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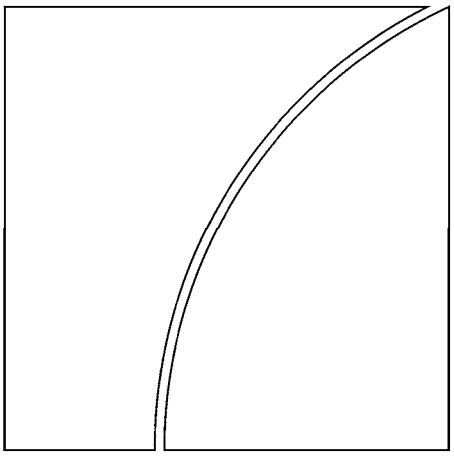

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Global imbalances and the financial crisis: Link or no link?

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Global imbalances and the financial crisis: Link or no link?[1]

Claudio Borio and Piti Disyatat[2]

Abstract

Global current account imbalances have been at the forefront of policy debates over the past few years. Many observers have recently singled them out as a key factor contributing to the global financial crisis. Current account surpluses in several emerging market economies are said to have helped fuel the credit booms and risk-taking in the major advanced deficit countries at the core of the crisis, by putting significant downward pressure on world interest rates and/or by simply financing the booms in those countries (the "excess saving" view). We argue that this perspective on global imbalances bears reconsideration. We highlight two conceptual problems: (i) drawing inferences about a country's cross-border financing activity based on observations of *net* capital flows; and (ii) explaining *market* interest rates through the saving-investment framework. We trace the shortcomings of this perspective to a failure to consider the distinguishing characteristics of a monetary economy. We conjecture that the main contributing factor to the financial crisis was not "excess saving" but the "excess elasticity" of the international monetary and financial system: the monetary and financial regimes in place failed to restrain the build-up of unsustainable credit and asset price booms ("financial imbalances"). Credit creation, a defining feature of a monetary economy, plays a key role in this story.

JEL Classification: E40, E43, E44, E50, E52, F30, F40.

Keywords: Global imbalances, saving glut, money, credit, capital flows, current account, interest rates, financial crisis.

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Introduction

Global current account imbalances and the net capital flows they entail have been at the forefront of policy debates in recent years. In the wake of the financial crisis, many observers and policymakers have singled them out as a key factor contributing to the turmoil.[3] A prominent view is that an excess of saving over investment in emerging market countries, as reflected in corresponding current account surpluses, eased financial conditions in deficit countries and exerted significant downward pressure on world interest rates. In so doing, this flow of saving helped to fuel a credit boom and risk-taking in major advanced economies, particularly in the United States, thereby sowing the seeds of the global financial crisis.

This paper argues that such a view, henceforth the *excess saving (ES) view*, and its focus on saving-investment balances, current accounts and *net* capital flows bears reconsideration. The central theme of the ES story hinges on two hypotheses, which appear to various degrees in specific accounts: (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. Our critique addresses each of these hypotheses in turn.

Our objection to the first is that a focus on current accounts in the analysis of cross-border capital flows diverts attention away from the global financing patterns that are at the core of financial fragility. By construction, current accounts and net capital flows reveal little about financing. They capture changes in net claims on a country arising from trade in *real* goods and services and hence *net* resource flows. But they exclude the underlying changes in gross flows and their contributions to existing stocks, including all the transactions involving only trade in financial assets, which make up the bulk of cross-border financial activity. As such, current accounts tell us little about the role a country plays in international borrowing, lending and financial intermediation, about the degree to which its real investments are financed from abroad, and about the impact of cross-border capital flows on domestic financial conditions. Moreover, we argue that in assessing global financing patterns, it is sometimes helpful to move away from the residency principle, which underlies the balance-of-payments statistics, to a perspective that consolidates operations of individual firms across borders. By looking at gross capital flows and at the salient trends in international banking activity, we document how financial vulnerabilities were largely unrelated to – or, at the least, not captured by – global current account imbalances.

The misleading focus on current accounts arguably reflects the failure to distinguish sufficiently clearly between *saving* and *financing*. Saving, as defined in the national accounts, 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. The financial crisis reflected disruptions in financing channels, in borrowing and lending patterns, about which saving and investment flows are largely silent. This objection, in fact, is of broader relevance. For instance, it is also applicable to the underlying premise of the large literature spurred by Feldstein and Horioka (1980). In this analysis, too, the distinction between saving and financing plays no role.

Our objection to the second hypothesis underlying the ES view is that the balance between *ex ante* saving and *ex ante* investment is best regarded as determining the *natural*, not the

[3] For example, Bernanke (2009a), Council of Economic Advisers (2009), Dunaway (2009), Economist (2009), Eichengreen (2009), King (2010), Kohn (2010), Krugman (2009) and Portes (2009). Some elements of this story are also present in Eichengreen (2009).

market, interest rate. The interest rate that prevails in the market at any given point in time is fundamentally a monetary phenomenon. It reflects the interplay between the policy rate set by central banks, market expectations about future policy rates and risk premia, as affected by the relative supply of financial assets and the risk perceptions and preferences of economic agents. It is thus closely related to the markets where financing, borrowing and lending take place. By contrast, the natural interest rate is an unobservable variable commonly assumed to reflect only real factors, including the balance between *ex ante* saving and *ex ante* investment, and to deliver equilibrium in the goods market. Saving and investment affect the market interest rate only indirectly, through the interplay between central bank policies and economic agents' portfolio choices. While it is still possible for that interplay to guide the market rate towards the natural rate over any given period, we argue that this was not the case before the financial crisis. We see the unsustainable expansion in credit and asset prices ("financial imbalances") that preceded the crisis as a sign of a significant and persistent gap between the two rates. Moreover, since by definition the natural rate is an equilibrium phenomenon, it is hard to see how market rates roughly in line with it could have been at the origin of the financial crisis.

We trace the limitations of the ES view to its application of what is a form of *real* analysis, better suited to barter economies with frictionless trades, to a *monetary* economy, especially one in which credit creation takes place. It is hard to see how an analysis ultimately rooted in the assumption that money and credit are veils of no consequence for economy activity can be adequate in understanding the pattern of global financial intermediation, determination of market interest rates and, *a fortiori*, financial instability.

To be clear, we *are not* arguing that current account imbalances are a benign feature of the global economy. To the extent that they reflect domestic imbalances and/or unsustainable policy interventions, they do raise first-order policy issues. Looking forward, persistent current account imbalances could generate damaging protectionist pressures and political frictions. Nor are we questioning the view that sizeable official inflows into US government securities may have contributed, at least at the margin, to lower long-term yields. Rather, we simply argue that the ES view tends to overestimate and miscast the role of current account imbalances in the crisis.

Our analysis has some natural policy implications. It suggests that, in 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. The roots of the recent financial crisis can be traced to a global credit and asset price boom on the back of aggressive risk-taking.[4] Our key hypothesis is that the international monetary and financial system lacks sufficiently strong anchors to prevent such unsustainable booms, resulting in what we call "excess elasticity". We conjecture that the main macroeconomic cause of the financial crisis was not "excess saving" but the "excess elasticity" of the monetary and financial regimes in place. In this context, the role of an inadequate framework of regulation and supervision has already been widely recognised and has triggered a major international policy response (eg G20 (2009), BIS (2009), BCBS (2009 and 2010a), Borio (2010)). Therefore, we will not discuss it further. By contrast, that of monetary policy frameworks has received less attention. Here we elaborate on the crucial role played by low policy interest rates worldwide in accommodating the credit boom.

Many of the core elements of our analysis are by no means new. In some respects, the analysis retrieves an older economic tradition, in which the implications of monetary

[4] For a similar conclusion, which plays down the role of global imbalances, see Truman (2009)); see also Shin (2009), who stresses the need to consider the important role played by monetary policy. Eichengreen (2009) and, based on a standard global macroeconomic model, Catte et al (2010) appear to reach intermediate conclusions.

economies took centre stage. The distinction between market and natural interest rates, and the key role played by credit, was already commonplace when John Stuart Mill (1871) was writing, and was the main preoccupation of thinkers such as Wicksell (1898) and those that followed him.[5] The importance of understanding global financial intermediation and its tenuous link to current accounts was a key theme in Kindleberger (1965). It has motivated the collection and analysis of statistics on international banking by the policy community, a task entrusted to the BIS in the 1970s. More recently, several observers have again highlighted the need to focus on the whole balance sheet of national economies, albeit from a purely residence (balance-of-payments) perspective (Lane and Milesi-Ferretti (2008), Obstfeld (2010)). The importance of looking also at consolidated balance sheets has been documented in detail by McGuire and von Peter (2009) in the context of the recent banking crisis. We see our main contribution as drawing out more starkly and bringing together these various strands of analysis, which are absent from the ES view.

The rest of the paper is organised as follows. Section I highlights the key elements of the ES view and presents some empirical observations that raise *prima facie* doubts about it. Section II considers the limitations of the ES view in casting light on international financing and intermediation patterns. This section introduces the distinction between saving and financing, first in a closed economy and then in an open economy, and explores financing and intermediation patterns in the run-up to, and during, the crisis. The discussion focuses largely on *identities* and on the risk of drawing misleading behavioural inferences from them. Section III examines the limitations of the saving-investment framework that underlies the ES view as a basis for explaining market, as opposed to natural, interest rates. The discussion here focuses squarely on *behavioural* relationships. Drawing on the previous analysis, Section IV identifies the key weaknesses in the international monetary and financial system that contributed to the crisis and highlights its policy implications.

I. The excess saving view: hypothesis and stylised facts

The left-hand panel of Graph 1 illustrates recent developments in the global configuration of external balances. On the deficit side, the US current account deficit widened persistently to almost 2 percent of world GDP in 2006 (over 6 percent of US GDP), before subsequently reversing as the US economy went into recession. On the surplus side, prominent increases have been recorded in Asia, particularly in China, and the oil exporting countries. With export growth driving economic recovery in many emerging Asian countries, central banks in the region have resisted appreciation pressures, not least through foreign exchange reserve accumulation. For most of the past decade, reserve accumulation in emerging Asia has actually exceeded the region's current account surplus (Graph 1, right-hand panel).

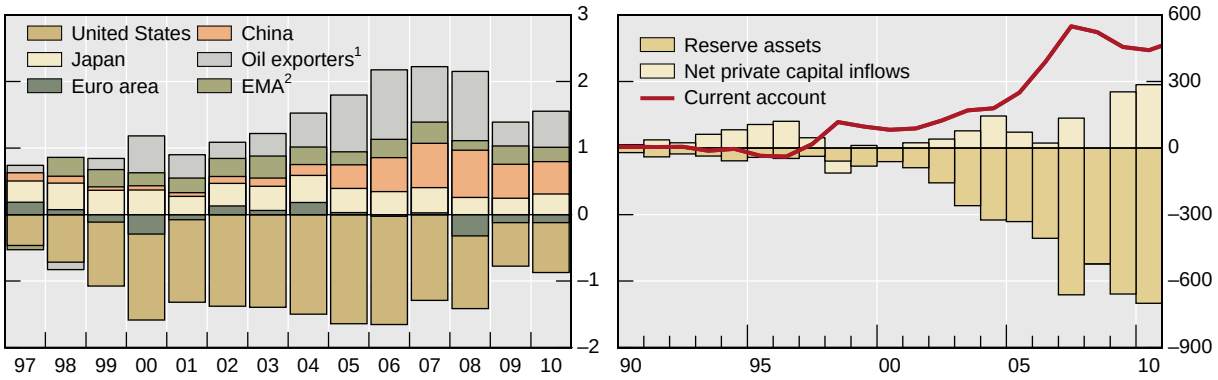
The ES view draws a close link between these current account imbalances, and the associated net capital flows, on the one hand, and financial conditions in deficit countries, world interest rates and, more recently, the financial crisis itself, on the other (see references in footnote 1). The view has several variants, but they all attribute the emergence of global imbalances to an excess of saving over investment in emerging market countries. This excess flowed "uphill" into advanced economies running large current account deficits, particularly the US, easing financial conditions and depressing long-term interest rates there.

[5] Laidler (1999) provides an excellent survey of this literature. See also Leijonhufvud (1981, 1997) and Kohn (1986).

Graph 1

Current account balance and net capital flows

Current account balance as a % of world GDP | **Net capital flows to emerging Asia[3]**



[1] Algeria, Angola, Azerbaijan, Bahrain, Democratic Republic of Congo, Ecuador, Equatorial Guinea, Gabon, Iran, Kazakhstan, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Sudan, Syrian Arabic Republic, Trinidad and Tobago, United Arab Emirates, Venezuela and Yemen. [2] Chinese Taipei, India, Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand. [3] EMA countries and China; in billions of US dollars.

Sources: IMF; authors' calculations.

The reduction in interest rates, in turn, encouraged a credit-financed boom, falling risk premia, rising asset prices and a deterioration in credit quality in these countries. This sowed the seeds of the subsequent crisis. In this story, regions that were in approximate external balance, such as the euro area, have a negligible role. They exert essentially a neutral effect on the dynamics of global financial flows.

