Financial integration and the Great Leveraging

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Abstract

While previous studies have focused on the relationship between international capital flows and domestic credit growth, highlighting the importance of the equity/debt mix, this paper shows that there are also important implications of flows going to different domestic recipient sectors, especially concerning money dynamics. In particular, cross-border banking flows display a strong comovement with credit but none with broad money; in turn, flows of domestic non-banks display comovement with both credit and money. For this reason, banking flows correlate with the decoupling of these two variables – the Great Leveraging –, a stylised fact documented for several economies in the past decades and associated to the rapid expansion of banks non-monetary liabilities. These results thus shed light on the mechanisms through which the international banking activity might have consequences for the composition of the domestic bank balance sheet.

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1 Introduction

Cross-border capital flows and, more generally, financial integration, interact with credit growth via different channels. On the one hand, capital inflows provide the resident banking sector with more resources which can be channeled to domestic credit provision. On the other hand, capital flows exert an upward pressure on asset prices, generating wealth effects, which can be translated into higher consumption and demand for credit – see, for instance, Aizenman and Jinjarak (2009), Sá and Wieladek (2012) and Vasquez-Ruiz (2012). Furthermore, higher asset values improve household and corporate balance sheets, boosting colateral values and, in that fashion, facilitate the access to credit.

The outburst of the global financial crisis has highlighted the need to better understand the connection between credit growth and financial stability. To the extent that surges in international capital flows have commonly been associated with periods of rapid credit growth, they too have been linked to the likelihood of crises. Examples of studies in this area include Mendonza and Terrones (2008) and Calderon and Kubota (2012), who argue that credit booms tend to follow periods of high capital inflows. Sá (2006), however, does not find evidence of a causal relationship between both variables. Reinhart and Reinhart (2008) examine the links between capital flows and financial crises and draw unconditional probabilities of a crisis given episodes of capital flow bonanzas. Against the backdrop of the global financial crisis, Lane and Milesi-Ferretti (2012) study the process of external adjustment and conclude that countries with higher current account deficits in the pre-crisis period than would be explained by underlying economic fundamentals experienced sharper corrections once the crisis erupted.

Recent studies have explored in more detail the relation between private credit growth and different types of international capital flows. Lane and McQuade (2014) show that the instrument composition is relevant in this context: while debt flows exhibit a strong co-variation pattern with private domestic credit growth, equity flows do not play a significant role. More recently, Igan and Tan (2015) find that the breakdown of flows into FDI, portfolio and other investment has distinct implications for corporate and household credit.

The main contribution of this paper is to extend the previous literature by assessing how financial

integration and, specifically, how different types of capital flows and their domestic recipient sectors interact with developments in the relationship between credit and money. Despite the body of research on the relationship between cross-border finance and private domestic credit, the literature, to my knowledge, is yet to explore how financial integration affects money holdings, as well as the interplay between both variables in the same framework. Doing so casts light on how cross-border capital flows contribute to the funding of domestic banks, how they might affect the shape and composition of banks' liabilities, and finally link them to the asset side and the transmission of this funding into domestic credit to non-banks.

To track how cross-border flows affect domestic monetary holdings, I rely on the monetary presentation of the balance of payments which, in a nutshell, establishes a statistical link between balance of payments flows of the different resident sectors – specifically, banking or money-issuing and non-banking or money-holding sectors – and monetary aggregates. Furthermore, to the extent that cross-border banking activity is generally seen as a key driver in credit funding, focusing on the sectoral decomposition of flows is also relevant from that perspective – on the role of global banks, how they operate and provide liquidity worlwide, see Cetorelli and Goldberg (2011, 2012), Bruno and Shin (2013), McCauley (2012) and Niepmann (2013).

The relevance of putting together the asset and liability sides of the banking sector balance sheet in an integrated manner is further strengthened by the recent evidence by Schularick and Taylor (2012) of two distinct periods concerning the dynamics of credit and money. Using a groundbreaking historical dataset, they describe how money and credit were growing at roughly the same pace since the end of the Second World War until the early 1970s, but from that period on credit grew faster than money. This decoupling between both variables – labeled the Great Leveraging by Taylor (2012) –, was achieved by the fast expansion of banks non-monetary liabilities, such as long-term debt securities, which enabled them to grant credit beyond their deposit base, and can be seen as a measure of leverage in the banking sector.

Furthermore, based on the crisis classifications in Bordo et al. (2001), they provide the link between faster credit growth and crises, by noting that the decoupling between credit and money went hand in hand with a resurgence of these episodes since the 70s. In contrast, there were barely any crisis

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episodes before that. Moreover, they show that credit is a predictor of crises while money is not. Their intuition for this result is that credit is a more encompassing measure of bank balance sheets as it captures features such as leverage and non-monetary liabilities which money does not.[1]

An econometric analysis of the relationship between credit, money and the ratio between credit and money and banking and non-banking sectors cross-border capital flows is carried out, in a cross-sectional specification for a group of countries encompassing OECD members plus other mostly Asian and Latin American countries. Importantly, the objective is to determine the co-variation patterns of these variables and therefore inferring causality is, in this case, not possible.

Turning to the results, banking sector flows significantly co-move with the decoupling of credit and money: on the one hand, banking flows display a strong positive co-variation with credit growth dynamics and, on the other hand, the same is not valid for developments in money. Actually, it is the case that money growth is exclusively associated with non-banking sector flows, while the relation of these flows with credit is less pronounced than with those of banks. Finally, turning to the equity/debt split, and irrespective of the sectoral breakdown of flows, these relationships work via debt flows while equity mostly plays only a negligent role.

The rest of the paper is organized as follows: Section 2 discusses the link between money and international capital flows, with an emphasis on the monetary presentation of the balance of payments; Section 3 goes through the data and general patterns; Section 4 introduces the empirical approach and the results obtained; concluding remarks are provided in Section 5.

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[1]Baeriswyl and Ganarin (2011) see the decoupling between credit and money as an opportunity to empirically test which of the two variables drives aggregate demand and inflation and thus solve the decade long dispute between the "credit view" and the "money view". With a focus on the United States and Switzerland, they conclude that money is the relevant variable to explain inflation, corroborating Friedman's (1970) assessment that "inflation is always and everywhere a monetary phenomenon". Putting the pieces together, while the asset side of bank balance sheet is the relevant one for financial stability purposes, the liability side is the relevant for monetary policy and price developments. A direct consequence of the latter is that the decoupling between credit and money has important implications for the role of central banking: when both variables were growing in tandem, by setting interest rates and controlling money growth, central banks were also determining developments in credit. Hence, with only a weak relationship between both variables, targeting inflation might be insufficient to address undesirable credit expansions.

2   Credit, money and international capital flows

A natural way to approach the relationship between money and international capital flows is to recall the concept of the monetary presentation of the balance of payments. This particular idea has not received much attention in the literature in recent times, most theoretical contributions already have a few decades. For instance, Johnson (1972) surveys monetary balance of payments models which, in contrast to Keynesian models that focus on relative price changes, look at the direct impact of the demand and supply for money on the balance between income and expenditure. He concludes that monetary balance of payments models are better suited for policy guidance in the long-run since they assume full employment of resources and that domestic price levels are in line with international price levels[2]. Along the same lines, Kemp (1975) argues that the balance of payments embodies an automatic adjustment mechanism, whereby divergences between actual and desired money balances are corrected. Importantly, no distinction is made between the different items of the balance of payments; the only thing that this class of models states is that excess supply or demand for money will be cleared in the goods, services or securities markets.

Both papers focus on how money demand and supply affect the current account balance and/or cross-border capital flows. More recent contributions instead look at how cross-border flows affect money aggregates, which is the adequate approach for the purpose of this paper. The ECB regularly publishes the monetary presentation of the euro area balance of payments together with its monthly releases and uses it in its regular analysis of monetary aggregates' developments[3]. One useful way to think about how cross-border flows may have a direct influence on the domestic money stock is to split them into transactions between non-residents and domestic (i) MFIs or money-issuing sectors and (ii) non-MFIs or the money-holding sectors. The monetary presentation of the balance of payments concentrates on the latter.

To see how transactions of the money-holding sectors might influence money dynamics, it is best to first look at the components of money. While in practice, it is up to each country to define its

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[2]Polak (2001) discusses in detail the Keynesian and the Johnsonian monetary approaches to the balance of payments.
[3]See for instance ECB (2008) as well the regular box on financial flows in the quarterly editions of the ECB's Monthly Bulletin

own money aggregates[4] it is nevertheless possible to define a general broad money concept using the consolidated aggregate balance sheet of the resident MFIs, i.e., the sum of all individual MFI (including the central bank) balance sheets after netting out intra-MFI positions, as depicted in Table 1.

