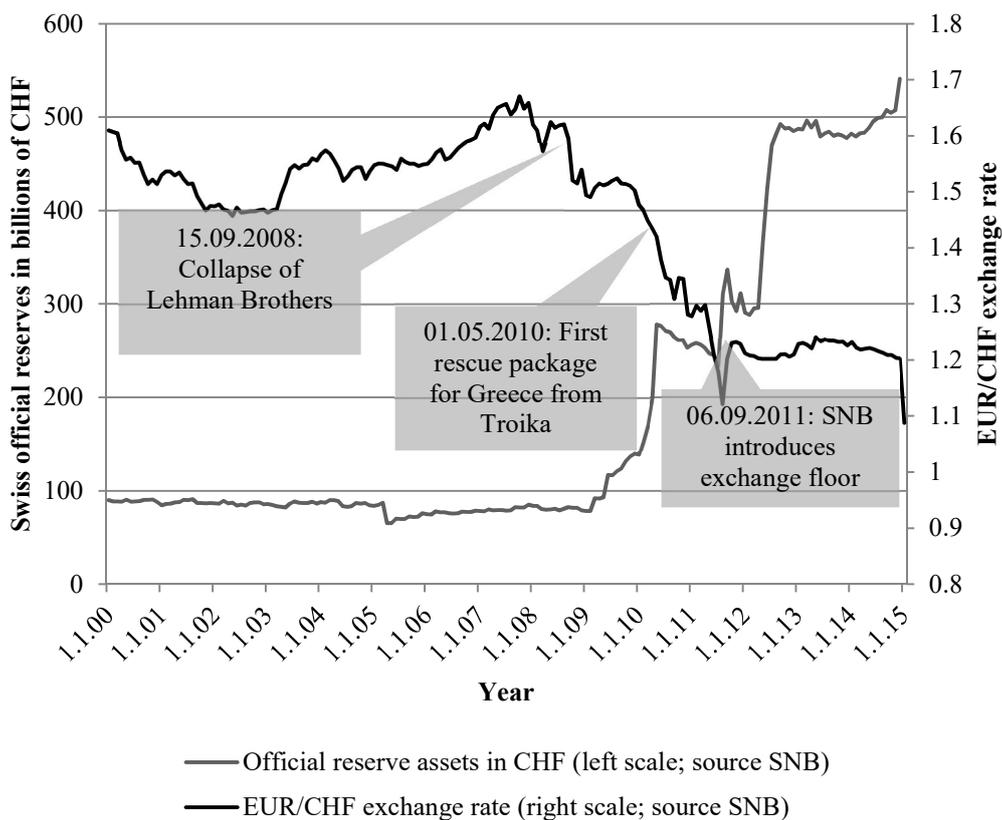
Graph 6.1 The EUR/CHF exchange rate and SNB official reserve assets (monthly data). Source: SNB (2015)

Graph 6.1 shows how the Swiss franc appreciated against the euro, and how the SNB's official reserves increased as a result of the SNB's foreign exchange

purchases. As a consequence of the other key currencies' weakness, the Swiss franc appreciated 11 percent against the euro between the collapse of Lehman Brothers in September 2008 and the announcement of the first rescue package for Greece by the Troika[21] in May 2010. The Swiss franc continued to appreciate thereafter, and after the franc reached parity with the euro on 10 August 2011, the SNB announced the minimum exchange rate on 6 September 2011 by pledging to purchase as much foreign currency (mainly euros) as necessary to keep the Swiss franc above the EUR/CHF 1.20 mark. The SNB's official reserve assets increased by 536 percent between December 2009 and December 2014, from CHF 85 billion to over CHF 540 billion according to the SNB's official data (Swiss National Bank, 2015, p. 8). The volume of foreign currency reserves on the SNB's books now amounted to around three quarters of Swiss GDP.[22, 23]

—— Government debt to GDP of euro area (left scale; source Eurostat)
—— Swiss public debt to GDP (left scale; source Federal Statistical Office)
—— EUR/CHF (right scale; source SNB)
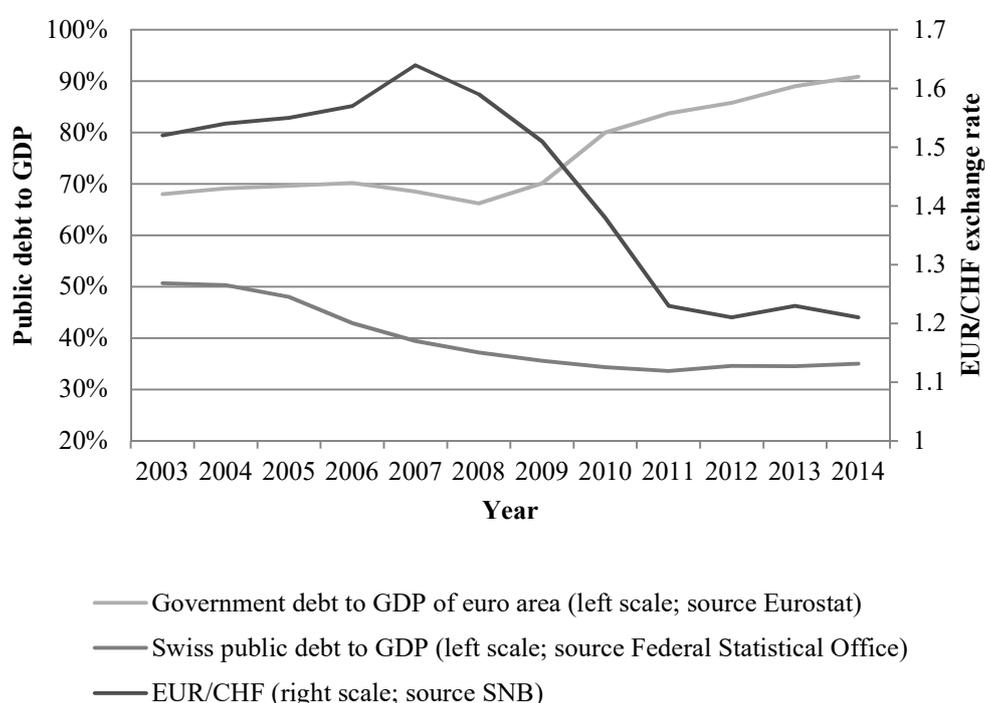
Graph 6.2 The public debt crisis in the euro area and Swiss public debt (annual data).

The reason the temporary exchange rate floor was introduced by the SNB was the broad consensus among economists that the Swiss franc was overvalued in the second half of 2011. At EUR/CHF 1.20, the Swiss franc was still regarded too strong, but considered a pragmatic compromise that would allow the Swiss economy – which exports around half of its GDP – to adapt to the new situation. Philipp Hildebrand (2011, Internet), the former chair of the SNB's governing board, justified the intervention with the "massive overvaluation of our national

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[21] The Troika consisted of the EU, the ECB and the IMF and was renamed in February 2015.

[22] Official reserve assets include i) foreign currency reserves (securities, currency and deposits), ii) IMF reserve positions, iii) Special Drawing Rights, iv) gold, and v) other reserve assets. In November 2014, 91 percent of official reserve assets consisted of foreign currency reserves.

[23] The SNB's foreign currency reserves amounted to CHF 498 billion in January 2015. Swiss GDP forecast for 2015: CHF 651 billion.

currency" which "carries the risk of a recession as well as deflationary developments". He ensured that the SNB would enforce the exchange rate floor "with utmost determination" by purchasing "foreign exchange in unlimited quantities". The SNB hoped that the Swiss franc would lose its relative attractiveness over time by itself, making the exchange rate floor unnecessary. This did not happen, especially as the eurozone's public finances gradually worsened (see Graph 6.2). On 15 January 2015, the SNB's governing board surprisingly decided to abandon the exchange rate floor, leading to a sharp appreciation in the exchange rate of the Swiss franc of around 20 percent. As a consequence, the SNB's book-loss on its foreign exchange reserves amounted to an estimated CHF 60 billion (*Neue Zürcher Zeitung*, 2015b) in a single day, or close to 10 percent of Swiss GDP. The United States' economic recovery led economists to hope that more investors would purchase US dollars instead of Swiss francs. However, two predicted events increased the uncertainty in the eurozone, thereby further weakening the euro relative to the Swiss franc: first, on 25 January 2015, the Greek population voted for a new parliament that openly called for forgiveness of the Greek public debt, sparking off anti-austerity sentiments in other European countries. According to the Greek Statistical Authority, the Greek government owes EUR 141.5 billion (around 45 percent of Greek public debt) to the European Financial Stability Facility (EFSF); Greek bonds worth another EUR 27 billion are held by the European Central Bank, and national central banks own another large chunk of Greek public debt (Chrysoloras, 2015). Forgiveness of the Greek public debt would therefore considerably diminish the assets of many European financial institutions. The second predicted event was the ECB's introduction of a quantitative easing programme, unveiled on 22 January 2015, which entails the purchase of EUR 1.1 trillion worth of eurozone countries' government debt.[24] The programme was expected to further push down the exchange rate of the euro relative to the Swiss franc.
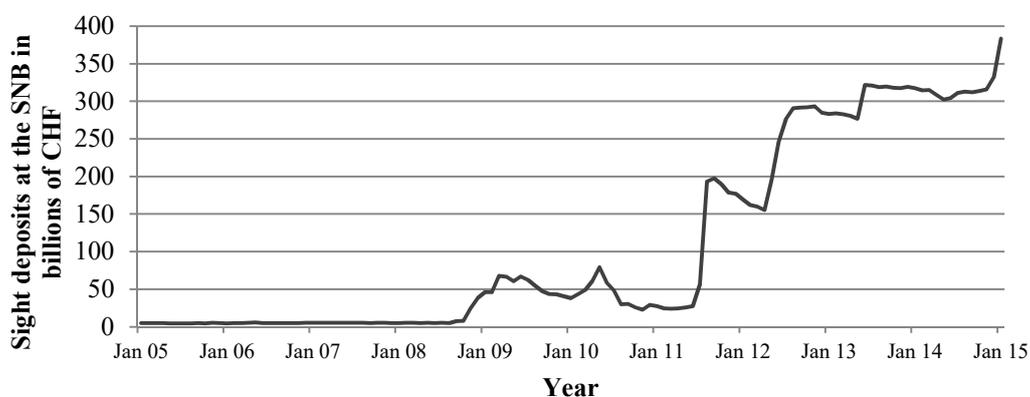
Graph 6.3 Sight deposits with the Swiss National Bank, 2005-2014 (monthly data).

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[24] In an attempt to distribute risks even-handedly, a planned 80 percent of this debt will be on the books of national central banks; only 20 percent will be on the ECB's books.

Central banks' purchase of foreign exchange is registered as an increase of banks' sight deposits (a central bank liability) and a corresponding increase in foreign currency reserves (a central bank asset). Owing to the SNB's purchase of foreign exchange, banks' sight deposits with the SNB increased forty-fold between September 2008 and September 2014 (see Graph 6.3).[25] The traditional instrument of providing central bank money to banks through repurchase agreements consequently became obsolete. On 18 December 2014, the SNB announced an interest rate of minus 0.25 percent on a part of its sight deposit account balances with the aim of taking the three-month Libor into negative territory (Swiss National Bank, 2014). All positive balances denominated in Swiss francs that exceed a certain exemption threshold were consequently levied at 0.25 percent. On 22 January 2015, one week after the SNB discontinued the minimum exchange rate, the interest on sight deposits was lowered further to minus 0.75 percent. The aim of this exceptional monetary policy instrument is to induce the holders of central bank sight deposits[26] to reduce the demand for Swiss francs in favour of other currencies.[27]

In the weeks before the SNB abandoned the exchange rate floor, it had been purchasing foreign exchange reserves worth several billions of euros each day in order to defend it (*Neue Zürcher Zeitung*, 2015a). Fritz Zurbrügg (*Blick*, 2015), member of the SNB's governing board, later explained the SNB's action with the disparaties between the United States and the eurozone. As the Swiss franc was *de facto* pegged to the euro and the US dollar appreciated against the euro in 2014, the Swiss franc lost around 14 percent of its value against the US dollar between July 2014 and January 2015. According to SNB forecasts, the foreign exchange interventions necessary to hold on to EUR/CHF 1.20 would have amounted to CHF 100 billion in January 2015 alone. Market commentators estimated that the SNB's balance sheet could have expanded to CHF 1'500-3'000 billion until the end of 2016 (*Neue Zürcher Zeitung*, 2015a). Unwilling to accumulate this foreign exchange rate risk in its books, the SNB decided to abandon the floor altogether, thereby accepting the damage this decision inflicted on the heavily export-oriented Swiss economy. By abandoning the exchange rate floor, the SNB willingly accepted deflation, implicitly attaching more importance to a profit goal than to price stability (see Eichengreen and Weder di Mauro, 2015).