Views differ on the underlying cause of the excess saving. Bernanke (2005) argues that a confluence of factors led to the emergence of a "global saving glut". These include policy interventions to boost exports (Asia), higher oil prices (Middle East), and a dearth of investment opportunities and an ageing population in advanced industrial countries. Mendoza et al. (2007) attribute high savings in emerging market countries to relatively low levels of financial development, which generate greater precautionary saving. Caballero et al. (2008) instead emphasise the lack of investment opportunities in these countries and the associated shortage of financial assets as the main source. Similarly, the IMF (2005) stresses low investment rates, rather than an increase in savings, following the Asian crisis.[6]

Despite the prominence of the ES view, there is increasing stylised evidence that appears *prima facie* inconsistent with it. Several points are worth highlighting.

First, the link between current account balances and long-term interest rates looks tenuous. For example, US dollar long-term interest rates tended to increase between 2005 and 2007 with no apparent reduction in either the US current account deficit or net capital outflows from surplus countries, such as China (Graph 2, left-hand panel). Moreover, the sharp fall in US long-term interest rates since 2007 has taken place against a backdrop of improvements in the US current account deficit – and hence smaller net capital inflows.

Second, the depreciation of the US dollar for most of the past decade sits uncomfortably with the presumed relative attractiveness of US assets (Graph 2, right-hand panel). Other things

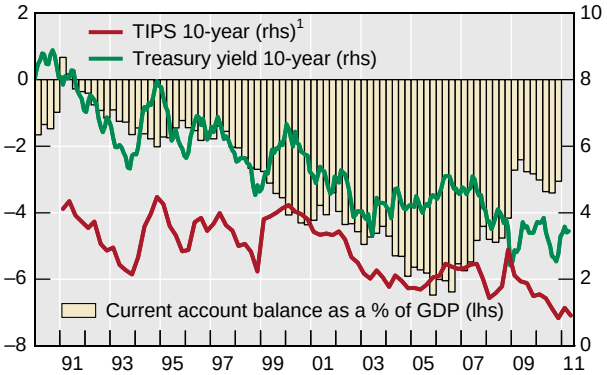
[6] There is also a broader literature that assesses the sustainability of the US current account deficit through the lens of global saving-investment balances where the implicit assumption is that surplus countries are "financing" those running deficits. Backus et al (2009) contains extensive references.

equal, the currency should have been appreciating as non-residents increased the demand for those assets.

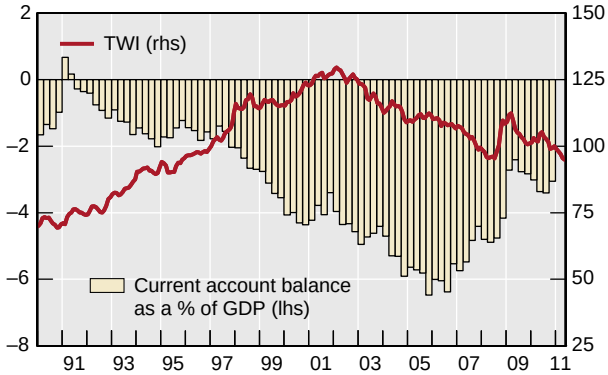
Graph 2

US current account and financial variables

Current account and long-term US interest rates



Current account and US effective exchange rate



[1] 10-year nominal government yield minus inflation expectations until end-1996.

Sources: Bloomberg; IMF; authors' calculations.

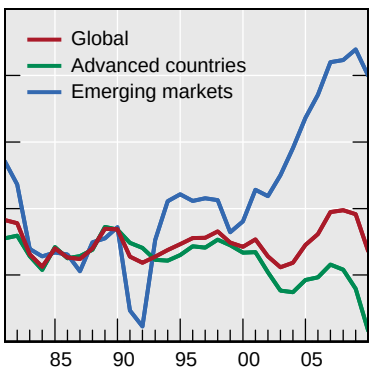
Third, the link between the US current account deficit and global savings appears to be weak. While the deficit began its trend deterioration in the early 1990s, the world saving rate actually trended downward to the end of 2003 (Graph 3, left-hand panel). At the same time, the stabilisation and reductions in US current account deficits since 2006 have occurred against the backdrop of a continued upward drift in emerging market saving rates.

Graph 3

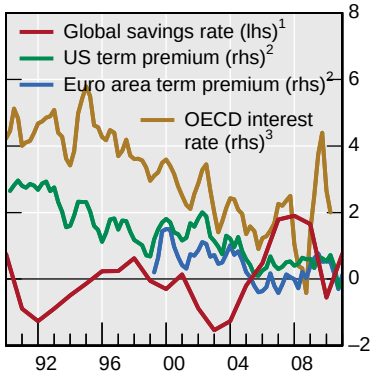
Global savings rate, GDP growth and interest rates

In per cent

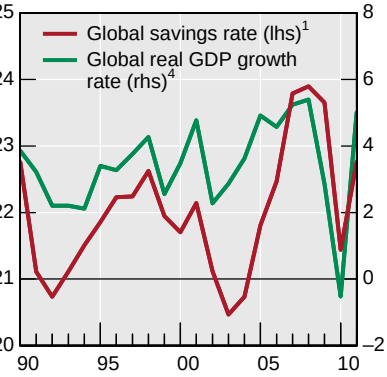
Gross national saving rate[1]



Global saving and interest rates



Global saving and GDP growth



[1] As a percentage of GDP. [2] Nominal 10-year term premia based on zero-coupon real and nominal yields calculated based on estimates from a modified version of the term structure model in P Hördahl and O Tristani, "Inflation risk premia in the term structure of interest rates", BIS Working Papers, no 228, May 2007. [3] 2005 GDP PPP-weighted average of real long-term (mainly 10-year) interest rates for Australia, Canada, Denmark, the euro area, Japan, New Zealand, Norway, Switzerland, the United Kingdom and the United States. [4] Year-on-year growth rates.

Sources: IMF; OECD; authors' calculations.

Fourth, there does not seem to be a clear link between the global saving rate and real interest rates or term premia. Real world long-term interest rates as well as term premia have trended downwards since the early 1990s, irrespective of developments in the global saving rate (Graph 3, centre panel).

Fifth, the growth performance of the world economy raises doubts about the nature of the underlying shock associated with a rise in saving. Questions about the unusually low long-term interest rates began to emerge around 2003. Starting then, the world economy experienced a string of years of record growth (Graph 3, right-hand panel). This is hard to reconcile with an increase in *ex ante* global saving, which, assuming nominal rigidities, should depress aggregate demand.

Sixth, credit booms have by no means been a prerogative of deficit countries. As highlighted by Hume and Sentance (2009), countries with large current account surpluses also had credit booms, including China from 1997 to 2000 and more recently, India from 2001 to 2004, Brazil from 2003 to 2007 and, one could add, economies in the Middle East in recent years. Moreover, going further back, the huge credit boom that preceded the banking crisis in Japan also occurred against the backdrop of a large current account surplus. And the same is true of the major boom in the 1920s that preceded the banking crisis and Great Depression in the United States (Eichengreen and Mitchener (2003)).

Finally, the countries seen at the origin of the net capital flows were among those least affected by the crisis, at least through their financial exposures. Financial institutions in other countries, notably in Europe, were hardest hit. In fact, before the crisis erupted, the main concern was that a flight from US dollar assets induced by unsustainable current account deficits would precipitate turmoil. The scenario that materialised was very different. Indeed, as the crisis unfolded, the US dollar actually appreciated (McCauley and McGuire (2010)).

The purpose of listing these observations is not to refute the ES hypothesis, but simply to raise some doubts about its validity. Ultimately, since *ex ante* saving and investment are not observable, it is hard to identify them. In the saving glut view, the fall in long-term interest rates is taken as *evidence* of a global excess of *ex ante* saving over investment, given the observed configuration of current account balances (Bernanke (2005)). Obviously, since current account balances add up to zero for the world as a whole, their existence cannot by itself say anything about shifts in global *ex ante* saving and investment.

Rather, our main objections are of an analytical character. We argue that the saving-investment framework is inadequate for drawing inferences about global *financing* patterns and explaining the behaviour of *market* interest rates. We explore each issue in turn.

II. The excess saving view and global financing patterns

A key element of the ES view is the association of global current account imbalances with the financing of credit booms in deficit countries. This line of reasoning is echoed in studies that examine the relationship between housing booms and current account deficits, which implicitly views the deficits as increasing the availability of foreign funds to finance domestic borrowing (eg Sá et al (2011), Aizenman and Jinjarak (2008)).[7] Many of those that take a more nuanced view of global imbalances, emphasising instead microeconomic weaknesses in the United States, still appear to suggest that the surge in *net* capital inflows into the country exacerbated them (eg Obstfeld and Rogoff (2009)).

[7] Of course, causality may quite plausibly run the other way: the domestic boom in credit and asset prices can easily generate, or at least increase, the current account deficit.

This focus on *net* capital inflows in discussing global intermediation and financing conditions in deficit countries has shortcomings. We first argue analytically that it does not distinguish sufficiently clearly between the notions of saving and financing; by extension, it fails to properly distinguish between gross and net capital flows across countries. We then show empirically that the global configuration of current account balances provides a misleading picture of the global pattern of financing flows and intermediation. Consequently, it is not informative about the potential risks to financial stability associated with these flows and with the stocks to which these flows contribute.

Saving versus financing: the closed economy case

By viewing cross-border capital flows through the lens of national saving-investment balances, the ES view tends to conflate borrowing and lending, which are *financial* transactions, with national income accounting concepts, which track *expenditures* on final goods and services. Consider first the closed economy case.

Saving, *defined* as income not consumed, is a national accounts construct that traces the use of real production. It does not represent the availability of *financing* to fund expenditures. By construction, it simply captures the contribution that expenditures other than consumption make to income (output). Put differently, in a closed economy, or for the world as a whole, the only way to save in a given period is to *produce* something that is not consumed, ie 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. In *ex post* terms, being simply the *outcome* of various forms of expenditure, saving does not represent the constraint on how much agents are able to spend *ex ante*.

The true constraint on expenditures is not saving, but *financing*. In a monetary economy, all financing takes the form of the exchange of goods and services for money (settlement medium) or credit (IOUs). Financing is a cash-flow concept. When incoming cash flows in a given period fall short of planned expenditures, agents need to draw down on their holdings of money or borrow. This is true for *every* transaction. And it is only once expenditures take place that income, investment, and hence saving, are generated.[8]

The distinction between saving and financing can be seen intuitively in at least two ways.

First, investment, and hence saving in the national income accounting sense, may be zero, but as long as production and the associated expenditures are positive, they *have to* be financed somehow. This is an economy in which saving is zero but financing positive. In the process, expenditures and production may be underpinned by substantial borrowing and lending (eg to pay for factors of production in advance of sales or loans for consumption). Disyatat (2010a), for instance, has a simple formal model with these properties.

Second, and more generally, the change in *financial* assets and liabilities in any given period bears *no relationship* to saving (and investment) in the national accounts sense. The same volume of saving can go hand-in-hand with widely different changes in financial assets and liabilities. This is precisely what the flows-of-funds in the national accounts show. And, by construction, those changes net out to zero: what is issued by one sector must be held by

[8] 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 then determines saving and investment for the economy in that period. Clearly, in this case it is the financing (in the form of trade credit) that workers grant firms ahead of production that generates matching saving and investment flows for the economy. From a national income accounts perspective, deficit spending of one sector creates the matching saving (or surplus) of another. Agents in the deficit sector require financing to enable them to spend more than their incomes (assumed here to coincide with a corresponding cash flow), and it is this very spending that creates the corresponding saving in the surplus sector.

another. Typically, increases in assets and liabilities greatly exceed saving in any given period, reflecting in part the myriad of ways in which expenditures are ultimately financed. For example, just *one* such component – the outstanding stock of credit to the private sector – tends to grow faster than GDP. In other words, its change is *much larger* than saving, which is only one part of income. This is a well known process termed "financial deepening" (Goldsmith (1969)).[9]

Probably, the occasional failure to appreciate fully the distinction between saving and financing reflects two sources.

One is extending inferences that are valid for an individual agent to the economy as a whole – a fallacy of composition. For an individual agent, additional income is *necessarily* accumulated in financial or real assets. The income not spent (the individual's "saving"), which is initially received in the form of additional settlement medium, is allocated across asset classes. But for the economy as a whole this is obviously not true. The allocation of savings simply represents a gross transfer of assets across individuals: the increase in deposits of income receivers is matched by the decline in deposits of those that pay that income out. It is only when the additional income is supported by issuance of financial claims (eg credit or shares) that financial assets and liabilities are created.[10] By the same token, the popular and powerful image that additional *saving* bids up financial asset prices (and hence depresses yields and interest rates) because it "has to be allocated somewhere" is misleading. There is no such thing as a "wall of saving" *in the aggregate*. Saving is not a wall, but a "hole" in aggregate spending.

