Global Liquidity through the Lens of Monetary Aggregates

Kyuil Chung, Jong-Eun Lee, Elena Loukoianova, Hail Park, and Hyun Song Shin

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Prepared by Kyuil Chung, Jong-Eun Lee, Elena Loukoianova, Hail Park, and Hyun Song Shin[1]

Abstract

This paper examines how the financial activities of non-financial corporations (NFCs) in international markets potentially affects domestic monetary aggregates and financial conditions. Monetary aggregates reflect, in part, the activities of NFCs, who channel capital market financing into the domestic banking system, thereby influencing funding conditions and credit availability. Periods of capital inflows are also those when the domestic currency is appreciating, and such periods of rapid exchange rate appreciation coincide with increases in the central bank's foreign exchange reserves, increasing the stock of narrow money. The paper examines economic significance of cross-country panel data on monetary aggregates and other measures of non-core bank liabilities. Non-core liabilities that reflect the activities of NFCs reflect broad credit conditions and predict global trade and growth.

JEL Classification Numbers: E51, F30, F33

Keywords: Corporate deposits, money supply, offshore bond issuance

Author's E-Mail Address: eloukoianova@imf.org, hsshin@princeton.edu, kichung@bok.or.kr, ljongeun@sejong.ac.kr, bluechip@bok.or.kr

[1] Kyuil Chung and Hail Park are at the Bank of Korea, Jong-Eun Lee is at Sejong University, Elena Loukoianova is at Statistics Department, IMF, and Hyun Song Shin is at Princeton University. The authors would like to thank Luca Errico, Yuka Hashimoto, Robert Heath, Lev Ratnovski, and two anonymous referees for their valuable comments; Hanan AbuShanab—for research assistantship; and to express special gratitude to Laurent Meister for handling data management.

I. INTRODUCTION

The external financial environment is an important backdrop in discussions about real activity and financial stability. The sensitivity to external financial conditions is most apparent for economies with open capital markets, but it also applies to economies that have open trade sectors, but not necessarily a fully open and liberalized financial system, as is the case in many emerging economies.

The purpose of this paper is to examine the relationship between certain bank liability aggregates and global financial conditions. Traditionally, bank liability aggregates have been identified with monetary aggregates and have been associated with macroeconomic outcomes through the transactions role of money and the quantity theory of money (Friedman, 1956).[2]

In contrast, our approach in this paper is to view bank liability aggregates as the liabilities side counterparts to banking sector assets, and to focus on questions of credit availability and financial vulnerability. Rapid credit growth is an important indicator of potential financial vulnerability. Normalized measures of total credit—such as the credit to GDP ratio—have taken on increasing importance as indicators of financial vulnerability (Borio and Lowe (2002, 2004), Basel Committee on Banking Supervision (2009)).

More specifically, we address two related sets of questions:

- What are the determinants of domestic liquidity as measured by domestic NFC deposits? How does domestic liquidity depend on global factors? What are the differences across narrow and broad money aggregates? How do countries differ with respect to their sensitivity to global factors?

- How does global liquidity vary with global economic activity? How does global liquidity affect growth, trade and other measures of economic activity across countries? How useful is global liquidity as a measure of global economic activity?

To the extent that measures of bank liabilities also convey information on the size of the banking sector balance sheet, bank liabilities may also serve a useful role as a measure of financial vulnerability. As a measurement exercise, the balance sheet of the banking sector

[2] Monetary aggregates as an intermediate target for monetary policy based on the transactions role of money has been ignored in central banks community and academia due to the unstable money demand which was triggered by financial liberalization in 1980s. Many central banks have instead adopted a short-term interest rate as a new policy instrument since then. However, the close relationship between credit and asset prices (more broadly financial vulnerability), which was clearly present over the crisis period in 2008, reminded us the importance of paying a renewed attention to money's role.

can be measured either in terms of the assets or in terms of the liabilities. Nevertheless, there are factors that may favor measures of the liabilities side when attempting to gauge overall financial conditions.

Bank liabilities tend to be more transparent and homogenous than bank assets. Liabilities tend to be short term—mainly in the form of deposits—and hence the book values of liabilities are close to their marked-to-market values. In addition, liabilities can more easily be organized by category into core and non-core liabilities that have contrasting cyclical properties. Non-core liabilities exhibit greater procyclicality so that the ratio of non-core to core liabilities conveys useful information as an early warning indicator of financial vulnerability (Hahm, Shin, and Shin (2013)).

Most importantly for the purposes of our paper, there is a further possible advantage of liability side measures in that they convey information on the global dimension to financial conditions and the transmission of financial conditions across borders. These advantages may be especially important for developing and emerging economies that have restricted capital accounts, but relatively more open trade accounts. In this type of economies, interest rates and various spreads may not provide any useful information, therefore tracking these variables may be irrelevant.

Our main hypothesis is that the money aggregate associated with the claims of NFCs on the banking sector is closely correlated with financial conditions facing firms operating across borders, and hence will be correlated with global economic activity. Considering that this paper is the first step to explore a new role of monetary aggregates that has been ignored for a long time in economics profession, we want to show correlation between these variables, and not any type of causality at this stage. Our study relies on the monetary series compiled under the IMF's International Financial Statistics and Standardized Reporting Forms (SRFs), which have the advantage of providing a consistent set of definitions that can be applied across countries. In contrast, any study that relies on the self-reported monetary aggregates under the more traditional classifications such as M0, M2, etc., will be subject to national definitions that preclude meaningful cross-country comparison.

At the same time, we highlight three problems with the data that deserve further attention. First, although monetary statistics have a long history, our experience during this study is that they have been neglected by some countries in recent years, so that some series are subject to discontinuities and unexplained jumps. Second, and perhaps more important, a number of key countries (both advanced and emerging) do not share key monetary data with the IMF through the SRFs that would contribute to the assessment of overall global vulnerabilities. Third, the SRF granular data series (such as NFC deposits) for all SRF-reporting countries go

back only to December 2001,[3] which therefore unfortunately restricts the length of the time series in our analysis. One of the purposes of our paper is to show the potential usefulness of the data, so as to spur further discussion on the merits of timely sharing of aggregate data that have the attributes of a global public good.

The study of global monetary aggregate echoes the project outlined by McKinnon (1982), but with a very different rationale. McKinnon (1982) proposed a global monetary aggregate in a monetarist framework with a stable demand for global money due to the possibility of substitution between currencies. For us, the role of the money stock serves as an indirect indicator of global credit conditions, when the cross-border activity of NFCs makes the direct measurement of corporate credit through standard location measures of external indebtedness less meaningful. Again, we do not track interest rates and various spreads, because these may not reflect monetary conditions in less developed countries (and may not even exist for some countries). In addition, after the recent financial crisis, market conditions are still distorted in most advanced countries, especially those with unconventional monetary policies. Therefore, interest rates and spreads may not fully reflect true situation in the economies.

The paper is organized as follows. Section II discusses conceptual and measurement issues. Section III describes the data that are used in the paper. Section IV focuses on the global liquidity as an activity indicator, discussing how global liquidity is correlated with real GDP growth, imports, and exports. Sections V and VI discuss the determinants of the NFC deposits and relationship to conventional monetary aggregates respectively. Finally, section VII provides some policy implications.

II. Conceptual and Measurement Issues

Measurement in international finance traditionally starts from national income accounting, which is aimed at measuring aggregate output within a well-defined "boundary" of some kind – not necessarily a national border, but which often coincides with the national border. The principle of measurement is based on residence, rather than nationality. So, even if a firm is headquartered elsewhere, if the firm conducts its business within the boundary, then it is counted as part of the aggregate activity.

The "boundary" defined above also serves two other roles in the international finance literature.

- The boundary is also taken to define the decision making unit. For instance, the residents within the boundary may be deemed to follow behavior that can be summarized by an aggregate consumption and investment function. In particular, the balance sheet of

[3] Some SRF-reporting countries started reporting granular data even later than December 2001.

the decision making unit is defined by the boundary set by national income accounting. Thus, capital flows are defined by reference to the increases in assets and liabilities of those inside the boundary and those outside. Capital inflow is defined as the increase in the liabilities of residents to non-residents, and so on.

- The boundary also often defines the exchange rate between two currencies in the literature. In the textbook models, the nominal exchange rate is defined as the price of one currency relative to another. Thus, implicitly, monetary policy by the central bank within the boundary affects the residents within the boundary itself in the first instance. To the extent that monetary policy has spillover effects, they may be captured either through the current account and trade balances, or they may be captured through capital inflows and outflows measured in residence terms.

Thus, to reiterated, the "boundary" in international finance serves three roles. First, it is the boundary relevant for national income accounting. Second, it is the boundary that defines the balance sheet of decision makers. Third, it is the boundary that defines what is domestic (or local) currency and what is foreign currency.

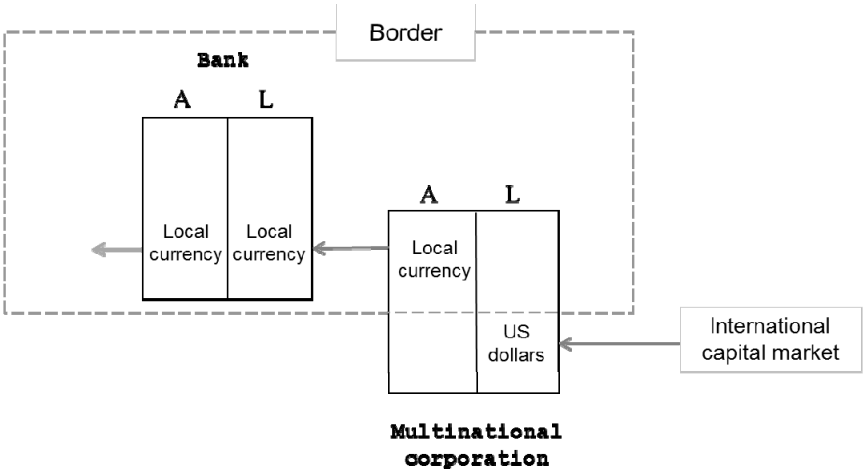
The coincidence between these three notions of the boundary were formulated and refined in the immediate post-war years. Arguably, the coincidence between the three boundaries was a good approximation of the state of affairs at the time, given the restrictions on cross-border capital mobility. However, with the advent of financial globalization, the coincidence between the three notions of the boundary has come increasingly under strain. The BIS paper (2012) gives an introduction to the conceptual distinctions in measurement of international financial positions.

Our approach in this paper is to motivate in part by the recognition that the traditional role of the boundary that defines national income may not be the most informative in understanding events in global financial markets. The advantage of liabilities measures derives from the role of NFCs whose activity "straddles" the border in a sense to be made precise below, and whose activities are not easily monitored through the usual external debt measures that use the locational definitions that underpin the balance of payments statistics and national income statistics.

We now elaborate the balance sheet operation of multinational corporations and check their cross-border activities with international debt statistics from BIS. The market stresses faced by many emerging market (EM) economies in the face of tighter global monetary conditions in 2013 have focused attention on the transmission of monetary shocks from advanced economies to EM economies. However, one conceptual challenge has to reconcile what appears to be the small net external debt position of many EM economies with the apparently disproportionate impact of tighter global monetary conditions on their currencies and financial markets.

One piece in the puzzle may be the role of NFCs that operate across borders. When corporate activity straddles the border, measuring exposures at the border itself may not capture the strains on corporate balance sheets. **Figure 1** illustrates a multinational corporation which borrows in U.S. dollars through its overseas subsidiary either from a global bank or from the corporate bond market. The proceeds of the borrowing could either be sent to headquarters directly, in which case the balance of payments would show a net capital inflow in the form of greater external liabilities of the headquarters.

Figure 1: Non-bank firm as surrogate intermediary



Multinational corporation -> Headquarter of multinational corporation

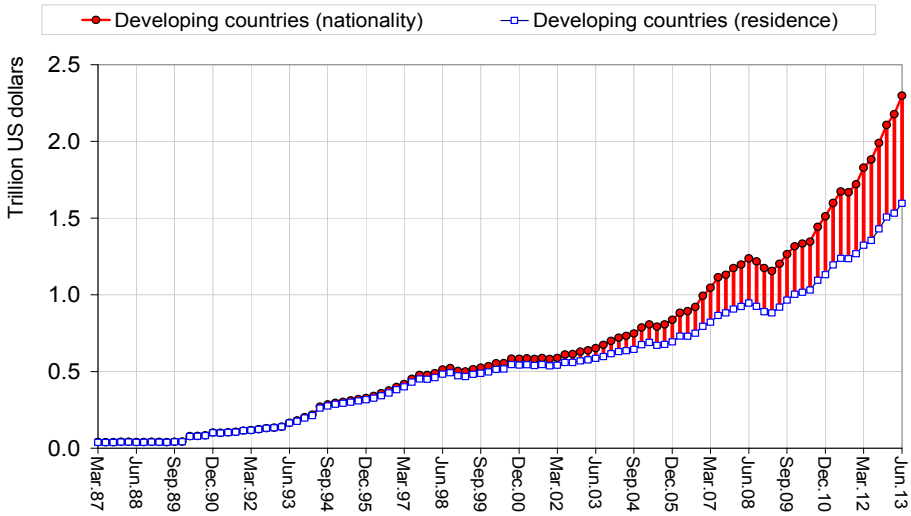
More interestingly, the same type of capital flow may be achieved even if external borrowing is restricted by regulation. The overseas subsidiary may defray the group's costs using the dollars borrowed overseas, but the firm may accumulate local currency deposits in the home country. The intra-group accounts would keep track of the claims of the subsidiary on headquarters, but the accumulation of claims may take place through the day-to-day operation of the firm rather than an explicit financial transaction that is classified as a capital inflow item on the balance of payments.