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[25] Note in passing that the traditional theory of the money multiplier, including monetarist theories, completely fail to explain the connection between sight deposits ("high powered money"), broader monetary aggregates and the rate of inflation.

[26] The relevant account holders are banks, securities dealers, cash processing facilities, clearing and settlement organisations, mortgage bonds institutions, insurance companies, international organisations and central banks (SNB, 2014).

[27] In 1978, the SNB already imposed a quarterly negative interest rate of 10 percent on those foreign insitutions' sight deposits with the SNB that exceeded an exemption threshold of CHF 5 million in order to weaken the Swiss franc (SNB, 2007, p. 197).

6.2 Was the Swiss franc overvalued before September 2011?

In 2011, most Swiss economists believed that the Swiss franc was overvalued at EUR/CHF 1.20. According to traditional economic theory, the current account should, in principle, be balanced in the long run (Blanchard and Milesi-Ferretti, 2011). Therefore, a current account surplus is seen as an indicator for a lack of domestic demand (absorption approach) or as a symptom of an undervalued currency (elasticity approach). As can be seen in Graph 6.4, the Swiss current account balance (black line) was positive between 2000 and 2013. According to the elasticity approach, this suggests an undervaluation of the Swiss franc since the year 2000. In fact, with the exception of 1980, Switzerland has been reporting current account surpluses every year since 1970 (Jordan, 2013a, p. 13).

In a speech given on 19 February 2013, Thomas Jordan (2013a), chair of the SNB's governing board, confronts the argument that the Swiss franc is undervalued, an argument that he explicitly considers to be unjustified. He defends his hypothesis by pointing out two notable specialities of the Swiss economy, and one systematic measurement error. It is worth looking into these three points in turn.
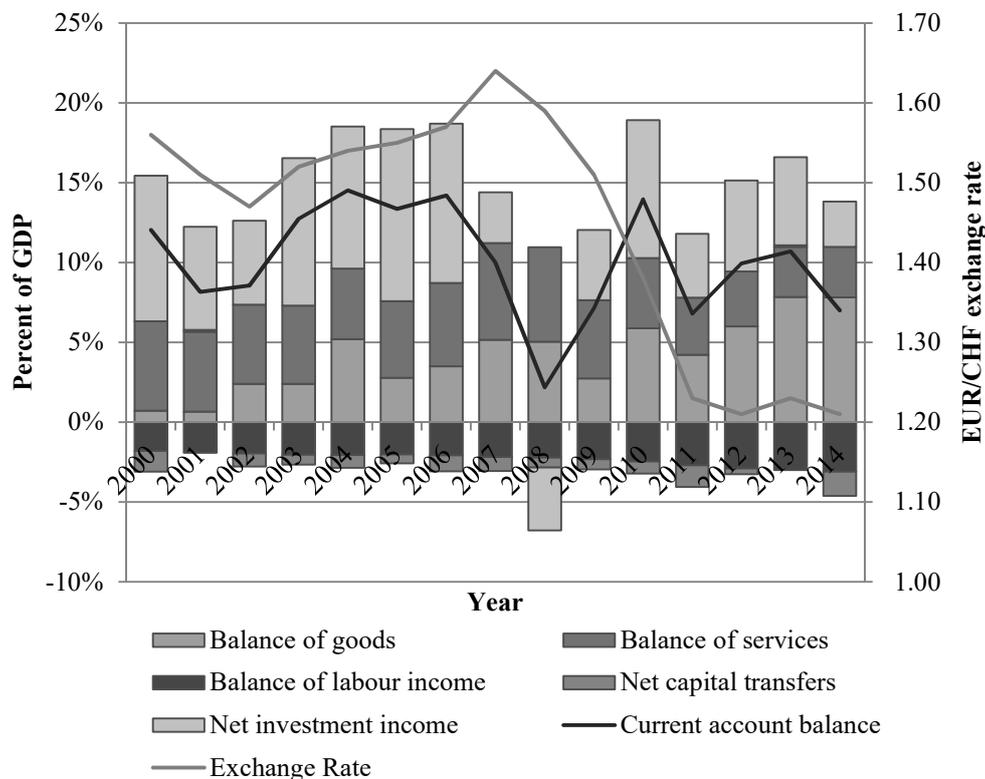
Graph 6.4 The Swiss current account (annual data).
Sources: Swiss National Bank (2015), Federal Statistical Office (2015), Seco (2015)

Jordan's (ibid., p. 8) first argument is that a large part of Switzerland's positive current account surplus can be explained with the traditionally large streams of investment income from abroad (top part of bar in Graph 6.4, except in 2008). These foreign assets are mainly held by pension funds and multinational corporations.[28] Secondly, a large part of the current account surplus is made up of "merchanting", which flows into the balance of services (second part of bar from the top in Graph 6.4). Merchanting refers to trade that does not cross the Swiss border. Specifically, merchanting is practiced by commodity houses that settle down in Switzerland, among other things for tax reasons. The third argument concerns a systematic measurement error in current account statistics. If a Swiss resident holds less than 10 percent of a foreign company's equity, the market value of those assets enters the statistics as portfolio investment. In this case, only the effectively distributed dividends form part of the Swiss current account's primary income. On the other hand, if a Swiss resident owns more than 10 percent of a foreign company's equity, the shares enter the statistics as foreign direct investment, and the foreign company's *entire* profit is added to the Swiss current account's investment income (ibid., pp. 11-2). Because of this, the official balance of payments statistics systematically overestimate Switzerland's current account balance by approximately 20 percent (*Neue Zürcher Zeitung*, 2014a).[29] Jordan (2013a) shows that these three factors explain a large part of Switzerland's current account surplus. In a nutshell, Jordan's speech is an attempt to play down Switzerland's current account surplus in order to justify the SNB's strategy of weakening the Swiss franc.

Because all three factors are, as Jordan claims, unrelated to the exchange rate, he argues that the Swiss franc cannot be considered too weak. While the third point regarding the systematic measurement error is undoubtedly valid, the first and second point are less clear. As regards Switzerland's large international investment position of CHF 877.6 billion in 2012 (Swiss National Bank, 2012) – of which CHF 399 billion is net foreign direct investment – it can be very plausibly argued that this accumulation of net foreign assets is due to an undervalued Swiss franc in past years. Jordan (2013a, p. 12) argues that the income earned on foreign direct investment depends upon firms' profitability abroad, not upon the exchange rate. This blends out the fact that the accumulation of a positive net foreign direct investment is made possible by Switzerland's current account surplus in the past. So, while *current* net investment income may not be directly related to the *current* external value of the Swiss franc, it should be clear that current net investment income is related to the exchange rate in the past.

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[28] Since 2008, foreign assets held by the SNB form another large part of Switzerland's international investment position.

[29] Note that Switzerland follows the balance of payments guidelines proposed by the International Monetary Fund's (1993) fifth edition until the end of 2014.

The second argument concerning commodity houses' merchanting activities is also open to doubt. When international commodity houses decide on an ideal location for their company headquarters, many factors are taken into consideration, one of them certainly being the corporate tax rate. However, the exchange rate certainly also plays an important role. In the case of international commodity houses located in Switzerland, most of their revenues accrue in US dollars and euros. Meanwhile, wages in company headquarters for consulting, financial management and administration are paid in Swiss francs. The weaker the Swiss franc, the more attractive it is to locate headquarters in Switzerland. Additionally, if some of the company's owners decide to live near company headquarters, their dividends will likely be changed into Swiss francs. The weaker the Swiss franc relative to the US dollar and the euro, the more purchasing power the owners receive. An undervalued Swiss franc therefore clearly increases the incentives for top management executives and owners to move headquarters to Switzerland. On a further note, Jordan (ibid., p. 7) argues that Switzerland's current account surplus is only marginally determined by the balance of goods (centre of bar in Graph 6.4). Rather, he claims that the balance of services and investment income drive Switzerland's current account surplus. This might have been true in 2011, when the balance of goods amounted to 4.22 percent of GDP. Since then, the balance of goods has increased to 7.82 percent of GDP (2014), although the exchange rate fell to EUR/CHF 1.21. It seems that, despite the strong Swiss franc, the balance of goods has been the single largest contributor to Switzerland's current account surpluses since 2011. Needless to say, this calls into question Jordan's main arguments.

Interestingly, Thomas Jordan's Zurich speech mainly addresses the concerns of those economists in favour of a balanced current account brought about by flexible exchange rates. The intellectual origin of this view dates back to Bickerdike's (1920) elasticity approach to the balance of payments. A more compelling case can be made by concentrating on the intertemporal approach (Sachs, 1980; Buiter, 1981; Obstfeld, 1982), an approach Jordan (2013b, p. 6) in fact chose when he defended the SNB's policies at the Peterson Institute in Washington, DC. Relative to the rest of the world, Switzerland as a country faces the challenge of an ageing population. In 2013, Switzerland's old age dependency ratio was already 28.4 percent, and it is increasing every year (Swiss Federal Statistical Office, 2015).[30] This means that approximately three retirees depended on the work of ten persons in the labour force in 2013. As in many Western countries, the baby boomer generation (born between 1946 and 1964) is currently going into retirement. As a result, fewer wage-earners will have to support more retired people in the very near future. In light of the foreseeable dissaving taking place in the next two decades owing to the increase in consumers relative to

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[30] The old age dependency ratio is the number of people aged 65 and over times 100 divided by the number of people aged 20-64.

producers, it was sensible for the Swiss population to increase its savings in the recent past. Some of these savings, many of which are pooled in pension funds, are invested abroad, seeking higher returns, thereby supplying other countries with the necessary purchasing power to import Swiss products. From this intertemporal perspective, Switzerland is in fact exchanging current output (exports of goods and services) against future output (foreign financial assets). This line of argument explains, and to an extent justifies, Switzerland's sustained current account surpluses in recent years. In Blanchard and Milesi-Ferretti's (2009, p. 4) words, this surplus merely reflects "optimal allocation of capital across time and space". It is unclear why Thomas Jordan, who is certainly aware of the intertemporal approach, did not use it already in his Zurich speech in order to justify Switzerland's current account surplus.

Judging from reading the national newspapers, the SNB's unorthodox foreign exchange operations between 2011 and 2015 were supported by most economists. Experts at home and abroad understood immediately that the Swiss franc's rapid appreciation after 2008 was not caused by fundamentals, but rather by financial institutions' portfolio adjustments and speculative activities in light of the uncertainties caused by the financial crisis, the ensuing Great Recession and the public debt crisis (Jordan, 2013b, p. 6; Rathke and Sturm, 2015). Despite the unpredictable risks involved, the SNB's intervention was welcomed as a balanced decision. Its communication between 2011 and 2015 followed the textbook. In order to prevent speculation, the public was taken by surprise by the SNB's changing exchange rate strategies. As a consequence of the strong Swiss franc, profitability in the export industry dropped; many firms have started to receive government benefits, for instance in the form of subsidised short-time work. The interesting question at this point is: are there alternatives to the SNB's policy?