A second possible source is the widespread use of analytical frameworks in which monetary factors are excluded, ie reliance on pure *real* analysis (Schumpeter (1954)). This corresponds to a world in which real investments can only be carried out by transferring real resources from saving units to investment units. Pre-existing savings (or "endowments") are necessary to carry out production and investment. Even when financial intermediaries are present, they perform no other function: they allocate, and do not create, purchasing power. The real endowments ("savings") are those intermediaries' liabilities as well as their assets, which are transferred to "investment" units. But in a monetary economy constraints are not as tight. Some intermediaries, banks, actually create additional purchasing power in the form of deposits through the act of extending credit (see Annex).

Saving versus financing: the open economy case

At the international level, the distinction between saving and financing is partly mirrored in the concepts of net versus gross capital flows. Current accounts capture the net financial flows that arise from trade in *real* goods and services. But they exclude the underlying changes in gross flows and their contributions to existing stocks, including all the transactions involving only trade in financial assets, which make up the bulk of cross-border financial activity. Net capital flows thus capture only a very small slice of global financial flows. And an economy running a balanced current account can actually be engaged in large-scale intermediation activity (eg foreign borrowing and lending; see eg Despres et al (1966)).

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[9] Of course, even if the outstanding stock at the end of the period was the same as that at the beginning, intra-period financing would have been positive.

[10] It goes without saying that most transactions are not associated with income (output) generation in the national accounts sense (eg purchases and sales of financial assets, of existing real assets, etc) but may result in the issuance of new financial claims.

To help frame the ensuing discussion of capital flows, recall the familiar balance-of-payments identity:

$$
\begin{aligned}
\textit{Current account} &= \textit{Change in resident holdings of foreign assets (gross outflow)} \\
&- \textit{Change in resident liabilities to non-residents (gross inflow)} \\
&= \textit{Net capital outflow} \\
&= \textit{Saving} - \textit{investment}
\end{aligned}
$$

Thus, the current account represents the net transfer of resources between the jurisdiction in question (residence basis) and the rest of the world, ie the "net capital flow". In other words, a surplus, say, implies a net increase in claims on the rest of the world. By definition, too, a current account surplus reflects an excess of aggregate saving over investment in a given jurisdiction. Abstracting from income transfers, current account transactions reflect imports and exports of goods and services. In turn, the net capital flow is identically equal to gross outflows minus gross inflows.

By analogy with the closed economy case, a number of points are worth highlighting, some well known, others less so.

First, gross flows need bear little relationship to net flows and hence to the current account. In fact, as in the case of a closed economy, they are generally much larger (see below). In turn, those gross flows themselves capture only a small fraction of transactions among residents and non-residents, all of which require financing. The reason is that they net out offsetting operations. The gross outflow is equal to residents' purchases minus residents' sales of *foreign assets*[11] and the inflow to non-residents' purchases minus sales of *domestic assets*. Available, albeit very partial, statistics confirm that the underlying transactions are of several orders of magnitude higher.[12]

Second, by construction, purely financial transactions are a wash and do not directly affect net flows (the current account balance).[13] They simply represent an exchange of financial claims between residents and non-residents and thus generate offsetting gross flows.

Third, by implication, and hardly appreciated, the distinction between saving and financing implies that the current account says *nothing* about the extent to which domestic investment is financed from abroad. Even if, say, a country's current account is in balance, or no imports and exports take place at all, the *whole* of its investment expenditures may be financed from abroad. One possibility, for instance, is for the financing to take the form of a loan: an increase in liabilities vis-à-vis non-residents is matched by the acquisition of a deposit vis-à-vis them (the transfer of purchasing power). The financial transaction only generates offsetting *gross* capital flows. And the subsequent use of the deposit to purchase investment good simply transfers it to another resident. A balanced current account only implies that

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[11] For example, if in a given reporting period one US-based bank buys a Japanese bond while another US-based bank sells a Japanese bond of the same value (though not necessarily the same bond), then the two transactions net to zero, leaving gross outflow unchanged.

[12] For instance, based on balance-of-payment statistics, for the United States in 2010 "gross-gross" flows, which do not net purchases and sales out, for securities alone amounted to 435% of GDP, or some 60 times larger than gross flows (ie the absolute sum of gross outflows and gross inflows of such securities).

[13] As an illustration, suppose a US private sector resident decides to buy Japanese bonds. By itself, this implies a gross outflow for the US (increase in claims abroad). But the purchase must be paid for somehow. There are three main possibilities: (i) running down his yen holdings; ii) selling US dollars for yen with a US-based bank; iii) selling US dollars for yen with a bank outside the United States. The first two options result in a reduction in gross outflows (fall in United States resident claims abroad), while the third induces a gross inflow (increase in foreign claims on the United States). In all cases, offsetting gross flows leave net flows and the current account balance unaffected.

domestic production equals domestic spending, not that domestic saving "finances" domestic investment.[14]

Fourth, *a fortiori*, on a multilateral basis it is not possible to infer from current account balances the pattern of *global* finance and cross-border intermediation that is taking place.[15] The distinction between saving and financing implies that countries running current account surpluses are *not* financing those running current account deficits. In terms of national income accounting, deficit countries are compensating for the non-consumption of surplus countries. In this sense, current account deficits are matched by saving in other regions. But the underlying consumption and investment expenditures that generate such imbalances may be financed in a myriad of ways, both domestically and externally. And while by exchanging financial claims for goods and services, the deficit country is effectively, on net, "borrowing" from, or drawing down assets on, the rest of the world, the ultimate counterpart of changes in those claims need not be countries running current account surpluses.

If, say, country A has a deficit vis-à-vis country B, it does not follow that it has accumulated liabilities vis-à-vis B: these liabilities may be held vis-à-vis *any* country in the world. For example, a US importer of Japanese goods may be transferring, say, a yen or US dollar deposit held in a (possibly Japanese) bank located in Europe to the Japanese firm. The reduction in assets of US residents vis-à-vis Europe matches the current account deficit in the US, while the corresponding increase in Japanese residents' assets vis-à-vis Europe matches Japan's surplus. The pattern of current account balances reveals little about the corresponding bilateral pattern of changes in net financial claims.[16]

Finally, for any given country, it is misleading to pair up the current account with *specific* gross flows. This is most often done with changes in foreign exchange (or "official") reserves, a sub-component of gross outflows reflecting official-sector holdings of foreign-currency liquid assets. By singling out this item, the balance-of-payments identity can be written as

$$\begin{aligned} \textit{Current account} &= \textit{Change in official reserves} \\ &+ \textit{other gross outflows} - \textit{gross inflows} \end{aligned}$$

with the financial flows other than official reserves sometimes, and potentially confusingly, termed "net private capital outflows". Based on this identity,[17] it is not uncommon to tie the current account surplus to the accumulation of official reserves. For example, in discussion of global imbalances, current account surpluses are often seen as "funding" the increase in reserves in those countries (Bernanke (2005), Bernanke et al (2011), Gros (2009));

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[14] Moreover, exports typically need as much financing as imports. Export firms need the cash to cope with lags between production and the receipt of final payments from the sales; they typically pledge the goods to be sold to obtain this form of finance. At the peak of the crisis, for instance, there were serious concerns that the drying-up of financing for exports was partly responsible for the plunge in world trade.

[15] Contrary to the ES view, which often asserts that "(a)s a result of this pattern of surpluses and deficits, capital flowed strongly to the United States from rapidly growing emerging market economies and some advanced economies" (Kohn (2010)).

[16] It goes without saying, the pattern of current account balances also says little about bilateral balances themselves. For instance, A may be in surplus, B in deficit and C in balance. And yet, A's surplus and B's deficit may be entirely by vis-à-vis C, with A and B not even trading with each other. The United States, for instance, has large bilateral deficits vis-à-vis a whole range of countries, not just China or oil exporters. In fact, for much of the past decade the bilateral deficit vis-à-vis European countries has been larger than that vis-à-vis OPEC countries and not that much smaller than that vis-à-vis China.

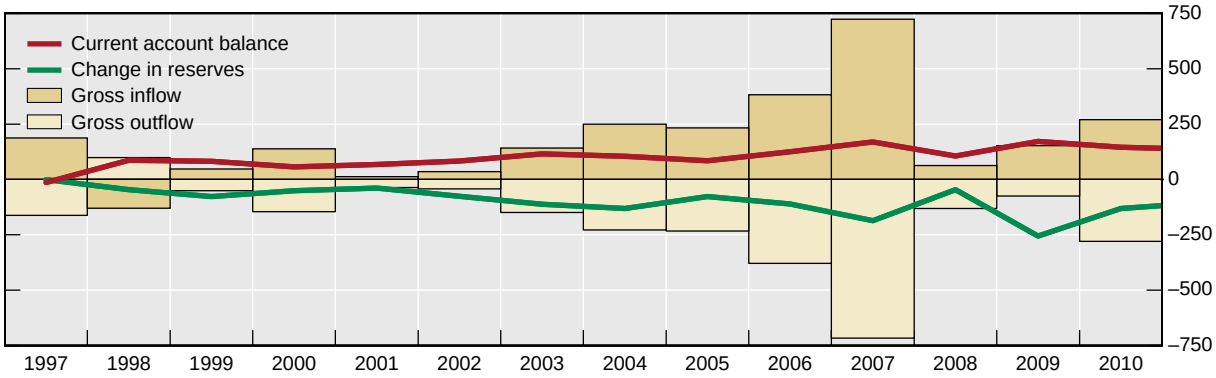
[17] Strictly speaking, foreign exchange reserves as defined in the internationally-agreed Special Data Dissemination Standard template may also include foreign currency assets held vis-à-vis residents (eg with domestic banks).

correspondingly, the US deficit is said to be "financed" by those increases.[18] Given that gross flows typically exceed net flows by quite some margin (Graph 4 illustrates the example of emerging Asia), such a matching is rather arbitrary.[19]

Graph 4

Emerging Asia gross capital flows

In billions of US dollars



Note: Emerging Asia comprises Chinese Taipei, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand.

Source: IMF World Economic Outlook.

More to the point, the accumulation of foreign exchange reserves is generally a purely financial transaction. As already noted, it automatically generates an offsetting gross flow: a reduction in private sector gross outflows or a gross inflow, depending on the specifics, thereby *leaving the current account unchanged*.[20] The holder of official reserves, typically the central bank, is just one of a myriad of domestic players acquiring foreign assets at any given

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[18] Summers (2004, p 4), for example, concludes that "…the basic picture that a large fraction of the US current account deficit is being financed by foreign central bank intervention is not one that can be argued with." Similarly, Bernanke et al (2011, p 6) argue that "(o)n net, China's current account surpluses were used almost wholly to acquire assets in the United States, more than 80 percent of which consisted of very safe Treasuries and Agencies."

[19] The safe-asset shortage view proposed by Caballero (2010) also appears to fail to distinguish sufficiently clearly between gross and net flows. By adding a portfolio-preference dimension to the basic ES story, it essentially ties the *net* outflow of emerging market countries to the *gross* outflows generated by central banks' reserve accumulation, which were indeed concentrated in safe assets (see below). More generally, the safe-asset shortage view relies on the assumption that there was a global preference for safe assets, *and* that some were clearly incorrectly perceived as safe, namely highly rated asset-backed securities. However, this is not consistent wit the fact that risk premia became highly compressed *across the board*, on both low-rated and high-rated assets. This is more consistent with an aggressive search for yield against the backdrop of low risk-free rates (partly reflecting portfolio preference of central banks). And these low risk-free rates may in turn have been a significant factor inducing the search for yield (Rajan (2005), BIS (2004), Borio and Zhu (2008)). Moreover, the fact that European banks, the dominant investors in asset-backed securities, levered up to invest in these assets suggests that the expansion of the market was driven just as much by supply as by demand. The combination of an attractive product and a highly effective marketing strategy induced a large demand for such assets.

[20] For example, the increase in reserve assets associated with central bank foreign exchange intervention is offset by a reduction in gross outflows (if the counterparty to the central bank is a domestic resident) or an increase in gross inflows (if the counterparty is a nonresident). In interpreting capital flow developments such as those shown in Graph 1, it is important to bear in mind that net private inflows (the financial account) and reserve assets are *not* independent. For every foreign exchange transaction conducted by the central bank, there will be an offsetting entry in the financial account.

point in time. It is, of course, possible to conceive of a current account transaction tied to the accumulation of official reserves. For example, oil proceeds may be automatically reinvested abroad in liquid foreign currency assets by the agency holding the reserves. Similarly, in the presence of stringent restrictions on residents' holdings of foreign currency claims, export proceeds from current account surpluses are more likely to end up in official holdings. But these are exceptions, not the rule.