Money aggregates are typically expressed on the basis of the liability side of the balance sheet. Accordingly, broad money can be defined as generally consisting of currency in circulation, liquid deposits (including foreign-currency-denominated) and other instruments with a given level of liquidity, such as repurchase agreements, debt securities (normally with a maturity below two years) and money market fund shares. Not included in money aggregates are other longer-term liabilities such as deposits with an agreed maturity and those redeemable at a period of over three months, as well as capital, reserves and provisions and other liabilities, such as central government deposits.

But, given that, by construction, the asset and liability sides of the aggregate consolidated balance sheet of the MFI sector must add up to the same amount, one can also define money aggregates using the asset side components or counterparts of money, which are more illustrative of the money creation mechanism. With this second approach, broad money (M) can be defined as the sum of domestic credit to non-banks (DC), net external assets (NEA) obtained as the difference between claims on and liabilities to non-residents, and other domestic assets (ODA) such as securities issued by domestic residents minus longer-term financial liabilities (LTFL) as defined before:

$$M = DC + NEA + ODA - LTFL \tag{1}$$

Changes to the broad money stock can then be traced to changes to domestic credit, net external transactions of the money issuing sector (NETMI) and net other domestic transactions (NODT):

$$\Delta M = \Delta DC + NETMI + NODT \tag{2}$$

The next step is to establish a relation between net external transactions of banks and balance of payments flows. Since MFI balance sheet and balance of payments statistics follow similar concepts,

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[4]§283 of the IMF's Monetary and Financial Statistics Manual states that "this manual does not contain prescriptions for national definitions of money, credit and debt, which are left to the discretion of national authorities"

transactions in both sets of statistics are equivalent[5]. This means that using balance of payments cross-border banking flows instead of the ones derived in MFI balance sheet data is appropriate in this context. But then, given that, by construction, balance of payments flows must sum to zero, it is trivial to realise that the net external transactions of the money-issuing sectors must be symmetrical to those of the money-holding sectors (NETMH), i.e., $NETMI + NETMH = 0$ or $NETMI = -NETMH$. Combining both expressions, we get

$$\Delta M = \Delta DC - NETMH + NODT \tag{3}$$

which finally establishes a direct relationship between broad money and non-bank balance of payments flows. Thus, in a nutshell, constructing the monetary presentation of the balance of payments involves isolating the balance of payments items that mirror the net external transactions of non-MFIs, which have an effect on the net external assets of banks and finally money holdings.

To better understand, consider the following example: if a domestic household sells an asset to another domestic household, there is no change in money holdings in the economy. In contrast, consider the case of a domestic household who sells an asset to a foreign resident: if the buyer uses a foreign account to pay for the asset and the domestic household deposits the proceeds in a domestic bank account, then money holdings will increase.

Importantly, this refers only to the *direct* effect of the capital flow on the MFI balance sheet. Other second round effects may follow suit. Using the same example as before, if the domestic MFI where the deposit is held then decides to use the extra money to increase loans to the domestic sector, this will lead to a further expansion of the aggregate balance sheet, if the funds are subsequently deposited and lent domestically. The size of the balance sheet expansion (or, in other words, money creation) will ultimately depend on the money multiplier.

However, in some situations the size of the aggregate balance sheet may remain unchanged. This would be the case if, considering the converse of the previous example, a resident household finances the purchase of foreign securities with a loan instead of drawing down its deposit, this will not reduce

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[5]There might be some differences in practice because of different compilation methods but those are deemed to be relatively small

the money holdings in the domestic economy.

Furthermore, although both sets of statistics have similar concepts, in practice, however, there may be divergences. The most important is the underlying assumption in the above reasoning, that the resident banking sector is involved in these money-holding sectors transactions. Going back to the previous example, if the resident household uses a non-resident bank account to purchase a foreign asset, this does not have an impact on the country's money stock; nevertheless, it should still be recorded in the balance of payments as it represents a financial transaction between a resident and a non-resident counterpart[6].

Finally, the last remaining link that needs to be established is between the standard detail provided in balance of payments statistics and the money-issuing and -holding sectors flows. In broad terms, it (almost exclusively) involves using the sectoral breakdown available in the financial account; a more detailed description is provided in the data appendix.

In itself, the monetary presentation of the balance of payments provides information on patterns and dynamics of financial account flows which allow for two main interesting analysis. On the one hand, they allow understanding which specific types of capital and/or instruments are being purchased or sold and, to the extent that they have different characteristics, the respective impacts and implications of these operations in money developments. In broad terms, the details available in the financial account are on (i) functional categories – foreign direct investment, portfolio investment, other investment –, the financial instrument – securities, loans, deposits, etc. – and the type of capital – equity or debt. On the other hand, the monetary presentation of the balance of payments provides not only measures of *net* but also *gross* flows, i.e., asset and liability flows. Specifically, domestic money holdings might change because of the behaviour of both resident and non-resident investors. For instance, money holdings might increase (decrease) because domestic residents sell (buy) foreign assets or because foreign investors buy (sell) domestic assets (or both). Understanding the origin of flows that affect money holdings could also be analytically relevant[7]. In short, the monetary presentation of the balance of payments enables (i) linking developments in money aggregates to cross-border transactions in

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[6]In practice, this situation should be mitigated by the fact that these are typically the transactions which statisticians have the greater difficulties to record. This is because normally the resident banking sector is the basis of reporting.

[7]For instance, Forbes and Warnock (2012) show the importance of using gross flows and clearly disentangling the behaviour of domestic and foreign investors when assessing episodes of capital surges and stops

specific asset classes and (ii) disentangling domestic versus foreign residents behaviour by looking separately at the dynamics of assets and liabilities.

3 Data and general patterns

In this section I briefly describe the data I use. More detailed information is provided in the data appendix. The list of countries for which there is available data and respective time periods is shown in Table 3. Although data for Luxembourg are available, I make the standard assumption and remove it from the analysis due to the significant mutual fund industry operating from the country[8].

3.1 Data

Starting with credit, I use the series on private credit to the private non-bank sectors by banks published by the IMF in the International Financial Statistics (IFS) dataset. The BIS staff has recently put together a new credit dataset for some fourty countries (details are provided in Dembiermont et al. 2013). In broad terms, this new dataset differs from the IFS credit series (or any other typical credit measure) in two main aspects: (i) it includes cross-border credit directly to domestic non-banks and (ii) credit provided by domestic non-banks. There are two reasons for not considering these credit series and using instead those of the IFS. The first is a conceptual reason: the focus of this paper is on the aggregate balance sheet of MFIs, i.e., how international capital flows *directly* affect its asset side (credit) and its liability side (money holdings). The two additional sources of credit contemplated in the new BIS series bypass the domestic banking sector and are therefore not consistent with the paper's goal. The second reason is of a practical nature: the country coverage in these new BIS series is smaller and, intersected with the capital flows data availability, would significantly reduce the number of countries considered.

Turning to money series, these are also from the IFS dataset and are broad money aggregates (mostly M3 but also M2 and other broad measures whenever M3 is not available). Additionally, one

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[8]The cross-border capital flows associated with the mutual funds industry are typically (i) very large and have a very limited impact in the domestic economy and (ii) imbalanced in the sense that equity flows associated to purchases of mutual fund shares are recorded on the liability side while debt flows are recorded on the asset side on account of the large bond portfolios these funds hold.

particular case is that of euro area countries, for which individual national money aggregates are not available. National contributions to the euro area money aggregates are available from the ECB and the respective national central banks but these are based on an euro area wide residency concept, i.e., they exclude intra-euro area banking positions. Using these as measures of national money aggregates would therefore likely hamper the analysis since the share of intra-euro area positions among total banking positions is significant for most EMU countries – Spiegel (2009a,b), for instance, discusses the increase and the drivers of euro area countries share in the total borrowing of Portuguese and Greek banks. Moreover, using a euro area wide residency concept would also be inconsistent with the residency concept underlying the national balance of payments flow data of individual euro area countries. For these reasons, I computed proxies for these aggregates using IFS data, which are based on the relevant national residency concept. More details can be found in a dedicated subsection in the data appendix. Table 4 displays the complete list of the aggregates I used for each country.

Finally, concerning capital flows data, the source is the IMF balance of payments database. I focus on net measures of debt and equity flows, both for the money-issuing and holdings sectors. A positive figure represents net capital inflows whereas a negative figure represents net outflows. Details on the construction of these measures are provided in the respective section of the data appendix. I also consider the current account balance for completeness. To get a better feel for these capital flows measures, Table 5 displays correlations between net equity and debt flows of money-issuing and -holding sectors with the change in the BIS net external bank claims for the available countries (all scaled by GDP and in the 1999-2007 period). The latter measure is a proxy for cross-border bank flows as changes in net claims, although also reflecting price and exchange rate variations, are mostly related to flows. As can be seen and despite these limitations, the correlation of the net debt flows of the money-issuing sectors with the BIS measure is particularly strong and positive, as expected.