6.3   Alternative policy: introduction of an international currency

The question of policy alternatives may be addressed by asking two separate and fundamental questions. The first question concerns the optimal *level* of the exchange rate. Specifically, what is the optimal exchange rate between two trading countries? The second question concerns the *stability* (or volatility) of exchange rates: how can central banks stabilise the exchange rate of their currency? To be sure, stable exchange rates greatly reduce uncertainty for companies and households alike, resulting in potentially large and positive welfare effects.

The first question is already addressed in section 6.2, where Thomas Jordan's (2013a) arguments concerning the Swiss franc's alleged undervaluation are discussed. To sum up the argument, the exchange rate of a currency should, *in principle*, be at a level that favours a balanced current account. If a country desires

to run sustained current account surpluses or deficits, it carries a burden of proof. To understand why, the Swiss case is again exemplary. Between 2000 and 2013, Switzerland's average annual current account surplus amounted to more than 10 percent of GDP, leading to an increase in net foreign financial assets. By definition, Switzerland's surpluses are the mirror image of other countries' deficits. These deficits, which are caused by surplus and deficit countries alike, may stifle economic growth in deficit countries and increase the fragility of the entire international financial system, notably by increasing the risk of a sudden stop. This is in line with Blanchard and Milesi-Ferretti's (2011, p. 4) claim that "smaller current account surpluses in surplus countries might actually benefit growth in the rest of the world". Because of this, only countries that can plausibly justify the need for a sustained current account surplus (for example because of a relatively faster ageing population) or deficit (for instance because of the need for long-term domestic investment that cannot be financed domestically) should be allowed to impose their imbalances on the rest of the world. In the case of Switzerland, its current account surplus can be justified by pointing to the ageing population accumulating savings for retirement, although it is dubitable this justifies such high and sustained current account surpluses. More research is clearly necessary in this direction.

With respect to the second question, the alternatives known to the Swiss National Bank are the free floating regime, the hard peg, and the myriad of combinations in the continuum between the two extremes. Free floating exchange rate regimes subdue the economy to highly damaging exchange rate volatility caused by currency speculation. Without wanting to demonise currency speculation, it is worth remembering at this point that it is a zero-sum game, as no valuable output is produced in the process; what is gained by one speculator is lost by the other. All the time and energy that goes into currency speculation could go into the production of useful goods and services. In principle, stable exchange rates are therefore preferable. Let us stress that speculators are not to be blamed for the current state of affairs; currency speculation and its harmful consequences are the results of an irrational monetary system. Economic agents cannot really be blamed for trying to dodge losses or make profits by trading currency.

While free floating regimes damage the economy by increasing uncertainty in the system, it is well known that hard pegs are also costly. Depending on the direction of the central bank's intervention, two cases can be distinguished: if a domestic currency is in low demand, central banks may at some point use up their foreign exchange reserves in the attempt to back up their currency. As soon as the foreign exchange reserves are used up, the domestic currency's exchange rate will drop sharply, triggering capital flight that seriously harms the economy. An example for this is Argentina in 2002. In case a domestic currency is in high demand – as has often been the case in Switzerland – the central bank will weaken its currency by buying (theoretically) unlimited amounts of foreign currency in exchange for

central bank sight deposits. While a central bank's intervention is limited by its command over foreign currency in the first case, the limits in the second case are determined by the central bank's risk aversion. In the case of Switzerland, the SNB decided to stop piling up reserves when its foreign exchange reserves amounted to approximately three quarters of Switzerland's GDP. If the exchange rate of the Swiss franc remains significantly below EUR/CHF 1.20, it is likely that it will take years for the SNB to recover from the book-losses it incurred within only a few days in January 2015. Through many channels, these losses ultimately fall back onto the population.[31] Additionally, the accumulation of central bank sight deposits is likely to fuel asset price bubbles in markets for shares or real estate as soon as banks attempt to replace these sight deposits with profitable financial assets.

The hard peg, the pure float, as well as the combinations of the two exchange rate regimes do not come without significant costs. This thesis advocates a new instrument with many advantages: the introduction of an international currency, as outlined in section 5.4. If Switzerland were to settle its international payments with an international currency, operated by an international central bank, foreign investors would not be able to purchase claims to CHF bank deposits in the first place. No net demand for Swiss currency could come into existence, resulting in a stable exchange rate without the need for exchange rate intervention. The positive welfare effects would be considerable.

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[31] Note that, in 1971, the SNB's book-loss caused by the Swiss franc's appreciation against the US dollar amounted to CHF 1.2 billion and was fully covered by the federal government (Swiss National Bank, 2007, p. 179).

Conclusion

The current approach in international macroeconomics focuses on assumed equilibrating forces in the balance of payments. The policy proposals flowing out of modern research programmes typically stress the need to manipulate exchange rates or to influence saving and investment incentives in order to achieve external balance. Additionally, macroeconomists tend to regurgitate the usual catechism: improve property rights and the rule of law, enact tax reform, reduce corruption and open up financial markets. The present thesis has offered a fresh interpretation of international imbalances that is informed by a novel conception of money and payments. By referring extensively to payment system literature and focusing on questions of payment finality between nations, structural-monetary pathologies are revealed which neither have anything to do with individual behaviour, nor do they depend upon the (non)existence of equilibrating forces. As Borio and Disyatat (2011, p. 2) rightly suggest, the problem lies in the architecture of the present monetary *system*:

> "[I]n promoting global financial stability, policies to address current account imbalances cannot be *the* priority. Addressing directly weaknesses in the international monetary and financial system is more important."

Economists specialising in international macroeconomics have been overly concerned with surpluses and deficits of international liquidity. This approach tends to mistake money for a net asset, and as a result mixes up international money and international credit. If this analytic procedure were theoretically and empirically sound, it would indeed be true that the world needs another internationally traded financial asset, such as Special Drawing Rights, in order to alleviate the problem. Yet, as this thesis shows, the actual problem does not stem from the lack of international *financial* intermediation – which is, in fact, already quite refined – but from a complete lack of international *monetary* intermediation.

Bernanke's (2005) saving glut hypothesis serves as a point of entry. This hypothesis, which is one of the most recent attempts to explain international imbalances, reveals how difficult it is to interpret causalities into a macroeconomic accounting framework. Indeed, it seems that Bernanke renounced his hypothesis in his textbook co-authored by Robert Frank (2013). In it, the authors reverse the causality of Bernanke's original hypothesis and claim that "a low rate of national saving is the primary cause of trade deficits" (ibid., p. 439). Suddenly, it is not high foreign saving or the desire for safe US financial assets that cause large US current account deficits, but low domestic saving. However, reversing the causality of the saving glut hypothesis simply meant turning it back into the well-known saving shortage hypothesis, an approach that had already been popular in the 1990s. The status of the saving glut hypothesis therefore

appears to be in abeyance, and Bernanke has to put up with the accusation that he used his hypothesis in order to shuffle off responsibility for domestic problems on developing economies.

Beside the problem of interpreting causalities into an accounting framework, theoretical critiques spelled out by Borio and Disyatat (2011) and Palley (2012, 2014) reveal an even more fundamental problem with some of the assumptions underlying Bernanke's (2005) hypothesis. To wit, all three authors point a finger at the highly unrealistic assumption of an exogenous money supply that characterises Bernanke's analysis. Picking up this common thread, a series of problematic assumptions that usually go unmentioned in international macroeconomics have been highlighted and explained in this thesis. Most importantly, the notion that money is a valuable net asset created *ex nihilo* by the banking system is both theoretically and empirically unsound. Let us repeat as clearly as possible the adverse consequences of this assumption: by assuming that money can be introduced as a net asset into the economy, money's purchasing power remains unexplained. Banks cannot but issue an empty accounting instrument in the form of an asset–liability (bank money); its content (income) must be provided by the national workforce. Only if the creation of money is linked to the process of production can the difference between money, Special Drawing Rights and bancor be properly understood. While money is transformed into income when wages are paid, SDRs and bancor do not monetise any production and therefore remain empty vessels devoid of purchasing power. Because every payment must be financed with income, neither SDRs nor bancor can serve as means of final payment, and their transfer consequently does not discharge debt between countries. Similarly, national money – being a *national* means of payment – does not have the power to discharge debt between countries. The Walrasian approach of introducing money by bluntly assuming that the nth commodity *is* money fails to grasp how money is woven into economic activity through payments on different markets. As long as money is perceived to be a net asset and its purchasing power is explained with people's faith in money, it will remain a mystery why national monies, bancor and SDRs will never serve as international means of payment.

In this thesis, the notion that national monies can serve as international means of payment is contested by pointing out the difference between inter-regional and international payments. When residents use their national money to import from another country, they surrender the country's IOU, thereby causing the indebtedness of the country as a whole. While this debt can be settled thanks to a centralised settlement system in the inter-regional setting, the international monetary system today offers no such possibility. The existence of the official reserves account – which does not exist in the inter-regional context – proves the qualitative difference between international and inter-regional payment setups, and serves as a reminder of national currencies' heterogeneity.

Myrdalian *ex ante* and *ex post* language is the theoretical blunder that removes the rigour from economic theorising and turns the 'a' in macroeconomics into an 'i'. Convinced that accounting identities provide no solid basis for economic analysis, economists quickly turned identities into functional relationships that are only equal under certain conditions. This involved putting planned but unrealised economic magnitudes onto the same conceptual level as realised magnitudes. This thesis makes an effort to show that logical identities do in fact provide a valuable basis for positive analysis. Money is a social bookkeeping device that is issued as an asset–liability every time banks carry out payments for their clients. The identity of output and income and of saving and investment cannot be explained with human behaviour, market forces or incentives. Instead, the identity is imposed by the accounting logic of modern bank money.

The overview of international monetary systems between the 1870s and today stresses economists' ongoing search for an efficient, viable and stable international monetary regime that serves the needs of the broader economy. By focusing on the settlement mechanism of each system – or the lack thereof – it is possible to identify strengths and weaknesses of each monetary arrangement since the international gold standard. Special Drawing Rights and Keynes's idea of an International Clearing Union are well-intentioned, but nevertheless flawed, attempts to solve the problems of an international monetary system that still uses national currencies for international transactions. The principles of a new international monetary framework are outlined in this thesis. Most importantly, the new monetary system would introduce an international money that guarantees final payment of all commercial and financial imports and exports. This new international money would only convey payments between countries, thereby preserving (and indeed significantly enhancing) monetary sovereignty for each country participating in the system. As there exists no international production, it will not be possible for individuals to hold any positive balances of this international money; the new international money would merely fill the monetary gap between countries without ever spilling into national monetary systems. The two-tier, pyramidal structure of national banking systems with commercial banks at the bottom and central banks at the top would be extended into the international realm, with an international central bank connecting national central banks. As a result of this third tier, the pathological duplication of national currencies that occurs when claims on bank deposits are exported is prevented *ex ante*. Specifically, every commercial or financial import of one country must, on the same day, be balanced by an equivalent financial export of the same country. The international monetary system would thereby gain the symmetry already today fully respected within the national sphere, and currencies would be exclusively used as means of payments, that is, instruments to offset debt between economic actors. This would fundamentally stabilise the landscape of international finance. Recent events in Switzerland underline the need for such a reform.

Bibliography

Abel, A.B. and B.S. Bernanke (1992), *Macroeconomics*, New York: Addison Wesley Publishing Company.

Aglietta, M. (2004), "The International Monetary Fund: past and future", in M. Desai and Y. Said (eds) *Global Governance and Financial Crises*, London and New York: Routledge, pp. 43-69.

Alexander, S.S. (1952), "Effects of a devaluation on a trade balance", *IMF Staff Papers*, **2** (2), pp. 263-78.

Alexander, S.S. (1959), "A simplified synthesis of elasticities and absorption approaches", *The American Economic Review*, **49** (1), pp. 22-42.

Athreya, K.B. (2013), *Big Ideas in Macroeconomics: A Nontechnical View*, Hong Kong and United States: MIT Press Books.