The practice of offshore issuance of debt securities by overseas subsidiaries of EM firms means that the standard external debt measures that are compiled on a residence basis may not fully reflect the true underlying vulnerabilities that are relevant for explaining behavior. If the overseas subsidiary of a company from an EM country has taken on U.S. dollar debt, but the company is holding domestic currency financial assets at its headquarters, then the company as a whole faces a currency mismatch and will be affected by currency movements between the funding currency and the domestic currency, even if no currency mismatch is captured in the official net external debt statistics.

Nevertheless, the firm's fortunes (and hence its actions) will be sensitive to currency movements and thus foreign exchange risk. In effect, the firm will be taking on a carry trade position, holding cash in local currency but with dollar liabilities in their overseas subsidiary. One motive for taking on such a carry trade position may be to hedge export receivables. Alternatively, the carry trade position may be motivated by the prospect of financial gain if the domestic currency is expected to strengthen against the dollar. In practice, however, the distinction between hedging and speculation may be difficult to draw.

For these reasons, in the case of firms that straddle borders, it may be more illuminating to look at the consolidated balance sheet that motivates corporate treasurers, rather than the balance of payments statistics that are organized according to residence. The offshore issuance of debt securities by EM firms has proceeded at great pace in recent years, as documented in the recent BIS Quarterly Review (McCauley, Upper and Villar (2013)).

Figure 2: International debt securities outstanding (all borrowers) of developing countries by nationality and residence of the borrower

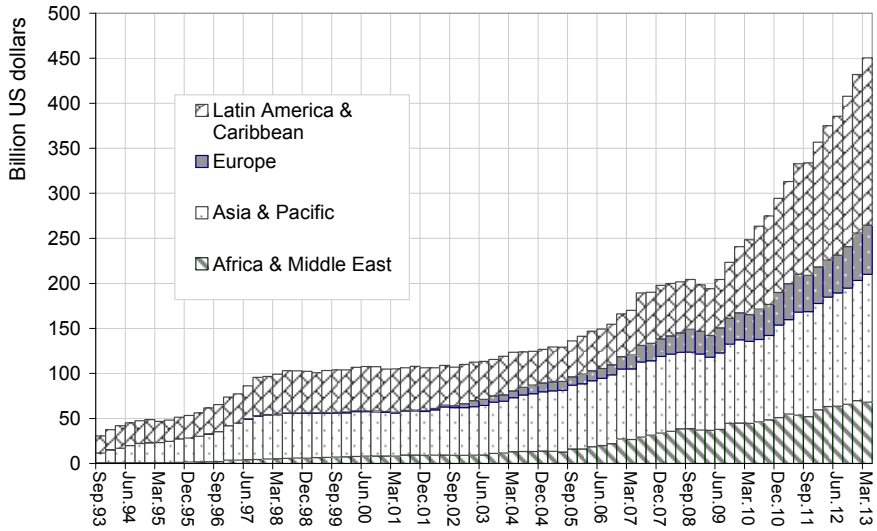


Source: BIS securities database Tables 11A and 12A

Figure 2 plots the international debt securities outstanding of borrowers from developing countries as defined by the BIS, plotted by residence and by nationality. The difference between the nationality and residence series is accounted for the offshore issuance of international debt securities. The difference remained small until after the global financial crisis, but since has widened. The gap stood at US$701 billion at the end of June, 2013. Whereas **Figure 2** is the amounts outstanding for all types of borrowers, **Figure 3** plots the international debt securities outstanding of the NFCs only, arranged by region of borrower. We see that the amounts outstanding have increased after the financial crisis for all regions, but especially for Latin America.

Our observations on the cross-border activity of firms are relevant for the discussion of measuring liquidity aggregates. For firms that straddle the border, their financial activities are likely to leave an imprint on the domestic financial system hosting the headquarters. **Figure 1** illustrated the case where the firm issues debt offshore in foreign currency but accumulates liquid financial assets in domestic currency in the form of claims on domestic banks in the headquarters country. Thus, keeping track of the corporate deposits of the firm will give an indirect indication of the overseas financial activities of the firm, and hence the broad financial conditions that prevail in international capital markets. When global credit conditions are permissive, we may expect to see such conditions being reflected in an increase in corporate deposits during periods when the firm takes on greater debt.

Figure 3: NFC international debt securities outstanding of developing economies by nationality of issuer



Source: BIS Debt Securities Statistics, Table 12D.

As the firm will be borrowing more during periods of permissive financial conditions in international capital markets, we would expect to see the conjunction of both the increased indebtedness of the firm on the consolidated balance sheet and a greater holding of cash and short-term investments at the same time. In other words, firms' financial assets and financial liabilities will increase together, as verified in Shin and Zhao (2013). In this way, the greater claims of the NFCs on the domestic banking system may reflect the indirect impact of more permissive financial conditions globally. Also, to the extent that there is a global factor that drives global financial conditions, we would expect the claims of NFCs globally to fluctuate in line with global financial conditions. In this way, measures of the liabilities side of banks' balance sheets may be a superior indicator of overall credit conditions than tracking the asset side as a whole.

III. First Look at the Data

In this section, we will first define our new monetary aggregates and then explore some key characteristics of the new monetary aggregates. We examine the monetary aggregate *L*, which is defined as the sum of deposits of NFCs in the banking system ("other depository corporations" (ODCs)). The deposits of NFCs consist of transferable and other deposits included in the measure of broad money, as well as transferable and other deposits excluded from the definition of broad money.[4] Our measurement of *L* draws on the information contained in the standardized reporting forms (SRFs) submitted by individual country monetary authorities to the IMF and then used to aggregate data for publication in the International Financial Statistics (IFS). The list of countries in our sample is presented in Appendix 2.

Ideally, our aggregate *L* should encompass the claims of NFCs on money market funds (MMFs) and other short-term claims in the shadow banking system. Unfortunately, the data reported in the SRFs are not sufficiently detailed to compile MMF claims for more than a handful of countries, and so we only include deposits in the regulated banking sector when constructing *L*.

Indeed, the quality of the monetary statistics available through the SRFs is uneven across countries, reflecting in part the prolonged period of neglect of monetary statistics in general. We return to this issue later in our paper, as many of the data gaps could easily be remedied by reinstating data series that were previously collected by central banks, but abandoned in more recent years.

Having obtained the *L* series for each country, we then examine the properties of the sum of *L* aggregated across countries, which we dub *GL,* which stands for "Global Liquidity." As we see below, the currency in which *GL* is measured matters greatly for the information value contained in the measure. The U.S. dollar *GL* measure is defined as

$$GL_{USD} = \sum_{j} \frac{L_j}{\text{Price of U.S. dollars in currency of country } j}$$

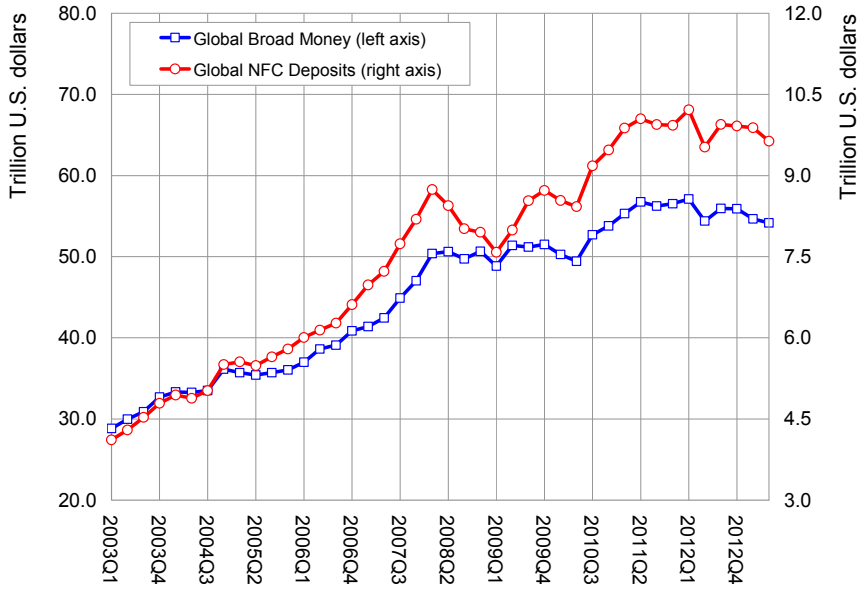
In other words, the U.S. dollar global liquidity measure GL_{USD} is defined as the global aggregate where the U.S. dollar amount of each country's *L* aggregate is summed up as a single aggregate. GL_{USD} variable is analogous to McKinnon's (1982) global money stock

[4] The breakdown of the NFC deposits follows the methodology and classification of the *Monetary and Financial Statistics Manual* (IMF, 2000), http://www.imf.org/external/pubs/ft/mfs/manual/index.htm; and the *Monetary and Financial Statistics Compilation Guide* (IMF, 2008), http://www.imf.org/external/pubs/ft/cgmfs/eng/index.htm.

measure, but where the underlying quantities at the country level are the NFC claims, rather than the money stock as a whole.

We now examine the relationship between our new monetary aggregates and traditional ones, the importance of currency unit for measuring GL, and the cyclical nature of new monetary aggregates. **Figure 4** plots the total stock of the U.S. dollar global liquidity measure. The two series are measured on different axes. The axis measuring global NFC deposits is set at 15 percent of the global broad money variable. We see that until around 2004, our global liquidity measure *GL* did not exceed 15 percent of the global broad money measure, but since then, the gap between *GL* and global broad money has opened up, indicating that NFC deposits have become a larger proportion of global broad money than previously. The only exception is the period during the recent crisis, when *GL* fell sharply.

Figure 4: Global Broad Money (M2) and U.S. Dollar Global Liquidity *GL* of global NFC deposits (in Trillion of US$) 2002Q1-2013Q2

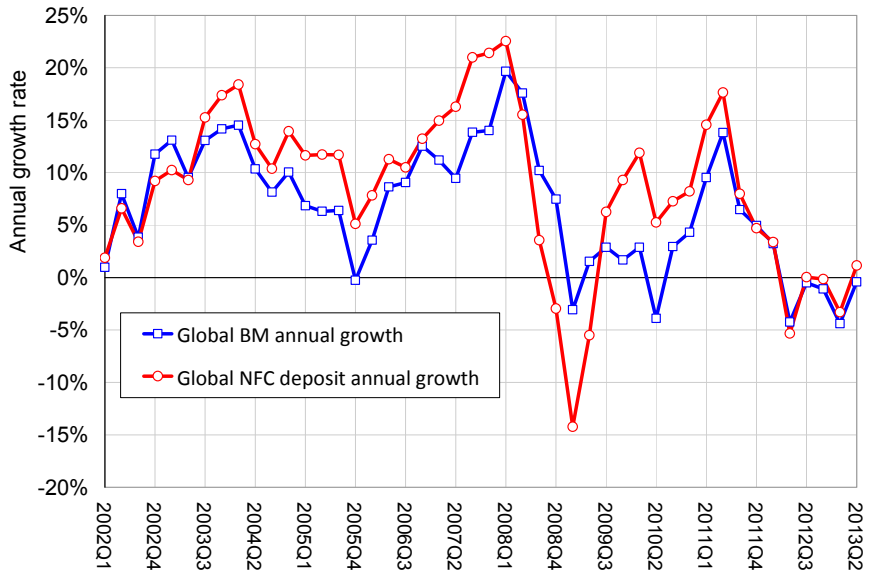


Source: International Financial Statistics, IMF.

Error! Not a valid bookmark self-reference. shows the annual growth rates of *GL* and global broad money so as to see the fluctuations more clearly. Notice how the *GL* measure displays a highly procyclical pattern, tracking the upswing before the global financial crisis, the sharp decline with the onset of the global financial crisis and then the subsequent recovery afterwards. When we contrast our global liquidity aggregate with the global broad money (M2) aggregate, we see that the time series signature of the two aggregates are quite different. The underlying data reported in the SRFs are not disclosed publicly, and so report only pooled series across countries.

The importance of the U.S. dollar as the currency that underpins the global financial system should be borne in mind when reading the charts. In Figure 5, the sharp fluctuations in the global liquidity measure reflect, in part, the exchange rate movements of the U.S. dollar vis-à-vis other currencies. The sharp decline in the global liquidity measure during the 2008 financial crisis is explained in part by the rapid appreciation of the U.S. dollar that coincided with the deleveraging pressures that hit borrowers around the world. In turn, the bounce-back in the global liquidity measure reflects the appreciation of EM currencies in the aftermath of the crisis. By using the U.S. dollar as the numeraire, we ensure that the fluctuations in the exchange rate move in the same direction as the local currency quantities. So, the global liquidity aggregate reflects the reinforcing interaction of the nominal exchange rates and the local currency aggregates.

Figure 5: Global Broad Money (M2) and U.S. Dollar Global Liquidity *GL* of global NFC deposits: Annual Growth Rates, 2002Q1-2013Q2



Source: Standardized Reporting Forms, International Financial Statistics, IMF.