3.2   Some general patterns

I start by focusing on annual data for the 1999-2007 period. There are two reasons for choosing this period. First, given that 1999 is the initial data point for the euro area countries' money aggregates proxies, I use this year as starting point so as not mix the previous national monetary aggregates with

these proxies[9]. Moreover, going further back than 1999 would also reduce the country coverage due to data availability. Second, I intentionally exclude the crisis period.

Table 6 displays some basic descriptive statistics for the countries in the dataset. Starting with the total, we see that credit and money scaled by GDP are almost identical, thus leading to a ratio of these variables of almost one. Moreover, this ratio was increasing in the period under consideration as credit grew faster than money. However, the statistics for the total dataset hide important differences across OECD and non-OECD countries: credit scaled by GDP is much higher in OECD than in non-OECD countries, whereas money is broadly the same in both country groups. As a consequence, the ratio of credit to money is higher in OECD countries. Moreover, this ratio has been growing for OECD countries as credit growth has been faster than money growth. Again, we get the opposite picture when looking at non-OECD countries, with money growing faster than credit and, therefore, a falling ratio.

Table 7 displays the same descriptive statistics according to two variables (details provided in the appendix): (i) the FX regime classification since, as opposed to a floating regime, the management of a fixed regime might lead the central bank to react and intervene in the presence of cross-border capital flows to stem their impact on the exchange rate and thereby influence the dynamics of credit and money; and (ii) the share of foreign banks in the domestic banking system as a significant presence of foreign banks is likely associated with higher cross-border financial activity. The statistics show that countries with fixed regimes have, on average, both higher levels and growth rates of credit and money scaled by GDP and of the ratio of both variables. The picture is less clear concerning the share of foreign banks. Countries with high shares have lower levels of credit scaled by both GDP and money. They also have lower credit and money growth rates but a higher average growth of the credit to money ratio.

As I am chiefly interested in capturing the medium- and long-term relationship between credit and money dynamics and cross-border capital flows, and also to eliminate high-frequency volatility, I use multi-year periods. Specifically, to obtain equally sized blocks within the same 1999-2007 period, I

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[9]Of course, the problem remains for Greece and Slovenia, that joined the euro area in 2001 and 2007, respectively. All remaining countries that didn't join the euro area at its inception, joined later than 2007: Cyprus and Malta in 2008, Slovakia in 2009 and Estonia in 2011.

use two non-overlapping four-year periods from 1999 to 2003 and 2003 to 2007. To better assess the interplay of developments in money and credit and cross-border capital flows, I split the countries in the dabatase into terciles according to the growth rate of their credit to money ratios in both periods. For each tercile, Table 8 displays the median values of credit, money, the ratio between both variables, the FX regime classification and the share of foreign banks in the domestic banking sector, as well asfive cross-border flow measures: net equity/debt flows of money-issuing and -holding sectors and the current account (4-year averages, scaled by GDP). In the first tercile, the growth rate of the ratio of credit to money is negative, positive but small in the second and positive and sizeable in the third and last tercile.

These descriptive statistics provide a few interesting insights. First, countries experience higher growth in the ratio of credit to money due to faster credit growth than money. In other words, both variables are growing, but one faster than the other. Second, the growth of the credit to money ratio and net debt flows seems to be related: slower ratio growth (or decrease) is associated with negative net flows (i.e., net outflows) or positive and/or smaller net flows (i.e., net inflows) whereas positive and/or faster ratio growth with positive and/or higher net flows. Furthermore, the relationship seems to be more pronounced for the money-issuing than for the money-holding sectors debt flows. At the same time, somewhat of a weaker relation seems to be present for net equity flows of the money-holding sectors in the first and second terciles while there is no apparent relation with money-issuing sectors net equity flows. An inverse relationship between the ratio of credit to money growth and the current account balance also seems to exist: for instance, in the 2003-2007 period, it is positive (i.e., net capital outflows)in the first tercile where the ratio is decreasing and negative (i.e., net capital inflows)in the second and third (higher in the third than in the second) where the ratio is increasing. Finally, faster credit to money ratio growth is associated with a more fixed FX regime, while the picture is not clear regarding the share of foreign banks in the domestic banking sector.

To illustrate these patterns, Charts 1 and 2 display quarterly credit and money scaled by GDP and 4-quarter moving sums scaled by GDP of money-issuing and money-holding sectors net debt flows for Estonia and Japan. These two countries provide examples for, respectively, a net importer of capital with a high presence of foreign banks in the domestic banking system and a fixed FX regime and a net

exporter of capital with a low presence of foreign banks in the domestic banking system and a floating FX regime. Starting with Estonia, credit and money were growing side-by-side in the beggining of the period: from end-1996 until roughly 1998 there was an initial rise in both variables at the same time that inflows into both the money-issuing and holding sectors were recorded; from 1998 until roughly 2000 both credit and money stagnated while net outflows were recorded. However, since the early 2000s, credit started to grow faster than money, leading to the decoupling of both variables. This development took place at the same time that consistent and sizeable inflows into the money-issuing sectors were recorded while money-holding sectors flows remained subdued and alternating between inflows and outflows. Turning to Japan, the decline in credit for most of the period goes together with consistent outflows from the money-issuing sectors as well as from the money-holding sectors, albeit smaller. In turn, money barely increases in the period.

In summary, there seems to be a strong comovement between credit and net debt flows, especially in the case of the money-issuing sectors, while broad money seems to move in line with money-holding sectors debt flows. Finally, these relationships are independent of whether the country in question is an overall net exporter or importer of capital, i.e., has a positive or negative current account.

3.2.1 Euro area

The euro area aggregate monetary presentation of the balance of payments is published by the ECB but country level data is not available. This paper's database, however, enables a more in-depth analysis of euro area country level dynamics, given that it includes data on eight countries, for which sufficiently detailed data allows computing the monetary presentation. One natural and obvious way to organize these eight euro area countries is to split them between core and periphery. In the database there are four core countries - Austria, Finland, France and Germany, - and four periphery countries - Greece, Italy, Portugal and Spain.

The second part of Table 6 displays descriptive statistics for the euro area countries. Importantly, for consistency purposes, the euro area figures presented in this table are the sum of the eight available countries and not aggregate credit or money variables based on euro area residency concepts (see the data appendix for more details).

Developments in credit and money in core and periphery countries are quite disparate. Credit and money scaled by GDP are both higher in periphery countries. The difference is however larger in the case of credit (around ten percentage points) than in the case of money (around five percentage points). As a consequence, the ratio of both variables is also higher in periphery countries. Perhaps more striking than the differences in the levels of these variables are the respective growth rates, especially that of credit: whereas credit grew only modestly in core countries, its expansion was much more pronounced in periphery countries. Moreover, credit grew more than twice as fast as money holdings in periphery countries, thus leading to a widening of the ratio between both variables, whereas this ratio grew more modestly in core countries.

Charts 3 and 4 display credit and money as well as net debt flows of the money-issuing and -holding sectors for Portugal and Germany in the same way as those for Estonia and Japan and illustrate broadly the same ideas. Starting with Portugal, a significant increase in credit took place together with a spike in inflows into the money-issuing sectors from 1999 to 2003. A period of subdued inflows and credit growth then took place. Strong credit growth resumed from roughly 2005, coupled with a new wave of sizeable money-issuing sectors inflows. Money decreased slightly from 1999 to 2004, at the same time that outflows were recorded for the money-holding sectors. From then on, money increased alongside inflows into the money-holding sectors. Turning to Germany, after an initial period up until roughly 2000 of credit growth and inflows into the money-issuing sectors, credit was constantly decreasing at the same time that outflows were recorded for the money-issuing sectors. In turn, money was almost always increasing.

4 Methodology and model specification

4.1 Empirical approach

As mentioned, I am interested in medium- and long-term joint-dynamics of, on the one hand, credit and money and, on the other hand, international capital flows. For that purpose, as well as to eliminate high-frequency volality of capital flow data, I resort a cross-sectional empirical approach using the previous two non-overlapping equally-sized four-year periods – from 1999 to 2003 and 2003 to 2007.

Again, I use 1999 as the initial data point so as not to mix the euro area countries' national monetary aggregates, previous to the monetary union, with the monetary aggregates proxies, and 2007 as ending point to intentionally leave out the crisis period. This empirical approach is closely related to Lane and McQuade (2014): I look at each of these periods in isolation in a pure cross-sectional approach, and also taken together, in pooled data regressions, in both cases resorting to OLS.