Baer, O.S. (2012), "Language in economics education", *International Journal of Pluralism and Economics Education*, **3** (3), pp. 252-65.

Banerjee, A. and E. Maskin (1996), "A Walrasian theory of money and barter", *Quarterly Journal of Economics*, **111** (4), pp. 955-1005.

Baranzini, M. and A. Cencini (2001), Foreword to S. Rossi's *Money and Inflation: a new macroeconomic analysis*, Cheltenham and Northampton: Edward Elgar (reprinted 2003).

Barr, N. (2012), *Economics of the Welfare State*, 5th edition, Oxford: Oxford University Press.

Belke, A. and T. Polleit (2009), *Monetary Economics in Globalised Financial Markets*, Berlin: Springer.

Belton, W. and R. Uwaifo Oyelere (2008), "The racial saving gap enigma: unraveling the role of institutions", IZA Discussion Papers, No. 3545.

Bergin, P.R. (2006), "How well can the New Open Economy Macroeconomics explain the exchange rate and current account?", *Journal of International Money and Finance*, **25** (5), pp. 675-701.

Bergin, P.R. and S.M. Sheffrin (2000), "Interest rates, exchange rates and present value models of the current account", *Economic Journal*, **110** (463), pp. 535-58.

Bergsten, C.F. (2009), "The Dollar and the Deficits: How Washington Can Prevent the Next Crisis", *Foreign Affairs* (November/December).

Bernanke, B.S. (2005), "The global saving glut and the U.S. current account deficit", Sandridge lecture given in Richmond (VA), 10 March, transcript available at http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/ (accessed 13 February 2015).

Bernanke, B.S. (2007), "Global imbalances: recent developments and prospects", Speech given at the Bundesbank in Berlin, 11 September, transcript available at http://www.federalreserve.gov/newsevents/speech/bernanke20070911a.htm

(accessed 12 October 2013).

Bernanke, B.S. (2009), "Financial reform to address systemic risk", Speech given at the Council on Foreign Relations, Washington, D.C., 10 March, transcript available at http://EconPapers.repec.org/RePEc:fip:fedgsq:y:2009:x:6 (accessed 14 October 2013).

Bernanke, B.S., C. Bertaut, L.P. DeMarco and S. Kamin (2011), "International capital flows and the returns to safe assets in the United States, 2003-2007", *Banque de France Financial Stability Review*, **15**, pp. 13-26.

Bickerdike, C.F. (1920), "The instability of foreign exchange", *Economic Journal*, **30** (117), pp. 118-22.

Bini Smaghi, L. (2008), "The financial crisis and global imbalances – two sides of the same coin", Speech given at the Asia Europe Economic Forum conference, Beijing, 9 December, transcript available at http://www.bis.org/review/r081212d.pdf (accessed 12 October 2013).

Black, W.K. (2005), *The Best Way to Rob a Bank is to Own One*, Austin: University of Texas Press.

Blanchard, O.J. (2006), "Current account deficits in rich countries", *Panoeconomicus*, **54** (2), pp. 127-58.

Blanchard, O.J. (2009), *Macroeconomics,* 5th international edition, London: Pearson Prentice-Hall.

Blanchard, O.J. and G.-M. Milesi-Ferretti (2009), "Global imbalances: in midstream?", *IMF Staff Position Note, No. 2009/29*, International Monetary Fund.

Blanchard, O.J. and G.-M. Milesi-Ferretti (2011), "(Why) Should current account balances be reduced?", *IMF Staff Discussion Note, No. 11/03*, International Monetary Fund.

Blejer, M. and Frenkel, J. (2008), "monetary approach to the balance of payments", in S.N. Durlauf and L.E. Blume (eds) *The New Palgrave Dictionary of Economics*, 2nd edition, Vol. V, Basingstoke and New York: Palgrave Macmillan, pp. 686-90.

Blick (2015), "Täglich gingen Milliarden raus" (22 January 2015).

Bofinger, P. (2001), *Monetary Policy: Goals, Institutions, Strategies, and Instruments*, Oxford: Oxford University Press.

Bofinger, P. (2012), "Mickymaus-Modelle sind völlig realitätsfern", *die Presse*, available at http://diepresse.com/home/wirtschaft/international/ 746705/Bofinger_MickymausModelle-sind-vollig-realitaetsfern (accessed 15 October 2014).

Böhm-Bawerk, E. (1959), *Capital and Interest*, South Holland: Libertarian Press, 3 vols (first published 1884-1909).

Boivin, J., M.T. Kiley and F.S. Mishkin (2011), "How has the monetary transmission mechanism evolved over time?", in B.J. Friedman and M. Woodford (eds) *Handbook of Monetary Economics*, Volume IIIa, Elsevier, pp. 369-422.

Borio, C. (2012), "The financial cycle and macroeconomics: What have we learnt?", Bank for International Settlements Working Paper, No. 395.

Borio, C. (2014), "The international monetary and financial system: its Achilles heel and what to do about it", Bank for International Settlements Working Paper, No. 456.

Borio, C. and P. Disyatat (2011), "Global imbalances and the financial crisis: Link or no link?", Bank for International Settlements Working Papers, No. 346.

Bortis, H. (2003), "Keynes and the classics: notes on the monetary theory of production", in L.-P. Rochon and S. Rossi (eds) *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, Cheltenham and Northampton: Edward Elgar, pp. 411-74.

Boulding, K. (2008), "Assets and liabilities", in S.N. Durlauf and L.E. Blume (eds) *The New Palgrave Dictionary of Economics*, 2nd edition, Vol. I, Basingstoke and New York: Palgrave Macmillan, pp. 261-63.

Brown, W.A. (1940), *The International Gold Standard Reinterpreted 1914-1934*, 2 vols, New York: NBER.

Buiter, W.H. (1981), "Time preference and international lending and borrowing in an overlapping-generations model", *Journal of Political Economy*, **89** (4), pp. 769-97.

Buiter, W.H. (2009), "The unfortunate uselessness of most 'state of the art' academic monetary economics", *Financial Times Blog*, 3 March, available at http://www2.econ.iastate.edu/tesfatsi/UselessnessOfMacro.WBuiter2009.pdf (accessed 30 October 2014).

Bussière, M., M. Fratzscher, and A.-N.G.J. Müller (2004), "Current account dynamics in OECD and EU acceding countries - an intertemporal approach", European Central Bank Working Paper, No. 311.

Caballero, R.J. and A. Krishnamurthy (2006), "Bubbles and capital flow volatility: causes and risk management", *Journal of Monetary Economics*, **53** (1), pp. 35-53.

Caballero, R.J., E. Farhi, and P.-O. Gourinchas (2008), "An equilibrium model of 'global imbalances' and low interest rates", *American Economic Review*, **98** (1), pp. 358-93.

Carpenter, S.B. and S. Demiralp (2010), "Money, reserves, and the transmission of monetary policy: does the money multiplier exist?", *Finance and Economics Discussion Series*, Washington, DC: Federal Reserve Board.

Ca'Zorzi, M., A. Chudik, and A. Dieppe (2012), "Thousands of models, one story: current account imbalances in the global economy", European Central Bank Working Paper, No. 1441.

Cencini, A. (1984), *Time and the Macroeconomic Analysis of Income*, London and New York: Pinter Publishers and St. Martin's Press.

Cencini, A. (1988), *Money, Income and Time*, London and New York: Pinter Publishers.

Cencini, A. (1995), *Monetary Theory, National and International*, London and New York: Routledge.

Cencini, A. (2001), *Monetary Macroeconomics. A New Approach*, London and New York: Routledge.

Cencini, A. (2005), *Macroeconomic Foundations of Macroeconomics*, London and New York: Routledge.

Cencini, A. (2012a), "Is there a common cause to economic and financial crises?", in C. Gnos and S. Rossi (eds) *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham and Northampton: Edward Elgar, pp. 193-217.

Cencini, A. (2012b), "Towards a macroeconomic approach to macroeconomics", in C. Gnos and S. Rossi (eds) *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham and Northampton: Edward Elgar, pp. 39-68.

Cencini, A. and B. Schmitt (1991), *External Debt Servicing: A Vicious Circle*, London: Pinter Publishers Limited.

Cencini, A. and M. Citraro (2012), "World monetary disorders: the mystery of the 'missing surplus' and of the 'missing capital outflow'", in C. Gnos and S. Rossi (eds) *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham and Northampton: Edward Elgar, pp. 261-92.

Chinn, M.D. and H. Ito (2007), "Current account balances, financial development and institutions: assaying the world 'saving glut'", *Journal of International Money and Finance*, **26** (4), pp. 546-69.

Chrysoloras, N. (2015) "Greece seeks third debt restructuring: who's on the hook?", *Bloomberg* (2 Feburary), available at http://www.bloomberg.com/news/articles/2015-02-02/greece-seeks-third-debt-restructuring-who-s-on-the-hook- (accessed 11 February 2015).

Clower, R.W. (ed.) (1969), *Monetary Theory: Selected Readings*, Harmondsworth: Penguin.

Clower, R.W. (1989), "The state of economics: hopeless but not serious?", in D. Colander and A.W. Coats (eds) *The Spread of Economic Ideas*, Cambridge: Cambridge University Press.

Clower, R.W. (1999), "Robert W. Clower", in B. Snowden and H.W. Vane (eds) *Conversations with Leading Economists: Interpreting Modern Macroeconomics*, Cheltenham and Northampton: Edward Elgar.

Committee on Payment and Settlement Systems (2001), *Core Principles for systemically important payment systems*, Basel: Bank for International Settlements.

Committee on Payment and Settlement Systems (2003a), *The Role of Central Bank Money in Payment Systems*, Basel: Bank for International Settlements.

Committee on Payment and Settlement Systems (2003b), *A Glossary of Terms Used in Payments and Settlement Systems*, Basel: Bank for International Settlements.

Committee on Payment and Settlement Systems (2005), *New Developments in*

Large-value Payment Systems, Basel: Bank for International Settlements.

Conard, J.W. (1959), *An Introduction to the Theory of Interest*, Berkeley, CA: University of California Press.

Corden, W.M. (1994), *Economic Policy, Exchange Rates, and the International System*, Chicago: University of Chicago Press.

Costabile, L. (2011), "The international circuit of key currencies", in E. Brancaccio and G. Fontana (eds) *The Global Economic Crisis: New perspectives on the critique of economic theory and policy*, London and New York: Routledge, pp. 187-200.

Council of Economic Advisers (2009), "Economic report of the president", Washington D.C., available at http://www.gpo.gov/fdsys/browse/collection.action?collectionCode=ERP (accessed 13 February 2015).

Cumby, R. and R. Levich (1992), "Balance of payments", in P. Newman, M. Milgate and J. Eatwell (eds) *The New Palgrave Dictionary of Money and Finance*, Vol. I, London and Basingstoke: Macmillan, pp. 113-9.

Dadkhah, K. (2009), *The Evolution of Macroeconomic Theory and Policy*, Springer: Heidelberg.

Dalziel, P. (1999/2000), "A Post Keynesian theory of asset price inflation with endogenous money", *Journal of Post Keynesian Economics*, **22** (2), pp. 227-45.

Davidson, P. (1972), *Money and the Real World*, London and Basingstoke: Macmillan.

Davidson, P. (2002), *Financial Markets, Money and the Real World*, Cheltenham and Northampton: Edward Elgar.

Davidson, P. (2011), *Post Keynesian Macroeconomic Theory*, 2nd edition, Cheltenham and Northampton: Edward Elgar.

Davidson, P. and S. Weintraub (1973), "Money as cause and effect", *Economic Journal*, **83** (332), pp. 1117-32.

Debreu, G. (1959), *Theory of Value: An Axiomatic Analysis of Economic Equilibrium*, Cowles Foundation Monograph no. 17, New York: John Wiley.

Deutsche Bundesbank (1994), "Recent trends in the Deutsche Bundesbank's cashless payments", *Monthly Report*, **46** (8), pp. 45-61.