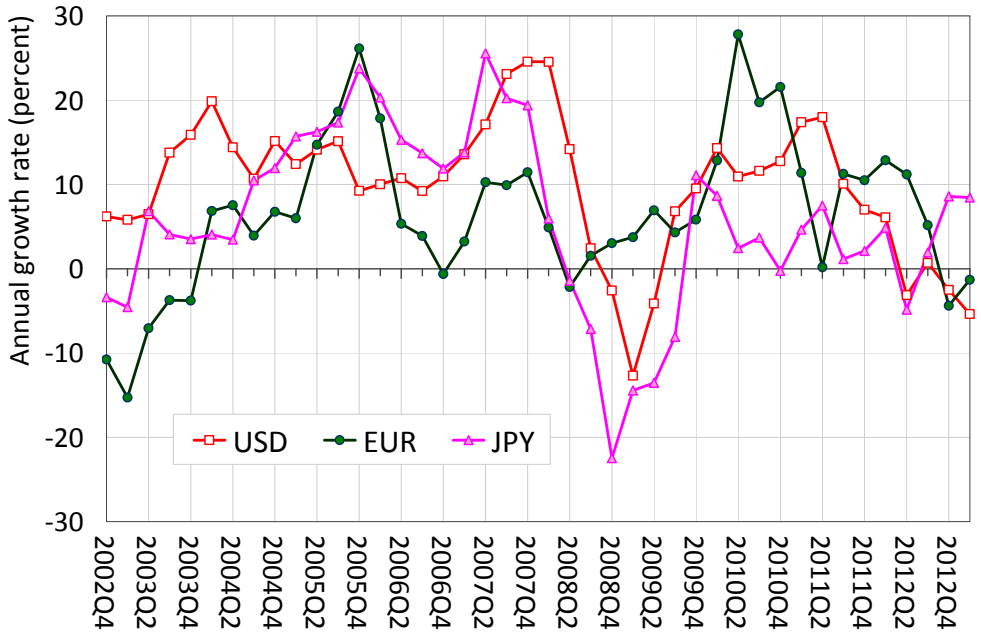
Figure 6 illustrates the importance of the numeraire currency in the measurement of global liquidity. The global liquidity variable in Euros differs substantially from those in U.S. dollars or in Japanese yen.

The similarity between the U.S. dollar and Yen comes from the fact that both are funding currencies and tend to strengthen due to deleveraging in a downturn driven by financial factors. As such, the contraction of the quantities will be reinforced by the currency movements. The numeraire currency for measuring global liquidity is therefore more than simply finding a common unit of account. The choice of numeraire should reflect the currency in which borrowing takes place. If the numeraire is the funding currency, then the

global liquidity aggregate will incorporate the tighter or looser financial conditions arising from currency fluctuations.

We will see shortly in our empirical investigation that U.S. dollar global liquidity is strongly associated with economic activity indicators at the country level such as exports, imports, and GDP growth in panel regressions, even more so than the local liquidity measures for that country. Moreover, we show that when global liquidity is measured in Euros, instead of U.S. dollars, the empirical association with measures of country's economic activity is much weaker, or has the "wrong" sign. In this sense, the U.S. dollar global liquidity measure occupies a special place, and we may attribute its special status to the role of the U.S. dollar as the currency that underpins global capital markets through its role as the pre-eminent funding currency for borrowers.

Figure 6: Global liquidity variable in U.S. dollar, Euro, and Yen

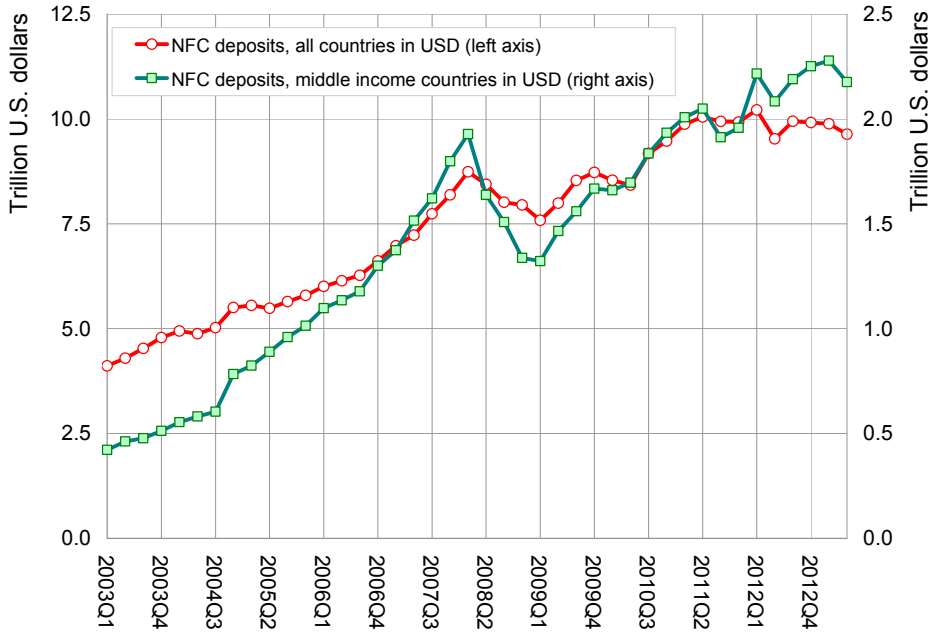


Source: Standardized Report forms (SRFs) for the IFS, IMF.

The sensitivity of the global liquidity measure with respect to the choice of numeraire currency shown in **Figure 6** reinforces the argument in Turner (2013) that exchange rate movements represent an important element in overall financial conditions facing an emerging market country. Turner (2013) argues that the exchange rate is as important as domestic interest rates when gauging monetary stance, especially for emerging economies. Bruno and Shin (2013) show that expectations of currency movements induce changes in global liquidity conditions that have effects that are qualitatively similar to shifts in credit risk for the underlying borrowers.

One way to illustrate the importance of global liquidity for emerging economies is to construct the *GL* series that includes the emerging economies only. **Figure 7** shows the U.S. dollar global liquidity measure for all countries measured on the left hand axis together with the U.S. dollar global liquidity measure for middle income countries measured on the right axis. Appendix 2 gives the full list of countries whose statistics are used to construct the global liquidity measure. We have used the World Bank classification of countries by income level.[5]

Figure 7: Levels of U.S. Dollar Global Liquidity of NFC deposits for all countries (left axis) and U.S. Dollar Global Liquidity of NFC deposits for middle income countries (right axis), 2003Q1-2013Q2.[6]



Source: Standardized Report forms (SRFs) for the IFS, IMF.

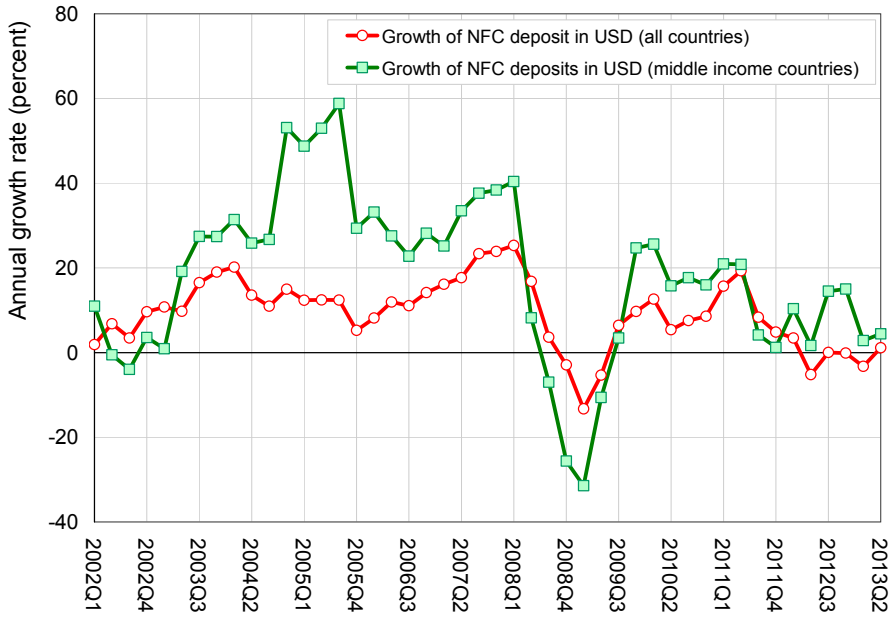
The axes in **Figure 7** have been scaled so that the right hand axis is 20 percent of the left hand axis. What is notable is how much more procyclical is the global liquidity measure for the middle income countries compared to the full sample. The *GL* measure for middle income countries start well below 20 percent for those for the full sample, but then overtakes it twice, once before 2008, and then again after the crisis. **Figure 8** plots the annual growth rates of the global liquidity measure for middle income countries compared to the full sample. We see that the middle income aggregate shows much greater fluctuations through the cycle,

[5] http://data.worldbank.org/about/country-classifications/country-and-lending-groups

[6] List of countries is in Appendix 2

especially in the immediate aftermath of the crisis. The U.S. dollar value declines close to 30 percent in 2009Q1 compared to a year earlier.

Figure 8: Annual growth rates of U.S. Dollar Global Liquidity of NFC deposits for all countries (left axis) and for middle income countries (right axis) 2003Q1-2013Q2.[7]



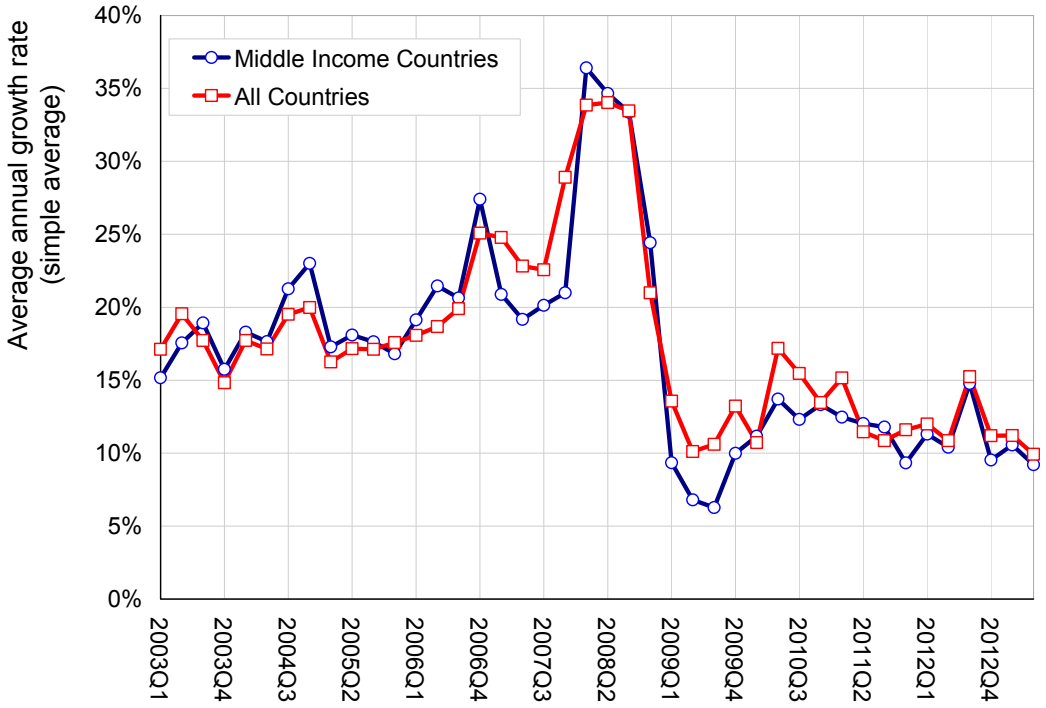
Source: Standardized Report forms (SRFs) for the IFS, IMF.

The greater fluctuations reflect currency movements to large degree, and can be seen as a consequence of the greater amplitude of fluctuations in emerging market currencies. **Figure 9** plots the average of annual growth rates in NFC deposits, but measured in the domestic currency of each country. The average is taken as a simple, unweighted average of the growth rates.

We see from **Figure 9** that when NFC deposit growth is measured in domestic currency, the difference between the full sample average and that for middle income countries is less dramatic. Middle income countries experience a sharper drop in NFC deposit growth rates in the crisis, but the average growth rate remains positive even at the trough. More interestingly, the growth rates between the full sample and for the middle income countries track each other closely after the crisis. In general, NFC deposit rates are much lower after the crisis than before the crisis. The contrast between **Figure 8** and **Figure 9** emphasize the important role played by the exchange rate against the U.S. dollar, and reinforces the point made in Turner (2013) on the importance of the exchange rate in determining financial conditions.

[7] List of countries is in Appendix 2.

Figure 9: Average annual growth rates of NFC deposits in domestic currency for all countries and for middle income countries. The average is taken as a simple average, 2003Q1-2013Q2.[8]



Source: Standardized Report forms (SRFs) for the IFS, IMF.