The specification is given by

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\begin{aligned}
(X_{it} - X_{it-s}) &= \beta_p^1 + \beta_p^2 X_{it-s} + \beta_p^3 log(GDP_{it-s}^{pc}) + \beta_p^4 FX_{it-s} + \beta_p^5 SFOREIGN_{it-s} + \beta_p^6 NOECD + \\
&+ \beta_p^7 \sum_{k=t-(s+1)}^{t} FL_{it} + \varepsilon_{ip}
\end{aligned}
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The left hand side variables X are either credit or money – both scaled by GDP – or the ratio of credit to money. Moving on to the right hand side variables, X is the initial level of the three variables and GDP^{pc} is the initial level of GDP per capita. Both co-variates are intended to capture potential convergence effects, whereby countries with smaller initial levels of credit/money and output per capita might be undergoing a catch up effect and, for this reason, experiencing faster growth (see Dell'Ariccia et al., 2012). Turning to FX, this is a dummy variable for the FX regime classification, assuming value 1 in the case of fixed regimes and 0 otherwise. $SFOREIGN$ is the share of foreign banks in total bank assets proxied by the local claims of foreign affiliates in a given country, taken from the BIS banking statistics, and scaled by private credit. In turn, $NOECD$ is a dummy variable taking value 1 for countries that do not belong to the OECD and 0 otherwise. Finally, FL are the cross-border capital flow measures. I use net equity and debt flows of the money-issuing and -holding sectors as well as the current account balance (4-year averages, scaled by GDP). The index p in the regression coefficients stands for the two time periods considered.

4.2   Results

Tables 9, 10 and 11 display, respectively, results for credit, money and the ratio between both variables. The first can be thought of as an asset side regression, the second as a liability side regression and the

third combines both the asset and liability sides.

Starting with the credit regressions in Table 9, credit growth displays overall a statistically significant comovement with net debt flows, especially in the 2003-2007 period and in the pooled data regression. Moreover, the signs are those expected: a positive coefficient means that net inflows are associated with an increase in credit growth. In turn, net equity flows are only significant in the 1999-2003 and for the money-holding sector. However, in this instance, net flows are associated to a lower credit, as the coefficient is negative. These results are therefore consistent with the findings in Lane and McQuade (2014) in the sense that debt is the significant component in explaining credit growth. Furthermore, the results of this paper further show is that, within net debt flows, those of the money-issuing sectors seem to have a stronger comovement with credit than those of the money-holding sectors, which are mostly relevant in the pooled data regression only.

The picture is completely different in the money regressions in Table 10. First of all, only money-holding sectors flows are relevant in explaining money dynamics and the coefficients are also positive; in no instance are money-issuing sectors flows significant. Again, net debt flows seem to be more powerful than net equity flows, as the latter are only barely significant in the pooled data regression. Moreover, in that particular case, the coefficient is negative, indicating that equity flows are associated with negative money growth.

Finally, turning to the credit to money ratio in Table 11, there is an evident and strong relation between money-issuing sectors debt flows in both periods and in the pooled data regression. At the same time, interestingly, money-holding sectors debt flows are not statistically significant. Since these flows display a positive co-movement with both credit and money, they do not significant co-move with the ratio of credit to money, contrary to those of the money-issuing sectors which co-move with credit only. Finally, money-holding sectors equity flows are only tenuously significant in the 2003-2007 period and with a positive coefficient: putting this result together with those of both previous sets of regressions, while money-issuing debt flows are likely associated with a higher credit to money ratio via a numerator effect, money-holding sectors equity flows have the same effect working via a denominator effect, i.e., by reducing money holdings.

Throughout the whole analysis, the current account exhibits a statistically significant comovement

with the three variables and the periods under consideration, with only few exceptions. The coefficient has a negative sign, as expected, relating capital inflows with an increase in the variables. This clearly shows that focusing on broad measures such as the current account might be seriously misleading given the differentiated roles of the instrument and sectoral composition play.

Regarding the co-variates, the results do not provide a clear cut picture on the existence of convergence effects. On the one hand, the initial levels of credit, money and the ratio between both variables are almost always not statistically significant and thus does not lead to conclusive evidence regarding convergence effects. On the other hand, GDP per capita is mostly not significant (or only weakly), with a positive coefficient in the credit and money regressions, and likely negative in the regressions with the ratio between both variables because the relationship is stronger for money. In this sense, it indicates stronger growth for countries with higher GDP per capita, and thus it is supportive of lack of convergence effects. The dummy for non-OECD countries provides the same indication, as it is almost always negative whenever it is significant.

Turning to the remaining variables, the coefficient for the share of foreign banks is only significant in the credit regressions and has a negative sign. The latter is consistent with the lack of convergence effects signaled by the previous variables, since lower-income and less financially developed countries tend to have a higher presence of foreign banks in their domestic financial sectors, as opposed to higher-income and more financially developed countries. The dummy for fixed FX regimes is only weakly significant in the money regressions. Finally, the dummy for the 1999-2003 is weakly significant in the credit and credit to money ratio regressions, indicating that the growth in this period is less robust than in the 2003-2007 period.

4.3   Robustness tests

Robustness of the results obtained in the previous section are presented here.

4.3.1   Country fixed effects

Using fixed/random effects in the 1999-2003 and 2003-2007 periods is not possible as these are isolated cross-sectional periods. However, that is not the case in the pooled data equations since they encompass

both periods. Therefore, as a robustness test, I reran the previous pooled data regressions for credit, money and the credit to money ratio, and for net equity/debt flows of money-issuing and-holding sectors, including country fixed effects.[10]

The results are displayed in Table 12. The same patterns of co-variation between capital flow variables and credit and money emerge and the coefficients have higher magnitude. Contrary to the benchmark regressions, the initial levels of credit, money and the ratio between both variables are now highly significant and negative, thus supporting the presence of convergence effects, where countries with higher levels experience slower growth than countries with lower initial levels. However, all remaining co-variates are not significant. As before, and somewhat stronger, the dummy for the 1999-2003 period is significant in the credit and credit to money ratio regressions, hinting to a lower growth of these variables in this period as compared to the 2003-2007 period.

4.3.2 Alternative treatment of intra-company loans

In some countries, intra-company loans may represent a significant cross-border source of funding to non-financial corporations. Although they are formally recorded within FDI, and therefore considered equity, they are in essence loans like others recorded elsewhere in the financial account – in other investment or in portfolio investment, since they can also take the form of debt securities – whereby companies in the same group provide funds to one another. Furthermore, these loans might also represents a source of inconsistencies, since as explained in detail in the appendix, intra-company loans in the case of financial corporations are recorded under other investment. For this reason, and to assess whether taking these loans as equity could be biasing the results, I reran the regressions considering the debt component of FDI within debt and only the remaining components of capital and reinvested earnings as equity (again more details on this alternative specification are provided in the data appendix). Results are displayed in Table 13 and they are qualitatively the same (I report only the results for the credit to money ratio). Net equity flows of the money-holding sectors are now more robust, especially in the 2003-2007 period but still positive and fully consistent with the picture

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[10]Hausman tests indicated that fixed effects were appropriate for the credit and the credit to money ratio regressions and random effects for the money regressions. For consistency, I present the fixed effects results for all regressions, also bearing in mind that, albeit not efficient in the case of the money regression, they are nevertheless consistent. Notwithstanding, using random effects does not qualitatively affect the results.

provided by the previous regressions.

4.3.3 Outliers

One concern with the approach used is that its results could be influenced by outliers. This is particularly the case regarding Iceland, whose values stand out from those of the remaining countries considered. Figure 5 illustrates this point, displaying a scatter for the ratio of credit to money and net debt flows of money issuing sectors. Iceland can be easily spotted out as the isolated point to the right of the cloud. For that reason, I reran the regressions excluding Iceland and all results proved to be robust to its exclusion (results not provided).

5 Concluding remarks

This paper has looked at the relationship between credit, money and international capital flows. It has showed that the sectoral composition of flows is an important component with different implications for domestic credit and money holdings. In particular, while flows of non-banks display comovement with broad money, flows of banks seem to be more relevant in explaining credit dynamics and co-move to the decoupling between both variables. Furthermore, these relationships are established via debt flows.

In other words, according to this evidence, in addition to contributing to credit growth and the expansion of the asset side of domestic banks balance sheets, the cross-border banking activity has gone hand in hand with a change in the mix between monetary and non-monetary liabilities of banks and, in this sense, it associated with the expansion of bank's non-monetary liabilities.

These results point to the need of carefully monitoring the cross-border element when assessing developments in credit and money. For instance, Shin (2013) argues that the non-core liabilities of banks – and therein especially external ones – are strongly associated with the vulnerability to a crisis. In turn, Hoggarth et al. (2010) discuss how foreign sources of funding are typically more volatile and procyclical than domestic sources and Hoggarth et al. (2013) discuss how foreign affiliates in the UK, which operate mostly using non-resident funding, were more volatile than UK-owned banks once the

crisis erupted.

A Data Appendix

The starting point for the country coverage was the OECD countries. To these I also added a significant number of other countries, mostly Asian and Latin American. Unfortunatelly, for data availibility reasons, the country coverage is smaller than that. The complete list of countries and with the time period for which data is available is in Table 3. This list is the intersection of the data availability across the three variables: credit, money and capital flows. More details for the different variables are provided in the next subsections.