Diamond, P. (1994), *On Time*, Cambridge: Cambridge University Press.

Disyatat, P. (2010), "The bank lending channel revisited", Bank for International Settlements Working Paper, No. 297.

Dooley, M.P., D.F.I. Folkerts-Landau, and P. Garber (2007), "Direct investment, rising real wages and the absorption of excess labor in the periphery", *G7 Current Account Imbalances: Sustainability and Adjustment,* National Bureau of Economic Research, pp. 103-32.

Dooley, M.P., D.F.I. Folkerts-Landau, and P. Garber (2009), "Bretton Woods II still defines the international monetary system", *Pacific Economic Review*, **14** (3), pp. 297-311.

Dow, S.C. (1996), *The Methodology of Macroeconomic Thought*, Cheltenham and

Brookfield: Edward Elgar.

Driscoll, J.C., S. Holden (2014), "Behavioral economics and macroeconomic models", *Journal of Macroeconomics*, **41** (2014), pp. 133-47.

Du, Q., and S.-J. Wei (2010), "A sexually unbalanced model of current account imbalances", National Bureau of Economic Research Working Paper, No. 16000.

Dunaway, S. (2009), "Global imbalances and the financial crisis", Council on Foreign Relations, available at http://www.cfr.org/world/global-imbalances-financial-crisis/p18690 (accessed 20 December 2014).

Economist (The) (2005), "A survey of the world economy: the great thrift shift" (22 September 2005).

Economist (The) (2009), "When a flow becomes a flood" (22 January 2009).

Economist (The) (2012), "Claudio Borio on the financial cycle", 14 December, *Free Exchange* Online Blog, available at http://www.economist.com/blogs/ freeexchange/2012/12/reforming-macroeconomics (accessed 10 October 2013).

Edwards, S. (2004), "Thirty years of current account imbalances, current account reversals, and Sudden Stops", *IMF Staff Papers*, **51** (1), Special Issue, pp. 1-49.

Eichengreen, B.J. (2007), *Global Imbalances and the Lessons of Bretton Woods*, The Cairoli Lectures, Cambridge and London: The MIT Press.

Eichengreen, B.J. (2008), *Globalizing Capital: A History of the International Monetary System*, 2nd edition, Princeton, NJ: Princeton University Press.

Eichengreen, B.J. (2009), "The financial crisis and global policy reforms", *Conference on Asia and the Financial Crisis,* Santa Barbara, CA: Federal Reserve Bank of San Francisco.

Eichengreen, B.J. (2011), *Exorbitant Privilege: The Rise and Fall of the Dollar and the Future of the International Monetary System*, Oxford: Oxford University Press.

Eichengreen, B.J. (2012), "Macroeconomic and financial policies before and after the crisis", in M. Obstfeld, D. Cho and A. Mason (eds) *Global Economic Crisis: Impacts, Transmisison and Recovery*, Cheltenham and Northampton: Edward Elgar, pp. 181-203.

Eichengreen, B.J. and B. Weder di Mauro (2015), "Central banks and the bottom line", 12 February, available at http://www.project-syndicate.org/commentary/central-bank-balance-sheet-losses-by-barry-eichengreen-and-beatrice-weder-di-mauro-2015-02 (accessed 16 February 2015).

Engel, C. and J.H. Rogers (2006), "The U.S. current account deficit and the expected share of world output", Federal Reserve Bank of San Francisco Working Paper, No. 2006-38.

European Central Bank (2004), *Financial Stability Review,* December, available at https://www.ecb.europa.eu/pub/pdf/other/financialstabilityreview 200412en.pdf??bec16d622a57688b206a61f0732f60a0 (accessed 20

November 2014).

Fazio, A. (2000), "The relationship between currencies and gold", Speech given at the World Gold Council International Conference, Rome, transcript available at http://www.bis.org/review/r001201b.pdf (accessed 2 December 2014).

Feldstein, M. (2008), "Resolving the global imbalance: the dollar and the U.S. saving rate", *Journal of Economic Perspectives*, **22** (3), pp. 113-25.

Feldstein, M. and C. Horioka (1980), "Domestic saving and international capital flows", *Economic Journal*, **90** (358), pp. 314-29.

Ferguson, N. and M. Schularick (2007), "'Chimerica' and the global asset market boom", *International Finance*, **10** (3), pp. 215-39.

Fischer, S. (1983), "A framework for monetary and banking analysis", *Economic Journal*, 93 (conference supplement), pp. 1-16.

Fisher, I. (1911/1931), *The Purchasing Power of Money: its determination and relation to credit, interest and crises*, New York: Macmillan.

Fleming, J.M. (1962), "Domestic financial policies under fixed and under floating exchange rates", *IMF Staff Papers*, **9** (3), pp. 369-80.

Fontana, G. (2009), *Money, Uncertainty and Time*, London: Routledge.

Frank, R.H. (2011), *The Darwin Economy: Liberty, Competition and the Common Good*, Princeton and Oxford: Princeton University Press.

Frank, R.H. and B.S. Bernanke (2013), *Principles of Macroeconomics*, 5th international edition, New York: McGraw-Hill/Irwin.

Frenkel, J.A. and A. Razin (1987), "The Mundell–Fleming Model: A Quarter Century Later", *IMF Staff Papers*, **34** (December), pp. 567-620.

Frenkel, J.A. and H.G. Johnson (eds) (1976), *The Monetary Approach to the Balance of Payments*, London: Allen and Unwin.

Freund, C. and F. Warnock (2007), "Current account deficits in industrial countries: the bigger they are, the harder they fall?", in *G7 Current Account Imbalances: Sustainability and Adjustment,* National Bureau of Economic Research, pp. 133-68.

Friedman, M. (1953), "The methodology of positive economics", *Essays in Positive Economics*, Chicago: University of Chicago Press, pp. 3-43.

Friedman, M. (1969), *The Optimum Quantity of Money and Other Essays*, Chicago: Aldine Publishing.

Friedman, M. (1987), "Quantity theory of money", in J. Eatwell, M. Milgate and P. Newman (eds) *The New Palgrave Dictionary of Economics*, London and Basingstoke: Macmillan, Vol. IV, pp. 3-20.

Friedman, M. and R.V. Roosa (1967), *The Balance of Payments: Free versus Fixed Exchange Rates*, Washington: American Enterprise Institute for Public Policy Research.

Fullwiler, S.T. (2003), "Timeliness and the Fed's daily tactics", *Journal of Economic Issues*, **37** (4), pp. 851-80.

Galbraith, J.K. (2008), *The Predator State: How Conservatives Abandoned the Free Market and Why Liberals Should Too*, New York: Free Press.

Gandolfo, G. (1994) *International Economics I: The Pure Theory of International Trade*, 2nd edition, Berlin: Springer.

Gandolfo, G. (2001), *International Finance and Open-Economy Macroeconomics*, Berlin: Springer.

Gandolfo, G. (2004), *Elements of International Economics*, Berlin: Springer.

Ghosh, A.R. and J.D. Ostry (1995), "The Current Account in Developing Countries: A Perspective from the Consumption-Smoothing Approach", *World Bank Economic Review*, **9** (2), pp. 305-33.

Giannini, C. (2011), *The Age of Central Banks*, Edward Elgar: Cheltenham and Northampton.

Gnos, C. (2004), "Is ex-ante ex-post analysis irrelevant to Keynes's theory of employment?", *Review of Political Economy*, **16** (3), pp. 335-45.

Gnos, C. (2008), "The multiplier, the principle of effective demand and the finance motive: a single coherent framework", in C. Gnos and L.-P. Rochon (eds) *The Keynesian Multiplier*, London and New York: Routledge, pp. 181-92.

Gold, J. (1970), "Special Drawing Rights: character and use", *IMF Pamphlet Series, no. 13*, Washington: International Monetary Fund.

Goodhart, C.A.E. (1975), *Money, Information and Uncertainty*, London: Macmillan.

Goodlet, C. (1997), "Clearing and settlement systems and the Bank of Canada", *Bank of Canada Review* (Autumn), pp. 49-64.

Government Accounting Office (2002), "Payment systems: central bank roles vary, but goals are the same", GAO-02-303.

Graeber, D. (2011), *Debt: The First 5'000 Years*, New York: Melville House Publishing.

Greenspan, A. (2005), "Testimony of Chairman Alan Greenspan", *Testimony before the Committee on Banking, Housing, and Urban Affairs*, U.S. Senate, 17 February, available at http://www.federalreserve.gov/boarddocs/hh/2005/february/testimony.htm (accessed 29 November 2014).

Greenspan, A. (2010), "The crisis", 9 March, Encino, CA: Greenspan Associates.

Grubel, H.G. (ed.) (1963), *World Monetary Reform: Plans and Issues*, Stanford: Stanford University Press.

Gruber, J.W. and S.B. Kamin (2007), "Explaining the global pattern of current account imbalances", *Journal of International Money and Finance*, **26** (4), pp. 500-22.

Handa, J. (2009), *Monetary Economics*, 2nd edition, London and New York: Routledge.

Hausmann, R. and F. Sturzenegger (2006), „Global imbalances or bad accounting? the missing dark matter in the wealth of nations", *John F. Kennedy School of Government Working Paper, rwp06-003*.

Hawtrey, R.G. (1933), *The Gold Standard in Theory and Practice*, London: Longmans, Green and Co.

Heinsohn, G. and O. Steiger (1983), "Private property, debts and interest or: the origin of money and the rise and fall of monetary economics", *Studi Economici*, **21**, pp. 5-55.

Hicks, J.R. (1967), *Critical Essays in Monetary Theory*, Oxford: Clarendon Press.

Hicks, J.R. (1973), *Capital and Time*, Oxford: Clarendon Press.

Hicks, J.R. (1974), "Capital controversies: ancient and modern", *American Economic Review*, **64** (2), pp. 307-16.

Hildebrand, P. (2011), "Short statement by Philipp Hildebrand on 6 September 2011 with regard to the introduction of a minimum Swiss franc exchange rate against the euro", *Swiss National Bank press release*, transcript available at http://www.snb.ch/en/mmr/speeches/id/ref_20110906_pmh/source/ref_20110 906_pmh.en.pdf (accessed 10 February 2015).

Howitt, P. (2011), "What have central bankers learned from modern macroeconomic theory", *Journal of Macroeconomics*, **34** (1), pp. 11-22.

Hubbard, R.G. (2005), "A paradox of interest", June 23, *Wall Street Journal*.

Hubbard, R.G. (2006), "The U.S. current account deficit and public policy", *Journal of Policy Modeling*, **28** (6), pp. 665-71.

Hume, D. (1752/2003), "Of money", in S. Medema and W. Samuels (eds) *The history of economic thought: a reader*, London: Routledge, pp. 135-52.

Hume, D. (1955), *Writings on economics*, Edinburgh: Nelson.

Humphrey, T.M. (2002), "Balance of payments: monetary approach", in B. Snowdon and H.R. Vane (eds) *An Encyclopedia of Macroeconomics*, Cheltenham and Northampton: Edward Elgar, pp. 39-46.

Iley, R.A. and M.K. Lewis (2007), *Untangling the US Deficit: Evaluating Causes, Cures and Global Imbalances*, Cheltenham and Northampton: Edward Elgar.

Iley, R.A. and M.K. Lewis (2013), *Global Finance After the Crisis*, Cheltenham and Northampton: Edward Elgar.

Ingham, G. (2004), *The Nature of Money*, Cambridge: Polity Press.

International Monetary Fund (1993) *Balance of Payments Statistics Manual*, Washington: International Monetary Fund.

International Monetary Fund (2005), "Liability aspects of SDRs", *IMF Committee on Balance of Payments Statistics Reserve Assets Technical Expert Group (RESTEG)*, Issues Paper No. 10, Prepared by Antonio Galicia-Escotto, IMF Statistics Department.

International Monetary Fund (2009), *Balance of Payments Statistics Manual*, Washington: International Monetary Fund.