Figure 9 does not show any evidence of a surge in NFC deposits of middle income countries after the crisis, in spite of the increased borrowing by emerging market firms after the crisis. Although it is possible that emerging market NFCs are using the proceeds of the debt issuance to finance real investment, another possibility is that the NFC deposits in the formal banking system are not measuring accurately the total financial assets held by NFCs. In particular, if the NFCs financial assets are held as claims on the shadow banking system that lie outside the formal banking sector, then measuring just the deposits in the regulated banking sector will underestimate the total size of financial assets held by NFCs. In addition, NFC deposits partly represent shadow banking activities in these countries, as multi-national and large domestic corporations may use external borrowing and intra-group transactions to bring foreign currency home and use it in the home country. In this regard, data limitations pose a difficulty for measuring global liquidity, and more concerted efforts to collect data related to cash-like holdings of firms in the shadow banking system would be illuminating.

A complementary approach that may mitigate the data limitations would be to examine firm level data, and track the cash and short-term investments held by individual firms, as done by

[8] List of countries is in Appendix 2.

Shin and Zhao (2013). Firm level data also have the advantage that when the cash holding of the firm is reported on a consolidated basis, the activities of a firm which straddles the border may be captured in the consolidated balance sheet.

Our discussion of NFCs in financial intermediation has a historical parallel with the experience of Japan in the 1980s during the liberalization of its financial sector. Hattori, Shin and Takahashi (2009) examined the role of the NFC sector as surrogate financial intermediaries following the sectoral changes that took place in Japan after the liberalization of the securities markets and the accompanying liberalization of the rules governing bank deposits.

In particular, as a result of the financial liberalization of the 1980s, securities markets enabled the opening up of new funding sources—both domestic and foreign—for companies that had traditionally relied on the banking sector. Of particular interest is the role played by the large manufacturing firms in Japan. Before the 1980s, manufacturing firms in Japan received most of its financing from the traditional banking sector, both for long-term investment as well as for short-term liquidity needs. However, with the liberalization of the securities market that began in the mid-1980s, NFCs were able to tap new sources of funding from outside the traditional banking sector. New issuance of equity, corporate bonds, warrants and commercial paper (CP) increasingly became important sources of funding for NFCs. The new funding was supplied both by domestic savers and other non-leveraged financial institutions such as life insurance companies who purchased the bonds and other securities issued by Japanese companies. Foreign investors also figured prominently among the new funding sources.

However, the sequencing of reforms meant that the liberalization of NFC funding proceeded ahead of the liberalization of the banking sector. As new funding sources opened up to large manufacturing firms, it became profitable for them to recycle liquidity and act as de facto financial intermediaries by raising funding in the capital markets through securities, and then depositing the funds in the banking system through time deposits. In effect, the NFCs played the role of surrogate intermediaries as depicted in Figure 3. Through this channel, the financial assets of NFCs increased dramatically together with their financial liabilities in the late 1980s (see Hattori, Shin and Takahashi (2009) for details).

IV. Global Liquidity as an Activity Indicator

We now examine the information value of monetary aggregates for real economic activity at the global level. In this analysis, we focus on the correlation between monetary aggregates and various control variables that reflect real economic activity. Our analysis do not claim

any form of causality between these variables.[9] The regression results presented in the paper are only those that show significant relationship between the sets of control variables and monetary aggregates (either global or local), all other intermediate regressions have been excluded from the tables. We choose the variables affecting global liquidity condition or global real activity as our control variables.

The regressions in Tables 1-7 are unbalanced panel regressions on quarterly data with country fixed effects and clustered standard errors at the country level. Also we allow for heteroskedasticity. We run Hausman specification test to check for the validity of the model. Fixed effect model is preferred to random effect model. One can expect different countries composed one closed global economy, converge in the long run or move in certain direction on average through real and financial integrations. It is also the purpose of this study to reveal more concrete picture of "integration" by tracking global liquidity of which meaning is highly elusive despite of its enormous impacts.

The regressions establish correlation between the dependent variable and the set of control variables, but not any form of causality. We leave the causality questions for further research. It is true that global real activity and global liquidity might be endogenous, and also cointegrated. We run the Johansen system cointegration test with two variables change in global real activity and global liquidity (defined either as broad money or NFC deposits), and as expected the test cannot reject the null hypothesis, meaning that indeed there is a long run causality between these two variables and the error term from the regression will be a stationary process with mean zero. At the same time, in which way the causality runs is not a focus on this paper, we only argue for correlation between these two variables. [10]

The results of panel regressions in quarterly frequency for 88 countries, that explore the association between the global liquidity and various measures of economic activity, are presented in Tables 1 to 3:

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[9] This is a good subject for follow up research, using more sophisticated econometric tools, such as dynamic panel regressions.

[10] If we would be interested in establishing the causality, we would need to check the presence of the short-run causality and its direction, so that the long-run causal relationship is robust to the presence of a short-run causality. We run the panel version of the model, so the short time dimension of the series is not a problem in our case. Both problems are well documented and solution is suggested in, for example, Canning and Pedroni (2008). At the same time, short-term and long-term relationship can be heterogeneous, and that is why we would have to test the long-term causality in a way that is robust to this. In addition, we would also have to test for the sign of long run causal effect.

- Table 1 presents results of panel regressions for individual country GDP growth;
- Table 2 presents the result of panel regressions for country imports; and
- Table 3 is for country exports.[11]

The results demonstrate that the lagged growth of U.S. dollar global NFC deposits is strongly positively associated with real GDP growth in the panel (Table 1, columns 1 and 2). In other words, the U.S. dollar global liquidity variable is a common factor that is positively associated with growth across the 88 countries in the sample.

Interestingly, when the U.S. dollar global liquidity variable is replaced by the global liquidity variable where the Euro is the numeraire, this variable is no longer significant (Table 1, columns 3 and 4). However, when global liquidity is measured with the Japanese yen as the numeraire, it becomes positive and strongly significant (Table 1, columns 5 and 6).

The contrasting results for the Euro on the one hand and the U.S. dollar and Japanese yen on the other becomes easier to grasp when we see the contrasting time series patterns (**Figure 6** plots the global liquidity series for three different numeraire currencies). This is mostly due to the fact that both the U.S. dollar and the Japanese yen are funding currencies, while the Euro is not.

The importance of choosing the numeraire currency for global liquidity is reinforced by our regression results. The U.S. dollar global liquidity series tracks the mutually amplifying effect of contractions in physical quantities and the appreciation of the funding currency. For a borrower who has U.S. dollar debts, the currency movement reinforces the contractionary impact of domestic quantities.

There is also notable lack of significance for the individual country NFC deposit term as an explanatory variable (Table 1). Across all six columns, we see that the growth of individual country NFC deposits is not significant. This is in spite of the fact that the *global* NFC deposit growth variable is highly significant. Thus, global NFC deposit growth is a global factor that explains the co-movement of activity across countries. This may not be surprising, as global NFC deposits reflect the ease of borrowing globally. In contrast, country-specific NFC deposits reflect to which extent NFCs in a country can make use of that ease of borrowing (export orientation, no restrictions on borrowing abroad, etc.).

Also, variables associated with greater credit supply by global banks are positively and highly significantly associated with GDP growth (Table 1), such as the growth of the

[11] Imports and Exports of goods and non-factor services are measured in U.S. dollar values.

U.S. security broker dealer sector, which has been used by Bruno and Shin (2013) as a proxy for the credit supply provided by global banks intermediating U.S. dollar funds.

The variable QE in Table 1 is a dummy variable that is equal to 1 in the post crisis period when unconventional monetary policy tools were being employed in the United States. The coefficient on QE is negative and significant, indicating that QE is associated with slower growth in GDP. However, the growth in the interaction term QE*VIX has a positive coefficient, suggesting that in those times when the VIX is high, the unconventional monetary policies had a mitigating impact on growth. The VIX represents global volatility factors in this analysis, which is used instead of various spreads.

Table 2 shows the results of panel regressions where the dependent variable is the quarterly growth in imports to each country. The results are similar as for the GDP growth panel regressions, but there are also some differences.

The global liquidity variables in U.S. dollars and Japanese yen are strongly positively significant. Columns 3 and 4 in Table 2 show that the global liquidity variable in Euros is positive and marginally significant. Interestingly, however, the individual country NFC deposit growth variable appears with a negative sign and is significant at the 5 percent level in all specifications.

Table 2 also shows that the interaction term QE*VIX enters with a negative sign and is highly significant. These results differ from those in Table 1. However, the growth in the U.S. broker dealer sector leverage enters with a positive sign and is significant at the one percent level. This result is similar to that in Table 1. Overall, however, Table 2 shows that the panel regressions for import growth have a much lower R^2 than in Table 1.

Table 3 shows the results of panel regressions where the dependent variable is the growth of exports of each country. Global liquidity in U.S. dollars and Japanese yen is strongly associated with export growth, with both positive and highly significant. Notably, however, the global liquidity variable in Euro enters with the "wrong" sign in the regression and is significant at the 5 percent level (column 4) or the 10 percent level (column 3). This result underlines yet again the importance of the numeraire currency in measuring global liquidity. As with Table 2, the growth in the individual country NFC deposit term in Table 3 enters with a negative sign and is strongly significant. Thus, in all three sets of real activity panel regressions, the global liquidity variable performs much better as an indicator of real activity than the individual country NFC deposit variable.

Table 3 also shows that the U.S. broker dealer variable enters with a positive sign and strongly significant. Thus, in all three sets of panel regressions, the proxy for credit availability from the global banks enters with a positive sign in explaining real activity. For

the QE term and the growth in the interaction term QE*VIX, the coefficients are negative for both.

Taken together, the consistent message is that global liquidity with the U.S. dollar or Japanese yen as the numeraire is positively associated with real activity, but the global liquidity measure with the Euro as the numeraire is not positively associated with real activity, underscoring the importance of the identifying the funding currency status of the numeraire currency. In this sense, the role of the U.S. dollar as the currency that underpins the global capital markets is crucial. However, although the results are broadly in line with our hypothesis, they are open to various interpretations, taken into consideration the fact that similar well-known identification issues arise as when relating any monetary aggregate to economic activity and other macroeconomic variables. For example, it could also represent a growing importance of credit constraints (i.e., companies hoarding cash in anticipation of future investments.) This is not inconsistent with capital flows reacting to improved growth opportunities in a given country. In other words, faced with higher growth opportunities, firms may start to accumulate cash while simultaneously, capital flows into the country.

Of the other variables in the panel regressions, the only other variable that enters with a consistently positive sign is the growth of U.S. broker dealer leverage. These findings are consistent with the empirical results in Bruno and Shin (2013), who find that U.S. broker dealer leverage is associated with cross-border capital flows through the banking sector.

V. Determinants of NFC Deposits

We now address the determinants of individual country NFC deposits in domestic currency and ask whether the growth of NFC deposits can be associated with the capital flow channel sketched at the outset. We investigate this question through panel regressions where the dependent variable is the quarterly growth of NFC deposits for each country. We run separate regressions corresponding to the income groups of the countries in our sample.

Tables 4 to 7 present the results of our unbalanced panel regressions with fixed country effects and cluster the errors by country. Table 4 is for the full sample of countries. Tables 5, 6 and 7 present the results for middle income, high income and low income countries, respectively.

A key right-hand side variable of interest is a measure of capital inflows into the non-bank sector in each country. The variable “Capital Inflows” refers to the growth in the financial liabilities of “other sectors” in the balance of payments statistics, as measured by the growth in debt security liabilities and loan liabilities of non-financial corporations and other financial

corporations.[12] This category of institutions includes both the NFCs and "other financial corporations" (OFCs). Since the category includes non-bank financial institutions, the capital inflow measure is not an exact match for NFC liabilities. This is not ideal for us, since we would like to isolate the activities of NFCs, but only a few countries report the NFC variable separately, and so the broader "other" category of liabilities is necessitated by data availability.

Nevertheless, the results are quite encouraging. The key result is that the sign of the coefficient on the capital inflows variable is positive and significant in some key specifications. In other words, when the capital inflows take place through non-banks, we see an increase in the claims of the NFCs on the banking sector, consistent with the picture of non-financial firms playing the role of surrogate financial intermediaries.

Table 4 reports the results of the panel regressions for the full sample of countries where the dependent variable is the growth of the NFC deposits of each country in domestic currency. We see from columns 1 and 2 that the capital flows variable is marginally significant, both contemporaneously and lagged by four quarters. The impact of the exchange rate on NFC deposits is also consistent with the hypothesis that NFC deposits increase when the domestic currency is strong against the U.S. dollar. In columns 1 and 3, the change in the nominal exchange rate enters with a negative sign, so that an appreciating domestic currency is associated with higher growth of NFC deposits. The VIX index enters with the negative sign, indicating that NFC deposit growth is slow when financial market volatility is high. The impact of the exchange rate and the VIX on NFC deposits is consistent with the empirical results in Bruno and Shin (2013) who find that a stronger domestic currency and low VIX are associated with faster capital inflows. Since our main hypothesis is that NFC deposits grow with capital inflows, our findings in Table 4 fit well with other related studies of capital flows.

Although the results in Table 4 are broadly consistent with the hypothesis presented in our paper, the significance of the right-hand side variables are weak. The R^2 numbers of all columns in Table 4 are also very low.

Table 5 presents the panel regression results for a subsample of countries that are classified as middle income countries in the World Bank classification of countries by income (see Appendix 2). This subsample of countries consists of 48 of the 72 countries that constitute the full sample. Therefore, the middle income group of countries is the largest of the three income categories in our sample.

[12] Balance of Payments and international Investment Position (compiled by the sixth edition methodology, BPM6), Statistics Department (STA), IMF, as reported by country authorities.