A.1 Credit and money aggregates

The data for credit and money aggregates is taken from the IFS CR-ROM August 2012 version.

Starting with credit, I use the claims of depositary corporations on other private sectors available at the IMF IFS dataset (line 22d). For some countries there are breaks in these series, mostly from 2000 to 2001. In these cases, I remove the initial data points and start in 2001 only.

Regarding money aggregates, there are two types in the IFS: the standardized report forms (SRFs) and the national definitions of money (NDMs). For consistency sake, I use the SRFs to the extent possible. I focus on a broad monetary aggregate and choose M3 as default. Whenever it's not available, I use M2. If neither is available in the SRFs, I resort to the NDMs or to other broad money definitions.

Finally, both credit and money series are provided in national currency. I convert them to US dollars using end-period exchange rates, also taken from the IFS dataset.

A.1.1 Euro area countries money aggregates

The ECB compiles and publishes euro area money aggregates which are built using country level data of the individual member states' contributions to both the aggregate and consolidated euro area MFI balance sheet. The contributions are compiled using the euro area wide residency concept, i.e., excluding intra-euro area positions. Therefore, these data are not suited to build individual countries' money aggregates and the ECB as, to my knowledge, euro area national central banks, don't produce and publish alternative data folowing a national residency concept. However, the IMF publishes

depository corporations balance sheet data of euro area member states according to a national residency concept – the same as balance of payments statistics – in the IFS statistics database.

The breakdowns are not exactly the same as the ones the ECB uses to build the euro area aggregates. Specifically, the split between different types of deposits – overnight deposits, deposits with an agreed maturity up to 2 years, deposits redeemable at a period of notice up to 3 months – as well as repurchase agreements is not available. One can nevertheless construct broad money aggregates similar to the Eurosystem's definition for the euro area. In order to get concepts as close as possible to the Eurosystem, I define M2 as the sum of currency in circulation, transferable and other deposits and M3 as M2 plus securities other than shares with a maturity up to two years and money market fund shares. Given the lack of detail within deposits, I ignore M1 (see Table 2).

A.2 Capital flows

I construct the monetary presentation of the balance of payments along the lines of Bê Duc et al. (2008)[11], which basically involves (almost exclusively) applying a sectoral breakdown and distinguishing external transactions of the money-holding sector from those of the money-issuing. Starting with the basic identity of the balance of payments

$$CA + KA + FA + EO = 0 \tag{4}$$

where CA is the current account, KA the capital account, FA the financial account and EO the residual errors and omissions. Breaking the financial account into transactions of the money holding (FAMH) and the issuing sectors (FAMI), we can rewrite the expression as

$$CA + KA + FAMI + FAMH + EO = 0 \tag{5}$$

There are, however, some limitations concerning items for which this breakdown is not available. This is the case of the current and capital accounts, as well as the item errors and omissions, the statistical discrepancy. For these items, Bê Duc et al. (2008), assume that they reflect money-holding

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[11]see also Bank of England (2005)

sectors' transactions. Thus, we can write $NETMI = FAMI$ and $NETMH = FAMH + CA + KA + EO$. Finally, recalling that $NETMI + NETMH = 0$

$$NETMI = \Delta NEA = -CA - KA - FAMH - EO \qquad (6)$$

Total net financial flows can be constructed for the four sectors available - monetary authority, MFIs, general government and other sectors - the outcome could be thought of a financial account for each of them. Net financial flows for the money issuing and money holding sectors are computed as the result of adding, respectively, on the one hand, net flows for the monetary authority and MFIs and, on the other hand, net flows of the general government and other sectors. Further breakdowns are available for equity and debt. Finally, total money-holding sector flows are obtained by adding the current and capital accounts as well as errors and omissions to the financial flows of those sectors. However, given the small magnitude of both the current account and errors and omissions, I abstract from these and focus on financial account flows only and their split into equity and debt instruments.

The data are taken from the IMF balance of payments dataset, from the January 2012 CD ROM version. There are two limitations regarding this dataset. The first is that, although I tried to include all OECD countries, there is a number of countries for which the monetary presentation of the balance of payments can not be calculated, due to the lack of reporting of needed sectoral details – this is mostly the case regarding the sectoral breakdown of portfolio investment. The data availability in Table 3 is, therefore, conditioned to the existence of sufficiently detailed data. The second limitation concerns the FDI category: the split between other sectors and banks is not available for any country, as this was not published by the IMF. However, this shouldn't be a significant caveat since, to a large extent, FDI should be associated to other sectors and not banks. Moreover, by definition, only equity positions of banks should be recorded in FDI, all other types of transactions (mainly loans between affiliates) should be recorded under other investment, which minimizes the impact of the lack of sectoral breakdown in this particular item (see §6.28 of IMF, 2009). To assess whether intra-company loans of other sectors might be influecing results across the equity/debt split, I also constructed an alternative version of the monetary presentation, assuming that these loans are debt and not equity.

A.3   Other variables

- Starting with GDP per capita, GDP data is from the IMF World Economic Outlook and population data from the World Bank.

- On the FX regime, this is a dummy variable constructed using Reinhart and Rogoff's (2009) FX regime classification. Specifically, this classification assigns values from 1 to 4, where 1 corresponds to fully fixed regimes and 4 to floating regimes. I take classifications 1 and 2 as fixed regimes and 3 and 4 as floating. The data are taken from the book's website.

- Data for the local claims used for the proxy on the share of foreign banks in the domestic banking sector are from the BIS consolidated banking statistics, taken from the BIS website. Specifically, these correspond to the local currency claims on local residents by all reporting banks and countries on an immediate borrower basis. The share of foreign banks in the domestic banking sector is obtained by scaling the claims by credit. For the purpose of Table 7, countries with low presence of foreign banks are defined as being below the median value in the 1999-2007 period and high presence of foreign banks are defined as being above. I also explored the data in Claessens and van Horen (2013), who create a database with the nationality of banks in the banking systems of a large sample of countries. With these data, they compute the percentage of foreign banks among total banks. They also develop an indicator of the percentage of foreign bank assets among total bank assets which would be ideal for the purposes of this analysis. However, their indicator only starts in 2004 due to Bankscope data availability. For this reason, I use instead a proxy for foreign banking activity with BIS data.

- Data for the change in net external claims used for the flow measures correlations are from the BIS locational banking statistics, taken from the BIS website. These are claims of domestic residents on foreign residents net of responsibilities of domestic residents to foreign residents by all reporting banks and countries.

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Table 1: Consolidated aggregate MFI balance sheet

Assets	Liabilities
	Broad money
Loans to domestic non-banks	Currency in circulation
	Deposits (liquid)
	Money market fund shares
	Repurchase agreements
	Debt securities (with limited maturity)
Claims on non-residents (external assets)	Financial liabilities to non-residents (external liabilities)
	Deposits and loans received from non-residents
	Non-monetary liabilities
	Longer-term financial liabilities
	Deposits and loans with agreed maturity
	Deposits redeemable at a period of notice of over 3 months
	Capital, reserves and provisions
Other domestic assets	Other liabilities
including fixed assets	including deposits by central government

Table 2: Definition of euro area money aggregates

ECB's definition of euro area money aggregates			
	M1	M2	M3
Currency in circulation	X	X	X
Overnight deposits	X	X	X
Deposits with an agreed maturity up to 2 years		X	X
Deposits redeemable at a period of notice up to 3 months		X	X
Repurchase agreements			X
Money market fund shares/units			X
Debt securities up to 2 years			X

EA countries' monetary aggregates using IFS data		
	M2	M3
Currency in circulation	X	X
Transferable deposits	X	X
Other deposits	X	X
Money market fund shares/units		X
Debt securities up to 2 years		X