International Monetary Fund (2010), "Reserve accumulation and international monetary stability", *IMF Strategy, Policy and Review Department*, Washington: International Monetary Fund.

International Monetary Fund (2011a), "Enhancing international monetary stability – a role for the SDR?", *IMF Strategy, Policy and Review Department*, Washington: International Monetary Fund.

International Monetary Fund (2011b), *Articles of Agreement of the International Monetary Fund* (1944), Washington, D.C.: International Monetary Fund.

International Monetary Fund (2013), "The interaction of monetary and macroprudential policies", 29 January, available at https://www.imf.org/external/np/ pp/eng/2013/012913.pdf (accessed 3 November 2014).

International Monetary Fund (2014), "Special Drawing Rights (SDRs)", *IMF Factsheet*, available at http://www.imf.org/external/np/exr/facts/sdr.HTML (accessed 20 November 2014).

Jakab, Z. and Kumhof, M. (2013), "Models of banking: loanable funds or loans that create funds?", Washington, D.C.: International Monetary Fund.

Johnson, H.G. (1976a), "Towards a general theory of the balance of payments", in J.A. Frenkel and H.G. Johnson (eds) *The Monetary Approach to the Balance of Payments*, London: Allen and Unwin, pp. 46-63.

Johnson, H.G. (1976b), "The monetary approach to balance of payments theory", in J.A. Frenkel and H.G. Johnson (eds) *The Monetary Approach to the Balance of Payments*, London: Allen and Unwin, pp. 147-67.

Johnson, H.G. (1976c), "Money and the balance of payments", *Banca Nazionale Del Lavoro Quarterly Review* (March).

Johnson, H.G. (1977), "The monetary approach to the balance of payments theory and policy: explanations and policy implications", *Economica*, **44** (175), pp. 217-29.

Johnson, S. and Kwak, J. (2010), *13 Bankers – The Wallstreet Takeover and the Next Financial Meltdown*, New York: Pantheon Books.

Jones, C.I. (2014), *Macroeconomics*, 3rd edition, New York and London: W.W. Norton & Company.

Jordan, T. (2013a), "Starker Franken und hoher Ertragsbilanzüberschuss: ein Widerspruch?", Speech given at the University of Zurich, February 19, transcript available at http://www.snb.ch/de/mmr/speeches/id/ref_20130219_tjn/source/ref_201302 19_tjn.de.pdf (accessed 13 February 2015).

Jordan, T. (2013b), "Reconciling Switzerland's minimum exchange rate and current account surplus", Speech given at the Peterson Institute for International Economics, Washington, D.C., 8 October 2013, transcript available at http://www.snb.ch/en /mmr/speeches/id/ref_20131008_tjn/source/ref_20131008_tjn.en.pdf (accessed 13 February 2015).

Karunaratne, N.D. (2010), "The sustainability of Australia's current account deficits – A reappraisal after the global financial crisis", *Journal of Policy Modeling*, **32** (1), pp. 81-97.

Kaldor, N. and J. Trevithick (1981), "A Keynesian perspective on money", *Lloyds Bank Review*, **139**, pp. 1-19.

Keen, S. (2011), *Debunking Economics*, revised and expanded edition, London and New York: Zed Books.

Keen, S. (2014), "Endogenous money and effective demand", *Review of Keynesian Economics*, **2** (3), pp. 271-91.

Kenen, P.B. (1985), "Macroeconomic theory and policy: how the closed economy was opened", in R.W. Jones and P.B. Kenen (eds) *Handbook of International Economics*, Vol. II, Amsterdam: North-Holland, pp. 625-77.

Kennedy, S. and R. Christie (2010), "G-20 nations are divided over Geithner's trade plan", Bloomberg (22 October), available at http://www.bloomberg.com/news/articles/2010-10-22/geithner-push-for-g-20-trade-gap-targets-opposed-before-g-20-talks-start (accessed 13 February 2015).

Keynes, J.M. (1930/1971), *The Collected Writings of John Maynard Keynes* (Vol. V *A Treatise on Money: The Pure Theory of Money*), London and Basingstoke: Macmillan.

Keynes, J.M. (1933/1973), "A monetary theory of production", in *The Collected Writings of John Maynard Keynes* (Vol. XIII *The General Theory and After: Part I Preparation*), London and Basingstoke: Macmillan, pp. 408-11.

Keynes, J.M. (1936/1973), *The Collected Writings of John Maynard Keynes* (Vol. VII *The General Theory of Employment, Interest and Money*), London and Basingstoke: Macmillan.

Keynes, J.M. (1937/1973), *The Collected Writings of John Maynard Keynes* (Vol. XIV *The General Theory and After: Part II – Defense and Development*), London and Basingstoke: Macmillan.

Keynes, J.M. (1972), *The Collected Writings of John Maynard Keynes* (Vol. IX *Essays in Persuasion*), London: Macmillan and Cambridge University Press.

Keynes, J.M. (1980), *The Collected Writings of John Maynard Keynes* (Vol. XXV *Activities 1940-1944. Shaping the Post-War World: the Clearing Union*), D.E. Moggridge (ed.), London: Macmillan and Cambridge University Press.

Kirman, A. (1999), "The future of economic theory", in A. Kirman and L.-A. Gérard-Varet (eds) *Economics Beyond the Millennium*, Oxford: Oxford University Press, pp. 8-22.

Kimball, M.S. (1990), "Precautionary saving in the small and in the large", *Econometrica*, **58** (1), pp. 53-73.

Kindelberger, C.P. (1969), "Measuring equilibrium in the balance of payments", *Journal of Political Economy*, **77** (6), pp. 873-91.

King, M. (2010), "Banking: from Bagehot to Basel, and back again", speech given at the 2nd Bagehot Lecture Buttonwood Gathering, 25 October, New York City, transcript available at http://www.bis.org/review/r101028a.pdf (accessed 13 February 2015).

Knapp, G.F. (1924), *The State Theory of Money*, agridged edition translated by H.M. Lucas and J. Bonar, London: Macmillan (first German edition 1905).

Koo, R.C. (2009), *The Holy Grail of Macroeconomics: Lessons from Japan's Great Recession*, John Wiley and Sons (Asia) Pte. Ltd.

Kouri, P.J.K. (1976), "The exchange rate and the balance of payments in the short run and in the long run: a monetary approach", *The Scandinavian Journal of*

Economics, **78** (2), pp. 280–304.

Krugman, P.R. (2009a), "Revenge of the glut", *The New York Times* (March 2).

Krugman, P.R. (2009b), "How did economists get it so wrong?", *New York Times Magazine* (2 September).

Krugman, P.R. (2012), "Something (everything) rotten in the state of macro", available at http://krugman.blogs.nytimes.com/2012/12/17/something-everything-rotten-in-the-state-of-macro/?_r=0 (accessed 10 October 2013).

Krugman, P.R. and M. Obstfeld (2003), *International Economics. Theory and Policy*, Reading, MA: Addison-Wesely.

Krugman, P.R., R. Wells, K. Graddy (2014), *Essentials of Economics*, 3rd edition, Worth Publishers.

Laidler, D. (2003), "The role of history of economic thought in modern macroeconomics", in P. Mizen (ed.) *Monetary History, Exchange Rates and Financial Markets: Essays in honour of Charles Goodhart*, Vol. II, Cheltenham, UK: Edward Elgar Publishing, pp. 12-29.

Lane, P.R. (2001), "The new open economy macroeconomics: a survey", *Journal of International Economics*, **54** (2), pp. 235-66.

Lane, P.R. and G.-M. Milesi-Ferretti (2007), "A global perspective on external positions", in *G7 Current Account Imbalances: Sustainability and Adjustment,* National Bureau of Economic Research, pp. 67-102.

Lavoie, M. (2003), "A primer on endogenous credit-money", in L.-P. Rochon and S. Rossi (eds) *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, Cheltenham and Northampton: Edward Elgar Publishing, pp. 506–43.

Lindert, P.H. (1969), "Key currencies and gold 1900-1913", *Princeton Studies in International Finance*, No. 24, International Finance Section, Princeton, NJ: Princeton University Press.

Lucas, R. (1976), "Econometric policy evaluation: A critique", *Carnegie-Rochester Conference Series on Public Policy*, **1** (1), pp. 19-46.

Lucas, R. (2005), "Robert E. Lucas Junior", in B. Snowdon and H.R. Vane (eds) *Modern Macroeconomics: Its Origins, Development and Current State*, Cheltenham and Northampton: Edward Elgar, pp. 272-93.

Lutz, F.A. (1963), "The problem of international liquidity and the multiple-currency standard", in H.G. Grubel (ed.) *World Monetary Reform: plans and issues*, Stanford: Stanford University Press.

Machlup, F. (1955), "Relative prices and aggregate spending in the analysis of devaluation", *American Economic Review*, **45**, pp. 225-78.

Machlup, F. (1956), "The terms of trade effects of devaluation upon real income and the balance of trade", *Kyklos*, **3**, pp. 417-50.

Machlup, F. (1963), "Reform of the international monetary system", in H.G. Grubel (ed.) *World Monetary Reform: Plans and Issues*, Stanford: Stanford University Press, pp. 253-60.

Machlup, F. (1966a), "International monetary systems and the free market economy", *Reprints in International Finance*, No. 3 (February), Princeton, NJ: Princeton University Press.

Machlup, F. (1966a), "World monetary debate – bases for agreement", *Reprints in International Finance*, No. 4 (September), Princeton, NJ: Princeton University Press.

Machlup, F. (1970), "Euro-dollar creation: a mystery history", *Banca Nazionale del Lavoro Quarterly Review*, **0** (94), pp. 219-60.

Machlup, F. (1976a), "Three concepts of the balance of payments and the so-called dollar shortage", in *International Payments, Debts, and Gold, Collected Essays*, 2nd edition, pp. 69-92.

Machlup, F. (1976b), "Equilibrium and disequilibrium: misplaced concreteness and disguised politics", in *International Payments, Debts, and Gold, Collected Essays,* 2nd edition, pp. 110-35.

Machlup, F. (1976c), "Comments on 'The Balance of Payments'", in *International Payments, Debts, and Gold, Collected Essays*, 2nd edition, pp. 136-39.

Machlup, F. (1976d), "The mysterious numbers game of balance-of-payments statistics", in *International Payments, Debts, and Gold, Collected Essays*, 2nd edition, pp. 140-66.

Machlup, F. (1976e), "Plans for reform of the international monetary system", in *International Payments, Debts, and Gold, Collected Essays*, 2nd edition, pp. 282-366.

Machlup, F. (1976f), "The fuzzy concepts of liquidity", in *International Payments, Debts, and Gold, Collected Essays*, 2nd edition, pp. 245-59.

Mankiw, N.G. (2005), "An interview", in B. Snowdon and H.R. Vane (eds) *Modern Macroeconomics: Its Origins, Development and Current State*, Cheltenham and Northampton: Edward Elgar, pp. 433-50.

Mark, N.C. (2004), *International Macroeconomics and Finance: Theory and Econometric Methods*, Oxford: Blackwell Publishing.

Marshall, A. (1948), *Principles of Economics*, 8th edition, New York: Macmillan.

Martin, A. (2005), "Recent evolution of large-value payment systems: balancing liquidity and risk", *Federal Reserve Bank of Kansas City Economic Review*, **90** (**1**), pp. 33-57.

Mayer, T., M. Bronfenbrenner, K. Brunner, P. Cagan, B. Friedman, H. Frisch, H.G. Johnson, D. Laidler and A. Meltzer (1978), *The Structure of Monetarism*, New York and London: W.W. Norton and Co.

McCloskey, D.N and J.R. Zecher (1976), "How the Gold Standard worked, 1880-1913", in J.A. Frenkel and H.G. Johnson (eds) *The Monetary Approach to the Balance of Payments*, London: Allen and Unwin, pp. 357-85.

McKinnon, R.I. (1969), "Private and official international money: the case for the dollar", *Princeton Essays in International Finance*, **74**.