Middle income countries consist of emerging economies that are the most likely candidates for the mechanisms described at the outset of the paper in channeling global liquidity into the domestic financial markets. This is because many middle income countries are at an early stage of development of their financial system and do not have fully open capital markets or banking systems that are exposed directly to external financial conditions. Therefore, we may conjecture that the role of NFCs in playing the role of surrogate intermediaries would be more pronounced for this group of countries.

Table 5 shows that the conjecture above is borne out in the main. We see from columns 1, 2, and 3 that the four-quarter lagged capital inflow variable is positive and significant at the 1 percent level. The effect of exchange rate appreciation is negative and significant, consistent with our main hypothesis. Columns 4, 5, and 6 show that VIX in levels enter with a negative sign and is highly significant. Column 3 has additional regional dummies that classify countries according to region.

Overall, Table 5 shows results that are broadly supportive of the hypothesis of non-financial firms playing the role of the channel of capital inflows. In contrast to the low R^2 numbers for the panel regressions on the full sample of countries, Table 5 shows that the R^2 numbers are higher for middle income countries (although they are still quite low).

Tables 6 and 7 present the panel regressions for the high income and low income country subsamples, respectively. Here, the main message from the regressions is that capital inflows are not associated with increases in NFC deposits. In both Table 6 and Table 7, the capital inflow variables are insignificant. However, for high income countries, the BIS bank lending variable enters with the positive sign and is significant at the 5 percent level in columns 4 and 5. The BIS lending variable is the cross-border claims of the BIS-reporting banks to non-banks, as given by BIS locational banking statistics, Table 7B.[13]

We have seen that monetary aggregates associated with the claims of the NFC sector on the banking system convey information on the extent of the capital inflows and surrogate intermediation performed by the NFC sector. However, to the extent that the financing conditions faced by NFCs are influenced by global factors, we may expect global financial conditions to enter as important determinants of domestic monetary aggregates.

The panel regressions draw attention to the role of the NFCs as being the channel of capital inflows, whereby the increase in their financial liabilities are reflected in the increase in their financial claims on the domestic intermediation sector as a whole. By using the IMF's

[13] http://www.bis.org/statistics/bankstats.htm

standardized reporting form (SRF) data, we are able to isolate the components of monetary aggregates that correspond to the claims of NFCs on the banking sector.

VI. Relationship to Conventional Monetary Aggregates

We now address how our results on NFC deposit aggregates relate to the conventional analysis of monetary aggregates, especially the link to M0 and M2. The conventional monetary aggregates are more familiar to researchers, but the insights we have gained from the focus on NFC deposits allow us to interpret the conventional monetary aggregates from a new perspective. In this section, we will first show the relationship between NFC deposits and M2 and M0 by using the balance sheets of NFC, commercial banks and central bank and then explain our regression analysis.

NFC deposits constitute only a small proportion of total broad money, as measured by M2. However, we have seen so far that NFC deposits tend to be more procyclical as compared to M2 itself. Therefore, a question of interest is how much the procyclicality will be exhibited by M2 itself.

A related question is how the narrow money aggregate M0 may be related to capital inflows and broad money aggregates. M0 is a liability of the central bank to the banking sector and so central bank operations that draw on commercial bank claims will imply a link between narrow money and broad money.

Figure 10: Money stock and capital inflows due to financial activities of NFCs

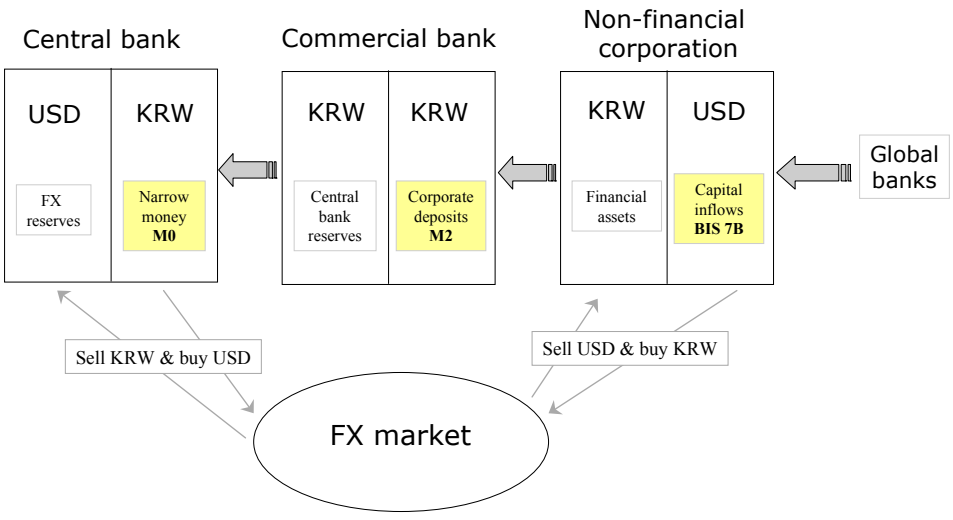


Figure 10 encapsulates the key balance sheet relationships that drive the connections between domestic monetary aggregates and global conditions. It depicts the relationship between the activities of NFCs, commercial banks, and the central bank. Consider the export-oriented manufacturing firms in Korea, as an example of activities of NFCs in an open

economy. As discussed in Chung, Park, and Shin (2012), exporting firms with long-dated U.S. dollar receivables have strong incentive to take on dollar liabilities in order to hedge the dollar receivables. If a Korean exporting firm wins an export order invoiced in U.S. dollars, then the firm effectively has an off balance sheet U.S. dollar asset. If the costs of the Korean firm are in won, then it will seek to hedge that exposure. One way to do so is to incur U.S. dollar liabilities by, for instance, borrowing in U.S. dollars from international banks or their branches in Korea. Another method is to issue securities (such as so-called kimchi bonds) that are denominated in U.S. dollars, bought or underwritten locally by international bank branches in Korea. Although the example cites Korean firms, the practice is widespread, with evidence from other countries.

One empirical counterpart to the borrowing of NFCs from global capital markets would be the BIS Locational Statistics, Table 7B, already considered in the panel regressions for NFC deposits. The coverage of this series is very broad geographically.[14] In **Figure 10**, the exporting firm sells U.S. dollars and buys Korean won in the spot FX market, thereby creating the short dollar position it desires. The proceeds of this transaction are Korean won financial assets. The firm then deposits this sum in the Korean commercial bank sector, and will be classified as corporate deposits. These corporate deposits will then be captured in a broad monetary aggregate, such as M2. Transactions of this type have been quite prevalent in emerging economies.

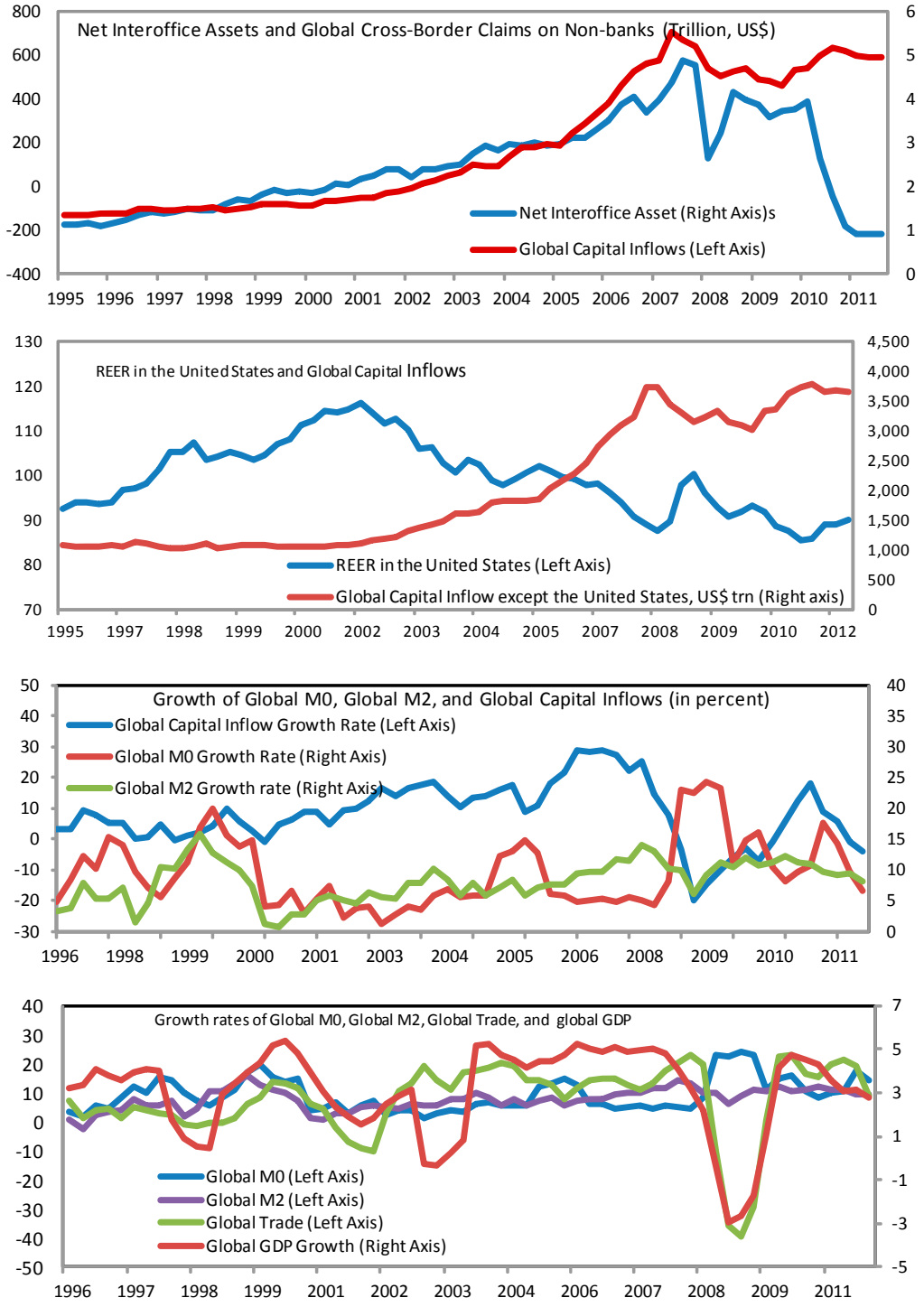
Periods of capital inflows are also those when the domestic currency is appreciating against the U.S. dollar, and such periods coincide with increases in the central bank's foreign exchange reserves, as recently discussed by the BIS paper by Filardo and Yetman (2011). The increases in foreign exchange reserves are associated with intervention by the central bank to slow the pace of currency appreciation. **Figure 10** depicts the central bank's transactions, which is the mirror image of the NFC sector's transactions. In order for the central bank to finance its increase in foreign currency assets, the central bank draws reserves from the commercial bank sector, thereby creating narrow money, M0. The possibility of sterilization is not depicted in **Figure 10**, but will be an important part of the central bank's operation.

With these mechanisms in mind, we plot several variables of interest in **Figure 11** to examine how M0 and M2 vary with global activity measures, exchange rates and capital flows. We see that M0 and M2 display quite different time signatures, with M2 being procyclical and M0 displaying some countercyclical features, especially around the time of the financial crisis. Capital flows and U.S. dollar real effective exchange rate (REER) are broadly consistent with the scenario depicted in our paper, with the U.S. dollar weakening

[14] http://www.bis.org/statistics/bankstats.htm

during the middle years of the 2000s which coincided with the uptick in the speed of capital inflows as measured by the BIS 7B series.

Figure 11: Evolution of Global Aggregates and Capital Flows, 1996–2011



Source: BIS, Fed, IFS, and authors' estimates. Note: All growth rates are annualized.

Next, we examine the determinants of M0 and M2 in the light of our discussion on NFC activities. We do so through panel regressions where the dependent variable is either the growth of M0 or the growth of M2, and examine a number of global and local explanatory variables. We also add a dynamic panel estimation by using a system GMM to deal with endogeneity problems between dependent and explanatory variables.

Our sample is a group of advanced and emerging economies, excluding financial centers.[15] The summary statistics for the main variables used in our panel regressions are presented in Table 8, classified in global and local variables. We begin with the net interoffice assets series of foreign banks in the United States examined by Bruno and Shin (2013) that plays the role of the proxy for the availability of cross-border credit. The global capital inflow variable is outstanding claims obtained from the BIS Locational Statistics Table 7B on non-bank borrowers. In some of the tables, we also include the outstanding debt securities issued by non-corporate borrowers from a particular country from the BIS securities database, Table 12D.

The set of questions on the determinants of monetary aggregates draws on cross-country data on monetary aggregates from the IMF's IFS database, and is addressed by conducting panel regressions that investigate to what extent global factors contribute to monetary growth. In particular, our focus will be on those components of monetary aggregates that correspond to the claims of NFCs on the banking sector and intermediation sector more generally.

In the panel regressions, the dependent variable is the log difference of money stock—either the broad money stock given by M2 or narrow money M0. As key explanatory variables, we include capital inflows to the NFC sector, consisting of loans and the increased debt securities outstanding of the non-bank sector. The hypothesis is that there is a positive relationship between money growth and capital inflows to the non-bank sector.