Figure 1: Credit, money and cross-border debt flows - Estonia
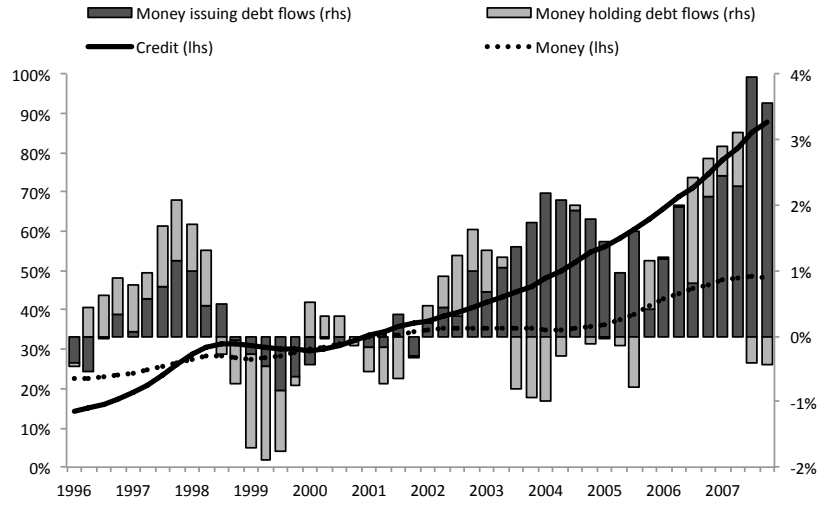
Figure 2: Credit, money and cross-border debt flows - Japan
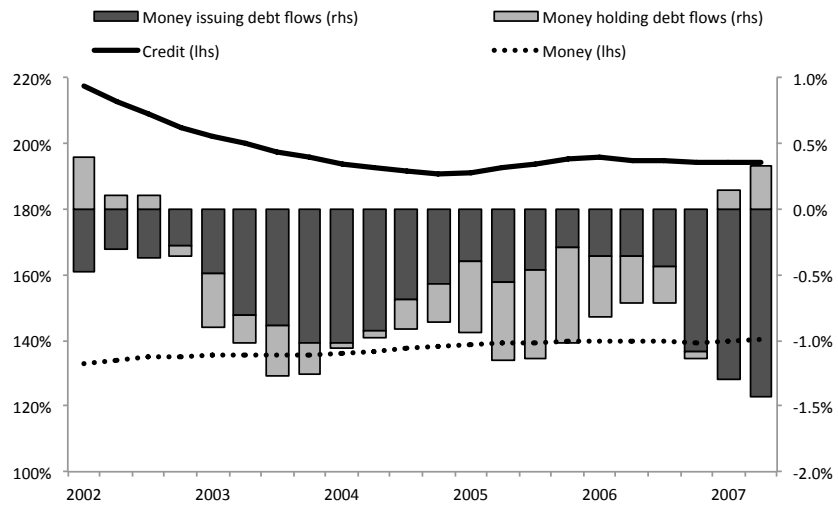
Figure 3: Credit, money and cross-border debt flows - Portugal
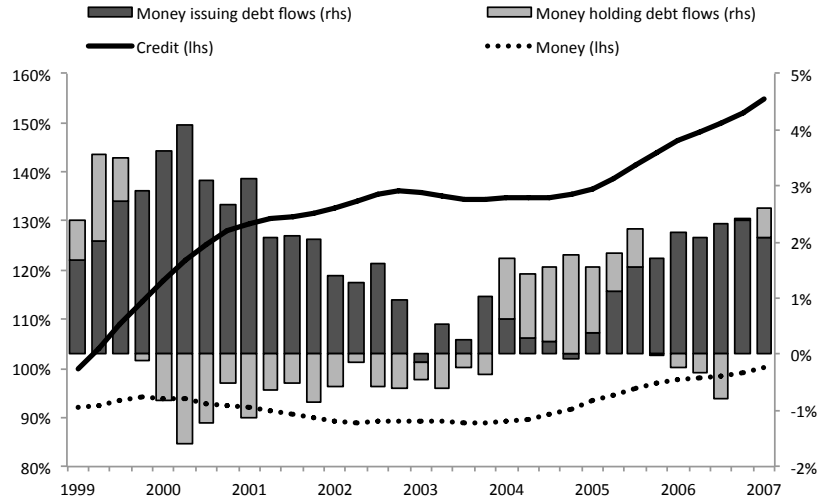
Figure 4: Credit, money and cross-border debt flows - Germany
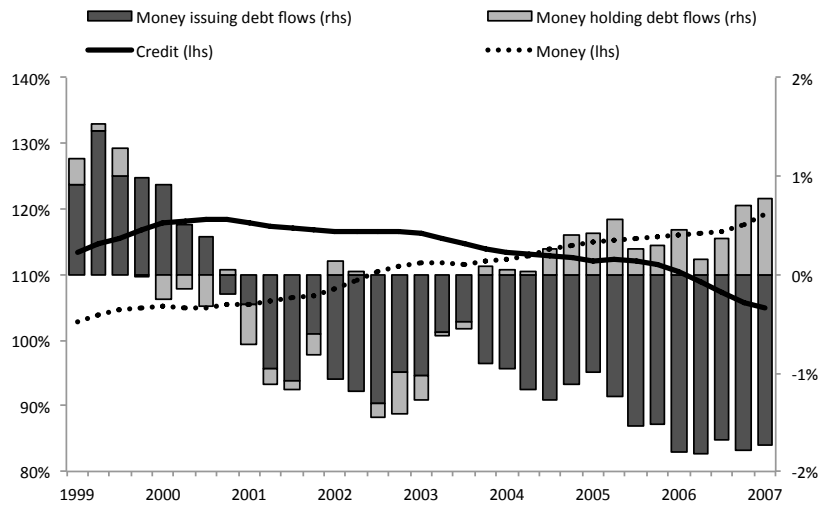
Figure 5: Credit to money ratio growth and net debt of the money-issuing sectors (1999-2003 and 2003-2007)
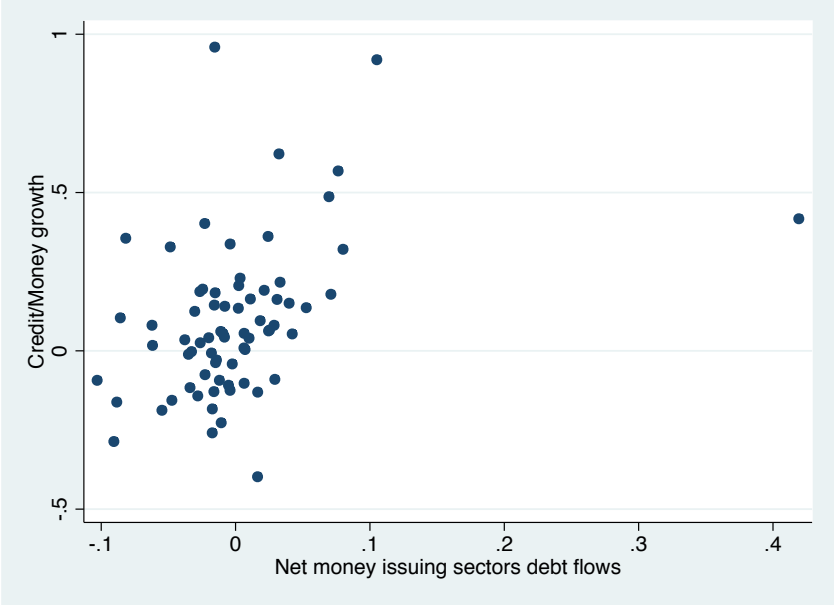
Table 3: Data availability

Country	Initial	Final	Country	Initial	Final
Argentina	1998	2010	Latvia	2003	2008
Australia	1990	2003	Lithuania	1996	2008
Austria	1999	2005	Luxembourg	2003	2010
Bolivia	1997	2010	Malaysia	2002	2009
Brazil	1995	2010	Malta	1995	2007
Bulgaria	1995	2008	Mexico	1996	2010
Canada	2001	2008	Morocco	2003	2009
Chile	1996	2010	Norway	1994	2006
Colombia	1996	2010	Peru	1992	2010
Cyprus	2001	2007	Philippines	1996	2007
Czech Republic	2002	2008	Poland	2000	2008
Denmark	2000	2008	Portugal	1999	2010
El Salvador	2001	2010	Romania	2001	2010
Estonia	1993	2010	Russia	2000	2010
Finland	1999	2006	Slovakia	2000	2008
France	1999	2010	Slovenia	1994	2006
Germany	1999	2010	South Africa	1992	2010
Greece	2001	2010	Spain	1999	2010
Guatemala	1997	2010	Sweden	2001	2008
Hong Kong	2001	2010	Thailand	1997	2010
Hungary	1995	2008	Turkey	1990	2010
Iceland	2000	2007	United Kingdom	1990	2010
Israel	1990	2010	Uruguay	2001	2010
Italy	1999	2010	Vietnam	1996	2010
Japan	2001	2010			

Note: No money aggregates for Israel and Vietnam

Table 4: Broad money aggregates

Country	Source	Series	Country	Source	Series
Argentina	SRF	M3	Latvia	SRF	M3
Australia	SRF	M3	Lithuania	SRF	M2
Austria	Est	M3	Luxembourg	Est	M3
Bolivia	NDM	M'4	Malaysia	SRF	M3
Brazil	SRF	M3	Malta	SRF	M3
Bulgaria	SRF	M3	Mexico	SRF	M3
Canada	NDM	M3 GROSS	Morocco	SRF	M3
Chile	SRF	M3	Norway	SRF	BROAD MONEY(M2)
Colombia	SRF	M3	Peru	SRF	LIQUIDITY
Cyprus	SRF	M2	Philippines	SRF	M3
Czech Republic	SRF	M3	Poland	SRF	M3
Denmark	SRF	M3	Portugal	Est	M3
El Salvador	SRF	M3	Romania	SRF	BROAD MONEY
Estonia	SRF	M2	Russia	SRF	BROAD MONEY
Finland	Est	M3	Slovakia	SRF	M2
France	Est	M3	Slovenia	SRF	M3
Germany	Est	M3	South Africa	SRF	M3
Greece	Est	M3	Spain	Est	M3
Guatemala	SRF	M2	Sweden	SRF	M3
Hong Kong	SRF	M3	Thailand	NDM	BROAD MONEY
Hungary	SRF	M3	Turkey	SRF	M3
Iceland	SRF	M3	United Kingdom	NDM	M4
Israel	-	-	Uruguay	SRF	BROAD MONEY
Italy	Est	M3	Vietnam	-	-
Japan	SRF	M3			

Note: "Est" are author own estimations. No money aggregates for Israel and Vietnam

Table 5: Correlations of capital flow measures - 1999-2007 period

	BIS derived flows
MISSUINGD	0.869
MHOLDINGD	-0.414
MISSUINGE	-0.421
MHOLDINGE	-0.639
CAB	-0.148

MISSUINGD is net debt flows of the money-issuing sectors, MHOLDINGD is net debt flows of the money-holding sectors, MISSUINGE is net equity flows of the money-issuing sectors, MHOLDINGE is net equity flows of the money-holding sectors, CAB is the current account balance.