McLeay, M., A. Radia and R. Thomas (2014), "money in the modern economy: an introduction", *Bank of England Quarterly Bulletin* (2014 Q1), pp. 1-10.

Meade, J.E. (1951), *The balance of payments*, Vol. I, London: Oxford University Press.

Meier, G.M. (1982), *Problems of World Monetary Order*, London: Oxford University Press.

Melvin, M. and S.C. Norrbin (2012), *International Money and Finance*, 8th edition, Waltham, MA: Academic Press, Elsevier.

Mendoza, E.G., V. Quadrini and J.-V. Ríos-Rull (2007), "Financial integration, financial deepness and global imbalances", *CEPR Discussion Papers No. 6149*, available at http://ideas.repec.org/p/cpr/ceprdp/6149.html (accessed 10 November 2014).

Menger, C. (1923), *Grundsätze der Volkswirtschaftslehre*, Vienna: Hölder-Pichler-Tempsky (first published 1871).

Metzler, L.A. (1942), "Underemployment equilibrium in international trade", *Econometrica*, **10** (2), pp. 97-112.

Michaely, M. (1971), *The Responsiveness of Demand Policies to Balance of Payments: Postwar Patterns,* New York: Columbia University Press.

Michie, R.C. (1986), "The myth of the Gold Standard: an historian's approach", *Revue Internationale d'Histoire de la Banque*, Genève: Librarie Droz, pp. 32-3.

Mill, J.S. (1874/1948), *Essays on Some Unsettled Questions of Political Economy*, Essay V, London: The London School of Economics and Political Science, pp. 120-64.

Mirowski, P. (2013), *Never let a serious crisis go to waste: how neoliberalism survived the financial meltdown*, London and New York: Verso.

Modigliani, F. (1970), "The life cycle hypothesis of saving and intercountry differences in the saving ratio", in W.A. Eltis, M.F. Scott, and J.N. Wolfe (eds) *Induction, Growth and Trade. Essays in Honor of Sir Roy Harrod*, Oxford: Clarendon, pp. 197-225.

Mohan, R. (2007), "India's financial sector reforms: fostering growth while containing risk", Speech given at Yale University, 3 December, transcript available at http://www.rbi.org.in/scripts/BS_SpeechesView.aspx?Id=371 (accessed 13 Feburary 2015).

Moore, B. (2004), "A global currency for a global economy", *Journal of Post Keynesian Economics*, **26** (4), Spring, pp. 395-418.

Moore, B. (2006), *Shaking the Invisible Hand: Complexity, Endogenous Money and Exogenous Interest Rates*, Basingstoke: Palgrave Macmillan.

Mundell, R.A. (1961), "The international disequilibrium system", *Kyklos*, **14** (2), pp. 153-72.

Mundell, R.A. (1962), "The appropriate use of monetary and fiscal policy for internal and external stability", *IMF Staff Papers*, **9** (1), pp. 70-9.

Mundell, R.A. (1963), "Capital mobility and stabilization policy under fixed and flexible exchange rates", *Canadian Journal of Economics and Political Science*, **29** (4), pp. 475-85.

Mundell, R.A. (1968), *International Economics*, New York: Macmillan.

Mundell, R.A. (1976), "Barter theory and the monetary mechanism of adjustment", in J.A. Frenkel and H.G. Johnson (eds) *The Monetary Approach to the Balance of Payments*, London: Allen and Unwin, pp. 64-91.

Mundell, R. (2000), "A reconsideration of the twentieth century", *American Economic Review*, **90** (3), pp. 327-40.

Mussa, M. (1976), "Tariffs and the balance of payments", in J.A. Frenkel and H.G. Johnson (eds) *The Monetary Approach to the Balance of Payments*, London: Allen and Unwin.

Myrdal, G. (1939), *Monetary Equilibrium,* London: W. Hodge.

Nason, J.M. and J.H. Rogers (2002), "Investment and the current account in the short run and the long run", *Journal of Money, Credit and Banking*, **34** (4), pp. 967-86.

Neue Zürcher Zeitung (2014a), "Epochenwechsel in der Zahlungsbilanzstatistik" (19 June).

Neue Zürcher Zeitung (2014b), "Goldinitiative: Der Nationalbankchef nimmt Stellung" (6 November).

Neue Zürcher Zeitung (2015a), "Was der SNB geblüht hätte" (23 January).

Neue Zürcher Zeitung (2015b), "60 Milliarden an einem Tag weg" (16 January).

Obstfeld, M. (1982), "Aggregate spending and the terms of trade: is There a Laursen-Metzler effect?" *The Quarterly Journal of Economics*, **97** (2), pp. 251-70.

Obstfeld, M. (2001), "International macroeconomics: beyond the Mundell–Fleming model", *IMF Staff Papers*, Vol. 47, Special Issue.

Obstfeld, M. and K. Rogoff (1995a), "Exchange rate dynamics redux", *Journal of Political Economy*, **103** (3), pp. 624-60.

Obstfeld, M. and K. Rogoff (1995b), "The intertemporal approach to the current account", in G.M. Grossman and K. Rogoff (eds) *Handbook of International Economics*, Vol. III, Elsevier, pp. 1731-99.

Obstfeld, M. and K. Rogoff (2001), "The six major puzzles in international macroeconomics: is there a common cause?", *NBER Macroeconomics Annual 2000,* Vol. 15, National Bureau of Economic Research, pp. 339-412.

Obstfeld, M. and K. Rogoff (2009), "Global imbalances and the financial crisis: products of common causes", *Centre for Economic Policy Research Discussion Papers, No. 7606*.

Obstfeld, M. and A.M. Taylor (1997), "The great depression as a watershed: international capital mobility over the long run", *National Bureau of Economic Research Working Paper, Nr. 5960*.

Ogaki, M., J.D. Ostry and C.M. Reinhart (1996), "saving behavior in low- and middle-income developing countries: a comparison"*, IMF Staff Papers*, **43** (1), pp. 38-71.

Ohlin, B. (1936), *International Economic Reconstruction*, Paris: International Chamber of Commerce.

Osborne, D.K. (1992), "Defining money", in P. Newman, M. Milgate and J. Eatwell (eds) *The New Palgrave Dictionary of Money and Finance*, Vol. I, London and Basingstoke: Macmillan, pp. 602-6.

Overland, J., C.D. Carroll and D.N. Weil (2000), "Saving and growth with habit formation", *American Economic Review*, **90** (3), pp. 341-55.

Palley, T.I. (2012), *From Financial Crisis to Stagnation: The Destruction of Shared Prosperity and the Role of Economics*, Cambridge, UK: Cambridge University Press.

Palley, T. (2013), "Gattopardo economics: the crisis and the mainstream response of change that keeps things the same", *European Journal of Economics and Policies: Intervention*, **10** (2), pp. 193-206.

Palley, T. (2014), "The theory of global imbalances: mainstream economics vs. structural Keynesianism", paper presented at the XI International Colloquium at the Rio Branco Institute of Itamaraty: Brasilia.

Patinkin, D. (1972), *Studies in Monetary Economics*, New York: Harper and Row.

Persaud, A. (2004), "When currency empires fall", Speech given at Gresham College, 7 October, transcript available at http://www.gresham.ac.uk/lectures-and-events/when-currency-empires-fall (accessed 15 October 2014).

Pigou, A.C. (1917), "The value of money", *Quarterly Journal of Economics*, **32** (1), pp. 38-65.

Pigou, A.C. (1949), *The Veil of Money*, London: Macmillan.

Quiggin, J. (2010), *Zombie Economics*: *How Dead Ideas Still Walk Among Us*, Princeton, NJ: Princeton University Press.

Rathke, A. and J.-E. Sturm (2015) "Der Abschied von der Untergrenze: Kommentar zum Nationalbank-Entscheid vom 15. Januar 2015", available at http://www.oekonomenstimme.org/artikel/2015/01/der-abschied-von-der-untergrenze-kommentar-zum-nationalbank-entscheid-vom-15-januar-2015/ (accessed 10 February 2015).

Reisen, H. (1998), "Sustainable and excessive current account deficits", *OECD Development Centre Working Paper, No. 132*.

Ricardo, D. (1809/1951), "The price of gold", reprinted in *The Works and Correspondence of David Ricardo*, Vol. III, Cambridge, UK: Cambridge University Press, pp. 15-21.

Ricardo, D. (1816/1951), "Proposals for an economical and secure currency", reprinted in *The Works and Correspondence of David Ricardo*, Vol. IV, Cambridge, UK: Cambridge University Press, pp. 45-141.

Roach, S. (2004), "Twin deficits at the flashpoint?", *Morgan Stanley Global Economic Forum*, available at http://pages.stern.nyu.edu/~dbackus/CA/Roach%20twin%20defs%20Aug%2016%2004.htm (accessed 5 December 2014).

Robbins, L. (1932), *An Essay on the Nature and the Significance of Economics Science*, London: Macmillan.

Roberds, W. (2008), "Payment system", in S.N. Durlauf and L.E. Blume (eds) *The New Palgrave Dictionary of Economics*, 2nd edition, Vol. VI,

Basingstoke and New York: Palgrave Macmillan, pp. 337-40.

Robertson, D.H. (1937), *Money*, Cambridge: Cambridge University Press (first published 1922).

Robertson, D.H. (1940), *Essays in Monetary Theory*, London: P.S. King.

Rochon, L.-P. (2012), "Money's endogeneity, Keynes's General Theory and beyond", in T. Cate (ed.) *Keynes's General Theory: Seventy-Five Years Later*, Cheltenham and Northampton: Edward Elgar, pp. 293-303.

Rochon, L.-P. and M. Vernengo (2003), "State money and the real world: or chartalism and its discontents", *Journal of Post Keynesian Economics*, **26** (1), pp. 57-67

Rochon, L.-P. and S. Rossi (eds) (2003), *Modern Theories of Money: the nature and role of capitalist economies*, Cheltenham and Northampton: Edward Elgar.

Rochon, L.-P. and S. Rossi (2007), "Monetary policy without reserve requirements: central bank money as means of final payment on the interbank market", *paper for the International Conference organised by the CEMF in collaboration with ADEK (France) and the RNMP (Germany)*, Dijon: University of Burgundy.

Rogoff, K. (2013), "The long mystery of low interest rates", 4 April, available at https://www.project-syndicate.org/commentary/why-are-long-term-interest-rates-so-low-by-kenneth-rogoff (accessed 11 June 2014).

Rossi, S. (2001), *Money and Inflation: a new macroeconomic analysis*, Cheltenham and Northampton: Edward Elgar (reprinted 2003).

Rossi, S. (2003), "Money and banking in a monetary theory of production", in L.-P. Rochon and S. Rossi (eds) *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, Cheltenham and Northampton: Edward Elgar Publishing, pp. 339–59.

Rossi, S. (2007a), *Money and Payments in Theory and Practice*, London and New York: Routledge.

Rossi, S. (2007b), "The monetary-policy relevance of an international settlement institution", in A. Giacomin and M.C. Marcuzzo (eds) *Money and Markets: a doctrincal approach*, London and New York: Routledge, pp. 96-114.

Rossi, S. (2009), "Global imbalances and international monetary disorder: supranational money as a means to avoid another global crisis", conference paper for the 13th international conference of the Research Network on Macroconomics and Macroeconomic Policies "The World Economy in Crisis: The Return to Keynesianism?", October, Berlin.

Rossi, S. (2012), "The origin of TARGET2 imbalances", in C. Gnos and S. Rossi (eds) *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham and Northampton: Edward Elgar, pp. 221-38.

Roubini, N. (2005), "US-China 'balance of financial terror' game. A Prisoners Dilemma Game: hard landing MAD or Chinese pre-emption as the likely solution?", available at http://www.economonitor.com/nouriel/2005/01/25/us-china-balance-of-financial-terror-game-a-prisoners-dilemma-game-hard-

landing-mad-or-chinese-pre-emption-as-the-likely-solution/ (accessed 3 December 2014).