As well as these country-specific variables, our focus will be on the global variables that have been shown by Bruno and Shin (2013) to be highly significant in explaining capital flows through the banking sector, such as the log of the VIX index of implied volatility of equity index options, which has been shown to proxy well the leverage decisions of the global banks.

[15] The sample in regressions presented in Tables 2 and 3 consists of Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, the People's Republic of China, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Lithuania, Malaysia, Mexico, the Netherlands, Norway, Philippines, Poland, Portugal, Russia, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, the U.K., the United States, Uruguay, and Vietnam.

In particular, we examine the following specifications:

$$\Delta M_{c,t} = \beta_0 + \beta_1 \cdot \text{Capital Inflow}_{c,t-1} + \beta_2 \cdot \Delta RER_{c,t-1} + \beta_3 \cdot VIX_{t-1} + \beta_4 \cdot \Delta VIX_t + \beta_5 \cdot \Delta \text{Interoffice}_{t-1} + \text{control}_{c,t} + e_{c,t} \quad - (1)$$

$$\Delta M_{c,t} = \beta_0 + \beta_1 \cdot \text{Capital Inflow}_{c,t-1} + \beta_2 \cdot \Delta RER_{c,t-1} + \beta_3 \cdot VIX_{t-1} + \beta_4 \cdot \Delta VIX_t + \beta_5 \cdot \Delta \text{Interoffice}_{t-1} + \beta_6 \cdot \text{QE dummy} + \text{control}_{c,t} + e_{c,t} \quad - (2)$$

In these panel regression specifications, the variables are defined as follows.

- $\Delta M_{c,t}$ is the quarterly growth rate in money supply;
- $\text{Capital Inflow}_{c,t-1}$ is the NFC sector capital inflow into country c in period, as given by the quarterly log difference in the external claims of BIS reporting country banks on country c, with one quarter lag;
- $\Delta RER_{c,t-1}$ is the quarterly log difference of the real exchange rate lagged by one quarter;
- VIX_{t-1} is the average of the quarter log of the VIX index; ΔVIX_t is the contemporaneous log difference in the VIX from the previous quarter, not lagged;
- $\Delta \text{Interoffice}_{t-1}$ is the growth in net Interoffice assets of foreign banks in the US from the quarter before, with one quarter lag;
- QE dummy is the dummy variable capturing Quantitative Easing period(QE 1: 2009 Q1-2010 Q1, QE 2: 2010 Q4-2011 Q2); and
- $\text{control}_{c,t}$ includes GDP Growth, Inflation, and Debt-to-GDP ratio.

The panel regressions in Tables 9-10 are on quarterly data with country fixed effects and clustered standard errors at the country level. We also estimate a dynamic panel model by using a system GMM method to deal with endogeneity problems between dependent and explanatory variables.

As we nmentioned earlier, problems with endogeneity are a familiar and pervasive feature in the literature of corporate finance, international business, and economics. In the absence of appropriate instruments for global liquidity, we attempt to address the endogeneity issue by using the dynamic Generalized Method of Moments (GMM) outlined in Arellano and Bover (1995). As discussed in Wintoki et al. (2012), an important aspect of the methodology is that

it relies on a set of "internal' instruments, such as past values of M0 and M2 growth as instruments (Tables 9-10). This eliminates the need for external instruments (see Wintoki et al., 2012 for more details).

We use the panel GMM estimator to control for the dynamic nature of the relationship between M0 or M2 growth and capital inflows. The dynamic GMM of choice uses a stacked system consisting of both first-differenced and level equations that assumes that *all* variables in Tables 9-10 are endogenous. We include two lags of the dependent variable in the dynamic system.

In order to use the dynamic GMM system, we first need to pass the following tests. The system requires first-order (AR(1)), but not second-order (AR(2)), serial correlation and to pass the Hansen J test of over-identifying restrictions. We avoid over-fitting and instrument proliferation by using one lag (the second lag) and combining instruments into smaller sets. Tables 9-10, columns 3, 4, 7, and 8, gives the results of the dynamic panel GMM regressions. The AR(1) tests consistently yield a p-value of less than 0.050. The AR(2) tests yield a p-value of more than 0.050 (and close to 1 in some cases). Therefore, in some cases, especially for the sample period 2000Q1-2012Q2, we cannot reject the null hypothesis of no- second-order serial correlation.

The results of fixed effects and dynamic GMM estimation show that our main hypotheses are borne out in the data, especially for the period 2000 onwards and are reported in Tables 9a, 9b (for M0) and Tables 10a and 10b (for M2). The difference between 9a and 9b is whether the capital inflow variable is defined just in terms of the BIS 7B capital flow term, or whether it also includes the international debt securities issuance by NFCs in BIS securities database Table 12D.

Tables 9a and 9b examine panel regressions for the determinants of M0. With a lagged dependent variable included, the capital inflow variable is positive and significant in Table 9a where capital inflow is defined just by reference to the BIS7B series. Capital inflow is not significant when it also includes debt securities issuance (Table 9b). Generally, the results for M0 are somewhat mixed. Log VIX enters with a positive sign, reflecting the increased commercial bank reserves during the crisis period, and the exchange rate variable does not feature as an important determinant of M0.

Tables 10a and 10b present the panel regressions for the determinants of M2. The results are broadly consistent with our earlier regressions where we have focused directly on the NFC deposits. In Table 10a, the capital inflow variable defined in terms of BIS7B is significant and positive, while the VIX enters with a negative sign, as predicted. In Table 10b, the capital inflow variable is extended to include debt securities growth. In this case, not all of the specifications show a significant effect of capital inflows.

Taken together, the results in Tables 9-10 are supporting of our main hypothesis, give us some assurance that the potential problems due to endogeneity, omitted variables, and reverse causality do not undermine our main conclusions drawn from our panel regressions, and confirm the role of capital inflows driving global liquidity.

VII. Conclusions and Policy Implications

The results reported in this paper suggest that some specialized bank liability may have information value as an indicator of economic activity, and that their information value derives from their sensitivity to the global environment in credit availability. When properly adapted and refined, we may expect versions of monetary aggregates to play an indicative role in two respects.

- First, as the liability side aggregate of bank balance sheets, we may gain useful insights into the credit conditions patterns in the economy.

- Second, to the extent that financial stability is tied to the procyclicality of the banking sector, the study of monetary aggregates may open the door to a more systemic approach to the vulnerability of an economy to financial crises and its susceptibility to reversals of capital flows.

In addressing the pro-cyclicality of the financial system, a useful distinction lies between core and non-core liabilities of the banking sector. Core liabilities can be defined as the funding that the bank draws on during normal times, and is sourced mainly domestically. What constitutes core funding will depend on the context and the economy in question, but retail deposits of the household sector would be a good first conjecture in defining core liabilities.

When banking sector assets are growing rapidly, the core funding available to the banking sector is likely to be insufficient to finance the rapid growth in new lending. This is because retail deposits grow in line with the aggregate wealth of the household sector. In a lending boom when credit is growing very rapidly, the pool of retail deposits is not likely to be sufficient to fund the increase in bank credit. Other sources of funding must then be tapped to fund rapidly increasing bank lending. The state of the financial cycle is thus reflected in the composition of bank liabilities. Hahm, Shin, and Shin (2013) show that the ratio of non-core to core liabilities is a reliable indicator of the vulnerability of an economy to crises.

The exact dividing line between core and non-core liabilities will depend very much on the structure of the financial system and the economy in question, as well as the degree of openness and level of development of financial markets and institutions.

When the domestic banking sector is mostly closed from the global banking sector, deposits will constitute the lion's share of banking sector liabilities, and traditional monetary aggregates such as M2 itself becomes highly variable and procyclical, encompassing volatile banking liabilities. In such instances, it may be more meaningful to decompose M2 itself into its core and non-core components. The non-core component of deposits then may include the deposits of NFCs who end up recycling funding within the economy and hence become integrated into the intermediary sector itself. Developing and emerging market economies, where the financial system is yet to be fully open to external conditions, may be good instances where this distinction between core and non-core liabilities may be usefully employed.

When NFCs play the role of *de facto* financial intermediaries, the stock of M2 (and especially the stock of NFC deposits) will see rapid increases due to the increasing deposit claims on the banking sector. Meanwhile, the banking sector itself will be under increasing pressure to find new borrowers, since their traditional customers (the manufacturing firms) no longer need funding and have instead undergone a reversal of roles and are pushing deposits into the banks, rather than receiving loans from the banks.

Under such circumstances, the distinction between core and non-core banking sector liabilities does not coincide neatly with the distinction between deposit and non-deposit liabilities. In many developing countries, that are at an earlier stage of financial development, or are more closed to the global banking system, the principle behind the distinction between core and non-core liabilities is better expressed as the distinction between: the *retail deposits* of the household sector and the *wholesale deposits* of NFCs.

The new liquidity requirements on banks contemplated under the Basel III rules—the Net Stable Funding Ratio (NSFR) and the Liquidity Coverage Ratio (LCR)—recognize that retail deposits are much more "sticky" and are less likely to run, while the wholesale corporate deposits are more flighty (BCBS, 2010).

Traditional monetary aggregates were defined around their legal form, and how liquid they are in transactions. For the reasons outlined above, these traditional aggregates will be less effective as a macroprudential monitoring tool without further adaptation.

The particular adaptations that may be usefully summarized in the following three points:

- For countries with open capital markets, *international capital flows* into the banking sector will be key indicators of financial vulnerability. During a boom, when bank assets are growing rapidly, the required funding outstrips the growth of the domestic deposit base, and is often met by capital flows from the international banks, and is reflected in the growth of short-term foreign currency-denominated liabilities of the domestic banking

system. Therefore, short-term foreign currency-denominated bank liabilities can be seen as the volatile non-core liabilities of the banking sector.

- For countries with relatively closed financial systems, where domestic banks do not have ready access to funding provided by the global banking system, a better approach would be to adapt existing conventional monetary aggregates to address financial stability concerns. The key distinction is not how *liquid* the claims are, but rather *who holds the claims*. The distinction between household retail deposits and corporate deposits in the banking sector will play a particular important role in this regard.

- More generally, invoking the accounting principle that defines core versus non-core liabilities of the banking sector may prove useful in guiding classification exercises of financial systems and economies more broadly. Core liabilities are the claims of the household sector on the intermediary sector. Non-core liabilities are the claims of the intermediary sector on itself.

As a practical matter, the classification into core and non-core is not so clear-cut. For a small and medium sized enterprise with an owner-manager, the bank deposits of that firm could be seen as household deposits. However, the firm could be a major firm with access to market finance, who can issue bonds and then deposit the proceeds of the bond sale in the banking system.

Nevertheless, the distinction between core and non-core bank liabilities provides a better window on the actual exposure of the banking sector to financial risk and their willingness to increase exposures. As such, the relative size of non-core liabilities can be used as a monitoring tool to reflect the stage of the financial cycle, the degree of vulnerability to potential setbacks, and more importantly as an early warning indicator.

Overall, this paper gets down to earth by linking global real economic activity (NFC) with global financial one. We have found that NFCs deposits performed well as indicators of NFC activity. In turn, the global liquidity variable that combines the information in the country specific quantities and the exchange rate are informative concerning global trade activity and global growth.

This study has construed open economy macroeconomics and international finance through the lens of balance sheets of banking sector and non-financial corporates, composition of liabilities, claim holders, and global monetary aggregates. Our results therefore deepen our understanding on financial development, vulnerability to crises and financial development.

This study has construed open economy macroeconomics and international finance through the lens of balance sheets of banking sector and non-financial corporations, composition of

liabilities such as core- and non-core liabilities that are related to who hold claims, global monetary aggregates and global real activity.

Our results deepen our understanding on global liquidity and related vulnerability to crises by watching its procyclical movements with other global variables on the global scale, and also by breaking down its flows by different economic units such as bank, other financial corporations, and non financial corporations.

It is like a work using both telescope and microscope that is required particularly to understand global liquidity and to suggest concrete policy measures.

Given that the data is on the quarterly frequency, and that shocks to the dependent variable may be persistent, the dynamic panel specification could be an appropriate method to study causality effects among main variables. This is a topic for a follow up project and further research.