Table 6: Summary statistics by country group, 1999-2007 period

	C/GDP	M/GDP	C/M	ΔC/GDP	ΔM/GDP	ΔC/M
Total						
N	424	392	384	376	346	338
Mean	0.742	0.737	1.083	0.040	0.026	0.019
SD	0.490	0.510	0.587	0.100	0.084	0.166
OECD						
N	280	266	258	248	235	227
Mean	0.838	0.746	1.194	0.058	0.029	0.035
SD	0.515	0.396	0.660	0.109	0.086	0.186
Non OECD						
N	144	126	126	128	111	111
Mean	0.554	0.719	0.856	0.006	0.019	-0.014
SD	0.375	0.693	0.287	0.068	0.081	0.108
Euro area						
N	72	70	70	64	62	62
Mean	1.025	0.857	1.224	0.063	0.035	0.025
SD	0.316	0.216	0.212	0.096	0.073	0.053
Euro area core						
N	36	36	36	32	32	32
Mean	0.978	0.831	1.189	0.034	0.026	0.011
SD	0.222	0.217	0.104	0.076	0.064	0.051
Euro area periphery						
N	36	34	34	32	30	30
Mean	1.071	0.885	1.261	0.092	0.044	0.041
SD	0.386	0.214	0.283	0.106	0.081	0.051

C/GDP is credit scaled by GDP, M/GDP is money scaled by GDP, C/M is the credit to money ratio.

Table 7: Summary statistics by FX regime and foreign bank presence - 1999-2007 period

	C/GDP	M/GDP	C/M	ΔC/GDP	ΔM/GDP	ΔC/M
Total						
N	424	392	384	376	346	338
Mean	0.742	0.737	1.083	0.040	0.026	0.019
SD	0.490	0.510	0.587	0.100	0.084	0.166
Fixed FX						
N	195	181	180	176	162	161
Mean	0.866	0.855	1.135	0.051	0.035	0.034
SD	0.473	0.592	0.579	0.097	0.092	0.087
Floating FX						
N	226	211	204	198	184	177
Mean	0.639	0.636	1.036	0.031	0.018	0.005
SD	0.482	0.401	0.591	0.103	0.076	0.213
High share foreign banks						
N	213	208	200	198	189	185
Mean	0.639	0.749	0.906	0.027	0.021	0.021
SD	0.445	0.581	0.448	0.078	0.083	0.095
Low share foreign banks						
N	211	184	184	178	157	153
Mean	0.846	0.724	1.275	0.056	0.031	0.016
SD	0.513	0.416	0.656	0.119	0.086	0.224

C/GDP is credit scaled by GDP, M/GDP is money scaled by GDP, C/M is the credit to money ratio.

Table 8: Credit to money growth - Terciles

	1999-2003			2003-2007		
	Tercile 1	Tercile 2	Tercile 3	Tercile 1	Tercile 2	Tercile 3
C/GDP	-0.051	0.151	0.270	0.018	0.135	0.385
M/GDP	-0.023	0.164	0.131	0.063	0.060	0.102
C/M	-0.129	0.035	0.223	-0.103	0.065	0.328
MISSUINGD	-0.120	-0.002	0.011	-0.028	-0.010	0.027
MHOLDINGD	0.004	0.015	0.005	-0.004	0.005	0.017
MISSUINGE	0.000	-0.000	0.000	0.000	0.000	-0.001
MHOLDINGE	0.017	0.010	0.004	0.007	0.022	0.021
CAB	-0.010	-0.011	-0.041	0.016	-0.026	-0.077
FX	3	1.5	1	3	3	1
SFOREIGN	0.229	0.218	0.122	0.214	0.234	0.327

Note: countries divided into terciles according to the ratio of credit to money growth in the 1999- 2003 and 2003-2007 period. Countries in the first tercile have the slowest growth whereas those in the third tercile have the fastest growth. Figures presented are the median values within each of the three terciles for both periods. C/GDP is credit scaled by GDP, M/GDP is money scaled by GDP, C/M is the credit to money ratio, MISSUINGD is net debt flows of the money-issuing sectors, MHOLDINGD is net debt flows of the money-holding sectors, MISSUINGE is net equity flows of the money-issuing sectors, MHOLDINGE is net equity flows of the money-holding sectors, CAB is the current account balance, FX is a dummy for the FX regime, SFOREIGN is the share of foreign banks in total bank assets.

Table 9: Credit regressions

	99-03	99-03	03-07	03-07	Pooled	Pooled
$CREDIT_0$	-0.07	0.04	0.03	0.06	-0.05	-0.02
	(0.10)	(0.10)	(0.09)	(0.08)	(0.06)	(0.05)
Log(GDPpc)	0.07*	-0.04	0.03	-0.08	0.06*	-0.01
	(0.04)	(0.04)	(0.06)	(0.05)	(0.03)	(0.03)
SFOREIGN	-0.42**	-0.14	-0.16**	-0.07	-0.23***	-0.11**
	(0.16)	(0.11)	(0.07)	(0.06)	(0.07)	(0.05)
FX	-0.00	0.04	-0.08	-0.01	-0.04	0.02
	(0.07)	(0.05)	(0.09)	(0.04)	(0.06)	(0.04)
NOECD	-0.09	-0.15**	-0.05	-0.12	-0.07	-0.10**
	(0.08)	(0.06)	(0.11)	(0.09)	(0.06)	(0.05)
CAB	-1.12		-2.40**		-1.86***	
	(0.87)		(0.94)		(0.68)	
MISSUINGD		2.21*		2.45***		2.23***
		(1.25)		(0.69)		(0.50)
MHOLDINGD		1.84		2.32*		2.09***
		(1.10)		(1.24)		(0.72)
MISSUINGE		8.31		-1.20		0.92
		(11.66)		(2.81)		(2.74)
MHOLDINGE		-2.96**		0.18		-0.34
		(1.18)		(0.74)		(0.60)
99-03					-0.07*	-0.07*
					(0.04)	(0.04)
Constant	-0.37	0.58	-0.03	0.86*	-0.22	0.39
	(0.37)	(0.36)	(0.51)	(0.44)	(0.30)	(0.27)
Obs	41	40	46	44	87	84
R squared	0.44	0.66	0.46	0.76	0.42	0.64

Robust standard errors in parenthesis. ***, **, * denote significance at 1, 5 and 10 percent levels respectively. $CREDIT_0$ is the initial credit/GDP ratio, Log(GDPpc) is log GDP per capita, SFOREIGN is the share of foreign banks in total bank assets, FX is a dummy for the FX regime, NOECD is a dummy for non-OECD countries, CAB is the current account balance, MISSUINGD is net debt flows of the money-issuing sectors, MHOLDINGD is net debt flows of the money-holding sectors, MISSUINGE is net equity flows of the money-issuing sectors, MHOLDINGE is net equity flows of the money-holding sectors, 99-03 is a dummy for the 1999-2003 period.