Rueff, J. (1963), "Gold exchange standard a danger to the West", in H.G. Grubel (ed.) *World Monetary Reform: plans and issues*, Stanford, CA and London: Stanford University Press and Oxford University Press, pp. 320-28.

Sachs, J.D. (1981), "The current account and macroeconomic adjustment in the 1970s", *Brookings Papers on Economic Activity*, **12** (1), pp. 201–82.

Samuelson, P. (1963), "Problems of methodology: discussion", *American Economic Review*, June 1973, **63** (3), pp. 231-236.

Samuelson, P. (1946), "The General Theory", in J. Stiglitz (ed.) *The Collected Scientific Papers of Paul A. Samuelson* (1966), Vol. II, pp. 1517-33.

Samuelson, P. (1973), "A quantum-theory model of economics: is the co-ordinating entrepreneur just worth his profit?", in J. Bhagwati and R.S. Eckaus (eds) *Development and Planning, Essays in Honour of Paul Rosenstein-Rodan*, London: John Allen and Unwin, Ltd., pp. 329-35.

Schmitt, B. (1960), *La Formation du Poivoir d'Achat*, Sirey: Paris.

Schmitt, B. (1966), *Monnaie, Salaires et Profits*, Paris: Presses Universitaires de France.

Schmitt, B. (1972), *Macroeconomic Theory. A Fundamental Revision*, Albeuve: Castella.

Schmitt, B. (1975), *Théorie Unitaire de la Monnaie, National et Internationale*, Albeuve: Castella.

Schmitt, B. (1978), *Die Theorie des Kreditgeldes*, Stuttgart: Gustav-Fischer.

Schmitt, B. (1984a), *Inflation, Chômage et Malformation du Capital*, Paris and Albeuve: Economica and Castella.

Schmitt, B. (1984b), "Introduzione", of *Scritti Monetari* by David Ricardo, Rome: Istituto dell'Enciclopedia Italiana.

Schmitt, B. (1984c), *La France Souveraine de sa Monnaie*, Paris and Albeuve: Economica and Castella.

Schmitt, B. (1996a), "A new paradigm for the determination of money prices", in G. Delaplace and E.J. Nell (eds) *Money in Motion: The Post Keynesian and Circulation Approaches*, London and New York: Macmillan and and St. Martin's Press, pp. 104-38.

Schmitt, B. (1996b), "Unemployment: is there a principal cause?", in A. Cencini and M. Baranzini (eds) *Inflation and Unemployment: Contributions to a New Macroeconomic Approach*, London and New York: Routledge, pp. 75-105.

Schmitt, B. (2012a), "Money, effective demand, and profits", in C. Gnos and S. Rossi (eds) *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham and Northampton: Edward Elgar, pp. 71-99.

Schmitt, B. (2012b), "Sovereign debt and interest payments", in C. Gnos and S. Rossi (eds) *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham and Northampton: Edward Elgar, pp. 239-60.

Schuberth, H. (2015), "Monetary targeting", in S. Rossi and L.-P. Rochon (eds) *Encyclopedia of Central Banking*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, pp. 350-352.

Schumacher, E.F. (1943), "Multilateral clearing", *Economica*, **10** (38), pp. 150-65.

Schumpeter, J.A. (1934), *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle*, Cambridge, MA: Harvard University Press.

Schumpeter, J.A. (1954/1994), *History of Economic Analysis*, London and New York: Routledge.

Shackle, G.L.S. (1972), *Epistemics and Economics. A Critique of Economic Doctrines*, Cambridge: Cambridge University Press.

Shin, H.S. (2011), "Global banking glut and loan risk premium", *Paper presented at the 12th Jacques Polak Annual Research Conference*, Washington, D.C.: World Bank.

Sloman, J. and A. Wride (2009) *Economics*, 7th edition, Essex: Pearson Education Limited.

Smith, A. (1776/1970), *The Wealth of Nations*, Harmondsworth: Penguin.

Smithin, J. (2013), *Essays in the Fundamental Theory of Monetary Economics and Macroeconomics*, Singapore: World Scientific Publishing.

Snowdon, B. and H.R. Vane (eds) (2002), *An Encyclopedia of Macroeconomics*, Cheltenham and Northampton: Edward Elgar.

Snowdon, B. and H.R. Vane (eds) (2005), *Modern Macroeconomics: Its Origins, Development and Current State*, Cheltenham and Northampton: Edward Elgar.

Solow, R.M. (1965), "Economic growth and residual housing", M.D. Ketchum and L.T. Kendall (eds) *Readings in Financial Institutions*, New York: Houghton Mifflin.

Sowell, T. (1972), *Say's Law: An Historical Analyis*, Princeton, NJ: Princeton University Press.

Spahn, H.-P. (2007), "Money as a social bookkeeping device: from mercantilism to General Equilibrium theory", in A. Giacomin and M.C. Marcuzzo (eds) *Money and Markets: a doctrincal approach*, London and New York: Routledge, pp. 150-65.

Steil, B. (2013), *The Battle of Bretton Woods*, Princeton, NJ: Princeton University Press.

Steuart, J. (1767/1998), *An Inquiry into the Principles of Political Oeconomy*, Vol. II, London: Pichering and Chatto (Publishers) Limited.

Stigler, G.J. (1983), "Nobel lecture: the process and progress of economics", *Journal of Political Economy*, **91** (4), pp. 529-45.

Stiglitz, J. (2002), *Globalisation and its Discontents*, New York: W.W. Norton & Company.

Stiglitz, J. (2005), "This can't go on forever – so it won't", *Guardian*, 1 January.

Stiglitz, J. (2011a), "Rethinking macroeconomics: what failed, and how to repair it", *Journal of the European Economic Association*, **9** (4), pp. 591-645.

Stiglitz, J. (2011b), "The best alternative to a new global currency", *Financial Times*, 31 March.

Stiglitz, J. (2011c), "Finding a balance in the reform debate", *Business Spectator*, available at http://www.businessspectator.com.au/article/2011/3/24/financial-markets/finding-balance-reform-debate (accessed 17 November 2014).

Stiglitz, J.E. and B. Greenwald (2010), "Towards a new global reserve system", *Journal of Globalization and Development*, **1** (2), Article 10.

Swiss Federal Statistics Office (2015) "Population size and population composition – Data, indicators", available at http://www.bfs.admin.ch/bfs/portal/en/index/themen/01/02/blank/key/alter/gesamt.html (accessed 10 February 2015).

Swiss National Bank (2007), *Die Schweizerische Nationalbank 1907-2007*, Zurich: Verlag Neue Zürcher Zeitung.

Swiss National Bank (2012), "Switzerland's international investment position 2012", *Swiss National Bank*, published December 2013.

Swiss National Bank (2014), "Nationalbank führt Negativzinsen ein", *Swiss National Bank press release* (18 December 2014), available at http://www.snb.ch/de/mmr/reference/pre_20141218/source/pre_20141218.en.pdf (accessed 10 February 2015).

Swiss National Bank (2015), "SNB balance sheet items end of December 2014", *Swiss National Bank*, released January 2015.

Taylor, J.B. (ed.) (1999), *Monetary Policy Rules*, Chicago: University of Chicago Press.

Taylor, J.B. (2008), *Getting Off Track: how Government Actions and Interventions Caused, Prolonged, and Worsened the Financial Crisis*, Stanford: Hoover Institution Press.

Taylor, M.P. (1990), *The Balance of Payments*, Aldershot: Edward Elgar.

Tobin, J. (1969), "A general equilibrium approach to monetary theory", *Journal of Money Credit and Banking*, **1** (1), pp. 15-29.

Trautwein, H.M. (2002), "Credit views in macroeconomic theory", in B. Snowdon and H.R. Vane (eds) *An Encyclopedia of Macroeconomics*, Cheltenham and Northampton: Edward Elgar, pp. 156-61.

Triffin, R. (1947), "National central banking and the international economy", *Postwar Economic Studies* 7, pp. 46-81.

Triffin, R. (1960), *Gold and the Dollar Crisis: The Future of Convertibility*, Hew Haven and London: Yale University Press.

Triffin, R. (1963a), "Excerpts from: gold and the dollar crisis", in H.G. Grubel (ed.) *World Monetary Reform: Plans and Issues*, Stanford: Stanford University Press, pp. 15-54.

Triffin, R. (1963b), "After the Gold Exchange Standard", in H.G. Grubel (ed.) *World Monetary Reform: Plans and Issues*, Stanford: Stanford University Press, pp. 422-39.

Triffin, R. (1968), *Our International Monetary System: Yesterday, Today and Tomorrow*, New York: Random House.

Truman, E. (2009), *Lessons from the Global Economic and Financial Crisis*, keynote address, at the conference "G20 Reform Initiatives: Implications for the Future of Financial Regulation", co-hosted by the Institute for Global Economics and the IMF, Seoul, Korea, 11 November.

Tsiang, S.C. (2008), "Loanable funds", in S.N. Durlauf and L.E. Blume (eds) *The New Palgrave Dictionary of Economics*, 2nd edition, Vol. V, Basingstoke and New York: Palgrave Macmillan, pp. 171-3.

United Nations (1993), *System of National Accounts 1993*.

United Nations (2008), *System of National Accounts 2008*.

United Nations (2009), "Recommendations by the Commission of Experts of the President of the General Assembly on reforms of the international monetary and financial system", accessed online http://www.un.org/ga/president/63/letters/recommendation Experts200309.pdf (accessed 23 April 2013).

Van den Berg, H. (2010), *International Finance and Open-Economy Macroeconomics: Theory, History, and Policy*, Singapore: World Scientific.

Viner, J. (1937), *Studies in the Theory of International Trade*, New York: Harper.

Vines, D. (2008), "Absorption approach to the balance of payments", in S.N. Durlauf and L.E. Blume (eds) *The New Palgrave Dictionary of Economics*, 2nd ed., Vol. I, Basingstoke and New York: Palgrave Macmillan, pp. 3-5.

Walras, L. (1874/1954), *Elements of Pure Economics or the Theory of Social Wealth*, London: George Allen and Unwin, translation by W. Jaffé (first published in French).

Ward, B. (1972), *What's Wrong With Economics?*, London: Macmillan.

Wickens, M. (2011), *Macroeconomic Theory: A Dynamic General Equilibrium Approach*, 2nd edition, Princeton, NJ and Oxford: Princeton University Press.

Wicksell, K. (1898), *Geldzins und Güterpreise: Eine Studie über die den Tauschwert des Geldes bestimmenden Ursachen*, Scientia-Verlag.

Wicksell, K. (1953/2010), *Lectures on Political Economy*, Vol. II, Oxon and New York: Routledge.

Williamson, J. (1976), "The benefits and costs of an international nonsystem", in E.M. Bernstein et al. (eds), *Reflections on Jamaica*, *Essays in International Finance, No. 115*, International Finance Section, Princeton University.

Williamson, J. (2009), "Understanding Special Drawing Rights", *Peterson Institute for International Economics Policy Brief, no. PB09-11*.

Withers, H. (1909/1930), *The Meaning of Money*, New York: Dutton.

Wolf, M. (2004), "America is now on the comfortable path to ruin", *Financial Times*, 18 August.

Wolf, M. (2008), "Global monetary and financial disorder: the role of global

imbalances", Speech given at the 7th BIS Annual Conference, June 27, transcript available at http://www.bis.org/events/conf080626/wolf.pdf (accessed 13 February 2015).

Wray, R. (1998), *Understanding Modern Money: the key to full employment and price stability*, Cheltenham and Northampton: Edward Elgar.

Wray, R. (2012), *Modern Money Theory: A Primer on Macroeconomics for Sovereign Monetary Systems*, Palgrave Macmillan.

Xiaochuan, Z. (2009), "Reform the international monetary system", March 23, People's Bank of China, available at http://www.bis.org/review/r090402c.pdf (accessed 24 November 2014).