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Appendix I. Data Description and Regressions Results

Variable	Definition	Data Source
NFC deposits	The sum of transferable and other deposits of public and other (private) non-financial corporations to other depository corporations (ODCs), included in and excluded from broad money, national and foreign currency	Other Depository Corporations Survey 2SG for the International Financial statistics (IFS), IMF, as reported by the country authorities
Capital inflows	Debt securities and loans of other sectors (non-financial corporations and other financial corporations), gross liabilities	Balance of Payments and international Investment Position (compiled by the sixth edition methodology, BPM6), Statistics Department (STA), IMF, as reported by country authorities
Exchange rate	Nominal exchange rate, end-of-period	Central bank survey 1SG for the IFS, IMF, as reported by country authorities
VIX	Chicago Board Options exchange Market Volatility Index, the implied volatility of S&P 500 index options; average	Bloomberg
Interoffice	Growth in net Interoffice assets of foreign banks in the United States	Federal Reserve Board (Fed) website
QE	Dummy variable capturing Quantitative Easing periods (QE1: 2009Q1 – 2010Q1; QE2: 2010Q4 – 2011Q2)	Constructed by authors
GDP growth	Real GDP growth, annual	National Accounts Database, STA/IMF, as reported by country authorities
Inflation	Annual percentage change of the CPI, end of period	National accounts Database, STA/IMF, as reported by country authorities
Debt/GDP ratio	Total external debt to GDP ratio	World Economic Outlook (WEO), IMF
External loans to non-banks (BIS)	External loans and deposits of reporting banks vis-à-vis the non-bank sector	Bank for International Settlements (BIS)
Spread	Spread between average deposit rate and BofA Merrill	FRED database http://research.stlouisfed.org/fred2/

	Lynch US High Yield BB US Effective Yield	
Broad money	Broad money liabilities	Depository corporations survey 3SG for IFS
Global NFC deposits	Sum of the non-financial corporate deposits in USD (EUR, JPY)	Other Depository Corporations Survey 2SG for the International Financial statistics (IFS), IMF, as reported by the country authorities
Export	Export of goods and non-factor services (in U.S. dollars)	Balance of Payments and international Investment Position (compiled by the sixth edition methodology, BPM6), Statistics Department (STA), IMF, as reported by country authorities.
Import	Import of goods and non-factor services (in U.S. dollars)	Balance of Payments and international Investment Position (compiled by the sixth edition methodology, BPM6), Statistics Department (STA), IMF, as reported by country authorities
Sovereign debt issuance	Sovereign and central bank debt securities	Balance of Payments and international Investment Position (compiled by the sixth edition methodology, BPM6), Statistics Department (STA), IMF, as reported by country authorities

Appendix II. Composition of SRF Submitting Countries by Income Group, Used in the Empirical Analysis

The construction of the global NFC aggregate includes data from the following countries that submit the Standardized Reporting Form (SRF) to the IMF. The classification of the income group follows the World Bank classification.[16]

LOW INCOME COUNTRIES (US$1,035 or less):

Afghanistan, Bangladesh, Burundi, Cambodia, Central African Republic, Chad, Comoros, Congo, DR, Eritrea, Ethiopia, The Gambia, Haiti, Kenya, Mali, Mozambique, Myanmar, Namibia, Nepal, Sierra Leone, Tajikistan, Tanzania, Uganda

MIDDLE INCOME COUNTRIES (US$1,036 to US$12,615):

Albania, Algeria, Anguilla, Armenia, Azerbaijan, Belarus, Belize, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Cameroon, Cape Verde, Colombia, Congo Rep., Costa Rica, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Gabon, Georgia, Ghana, Grenada, Guatemala, Guyana, Honduras, Hungary, Indonesia, Iraq, Jamaica, Kazakhstan, Kosovo, Lesotho, Macedonia FYR, Malaysia, Maldives, Mauritius, Mexico, Moldova, Mongolia, Morocco, Nicaragua, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Philippines, Romania, Samoa, Sao Tome and Principe, Serbia, Seychelles, Solomon Islands, South Africa, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Swaziland, Syrian Arab Republic, Thailand, Timor-Leste, Tonga, Turkey, Ukraine, Vanuatu, Venezuela, West Bank and Gaza, Zambia

HIGH INCOME COUNTRIES (US$12,616 or more)

Antigua and Barbuda, Australia, Barbados, Bermuda, Brunei Darussalam, Canada, Chile, Croatia, Czech Republic, Denmark, Equatorial Guinea, Euro Area, Iceland, Israel, Japan, Korea, Kuwait, Latvia, Lithuania, Macao SAR, Malta, Oman, Poland, Qatar, St. Kitts and Nevis, Sweden, Trinidad and Tobago, United States, Uruguay

[16] http://data.worldbank.org/about/country-classifications/country-and-lending-groups

Table 1: Global Money Stock as Activity Indicator for real GDP growth

This is a set of unbalanced panel regressions, with the sample period—2001Q4–2013Q1 and quarterly frequency. The dependent variable in each regression is the real GDP growth. Definitions of all variables are presented in the Appendix 1.

	1	2	3	4	5	6
Dlog(Global NFC in USD) (t-1)	**1,093*** **	**1,138*** **				
	[1.39e-07]	[4.89e-09]				
Dlog(Global NFC in EUR) (t-1)			70.75	80.47		
			[0.661]	[0.601]		
Dlog(Global NFC in JPY) (t-1)					**1,021*** **	**1,011*** **
					[7.84e-09]	[1.95e-08]
Dlog(NFC) (t-1)	0.00565	0.00463	0.00591	0.00478	0.00569	0.00474
	[0.205]	[0.315]	[0.203]	[0.322]	[0.210]	[0.316]
Dlog(NFC)^2 (t-1)	-0.000814	-0.000315	-0.000720	-0.000195	-0.000894	-0.000398
	[0.399]	[0.733]	[0.475]	[0.840]	[0.359]	[0.671]
Dlog(Broad Money)	**0.0521** **	**0.0562** **	**0.0599*** **	**0.0661*** **	**0.0563*** **	**0.0612*** **
	[0.0144]	[0.0171]	[0.00705]	[0.00677]	[0.00876]	[0.00957]
Dlog(VIX) (t-1)	-0.00137	-0.000587	-0.00160	-0.000844	0.00407*	0.00473**
	[0.466]	[0.716]	[0.351]	[0.569]	[0.0866]	[0.0232]
QE	**-0.0277*** **	**-0.0282*** **	**-0.0249*** **	**-0.0253*** **	**-0.0216*** **	**-0.0220*** **
	[2.58e-09]	[2.14e-10]	[7.83e-09]	[8.26e-10]	[1.44e-07]	[1.17e-08]
Dlog(QE * VIX)	**0.00934** **	0.00481	**0.0185*** **	**0.0140*** **	**0.0326*** **	**0.0283*** **
	[0.0401]	[0.282]	[0.000176]	[0.00593]	[1.71e-06]	[4.10e-05]
Dlog(Sec Broker-dealers total lia	**0.0678*** **	**0.0659*** **	**0.0838*** **	**0.0822*** **	**0.0580*** **	**0.0566*** **
	[8.46e-09]	[1.82e-08]	[8.48e-10]	[4.14e-09]	[7.41e-08]	[1.89e-07]
Dlog(Export) (t-1)		**0.0224*** **		**0.0245*** **		**0.0231*** **
		[0.000102]		[7.42e-05]		[8.47e-05]
Constant	**0.0479*** **	**0.0467*** **	**0.0496*** **	**0.0483*** **	**0.0486*** **	**0.0474*** **
	[0]	[0]	[0]	[0]	[0]	[0]
Observations	3,505	3,130	3,505	3,130	3,505	3,130
R-squared	0.103	0.150	0.096	0.140	0.104	0.150
Number of country_code	88	83	88	83	88	83

Robust pval in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Global Money Stock as Activity Indicator of Imports

This is a set of unbalanced panel regressions, with the sample period—2001Q4–2013Q1 and quarterly frequency. The dependent variable in each regression is import of goods and service. Definitions of all variables are presented in the Appendix 1.

	1	2	3	4	5	6
Dlog(Global NFC in USD) (t-1)	**8,230*** **	**6,757*** **				
	[0]	[0]				
Dlog(Global NFC in EUR) (t-1)			**816.0***	**899.0***		
			[0.0760]	[0.0573]		
Dlog(Global NFC in JPY) (t-1)					**5,266*** **	**4,482*** **
					[0]	[0]
Dlog(NFC) (t-1)	**-0.0461** **	**-0.0478*** **	**-0.0431** **	**-0.0458** **	**-0.0442** **	**-0.0464** **
	[0.0122]	[0.00994]	[0.0206]	[0.0139]	[0.0157]	[0.0116]
Dlog(NFC)^2 (t-1)	0.00558	0.00494	0.00660	0.00533	0.00518	0.00457
	[0.333]	[0.419]	[0.291]	[0.415]	[0.406]	[0.480]
Dlog(VIX) (t-1)	**-0.0147** **	0.00359	**-0.0272*** **	0.00139	**0.0139***	**0.0277*** **
	[0.0327]	[0.602]	[0.000224]	[0.849]	[0.0926]	[0.000923]
QE	**-0.0768*** **	**-0.0617*** **	**-0.0644*** **	**-0.0459*** **	**-0.0376*** **	**-0.0301** **
	[6.57e-08]	[9.43e-06]	[1.01e-06]	[0.000284]	[0.00189]	[0.0114]
Dlog(QE * VIX)	**-0.297*** **	**-0.240*** **	**-0.256*** **	**-0.186*** **	**-0.152*** **	**-0.121*** **
	[3.65e-08]	[4.81e-06]	[3.58e-07]	[9.96e-05]	[0.00101]	[0.00715]
Dlog(Sec Broker-dealers total liabilities		**0.227*** **		**0.329*** **		**0.212*** **
		[2.12e-10]		[0]		[1.46e-08]
Constant	**0.0156*** **	**0.0170*** **	**0.0312*** **	**0.0286*** **	**0.0240*** **	**0.0244*** **
	[0]	[0]	[0]	[0]	[0]	[0]
Observations	3,239	3,213	3,239	3,213	3,239	3,213
R-squared	0.068	0.077	0.028	0.052	0.052	0.066
Number of country_code	85	85	85	85	85	85

Robust pval in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Global Money Stock as Activity Indicator of Export

This is a set of unbalanced panel regressions, with the sample period—2001Q4–2013Q1 and quarterly frequency. The dependent variable in each regression is export of goods and services. Definitions of all variables are presented in the Appendix 1.

	1	2	3	4	5	6
Dlog(Global NFC in USD) (t-1)	**6,296*** **	**4,887*** **				
	[0]	[5.51e-08]				
Dlog(Global NFC in EUR) (t-1)			**-1,066***	**-1,349** **		
			[0.0775]	[0.0350]		
Dlog(Global NFC in JPY) (t-1)					**4,406*** **	**3,279*** **
					[5.63e-10]	[5.47e-06]
Dlog(NFC) (t-1)	**-0.0542** **	**-0.0513** **	**-0.0522** **	**-0.0493** **	**-0.0528** **	**-0.0504** **
	[0.0165]	[0.0241]	[0.0192]	[0.0288]	[0.0168]	[0.0239]
Dlog(NFC)^2 (t-1)	0.0107	0.00958	0.0117	0.0102	0.0103	0.00931
	[0.123]	[0.172]	[0.118]	[0.174]	[0.157]	[0.200]
Dlog(VIX) (t-1)	**-0.0486*** **	**-0.0303*** **	**-0.0522*** **	**-0.0277*** **	**-0.0240** **	-0.0124
	[3.79e-07]	[0.000323]	[1.42e-08]	[0.000427]	[0.0236]	[0.207]
QE	**-0.0714*** **	**-0.0588*** **	**-0.0603*** **	**-0.0481*** **	**-0.0395*** **	**-0.0355*** **
	[8.12e-10]	[2.49e-07]	[3.27e-08]	[6.35e-06]	[0.000130]	[0.000465]
Dlog(QE * VIX)	**-0.325*** **	**-0.271*** **	**-0.285*** **	**-0.229*** **	**-0.206*** **	**-0.183*** **
	[0]	[3.00e-10]	[0]	[4.95e-09]	[9.97e-09]	[1.38e-07]
Dlog(Broker-dealer Leverage) (t-1		**0.279*** **		**0.327*** **		0.270***
		[0]		[0]		[0]
Constant	**0.0182*** **	**0.0246*** **	**0.0325*** **	**0.0373*** **	**0.0240*** **	**0.0297*** **
	[1.17e-10]	[0]	[0]	[0]	[0]	[0]
Observations	3,239	3,213	3,239	3,213	3,239	3,213
R-squared	0.052	0.068	0.034	0.058	0.047	0.064
Number of country_code	85	85	85	85	85	85

Robust pval in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Determinants of NFCs, All countries

This is a set of unbalanced panel regressions, with the sample period—2001Q4–2013Q1 and quarterly frequency. The dependent variable in each regression is a log-difference of the sum of the total NFC deposits in banks for all countries, for which the SRF data is available. Definitions of all variables are presented in the Appendix 1.