By implication, the oft-heard view that current account surpluses are necessary to accumulate reserves is highly misleading. It harks back to a world of tight currency controls, in which official authorities would require economic agents to surrender scarce foreign exchange to meet import demands. This survived thereafter for a long time, even to the present day, despite the lifting of restrictions (eg Williamson (1973, 1994)). It is, however, an anachronism. In fact, causality between the current account and the accumulation of reserves is more likely to run the other way: the accumulation may reflect the wish to resist the appreciation of the currency, when the authorities face strong foreign demand for domestic currency assets, manifested in gross capital inflows (see below). More generally, the empirical relationship between current account positions and reserve accumulation can be very tenuous. For example, the monetary authorities of Australia, Turkey, and South Africa have accumulated foreign reserves in substantial amounts in the second half of the past decade in the context of persistent and sizeable current account deficits. Brazil's substantial accumulation of reserves since 2005 has taken place against the backdrop of both deficits and surpluses in its current account.[21]

Just as in the closed-economy context, the failure to distinguish sufficiently clearly between saving and financing in the open economy case seems to reflect the common use of conceptual frameworks purely based on real analysis. The frameworks focus exclusively on net transfers of resources and do away with monetary factors. These are also the types of model that underpin two other popular notions. One is the view that net flows of capital from emerging markets to the developed world are somehow "perverse".[22] The other is the observation that, despite capital mobility, saving and investment tend to be matched closely within national borders (the Feldstein-Horioka puzzle).[23] Once saving and financing are distinguished, neither empirical finding seems so surprising. Even if these countries financed all of their investments from abroad, with high potential returns to capital attracting foreign investment, a net outflow (current account surplus) may still prevail, reflecting trade surpluses possibly associated with an export-led development strategy. Similarly, the degree of persistence in current account surpluses and deficits tells us something about the sustainability of differences between aggregate production and expenditure within

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[21] The frequently expressed view that central banks in emerging market countries are intermediating domestic savings, channelling them into US Treasuries, also bears qualification. Given that reserve accumulation has gone hand-in-hand with large gross inflows into these countries, one could alternatively view that central banks are intermediating foreign inflows and channelling them back into international capital markets (on behalf of domestic banks which end up owning more domestic claims – such as central bank bonds – instead of foreign assets). This, of course, is a corollary to our critique of the arbitrary matching of gross with net flows.

[22] Standard international macroeconomics predicts that capital should flow, on net, from capital-rich countries, where the marginal return on investment is low, to capital-poor countries, where the marginal return is high (eg Lucas (1990)). In formal treatments of this question, there is typically no difference between gross and net capital flows, as capital movements are unidirectional and/or the analysis is carried out purely in "real" terms. In a recent attempt to explain this "perverse" pattern of net capital flow, Caballero et al (2008) essentially assumes that returns to investment (ie productivity of "trees" the assumed saving vehicle), and hence autarky real rates, are lower in emerging market countries relative to developed ones.

[23] Apergis and Tsoumas (2009) survey this literature. The Feldstein-Horioka puzzle is based on the intuition that under perfect capital mobility, each country's domestic savings is free to seek out investment opportunities worldwide while its domestic investment can be financed by the global pool of capital. This perspective fails to distinguish real resource flows from financial flows.

jurisdictions, but far less about the degree of mobility of *financial* capital or *financing* patterns *per se*.[24]

Before turning to the empirical findings, it is worth highlighting a related point: the residency principle that underlies the balance-of-payment statistics is not fully adequate to understand international financing patterns. In particular, in a globalised world, the economic units taking decisions increasingly operate in several jurisdictions. The multinational corporation is a fact of life. Especially in banking, these units manage risks and activities across their whole balance sheet, regardless of where they happen to be located. For instance, apparent maturity or currency mismatches on the balance sheet of one office can be offset by positions booked in offices elsewhere. As a result, the more relevant criterion to understand risks and vulnerabilities is to consolidate balance sheets across locations, such as on a nationality basis (ie based on the location of the headquarters, seen as the nerve centre of the organisation). We illustrate the implications of such a consolidation below.[25]

A broader perspective on global financial flows

So far, we have argued that, analytically, current accounts and the corresponding net capital flows say very little about financing activity and intermediation patterns. To cast light on those patterns, we next consider empirically gross flows and the consolidated bank balance sheets of financial institutions in the run-up to, and during, the financial crisis. We find that there are several respects in which these patterns are not consistent with the view that global current account imbalances played a critical role in the crisis. This is true of global flows and of those that affected the United States, the country at the epicentre of the turmoil.

First, the expansion of global gross capital flows (inflows plus outflows) has been spectacular since the late 1990s, dwarfing current account positions and largely resulting from flows *among* advanced economies. Gross flows rose from around 5 percent of world GDP in 1998 to over 20 percent in 2007 (Graph 5). The bulk of this expansion reflected flows between advanced economies, despite a decline in their share in world trade (Lane and Milesi-Ferretti (2008)). By comparison, flows between, or from, EMEs were much smaller. And yet, the ES view sees emerging market countries as the main drivers of global financial conditions.

Second, current accounts did not play a dominant role in determining financial flows into the United States before the crisis. Against the backdrop of widening current account deficits since the early 1990s, gross capital flows into and out of the United States expanded even more rapidly in the run-up to the crisis (Graph 6, top left-hand panel). The increase in net claims on the country, which mirrors the current account deficit, was about three times smaller than the change in gross claims. This reflected substantial outward financial investments by US residents as well as inward financial flows from foreigners. Thus even if the US had not run trade deficits at all in the 1990s, there would have been large foreign inflows into US financial markets.

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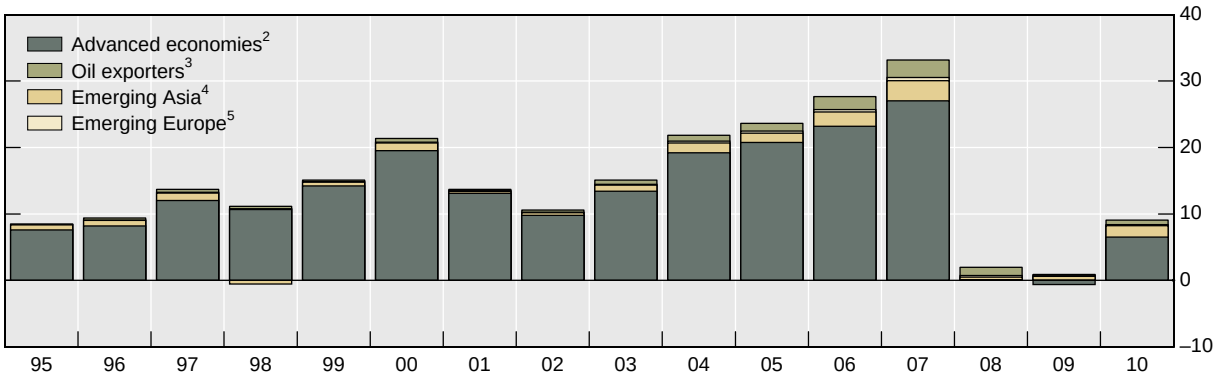
[24] By way of analogy, one would not look at regional trade balance to assess the pattern of financing across regions in a given country (eg across US states). The concentration of subprime loans in certain US states, for example, and the complex web through which such loans were pooled and distributed across the US financial system would hardly be evident in such data. That said, it is indeed likely that free capital movements may help countries to tolerate current account deficits for longer than would otherwise be the case (see below).

[25] In addition, much foreign currency trading occurs either among residents or directly among non-residents. For example, according to the BIS Triennial Survey for many currencies more than two-thirds of all trading in many currencies, from both advanced and emerging market economies, can take place exclusively among non-residents (McCauley and Scatigna (2011)). This underscores the point that a lot of position taking that may affect exchange rates hardly takes place along the resident/non-resident axis.

Graph 5

Gross Capital flows[1] as a percentage of World GDP



[1] Gross flows equals sum of inflows and outflows of direct, portfolio and other investments. [2] Australia, Canada, Denmark, the euro area, Japan, New Zealand, Sweden, the United Kingdom and the United States. [3] Algeria, Angola, Azerbaijan, Bahrain, Democratic Republic of Congo, Ecuador, Equatorial Guinea, Gabon, Iran, Kazakhstan, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Sudan, Syrian Arabic Republic, Trinidad and Tobago, the United Arab Emirates, Venezuela and Yemen. [4] China, Chinese Taipei, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Thailand and the 20 smaller Asian countries. [5] Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

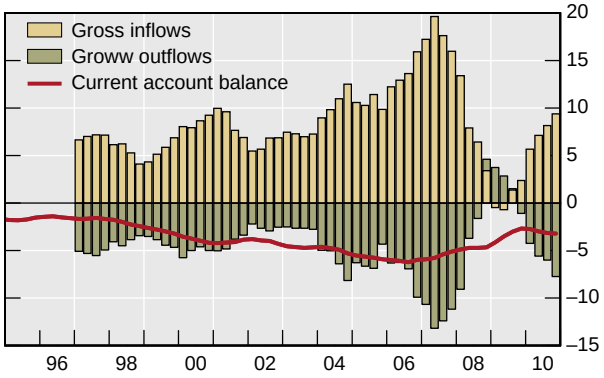
Sources: IMF; authors' calculations.

Graph 6

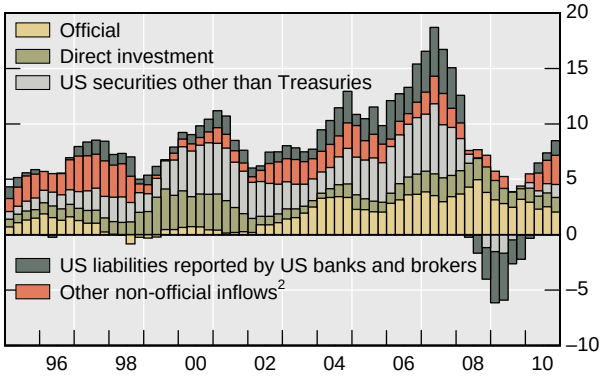
US balance of payments[1]

As a percentage of US GDP

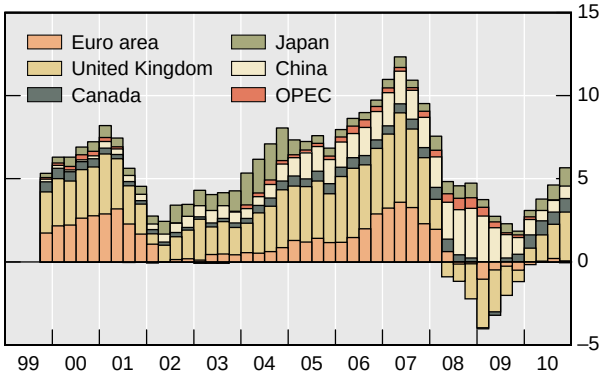
Gross capital flows and the current account



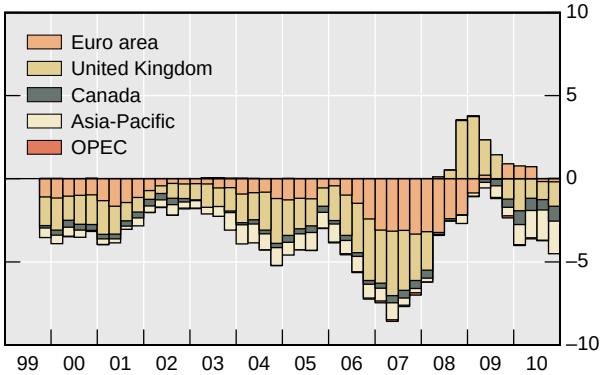
Gross capital inflows by category



Gross capital inflows by region



Gross capital outflows by region



[1] 4-quarter moving average. [2] Sum of US Treasury securities, foreign assets in US dollar and US liabilities to unaffiliated foreigners.

Sources: Bureau of Economic Analysis; authors' calculations.

Third, while discussions of global imbalances have emphasised the role of the official sector, the bulk of gross inflows into the United States originated in the private sector (Graph 6, top right-hand panel). Acquisition of US securities was the largest single category of the private inflow, the bulk in the form of non-Treasury securities. Liabilities to private foreign investors reported by US banks were also large and grew substantially after 2002, reflecting the greater role of cross-border bank flows, which would later come to the fore during the crisis. Overall, the sizeable expansion in foreign purchases of US securities and in US banks' liabilities to non-residents between 2000 and 2007 is striking, a telling sign of the strong global financial boom which saw the United States at its epicentre. These key features are obscured by looking only at net flows.

Fourth, the geographical breakdown of capital inflows into the US in the run-up to the crisis is hardly consistent with the ES view. By far the most important source was Europe, not emerging markets. Europe accounted for around one-half of total inflows in 2007 (Graph 6, bottom left-hand panel). Of this, more than half came from the United Kingdom, a country running a current account *deficit*, and roughly one-third from the euro area, a region roughly in balance. This amount alone exceeded that from China and by an even larger margin that from Japan, two large surplus economies. Similarly, the Middle East and OPEC countries accounted for a small portion of the inflows.[26] From this perspective, the role of Asia – in particular China – and oil exporters in "funding" the US current account deficit or the credit boom do not seem particularly significant. US gross outflows show a similar pattern, with outflows into Europe accounting for an even larger share compared to inflows (Graph 6, bottom right-hand panel).