Table 10: Money regressions

	99-03	99-03	03-07	03-07	Pooled	Pooled
$MONEY_0$	0.03	0.07*	-0.00	0.03	0.01	0.04
	(0.04)	(0.04)	(0.07)	(0.08)	(0.07)	(0.06)
Log(GDPpc)	0.04	0.04	0.08**	-0.01	0.06**	-0.01
	(0.02)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)
SFOREIGN	-0.11	-0.11	0.03	0.04	-0.00	0.03
	(0.08)	(0.08)	(0.06)	(0.06)	(0.05)	(0.05)
FX	-0.01	-0.02	0.04	0.09*	0.03	0.07*
	(0.03)	(0.03)	(0.05)	(0.05)	(0.03)	(0.04)
NOECD	-0.07	-0.06	0.19*	0.02	0.08	-0.01
	(0.05)	(0.05)	(0.11)	(0.10)	(0.07)	(0.06)
CAB	-0.89***		-0.93***		-0.79***	
	(0.29)		(0.31)		(0.27)	
MISSUINGD		0.03		-0.17		0.02
		(0.37)		(0.60)		(0.32)
MHOLDINGD		1.22**		1.81**		1.40***
		(0.45)		(0.86)		(0.52)
MISSUINGE		2.82		-1.25		-0.36
		(3.75)		(2.18)		(1.78)
MHOLDINGE		0.74		-1.39		-1.15*
		(0.57)		(0.91)		(0.68)
99-03					0.01	0.01
					(0.02)	(0.02)
Constant	-0.21	-0.26	-0.77*	0.12	-0.49*	0.09
	(0.22)	(0.24)	(0.40)	(0.40)	(0.29)	(0.24)
Obs	29	28	45	43	74	71
R squared	0.64	0.67	0.25	0.43	0.23	0.40

Robust standard errors in parenthesis. ***, **, * denote significance at 1, 5 and 10 percent levels respectively. $MONEY_0$ is the initial money/GDP ratio, Log(GDPpc) is log GDP per capita, SFOREIGN is the share of foreign banks in total bank assets, FX is a dummy for the FX regime, NOECD is a dummy for non-OECD countries, CAB is the current account balance, MISSUINGD is net debt flows of the money-issuing sectors, MHOLDINGD is net debt flows of the money-holding sectors, MISSUINGE is net equity flows of the money-issuing sectors, MHOLDINGE is net equity flows of the money-holding sectors, 99-03 is a dummy for the 1999-2003 period.

Table 11: Credit to money ratio regressions

	99-03	99-03	03-07	03-07	Pooled	Pooled
$CREDIT/MONEY_0$	0.07	-0.01	0.08	-0.02	0.06	-0.01
	(0.21)	(0.20)	(0.06)	(0.09)	(0.05)	(0.07)
Log(GDPpc)	-0.02	-0.07	-0.09*	-0.07	-0.07*	-0.07
	(0.07)	(0.06)	(0.05)	(0.08)	(0.04)	(0.05)
SFOREIGN	-0.22	-0.17	0.04	0.02	-0.00	-0.01
	(0.25)	(0.23)	(0.09)	(0.09)	(0.07)	(0.07)
FX	0.03	0.06	-0.00	0.01	0.02	0.03
	(0.07)	(0.09)	(0.07)	(0.07)	(0.05)	(0.06)
NOECD	-0.24*	-0.24*	-0.22*	-0.14	-0.24***	-0.23**
	(0.13)	(0.14)	(0.11)	(0.18)	(0.08)	(0.11)
CAB	-1.15		-1.74***		-1.40***	
	(0.92)		(0.55)		(0.50)	
MISSUINGD		2.81**		2.87***		1.97**
		(1.33)		(1.05)		(0.84)
MHOLDINGD		2.20		-0.48		0.62
		(1.87)		(1.01)		(1.02)
MISSUINGE		-0.91		1.84		2.19
		(14.01)		(4.11)		(4.72)
MHOLDINGE		-1.31		2.13*		1.10
		(1.41)		(1.06)		(0.77)
99-03					-0.07	-0.10*
					(0.05)	(0.06)
Constant	0.27*	0.80*	0.91*	0.80	0.69	0.81*
	(0.43)	(0.46)	(0.52)	(0.82)	(0.36)	(0.45)
Obs	29	28	44	42	73	70
R squared	0.48	0.57	0.45	0.51	0.43	0.44

Robust standard errors in parenthesis. ***, **, * denote significance at 1, 5 and 10 percent levels respectively. $CREDIT/MONEY_0$ is the initial credit/money ratio, Log(GDPpc) is log GDP per capita, SFOREIGN is the share of foreign banks in total bank assets, FX is a dummy for the FX regime, NOECD is a dummy for non-OECD countries, CAB is the current account balance, MISSUINGD is net debt flows of the money-issuing sectors, MHOLDINGD is net debt flows of the money-holding sectors, MISSUINGE is net equity flows of the money-issuing sectors, MHOLDINGE is net equity flows of the money-holding sectors, 99-03 is a dummy for the 1999-2003 period.

Table 12: Pooled data regressions - Fixed effects

	CREDIT	MONEY	CREDIT/MONEY
$CREDIT_0$	-0.61***		
	(0.17)		
$MONEY_0$		-0.86**	
		(0.39)	
$CREDIT/MONEY_0$			-0.93***
			(0.22)
Log(GDPpc)	0.09	0.08	-0.18
	(0.09)	(0.14)	(0.17)
SFOREIGN	0.03	-0.00	0.08
	(0.09)	(0.10)	(0.11)
FX	-0.10		
	(0.08)		
MISSUINGD	2.73***	0.85	3.84***
	(0.56)	(1.02)	(1.02)
MHOLDINGD	2.80***	2.16**	1.07
	(0.85)	(0.88)	(0.89)
MISSUINGE	-0.35	0.44	-6.30
	(3.83)	(3.91)	(4.11)
MHOLDINGE	1.11*	-0.51	2.17**
	(0.63)	(0.79)	(0.77)
99-03	-0.10***	-0.06	-0.09**
	(0.03)	(0.05)	(0.04)
Constant	-0.15	-0.02	2.62*
	(0.73)	(1.23)	(1.37)
Obs	84	71	70
R squared (overall)	0.17	0.00	0.03

Robust standard errors in parenthesis. ***, **, * denote significance at 1, 5 and 10 percent levels respectively. $CREDIT_0$ is the initial credit/GDP ratio, $MONEY_0$ is the initial money/GDP ratio, $CREDIT/MONEY_0$ is the initial credit/money ratio, Log(GDPpc) is log GDP per capita, SFOREIGN is the share of foreign banks in total bank assets, FX is a dummy for the FX regime, NOECD is a dummy for non-OECD countries, MISSUINGD is net debt flows of the money-issuing sectors, MHOLDINGD is net debt flows of the money-holding sectors, MISSUINGE is net equity flows of the money-issuing sectors, MHOLDINGE is net equity flows of the money-holding sectors, 99-03 is a dummy for the 1999-2003 period.

Table 13: Credit to money ratio regressions - alternative flow specification

	99-03	99-03	03-07	03-07	Pooled	Pooled
$CREDIT/MONEY_0$	0.07	-0.06	0.08	0.02	0.06	-0.00
	(0.21)	(0.24)	(0.06)	(0.08)	(0.05)	(0.07)
Log(GDPpc)	-0.02	-0.05	-0.09*	-0.07	-0.07*	-0.06
	(0.07)	(0.08)	(0.05)	(0.07)	(0.04)	(0.04)
SFOREIGN	-0.22	-0.18	0.04	0.03	-0.00	-0.02
	(0.26)	(0.26)	(0.09)	(0.09)	(0.07)	(0.07)
FX	0.03	0.05	-0.00	-0.01	0.02	0.03
	(0.07)	(0.10)	(0.07)	(0.07)	(0.05)	(0.06)
NOECD	-0.24*	-0.21	-0.22*	-0.12	-0.24***	-0.22**
	(0.13)	(0.15)	(0.11)	(0.17)	(0.08)	(0.11)
CAB	-1.15		-1.74***		-1.40***	
	(0.92)		(0.55)		(0.50)	
MISSUINGD		2.77**		3.34***		2.32***
		(1.37)		(0.96)		(0.87)
MHOLDINGD		1.66		-0.17		0.36
		(1.75)		(0.63)		(0.73)
MISSUINGE		-3.73		2.18		2.23
		(14.31)		(3.09)		(3.80)
MHOLDINGE		-0.74		3.07***		1.73*
		(1.67)		(1.01)		(0.91)
99-03					-0.07	-0.11*
					(0.05)	(0.06)
Constant	0.27	0.58	0.91*	0.72	-0.69*	0.74*
	(0.43)	(0.49)	(0.52)	(0.73)	(0.36)	(0.43)
Obs	29	28	44	42	73	70
R squared	0.48	0.52	0.45	0.54	0.43	0.45

Robust standard errors in parenthesis. ***, **, * denote significance at 1, 5 and 10 percent levels respectively. $CREDIT/MONEY_0$ is the initial credit/money ratio, Log(GDPpc) is log GDP per capita, SFOREIGN is the share of foreign banks in total bank assets, FX is a dummy for the FX regime, NOECD is a dummy for non-OECD countries, CAB is the current account balance, MISSUINGD is net debt flows of the money-issuing sectors, MHOLDINGD is net debt flows of the money-holding sectors, MISSUINGE is net equity flows of the money-issuing sectors, MHOLDINGE is net equity flows of the money-holding sectors, 99-03 is a dummy for the 1999-2003 period.