Fifth, developments in gross capital flows during the financial crisis confirm that net capital flows do not capture the severe disruption in cross-border interbank lending nor do they correctly predict the source of strains. Global current account imbalances (ie net capital flows) narrowed only slightly in 2008; by contrast, gross capital flows collapsed, driven predominantly by retrenchment in flows between advanced economies (Graph 5). For the US, net capital inflows fell only marginally during 2008, by a mere *$20 billion*. Over the same period, gross inflows decreased by no less than *$1.6 trillion* – roughly a 75 percent decline from their 2007 level (Graph 6). Likewise, gross outflows also collapsed. Much of the drop reflected gross flows between the United States and Europe, which reversed abruptly in both directions. Gross inflows from China and Japan actually continued. If anything, official flows from Asia and oil exporters were a stabilising force during the crisis.

Sixth, data on stocks of cross-border claims indicate that foreign holdings of US securities by European residents made up almost half of all foreign holdings immediately before the crisis (Table 1). The US was by far the most important non-European destination for euro area investors. Chinese and Japanese investors also had large holdings, reflecting the accumulation of foreign exchange reserves.[27] As documented in Milesi-Ferretti (2009), while total holdings of US debt securities on the eve of the crisis (June 2007) were particularly high in China and Japan, holdings of privately issued mortgage-backed securities were instead concentrated in advanced economies and offshore centres. More recently, also Bernanke et

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[26] This in part reflects the fact that a large part of the dollar holdings by these countries is invested through other countries. To the extent the United Kingdom is a major international financial centre, the large figure for gross inflow from that country is partly due to such indirect holdings (see below).

[27] The source for Table 1 is the Treasury survey, which seeks to "look through" intermediation activity in investment patterns, drilling down as far as possible to their ultimate holders. It thus goes beyond the immediate residence principle of the balance-of-payments and is akin to providing information on a consolidated basis, discussed below for the banking sector. For example, compared with the balance-of-payment statistics, these data actually reallocate holdings *from* Europe *to* Asia, reflecting in particular the intermediation of foreign exchange reserve holdings through asset management companies located in Europe.

al (2011) have highlighted the dominant role of capital flows from Europe into such securities. This suggests that Asia's role in financing the US housing boom was not substantial in relative terms.

Table 1

Foreign holdings of US securities, in billions of US dollars[1]

	2002	2003	2004	2005	2006	2007	2008	2009
Europe	1,738	1,989	2,531	2,880	3,231	4,203	4,215	3,632
of which								
Euro currency countries	973	1,174	1,496	1,676	1,881	2,370	2,398	1,983
United Kingdom	368	390	491	560	640	921	864	788
Asia	1,269	1,574	2,008	2,358	2,686	3,143	3,607	3,976
of which								
China	181	255	341	527	699	922	1,205	1,464
Japan	637	771	1,019	1,091	1,106	1,197	1,250	1,269
Americas	703	898	1,105	1,258	1,454	1,964	2,075	1696
of which								
Caribbean financial centers	365	502	661	769	835	1,156	1,204	985
Others	628	517	375	368	406	461	424	336
Total	4,338	4,978	6,019	6,864	7,777	9,771	10,322	9,641

[1] Foreign holdings of US long-term and short-term securities

Source: US Treasury.

Finally, a look at the consolidated balance sheets of banking systems, defined in terms of the nationality of the institutions, provides a valuable complementary picture.[28] Graph 7 illustrates the size of the operations conducted through the foreign offices of banks headquartered in eleven reporting countries in the BIS international banking statistics. Not only do overall claims on non-residents ("foreign claims") account for a substantial share of total assets (Graph 7, top right-hand panel), those booked by offices *outside* the home country are sizeable – especially for Swiss and Dutch banks (Graph 7, bottom left-hand panel). For most countries in the sample, less than half of banks' foreign claims are booked in their home offices, French and Japanese banks being exceptions (Graph 7, bottom right-hand panel). Swiss banks' foreign claims make up no less than over 80 percent of their total assets, and only 18 percent of such claims are booked in domestic offices.

The consolidated balance sheets highlight the remarkable boom in global banking over the past decade and the prominent role of European banks. Since 2000, the outstanding stock of banks' foreign claims grew from $10 trillion to a peak of around $34 trillion by end-2007, an expansion that is striking even when scaled by global GDP (Graph 8, left-hand panel). European banks accounted for a large fraction of this increase (Graph 8, right-hand panel).

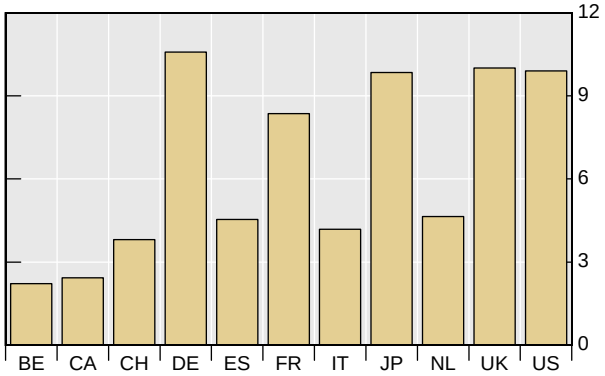
[28] McGuire and von Peter (2009) provide details of the construction of such data.

Graph 7

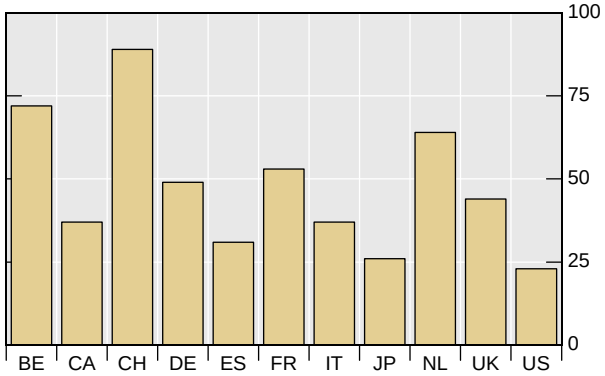
Size and structure of banks' foreign operations: nationality basis

Positions at end-2007

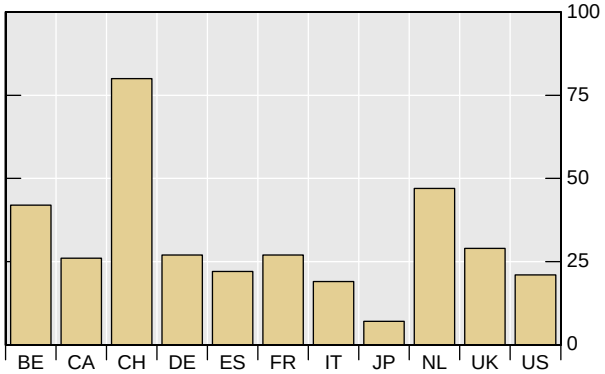
Total assets[1]



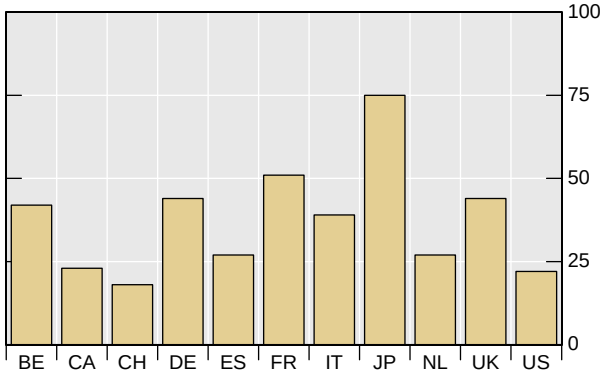
Foreign claims as a percentage of total assets[2]



Assets booked by foreign offices[3]



Share of home country in foreign claims[4]



[1] Total assets (including "strictly domestic assets") aggregated across BIS reporting banks. For reporting jurisdictions which do not provide this aggregate (DE, ES, FR, IT, JP), total assets are estimated by aggregating the worldwide consolidated balance sheets (from BankScope) for a similar set of large banks headquartered in the country; in trillions of US dollars. [2] Foreign claims as reported in the BIS consolidated banking statistics (immediate borrower basis) plus foreign currency claims vis-à-vis residents of the home country booked by home offices (taken from the BIS locational banking statistics by nationality); excludes inter-office claims; in per cent. [3] Share of total assets booked by offices outside the home country, in per cent. [4] Total claims (cross-border claims plus claims on residents in host country) booked by offices in each location over total worldwide consolidated foreign claims. Excludes banks' "strictly domestic" claims, or their claims on residents of the home country in the domestic currency; in per cent.

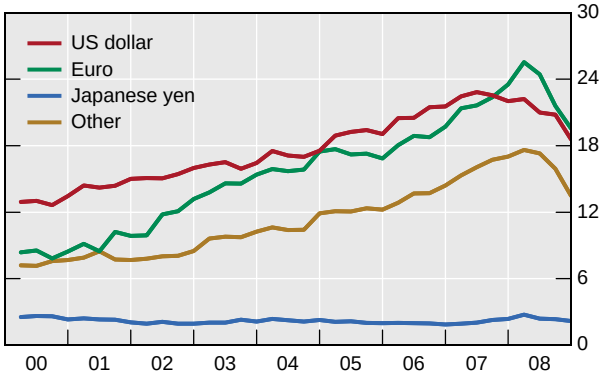
Sources: McGuire and von Peter (2009); IMF IFS; BankScope; BIS consolidated statistics (immediate borrower basis); BIS locational banking statistics by nationality.

Graph 8

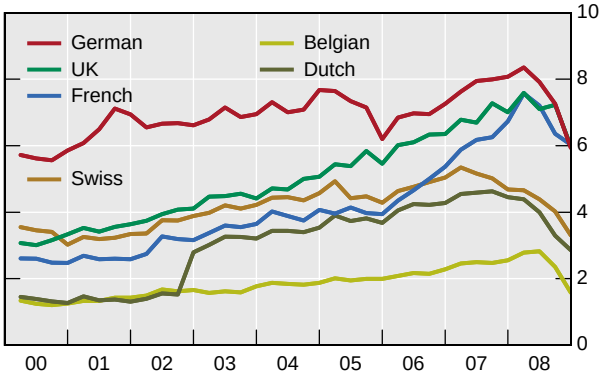
Foreign claims scaled by world GDP: nationality basis

In per cent

All banks, by currency[1]



European banks (all currencies)[2]



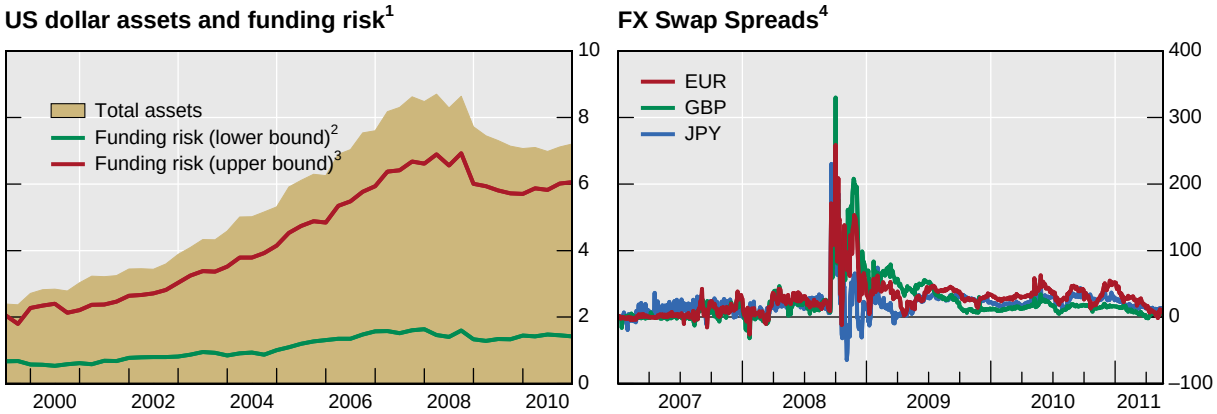
[1] Estimated totals for 19 banking systems (see data appendix in McGuire and von Peter (2009)). [2] Foreign claims excluding claims on residents of the home country booked by banks' foreign offices.

Sources: McGuire and von Peter (2009); IMF; BIS consolidated statistics (immediate borrower basis); BIS locational statistics by nationality.

The same statistics pinpoint vulnerabilities in the funding patterns of those banks, largely associated with their investments in US assets. In particular, US dollar and other non-euro denominated positions were important drivers of the overall increase in foreign assets of European banks. Combined US dollar assets of European banks reached some $8 trillion in 2008, including retail and corporate lending as well as holdings of US securities – Treasury, agency and structured products (Graph 9, left-hand panel). Of this amount, between $300 and $600 billion was financed through foreign exchange swaps, mostly short-term, against the pound sterling, euro and Swiss franc. Estimates indicate that the maturity mismatch ranged between $1.1 to as high as $6.5 trillion (McGuire and Von Peter (2009)). This explains the surprising funding squeeze that hit these banks' (and others') US dollar positions, and the associated serious disruptions in foreign exchange swap markets – the so-called US dollar shortage (Graph 9, right-hand panel; see Baba et al. (2008, 2009), Baba and Packer (2008)).

Graph 9

US dollar assets and funding risk



[1] In trillions of US dollars. Estimates are constructed by aggregating the on-balance sheet cross-border and local positions reported by Canadian, Dutch, German, Japanese, Swiss and UK banks' offices. [2] Net claims on non-banks, which is identical to the sum of net positions vis-à-vis other banks, vis-à-vis monetary authorities and net cross-currency (FX swap) funding. See McGuire and von Peter (2009) for details. [3] Same as the lower bound estimate, but includes *gross* liabilities to non-banks under the assumption that all liabilities are to these counterparties are short term. [4] In basis points. Spread between three-month FX swap-implied dollar rate and three-month Libor; the FX swap-implied dollar rate is the implied cost of raising US dollars via FX swaps using the funding currency. For details on calculation, see N Baba, F Packer and T Nagano, "The spillover of money market turbulence to FX swap and cross-currency swap markets", BIS Quarterly Review, March 2008, pp 73–86.

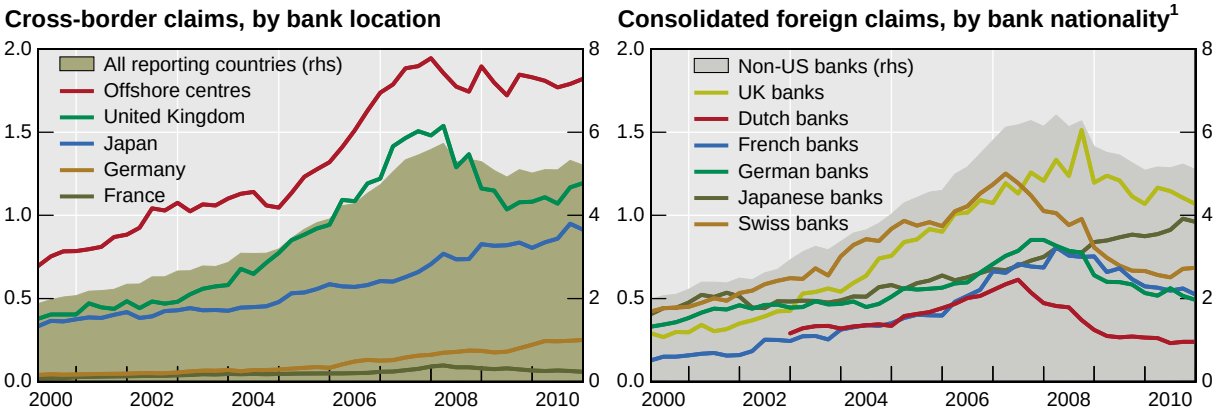
Sources: McGuire and von Peter (2009); BIS locational and consolidated banking statistics; Bloomberg; BIS calculations.

By contrast, the balance-of-payment statistics, given their residency basis, conceal the importance of European banks (Graph 10, left-hand panel). True, they do capture the role of the United Kingdom as financial centre – although a large share of exposures to banks located in that country are not to UK banks. But they attribute a very large role to offshore centres, mainly in the Caribbean, and do not reveal the large exposures of French, Swiss and German banks in particular. Only the BIS consolidated statistics provide this information (Graph 10, right-hand panel).

Graph 10

Claims on residents of the United States

Amounts outstanding, in trillions of US dollars



[1] Non-US banks' worldwide consolidated foreign claims (cross-border plus local claims).

Sources: BIS locational international banking statistics by residence, BIS consolidated banking statistics (IB basis).

On balance, the picture that emerges is strikingly different from the stylised one associated with the ES view. Not least, Asia plays little role in the financing of the credit boom in the United States, while Europe, and in particular European banks (classified on a nationality basis), take centre stage. This also helps to explain the pattern of financial strains during the crisis, which affected these institutions so heavily. The focus on global current account imbalances misses the role of European banks in supporting the boom in US housing credit and the subsequent collapse of such financing. At the same time, official holdings of US Treasury securities by the countries that had been accumulating foreign exchange reserves, so much stressed by the ES view, hardly figured in the turmoil. The trigger for the crisis, and the mechanism underlying its propagation, was not a disorderly unwinding of global imbalances. Rather, it reflected dislocations in the chain of global intermediation.

III. The excess saving view and the determination of the interest rate

We now turn to the second main tenet of the ES view. This holds that a major factor underpinning the decline in world interest rates over the last decade has been an increase in the surplus of *ex ante* saving over *ex ante* investment in a number of emerging market countries (eg Dunaway (2009), Portes (2009), King (2010), Wolf (2008), Kohn (2010), Bernanke et al (2011), Feldstein (2011)). Real (ie inflation-adjusted) interest rates are viewed as determined by the global supply of saving and demand for investment. We argue that the saving-investment framework is best regarded as explaining developments in the *natural*, rather than in the *market*, interest rate, which is primarily determined by monetary and financial factors. Here again, the distinction between saving and financing is critical. Deviations between the two can persist for long periods, need not show up in rising inflation and may in fact be one reason behind the financial crisis.

The market rate versus the natural rate

The saving-investment framework describes the real side of the economy. The equality between *ex ante* saving and investment is an equilibrium condition for the goods market. Not surprisingly, the formal models in which the task of equating demand and supply in the goods market falls *exclusively* on the interest rate fall squarely in the real analysis tradition. Monetary factors play no role. In the international context, the famous Metzler (1960) diagram, postulating that a real world interest rate equates the global supply of saving and the global demand for investment, or the more modern rendering by Caballero et al (2008), are clear examples of the genre. In such models, by construction, there is no difference between saving and financing as defined in this paper.

But can these frameworks realistically represent the determination of the interest rates prevailing in financial markets at any given point in time? We do not think so. In our view, it is more helpful to think of interest rates as related to clearing in financial markets and financing conditions, in which monetary factors play a key role, rather than to clearing in the goods market (eg Borio and Disyatat (2010)). Specifically, it is better to regard them as determined by the interplay between the central bank's policy reaction function and private sector expectations and preferences as embedded in financial markets. With respect to risk-free interest rates, the short end of the maturity spectrum is set largely by monetary policy, while the rest of the term structure reflects market expectations of future short rates (and hence the future stance of monetary policy) plus a term premium. Given the risk-free term structure of rates, credit, market and liquidity risk determine differentials with other interest rates. These factors are influenced primarily by the risk perceptions and risk tolerance of economic agents

as well as the relative supply of different assets. The (*ex ante*) real interest rate that obtains is then simply the observed market nominal rate minus expected inflation. Indeed, the large macro-finance literature analyses interest rate determination precisely in this way.[29]

The two sharply contrasting conceptual approaches point to a tension between real factors, on the one hand, and monetary and financial factors, on the other. One way to reconcile them is to conjecture, as most economists do, that real factors determine at least the steady state equilibrium level of real interest rates. Monetary and financial factors, together with economic agents' expectations, can then be left to determine the actual interest rates that prevail at any given point in time. This is part and parcel of the distinction between the natural and the market interest rate.

The distinction between natural and market interest rates has a long history in economic thought, although the specific definition of the natural interest rate is necessarily model-dependent. To Wicksell (1898, p 102), for example, the natural rate is that which equates saving and investment at full employment, which he identifies as "the rate of interest which would be determined by supply and demand if no use were made of money and all lending were effected in the form of real capital goods". In today's popular New Keynesian paradigm, it is the equilibrium real interest rate that would obtain in an economy without nominal rigidities, and hence with fully flexible prices (Woodford (2003), Amato (2005)).[30] These examples make clear that the natural rate, as most commonly defined, is an equilibrium concept that corresponds to a hypothetical economy in which monetary factors are purely a veil, ie in which the distinction between saving and financing is not meaningful.[31] More generally, the specific characteristics of this purely real economy determine the specific characteristics of the natural rate, typically including factors such as time preference, demographics, factor productivity and the like.

If at any given point in time market interest rates are determined as we suggest, then they are not *directly* influenced by changes in the *ex ante* saving-investment balance. That balance influences the natural rate. But this is a notional, unobservable benchmark that would prevail only if the economy was in equilibrium. The influence of the saving-investment balance on market rates is only *indirect*, through the reaction function of the central bank, market participants' expectations of what the "right" rate should be and their risk preferences. And these factors play a different role along the yield curve: central bank policy is particularly important at shorter maturities; market expectations and risk preferences at the longer end.[32]

If so, the ES view could still be a valid approximation if the market rate moved at least roughly in line with the natural rate over the relevant observation period. According to this

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[29] Hördahl et al (2008) and Rudebusch et al (2007) contain relevant references. For a brief description of the practical implementation of monetary policy and its broader economic implications, see Disyatat (2008).

[30] Amato (2005), in particular, provides a detailed comparison of the concept of the natural rate in Wicksell and New Keynesian models. See also the Annex.

[31] Not all models, of course, result in such a sharp dichotomy between real and monetary factors. For example, De Fiore and Tristani (2008) show that in a model with financial frictions where debt is denominated in nominal terms, monetary policy itself affects the natural rate of interest, so that the real and monetary dichotomy breaks down. Similarly, in models with capital, the equilibrium real rate of return depends on the capital stock, which is an endogenous state variable and hence a function of past monetary policy actions (see chapter 5 of Woodford (2003)).

[32] Even assuming that the central bank seeks to influence long-term rates only through expectations about future rates and steady-state inflation, its impact can be broader, through risk (term) premium on the riskless (default-free) curve and, by extension, on risk premia on various asset classes. These premia are affected not only by the credibility of the central bank in achieving its objectives (eg an inflation objective), but also more subtly, through the effect of policy rates on the risk-taking of the private sector (the "risk-taking channel"). On this, see, for instance, Borio and Zhu (2008), Rajan (2005), Adrian and Shin (2009), Fahri and Tirole (2009) and, for empirical evidence, the studies mentioned in Gambacorta (2009).

less literal interpretation, the central bank, together with market participants, would steer it in the right direction. This is indeed what occurs in the New Keynesian models, as long as the central bank performs its tasks correctly.[33] That said, the challenge should not be underestimated. At a minimum, both the central bank and agents' expectations about the path of policy rates and their steady state levels have to gravitate towards a highly elusive target (the natural rate) about which little is known and disagreement abounds. What the level of the natural rate is at any given point in time is largely in the eye of the beholder.

So, how could one tell whether the market and natural rates are roughly in line? After all, the natural rate is unobservable and time-varying. The answer depends on what one would expect to see if the two rates deviated sufficiently far apart. Are there observable developments that could signal significant and persistent deviations? The answer is, at least in part, model-specific again.

Despite their very different starting points (see Annex), Wicksell and canonical New Keynesian models provide a similar, deceptively simple answer: look at what happens to inflation. According to Wicksell, deviations would be associated with (secular) inflation or deflation. In New Keynesian models, in which price rigidities play a key role, such deviations would, on average, lead to rising or falling inflation (Woodford (2003)).[34] Judged by this metric, the ES view could be regarded as consistent with developments prior to the crisis: inflation remained low and remarkably stable – alongside strong and stable growth, a hallmark of the so-called Great Moderation.

A closer look, however, casts doubts on this conclusion.

For one, these models are very restrictive in terms of the permissible symptoms of gaps between market and natural rates. Arguably, a gap may manifest itself in ways other than inflation. In fact, the last decade has seen a major credit (and asset price) boom *even as* inflation has remained quiescent (Graph 11, right-hand panel). It is hard to imagine that goods markets can be in full equilibrium, and hence growth can be sustainable, in the presence of such credit booms (Borio and Lowe (2002a, 2004)). If anything, the subsequent full-blown financial crisis suggests that the unusually rapid credit expansion was a sign that market rates were *below* the natural rate. Indeed, the expansion of credit was part and parcel of Wicksell's "cumulative process" resulting from market rates lower than the natural rate. And while Wicksell saw inflation as the inevitable outcome, others, such as Hayek (1933), argued that the distortion would be reflected in relative prices, in this case between consumer and investment goods. This suggests that it would be important to develop formal analytical models in which such a gap is reflected also in unsustainable asset price booms.[35]

Indeed, a striking observation over the past decade is the very low level of world policy rates, even against the backdrop of rising and unusually high estimates of potential world growth (Graph 11, left-hand and middle panels). While naturally more stable, real long-term real interest rates have shadowed the trend decline in real policy rates (Graph 11, centre panel). To the extent that the estimates of potential growth reflected the impact of a string of positive

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[33] This does not imply that central banks should always aim to strictly follow the natural rate of interest at all times. The optimal setting of monetary policy depends crucially on the underlying shocks as well as the specific structure of the economy assumed in the model.

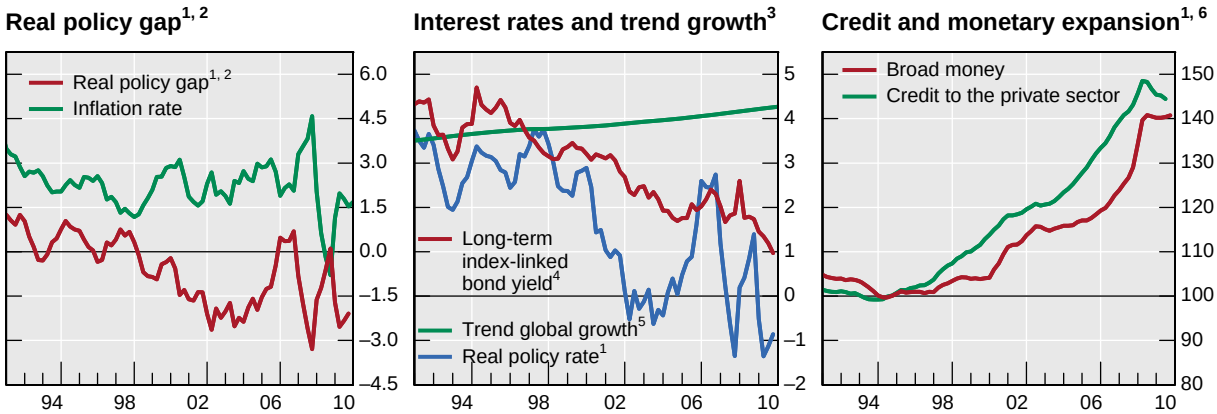
[34] The mechanisms behind this persistence differ in the two cases: Wicksell stresses errors in expectations by market participants; in New Keynesian models, which typically assume that economic agents have model-consistent ("rational") expectations, it would be central bank policy.

[35] For example, in canonical macroeconomic models, sustained divergence from steady state and non-fundamental asset price dynamics can be explained through departures from rational expectations. Such deviations distort relative prices and result in inefficient resource allocation; see Dupor (2005) for a step in this direction.

supply-side shocks (eg IT innovations and the integration of China into the world economy) that raise potential world growth, across a range of models one would have expected an *increase* in the natural interest rate. From this perspective, there is a clear tension between the corresponding upward trajectory of steady-state equilibrium interest rates and the downward drift in policy, at times at negative levels not seen since the Great Inflation in the 1970s (Borio (2007, 2009)).[36]

Graph 11

Low interest rates, world growth and credit expansion



[1] Major OECD countries; weighted averages based on 2005 GDP and PPP exchange rates. [2] Real policy rate minus natural rate. The real rate is the nominal rate adjusted for four-quarter consumer price inflation. The natural rate is defined as the average real rate 1985–2005 (for Japan, 1985–95; for Switzerland 2000–05) plus the four-quarter growth in potential output less its long-term average. [3] In per cent. [4] From 1998; simple average of Australia, France, the United Kingdom and the United States; otherwise only Australia and the United Kingdom. [5] Trend world real GDP growth as estimated by the IMF in April 2009 WEO. [6] Relative to nominal GDP; 1995 = 100.

Sources: IMF; OECD; Bloomberg; national data; BIS calculations and estimates.

More generally, once it is recognised that, analytically, the ES view assumes that market and natural interest rates are broadly in line with each other, one may wonder about its internal consistency *as an explanation for the financial crisis*. For if fundamental forces explain the reduction in market interest rates, their behaviour would simply act to clear the global saving-investment balance and tend to equilibrate the world economy. Why, then, should the macroeconomic consequences associated with this shift, including any growing global "imbalances", be viewed as problematic? *A fortiori*, it would not be easy to see how the shift could explain the macroeconomic crisis that followed. In fact, *before* the crisis, the interpretation of global imbalances from a saving-investment perspective was typically a benign one (eg Caballero et al (2008)).

[36] For another analysis highlighting the role of monetary policy, see Taylor (2008). This analysis, however, is purely based on deviations of the policy rate from traditional reaction functions based on backward-looking inflation and output developments found to have performed well in relation to inflation in the past (the "Taylor rule"). For counterarguments based on a forward-looking version of the Taylor rule, see Bernanke (2009b). For an analysis based on the addition of indicators of financial imbalances to a Taylor rule, see Borio and Lowe (2004).

IV. The international monetary and financial system: excess elasticity?

The preceding analysis raises key issues about the international monetary and financial system. Once attention shifts from current account balances to the gross financing flows that underpin economic activity, monetary and financial factors take centre stage. A core question is whether the global economy has anchors in place that can prevent the overall expansion of credit, and external funding more generally, from fuelling the unsustainable build-up of financial imbalances. By financial imbalances we mean overstretched balance sheets, typically on the back of rapid increases in credit and asset prices. These support unsustainable expenditure patterns in the aggregate, across expenditure categories and sectors, and possibly even across borders (current account positions). Here, the spotlight is firmly on the monetary regimes that set monetary conditions in the various currencies, the financial regimes that set constraints on financial intermediation in the various national jurisdictions, and on the interaction between the two.

A useful concept to approach the question is that of "elasticity". This is defined to be the degree to which the monetary and financial regimes constrain the credit creation process, and the availability of external funding more generally. Weak constraints imply a high elasticity. A high elasticity can facilitate expenditures and production, much like a rubber band that stretches easily.[37] But by the same token it can also accommodate the build-up of financial imbalances, whenever economic agents are not perfectly informed and their incentives are not aligned with the public good ("externalities"). The band stretches too far, and at some point inevitably snaps. As argued in detail elsewhere, the recurrence of major financial crises with serious macroeconomic costs across countries of all types is a reflection of these deep-seated forces (eg Borio and Lowe (2002a)). That these crises have affected countries at various degrees of economic and financial development and have increased in frequency (Bordo et al (2001), Reinhart and Rogoff (2009)) is a telling sign that the elasticity of the current international monetary and financial system may be too high. In other words, to reduce the likelihood and severity of financial crises, the main policy issue is how to address the "excess elasticity" of the overall system, not "excess saving" in some jurisdictions.

The major policy efforts to revamp prudential regulatory and supervisory frameworks in the wake of the recent financial crisis go some way towards reducing this elasticity. Initiatives designed to reduce the procyclicality of financial systems by strengthening the macroprudential orientation of current frameworks are especially important (eg Borio (2010), Caruana (2010), BCBS (2010b), FSB-IMF-BIS (2011)).

But it would be unwise to expect prudential policy to do the job on its own. Our analysis indicates that monetary policy plays a crucial role. It is monetary policy that underpins the term structure of *market* interest rates. And it is the relationship between market interest rates and the unobservable natural rate that underpins credit creation and the availability of external financing in general. In other words, it is monetary policy that ultimately sets the *price of leverage* in a given currency area. The central bank's reaction function, describing how market interest rates are set in response to economic developments, is the ultimate anchor in the monetary regime. This has implications for policy at the domestic and the international level.

[37] This use of the term "elasticity" harks back to a very old tradition in monetary economics, in which the term denoted, roughly speaking, the extent to which the monetary system allowed the volume of the medium of exchange to grow to accommodate the demand in the economy. The term was already employed at the time of Jevons (1875).

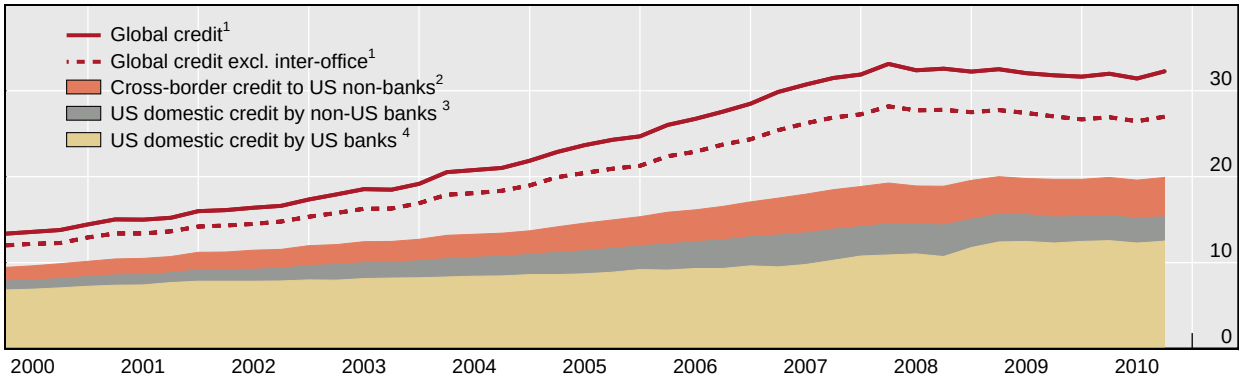
At the *domestic* level, a monetary policy narrowly focused on price stability, and which may disregard credit developments except when reflected in near-term inflationary pressures, may not always be sufficient to promote macroeconomic stability over the medium term (Borio and Lowe (2002a), White (2006), BIS (2009), Disyatat (2010b)). Credit booms, when occurring alongside asset price booms, are the most telling sign of the build-up of financial imbalances and the possibility that prevailing market rates differ from the natural rate.

At the *international* level, the interaction between different currency areas raises especially tricky issues, constraining countries' ability to insulate domestic monetary conditions from those prevailing elsewhere. For one, the domain of use of a given currency and national jurisdictions do not coincide. International currencies, especially the US dollar, are actively used outside domestic borders. For example, the BIS international banking statistics indicate that bank claims in US dollars vis-à-vis non-US residents amount to roughly one-third of US domestic bank credit, even once interoffice transfers are excluded (Graph 12). Similarly, a non-negligible portion of bank loans to US residents are made by banks located abroad (Graph 12, "cross-border" line).

Graph 12

Composition of worldwide US dollar bank credit

Amounts outstanding, in trillions of US dollars



[1] Approximated by US dollar foreign claims vis-à-vis counterparties in all countries. Foreign claims are composed of cross-border claims booked by banks located in all reporting countries plus local claims (ie claims on residents of the banks' host country) booked by banks located outside the United States. Claims include also interbank claims. [2] Cross-border claims on non-banks in the United States by banks located in other BIS reporting countries (excluded from US domestic credit statistics). [3] Local US dollar claims booked by non-US banks located in the United States. [4] Estimated as total US domestic credit less US dollar-denominated local claims booked by foreign banks in the United States.

Sources: BIS international locational and consolidated banking statistics; IMF.

In addition, the exchange rate is such an important relative price that it can raise dilemmas for the pursuit of domestic monetary policy objectives. Large shifts of asset allocations across currencies, possibly associated with large gross capital flows across jurisdictions, can induce large shifts in exchange rates, especially for smaller economies. Gradual appreciations can induce further portfolio shifts and capital inflows by reinforcing expectations of capital gains and providing incentives to maintain or add to given foreign currency positions. And the necessary appreciation to generate expectations of a future depreciation may be too large for a country to bear, owing to the costs in terms of competitiveness and distortions in production and expenditure patterns that it can generate.[38]

[38] For an interesting recent analysis of exchange rate overshooting, similar in spirit to the work on leading indicators of financial imbalances noted above, see Frydman and Goldberg (2010).

Under these conditions, and in the absence of exchange controls, exchange rate flexibility may provide only limited insulation from interest rates, and hence monetary conditions, in the core jurisdictions. Even when a monetary policy stance is appropriate for those jurisdictions, it may not be appropriate for the world as a whole.

This issue was well in evidence in the run-up to the financial crisis. Following the collapse of the dot.com equity boom and the subsequent economic weakness, unusually low policy rates in core economies, not least the United States, encouraged strong capital outflows to EMEs. Countries that experienced unwanted upward pressure on their exchange rate, often inconsistent with their domestic price stability objectives, faced a difficult choice. They could reduce their policy rates, potentially compromising their domestic targets, at least where inflation was already low or negative. Alternatively, they could resist that pressure by accumulating foreign exchange reserves (and routinely "sterilising" the impact on domestic currency banks' reserves). Most followed a combination of the two, but the overall accumulation of reserves was unprecedented, especially in Asia and those economies, such as China, with fixed exchange rate pegs.[39] Reducing policy rates transmitted the policy stance from advanced economies to the rest of the world. Accumulating foreign exchange reserves, given the strong portfolio preference for US Treasuries, may indeed have helped to keep US dollar long-term rates low, by depressing the risk premium (Warnock and Warnock (2009), BIS (2008)).[40] As noted above, risk attitudes and relative supplies do affect market rates directly (eg Borio and Disyatat (2010)). Either way, these actions added to the global credit boom.

Experience since the financial crisis has once again highlighted this dilemma. The global economy has been proceeding at a dual speed. On the one hand, the advanced industrial countries that have suffered most from the crisis have seen anaemic growth and economic slack. On the other hand, emerging market economies, not least in Asia, have been growing strongly after a brief slowdown. Differential growth prospects and the extraordinarily low interest rates in core jurisdictions have generated appreciation pressures on the exchange rates of emerging market economies, inducing large capital inflows and supporting strong increases in credit and asset prices in these jurisdictions (Graph 11). This has raised the risk of the build-up of financial imbalances, not unlike experience in the years prior to the 1997 Asian crisis.[41] This time, however, inflationary pressures in EMEs have been on the rise, providing a good reason to raise rates irrespective of external influences and lessening the policy dilemma.

The spillovers and externalities associated with monetary policy in individual economies speak in favour of some form of policy cooperation. So long as central banks condition their policy exclusively on domestic developments, global financial conditions may be inappropriate. And in considering the need for cooperation, the effect of a given country's monetary policy is better analysed through the lens of currency areas rather than national boundaries.

How can monetary anchors be strengthened?

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[39] While the initial phase of reserve accumulation following the Asian crisis reflected attempts to build up a war chest (precautionary motive), later on, especially from 2004 onwards, "involuntary" accumulation as a by-product of resisting exchange appreciation became more important.

[40] This point has been stressed, among others, by Dooley et al (2009). These authors, however, do not regard the corresponding reduction in risk premia as a factor behind the financial crisis.

[41] Indeed, empirical evidence indicates that for emerging market economies, sustained appreciations of exchange rates alongside credit booms can help to predict subsequent banking crises (eg Borio and Lowe (2002b)).

At the domestic level, the answer is to go beyond narrow inflation targeting regimes. Policy frameworks should allow for the option to tighten monetary policy to lean against the build-up of financial imbalances even if near-term inflation appears to be under control. The balance of views within the central banking community has been shifting in this direction (Shirakawa (2009), Trichet (2009), Carney (2009), Cagliarini et al (2010)).

At the international level, the answer is more complex. Undoubtedly, improved domestic anchors would also help to promote a sounder international monetary system. They would remove an important source of potential global spillovers. Even so, they would still leave unaddressed the challenge of internalising the residual spillovers of domestic policies. This, of course, is the perennial challenge of international cooperation, one that has proved so intractable over the years (see Dorrucci and McKay (2011) and Padoa-Schioppa (2010)).

At a minimum, making progress calls for the adoption of analytical frameworks that stress the externalities involved (Borio (2011a)). This would highlight that no individual country can be safe unless the world as a whole is safe. Such a shift in perspective would be akin to the one that has already occurred in regulation and supervision, from a micro- to a macro-prudential orientation: no individual financial institution can be safe unless the financial system as a whole is safe. But beyond this recognition, political considerations loom large and set the ultimate constraints on feasible solutions. Until and unless progress is made in this area, more of the burden will have to be taken by other policies, including prudential and fiscal policies.

Indeed, the excess elasticity of the international monetary and financial system has implications for other policies too. Fiscal policy is an important case in point. Unsustainable credit and asset price booms flatter the government accounts. As a result, they lull governments into a false sense of security and relieve pressure on consolidation in good times, undermining fiscal prudence. Moreover, once the financial imbalances unwind, a fiscal response designed to soften the blow can quickly hit serious constraints. The ultimate risk is that a private sector source of financial instability (a credit and asset price boom and bust) is replaced by a public sector one (a fiscal and hence sovereign crisis). The recent experience is simply replaying an old tune which had been all too easily forgotten by policymakers (Reinhart and Rogoff (2009)).

Conclusion

The role of global current account imbalances in contributing to the recent financial crisis needs to be reconsidered. In particular, we raise two basic objections to the popular “excess saving” view. It fails to distinguish sufficiently clearly between saving, a national account concept, and financing, a cash-flow concept, thereby focusing too heavily on net rather than gross capital flows. And it conflates the determinants of the market and the natural rate of interest rate. As a result, the ES view has little to say about the underlying patterns of global intermediation that contributed to the credit boom and the transmission of the turmoil, and diverts attention away from the monetary and financial factors that sowed the seeds of the crisis.

We have argued that the fundamental weaknesses in the international monetary and financial system stem from the problem of “excess elasticity”: the system lacks sufficiently strong anchors to prevent the build-up of unsustainable booms in credit and asset prices (financial imbalances) which can eventually lead to serious financial strains and derail the world economy. Reducing this elasticity requires that anchors be put in place in the financial and monetary regimes, underpinned by prudent fiscal policies.

Analytically, this paper is a plea for a more systematic inclusion of monetary and financial factors in current macroeconomic paradigms. The distinguishing characteristic of our economies is that they are *monetary* economies, in which credit creation plays a fundamental

role. The financial system can endogenously generate financing means, regardless of the underlying real resources backing them. In other words, the system is highly elastic. And this elasticity can also result in the volume of financing expanding in ways that are disconnected from the underlying productive capacity of the economy. In macroeconomic models, the role of money and credit should be essential, not ancillary. This calls for a revival of an old and highly respected tradition in macroeconomics – one which, sadly, has been largely neglected in the current prevailing paradigm.

Annex: Real vs monetary analysis and the determination of the interest rate

The determination of the interest rate has long been a focal point of debate among economists. One the one hand, theoretical analysis typically emphasises the determinants and effects of a single *real* interest rate that applies broadly to the whole economy. On the other hand, real-world transactions take place on the basis of a plethora of *nominal* interest rates that vary with the type of transaction and its duration. This distinction is partly a reflection of the wider dichotomy between two conceptual paradigms, namely real and monetary analysis.

As stressed, *inter alia*, by Schumpeter (1954), *real analysis* presumes that the functioning of the economy can be sufficiently well understood in terms of real factors; money is simply a veil. Economic processes are analysed as if they took place in a virtual barter economy, but one in which exchange proceeds costlessly and smoothly, with perfect coordination among trades. It is the world of Walras's all-cognisant and all-powerful auctioneer. *Monetary analysis* focuses instead on the money flows that are the counterpart of all exchanges. "Money prices, money incomes, and saving and investment decisions bearing upon these money incomes… acquire a life and an importance of their own, and it has to be recognized that essential features of the capitalist process may depend upon the 'veil' and that the 'face behind it' is incomplete without it" (Schumpeter 1954, p 278).

The type of analysis shapes views on how the interest rate is determined. This is most clearly illustrated by the popular loanable funds framework, most fully articulated by Wicksell (1898).[42] The basic idea here is that *market* interest rates are determined in the market for loanable funds, or credit more generally, where demanders of funds interact with providers of funds (financing). That is, the market rate is fundamentally a monetary phenomenon. But when the economy is in full equilibrium, the market rate coincides with the natural rate, which is fundamentally a real phenomenon, equating ex ante saving and ex ante investment at full employment. The gist of the story, using the terminology employed in this paper, can be told as follows.

In full equilibrium, the goods market and the credit market clear at full employment without price pressures. With investment demand being driven by the marginal product of capital and saving governed by households' rate of time preference, it is possible to characterise investment and saving as functions of the real interest rate. In equilibrium, the amount that households wish to save (ie not to spend) *makes just enough room* for the amount of desired investment not to generate excess demand in the goods market. In other words, the "hole" in aggregate spending left by households is just large enough so that the sum of desired consumption and investment exhaust total output. This determines the natural interest rate, which is thus fully pinned down by the real side of the economy. *As long as the market rate coincides with this rate*, therefore, the economy is in full equilibrium and there is no need to appeal explicitly to monetary factors. The credit market is also in equilibrium.

Monetary analysis comes alive in *disequilibrium*, when the market and natural rates differ. In this analysis, when the market rate is below the natural rate, banks create additional credit, thereby adding to the money stock, in order to meet the additional investment demand (the "cumulative process"). If goods prices are fully flexible and output cannot expand, prices rise and "crowd out" household consumption, ie they generate *disequilibrium* (sometimes termed

[42] In textbooks and in typical references, the loanable funds theory of the interest rate is purely couched in terms of saving and investment (eg Mankiw (2008)). This, however, refers only to a full equilibrium state and ignores the role of the credit market. Therefore, it only describes the determination of the natural rate. This widespread representation of the theory encourages the failure to appreciate the distinction between saving and financing.

"forced") saving to match actual investment *ex post*. The ex post real interest rate declines, investment expenditures rise and households are prevented from reaching their preferred consumption level. Investment crowds out consumption.

Banks, and their ability to expand credit, play a key role in this story. Through the creation of deposits associated with credit expansion, banks can grant nominal purchasing power without reducing it for other agents in the economy. The banking system can both expand total nominal purchasing power and allocate it at terms different from those associated with full-employment saving-investment equilibrium. In the process, the system is able to stabilise interest rates *at an arbitrary level*. The *quantity of credit adjusts* to accommodate the demand at the prevailing interest rate.

How can this disequilibrium process come to an end? This was a fundamental preoccupation of Wicksell and many economists that came after him. For an economy backed by commodity money (gold), he had an answer: gold provides an external anchor. Recall that, in Wicksell, it is banks that set the market interest rate. As prices rise, they eventually lead to an outflow of gold that induces banks to raise loan rates. Equilibrium is finally re-established. By contrast, for a pure credit economy, with no external gold backing but with only inside money (credit-backed deposits), he had no answer.[43] He could identify no forces that would take the system towards equilibrium.

To Wicksell, a pure credit economy was largely a fictitious, futuristic concept. However, our present-day systems are in fact quite close to a pure credit economy (Disyatat (2010a), Borio and Disyatat (2010)). The amount of cash holdings by the public, one form of outside money, is purely demand-determined; as such, it provides no external anchor. And banks' reserves with the central bank – the other component of outside money – *cannot* provide an anchor either: Contrary to what is often believed, they do not constrain the amount of inside credit creation. Indeed, in a number of banking systems under normal conditions they are *effectively zero*, *regardless* of the level of the interest rate. Critically, the existence of a demand for banks' reserves, arising from the need to settle transactions, is *essential* for the central bank to be able to set interest rates, by exploiting its monopoly over their supply (Borio and Disyatat (2010)). But that is where their role ends. The ultimate constraint on credit creation is the short-term rate set by the central bank and the reaction function that describes how this institution decides to set policy rates in response to economic developments.

It is now worth comparing Wicksell's analysis with that of the New Keynesian paradigm, the prevailing modelling approach nowadays. The similarities abound. In both there is a clear distinction between the natural and the market interest rate. In both the former is purely a function of real factors while the latter is set independently in the monetary sphere: by banks in Wicksell, by the central bank in New Keynesian models. And in both price instability is the sole, or at least main, symptom of a divergence between the natural and the market rate.

Yet these similarities conceal fundamental differences. They all relate to the treatment of monetary factors in the two approaches.

First, they differ methodologically, in terms of the role played by disequilibrium. Disequilibrium is an integral part of Wicksell's analysis; markets are always in equilibrium in the New Keynesian approach, in the sense that no agent fails to optimise given the constraints faced. For instance, there is no such thing as "forced saving" in New Keynesian models or the equivalent of a cumulative process. In Wicksell, inflation is a disequilibrium phenomenon that, under some conditions at least, can actually help to re-equilibrate the

[43] Fisher (1911) and Mises (1924) provided different answers to this fundamental problem. See Laidler (1999) for a detailed discussion of these issues.

economy; in New Keynesian models it is an equilibrium phenomenon that serves no such purpose.

Second, they differ with respect to the source of the wedge between the market and the natural rate. In Wicksell's world the main source is a failure in funding markets, ie a capital market failure.[44] Banks are unable to set interest rates at the right level: they do not have sufficient information about the level of the natural interest rate and, even if they did, they have no incentive to set the market rate there. In modern New Keynesian frameworks the source of the wedge is nominal rigidities, notably sticky prices.[45]

Finally, the very meaning of monetary factors is fundamentally different in the two cases. In Wicksell, money and credit are essential elements of the workings of the economy. In the canonical New Keynesian paradigm, rather paradoxically, they are entirely redundant or at least inessential. The canonical model is that of a money-less economy that can do away with the ultimate settlement medium (Woodford's (2003) "cashless economy"). Indeed, paradoxically, when settlement balances (money) are introduced, they act as a "friction", not as the indispensable lubricant in an otherwise inefficient barter-exchange mechanism. It is an economy in which credit is just a vague shadow in the background: since credit does not affect behaviour, its evolution does not need to be tracked.[46] When banks are introduced, credit may have more information content. But, even then, intermediaries do not generate purchasing power, they simply transfer real resources from one sector to the other. The underlying economy is, *in this sense*, a real economy disguised as a monetary one. Credit is just another real resource that households make available to entrepreneurs. This contrasts sharply with the essence of monetary analysis.

It might be argued that this shortcut is of limited significance. After all, assuming that the interest rate is simply set by the central bank is a good approximation to the workings of the economy. It is certainly a major step forward compared with the approach common in much of the post-war period and popularised by the monetarist tradition (eg Borio and Disyatat (2010), Disyatat (2008)). This assumed that (outside and, sometimes, inside) money was exogenously set by the central bank and drove the interest rate. The New Keynesian paradigm has the great merit of having reinforced the shift away from this view. But by doing away with the *quantities* of credit and deposits it has obscured the factors that are at the *very core* of financial instability. It remains to be seen how far shortcuts that introduce money and credit through the backdoor, simply as transfers of real resources, will help illuminate these economic processes. We would conjecture that a rediscovery of the essence of monetary analysis is critical for a deeper understanding.[47]

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[44] In Keynes (1936) liquidity preference is another form of capital market failure, but Keynes goes further and rejects the usefulness of the distinction between real and monetary factors; see Leijonhufvud (1997) and Kohn (1986).

[45] "It is only […] with sticky prices that one is able to introduce the crucial Wicksellian distinction between the actual and the natural rate of interest, as the discrepancy between the two arises only as a consequence of a failure of prices to adjust sufficiently rapidly" (Woodford (2003, p 238)).

[46] This is so despite the fact that Woodford (2003) explicitly draws inspiration from Wicksell's pure credit economy; on this, see Laidler (2004).

[47] For a further elaboration of these issues, see Borio (2011b).

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