	1	2	3	4	5	6
Capital Inflows[1]	**0.00793***	0.00729	0.00756			
	[0.0989]	[0.114]	[0.123]			
Capital inflows (t-4)	**0.00597***	**0.00531***	0.00536			
	[0.0695]	[0.0836]	[0.104]			
Dlog(BIS external loans nonbanks)				-0.0194	-0.0191	-0.0192
				[0.217]	[0.219]	[0.217]
Dlog(BIS external loans nonbanks) (t-1)				0.0133	0.0134	0.0134
				[0.196]	[0.196]	[0.196]
Δ Nominal Exchange rate (t-1)	**-1.73e-05****	-1.46e-05	**-1.53e-05***	6.49e-06	5.98e-06	5.93e-06
	[0.0265]	[0.122]	[0.0956]	[0.651]	[0.655]	[0.655]
Log(VIX) (t-1)		**-0.0400****		**-0.0234****	**-0.0213****	**-0.0217****
		[0.0448]		[0.0134]	[0.0236]	[0.0300]
Dlog(VIX) (t-1)	0.0141	**0.0356****	0.0146	**0.0256*****	**0.0227*****	**0.0230*****
	[0.327]	[0.0246]	[0.315]	[0.00475]	[0.00856]	[0.00797]
Growth of interoffice (t-1)	0.0117	0.0112	0.00902	-0.000294	-0.00110	-0.00144
	[0.112]	[0.117]	[0.202]	[0.948]	[0.817]	[0.768]
QE(t-1)	0.00324	-0.0313	-0.0196		-0.00962	-0.0136
	[0.673]	[0.417]	[0.555]		[0.140]	[0.373]
QE * VIX (t-1)		17.78	11.00			1.776
		[0.294]	[0.427]			[0.776]
Real GDP growth (t-1)	0.128	0.0906	0.118	0.0241	0.00263	0.00478
	[0.199]	[0.334]	[0.274]	[0.688]	[0.968]	[0.943]
inflation (t-1)	-0.0004	-0.0001	-0.0004	-0.0002	-0.0002	-0.0002
	[0.414]	[0.781]	[0.381]	[0.601]	[0.493]	[0.480]
Δ Debt/GDP (t-1)	-17.62	-19.22	-18.53	-8.052	-7.651	-7.813
	[0.474]	[0.475]	[0.490]	[0.211]	[0.237]	[0.234]
QE * VIX (CEE)			-0.649			
			[0.893]			
QE * VIX (CIS)			**-22.74*****			
			[9.30e-08]			
QE * VIX (Dveloping Asia)			-2.253			
			[0.890]			
QE * VIX (LAC)			**11.36****			
			[0.0414]			
QE * VIX (MENA)			-1.945			
			[0.512]			
QE * VIX (SSA)			-1.501			
			[0.659]			
Avg Deposit rate spread over Spec. corp bonds (				5.16e-05	-7.76e-05	-4.36e-05
				[0.903]	[0.864]	[0.923]
Constant	**0.0439*****	**-0.208***	**0.0457*****	**-0.101***	-0.0853	-0.0878
	[3.07e-08]	[0.0979]	[2.70e-07]	[0.0861]	[0.151]	[0.164]
Observations	690	690	690	2,607	2,607	2,607
R-squared	0.008	0.011	0.010	0.005	0.006	0.006
Number of country_code	56	56	56	72	72	72

Robust pval in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Determinants of NFC deposits, Middle Income countries

This is a set of unbalanced panel regressions, with the sample period—2001Q4–2013Q1 and quarterly frequency. The dependent variable in each regression is a log-difference of the sum of the total NFC deposits in banks for middle-income countries, for which the SRF data is available. Definitions of all variables are presented in the Appendix 1.

	1	2	3	4	5	6
Capital inflows (t-1)	0.00144	0.000953	0.000195			
	[0.790]	[0.862]	[0.971]			
Capital inflows (t-4)	**0.0108*** **	**0.0108*** **	**0.0102*** **			
	[0.00328]	[0.00311]	[0.00621]			
Dlog(BIS external loans nonbanks) (t-1)				0.000800	0.000569	0.000579
				[0.950]	[0.964]	[0.964]
Dlog(BIS external loans nonbanks) (t-4)				7.51e-05	-0.000476	-0.000504
				[0.993]	[0.954]	[0.952]
Δ Nominal Exchange rate (t-1)	**-2.03e-05***	**-2.08e-05** **	**-2.71e-05***	1.29e-05	1.24e-05	1.24e-05
	[0.0599]	[0.0298]	[0.0762]	[0.508]	[0.508]	[0.507]
Log(VIX) (t-1)		-0.0121		**-0.0214*** **	**-0.0200** **	**-0.0201** **
		[0.477]		[0.00604]	[0.0126]	[0.0190]
Dlog(VIX) (t-1)	**0.0233***	**0.0291***	0.0227	**0.0168***	0.0148	0.0149
	[0.0949]	[0.0554]	[0.101]	[0.0999]	[0.125]	[0.112]
Growth of interoffice (t-1)	0.00715	0.0120*	0.0105	0.00334	0.00277	0.00266
	[0.197]	[0.0509]	[0.112]	[0.531]	[0.617]	[0.647]
QE(t-1)	-0.00926	0.0345	0.0421		-0.00684	-0.00815
	[0.260]	[0.211]	[0.131]		[0.258]	[0.579]
QE * VIX (t-1)		-18.19	**-20.84***			0.588
		[0.123]	[0.0932]			[0.932]
Real GDP growth (t-1)	0.110	0.0607	0.0163	0.0559	0.0394	0.0405
	[0.551]	[0.722]	[0.928]	[0.510]	[0.666]	[0.675]
inflation (t-1)	-0.000194	-9.43e-05	-0.000243	-0.000349	-0.000391	-0.000393
	[0.746]	[0.871]	[0.674]	[0.448]	[0.401]	[0.403]
Δ Debt/GDP (t-1)	8.350	12.64	15.38	-6.891	-6.436	-6.515
	[0.635]	[0.449]	[0.378]	[0.292]	[0.338]	[0.348]
QE * VIX (CIS)			**-18.19*** **			
			[0.00581]			
QE * VIX (Dveloping Asia)			-20.00			
			[0.106]			
QE * VIX (LAC)			11.26			
			[0.145]			
QE * VIX (MENA)			-1.869			
			[0.664]			
QE * VIX (SSA)			**9.139*** **			
			[0.00687]			
Avg Deposit rate spread over Spec. corp bonds				1.28e-05	-8.42e-05	-7.31e-05
				[0.975]	[0.843]	[0.877]
Constant	**0.0390*** **	-0.0351	**0.0459*** **	-0.0920*	-0.0807	-0.0815
	[0.00422]	[0.755]	[0.00137]	[0.0581]	[0.113]	[0.138]
Observations	535	535	535	1,704	1,704	1,704
R-squared	0.029	0.034	0.044	0.008	0.009	0.009
Number of country_code	38	38	38	48	48	48

Robust pval in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Determinants of NFC deposits, High Income Countries

This is a set of unbalanced panel regressions, with the sample period—2001Q4–2013Q1 and quarterly frequency. The dependent variable in each regression is a log-difference of the sum of the total NFC deposits in banks for high-income countries, for which the SRF data is available. Definitions of all variables are presented in the Appendix 1.

	1	2	3	4	5	6
Capital inflows (t-1)	0.0300	0.0316	0.0347			
	[0.203]	[0.201]	[0.234]			
Capital inflows (t-4)	0.0244	0.0243	0.0225			
	[0.379]	[0.403]	[0.368]			
Dlog(BIS external loans nonbanks) (t-1)				**0.0659***	0.0598	0.0589
				[0.0694]	[0.113]	[0.108]
Dlog(BIS external loans nonbanks) (t-4)				**0.125****	**0.108****	**0.104***
				[0.0200]	[0.0370]	[0.0520]
Δ Nominal Exchange rate (t-1)	0.000778	0.00148	0.000869	6.33e-05	-2.84e-06	-2.23e-05
	[0.145]	[0.236]	[0.131]	[0.715]	[0.988]	[0.891]
Log(VIX) (t-1)		-0.218		-0.125	-0.122	-0.121
		[0.330]		[0.254]	[0.252]	[0.251]
Dlog(VIX) (t-1)	-0.0668	0.0369	-0.0376	0.0596	0.0466	0.0488
	[0.276]	[0.768]	[0.537]	[0.222]	[0.289]	[0.300]
Growth of interoffice (t-1)	0.0658	0.00722	0.0266	0.0143	0.00857	0.00346
	[0.452]	[0.867]	[0.464]	[0.497]	[0.660]	[0.789]
QE(t-1)	0.0315	-0.692	-0.541		**-0.0746***	-0.132
	[0.500]	[0.276]	[0.293]		[0.0643]	[0.213]
QE * VIX (t-1)		341.2	266.1			25.97
		[0.287]	[0.283]			[0.528]
Real GDP growth (t-1)	-0.467	-0.0992	-0.0430	0.0320	-0.169	-0.167
	[0.599]	[0.883]	[0.959]	[0.852]	[0.404]	[0.416]
inflation (t-1)	0.0116*	0.0265	0.00670	0.0101	0.00833	0.00824
	[0.0898]	[0.214]	[0.306]	[0.214]	[0.252]	[0.266]
Δ Debt/GDP (t-1)	-227.3	-313.1	-298.7	-113.8	-119.3	-128.5
	[0.387]	[0.356]	[0.365]	[0.362]	[0.347]	[0.342]
qe_vix_D_WEO2			-32.54			
			[0.381]			
qe_vix_D_WEO3			-29.66*			
			[0.0609]			
qe_vix_D_WEO7			42.29			
			[0.343]			
Avg Deposit rate spread over Spec. corp bonds				-0.0165	-0.0198	-0.0173
				[0.155]	[0.136]	[0.141]
Constant	0.0441	-1.412	0.0487	-0.851	-0.817	-0.798
	[0.311]	[0.340]	[0.371]	[0.257]	[0.261]	[0.258]
Observations	124	124	124	309	309	309
R-squared	0.042	0.067	0.056	0.035	0.042	0.043
Number of country_code	9	9	9	9	9	9

Robust pval in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Determinants of NFC Deposits, Low Income Countries

This is a set of unbalanced panel regressions, with the sample period—2001Q4–2013Q1 and quarterly frequency. The dependent variable in each regression is a log-difference of the sum of the total NFC deposits in banks for low-income countries, for which the SRF data is available. Definitions of all variables are presented in the Appendix 1.

	1	2	3	4	5	6
Capital inflows (t-1)	-0.0307	-0.0284	-0.0317			
	[0.217]	[0.215]	[0.198]			
Capital inflows (t-4)	0.00516	0.00770	0.00515			
Dlog(BIS external loans nonbanks) (t-1)				0.0349	0.0348	0.0347
				[0.231]	[0.256]	[0.254]
Dlog(BIS external loans nonbanks) (t-4)				-0.0178	-0.0177	-0.0187
				[0.431]	[0.430]	[0.400]
	[0.743]	[0.647]	[0.741]			
Δ Nominal Exchange rate (t-1)	-0.000135	-4.47e-05	-7.90e-05	2.66e-05	2.65e-05	3.05e-05
	[0.233]	[0.787]	[0.602]	[0.775]	[0.777]	[0.737]
Log(VIX) (t-1)		0.0215		-0.00910	-0.00929	-0.00688
		[0.553]		[0.620]	[0.612]	[0.698]
Dlog(VIX) (t-1)	**0.0987*** **	0.0616	0.0772	0.0325	0.0328	0.0302
	[0.00593]	[0.387]	[0.120]	[0.270]	[0.240]	[0.282]
Growth of interoffice (t-1)	-0.0426	-0.0607	-0.0627	-0.0110	-0.0110	-0.00745
	[0.253]	[0.395]	[0.390]	[0.323]	[0.350]	[0.554]
QE(t-1)	0.0554*	-0.0353	-0.0411		0.000827	0.0348
	[0.0688]	[0.801]	[0.786]		[0.968]	[0.518]
QE * VIX (t-1)		29.69	33.96			-14.74
		[0.582]	[0.569]			[0.418]
Real GDP growth (t-1)	0.415	0.614	0.589	-0.00890	-0.00781	-0.00794
	[0.396]	[0.415]	[0.475]	[0.905]	[0.908]	[0.907]
inflation (t-1)	-0.000828	0.000109	-0.000549	-4.59e-05	-3.95e-05	1.73e-05
	[0.763]	[0.958]	[0.768]	[0.949]	[0.960]	[0.983]
Δ Debt/GDP (t-1)	**-9.961***	**-13.32*****	**-13.79****	-0.946	-0.971	-0.968
	[0.0659]	[0.00861]	[0.0147]	[0.926]	[0.928]	[0.927]
Avg Deposit rate spread over Spec. corp bonds (				-0.000926	-0.000911	-0.00147
				[0.628]	[0.641]	[0.507]
Constant	0.0230	0.133	0.00914	-0.00248	-0.00393	0.0103
	[0.716]	[0.554]	[0.900]	[0.982]	[0.972]	[0.924]
Observations	35	35	35	472	472	472
R-squared	0.172	0.199	0.196	0.004	0.004	0.005
Number of country_code	7	7	7	14	14	14

Robust pval in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Summary Statistics for M0, M2 Regression

Variable	Frequency	Obs	Mean	Std. Dev.	Min	Max
Global Variables						
VIX	Quarter	70	3.0161	0.3371	2.4006	4.0707
ΔVIX	Quarter	69	0.0074	0.2134	-0.4978	0.8491
Δ Interoffice	Quarter	65	-0.0001	1.1145	-4.1770	5.2829
Local Variables						
ΔM0	Quarter	3011	0.0269	0.1602	-3.1091	2.9787
ΔM2	Quarter	2977	0.0308	0.1320	-2.3519	2.6670
Capital Inflow	Quarter	2970	0.0235	0.1100	-0.7631	0.9285
Δ RER	Quarter	2917	-0.0006	0.0661	-0.5101	1.0309
Real GDP Growth	Annual	810	0.0326	0.0376	-0.1480	0.1420
Inflation	Annual	802	0.0679	0.2507	-0.1285	5.4921
Δ Debt to GDP	Annual	700	0.0043	0.0773	-0.3991	1.1137

Table 9a: Determinants of M0 Growth: Capital flows given by BIS 7B
Panel regressions with quarterly data on the determinants of M0 growth.

	Sample period: 1995Q1 - 2012Q2				Sample period: 2000Q1 - 2012Q2			
	Fixed effects		Dynamic (System GMM)		Fixed effects		Dynamic (System GMM)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M0 Growth(t-1)			**-0.2986*** **	**-0.2987*** **			**-0.2143*** **	**-0.2160*** **
			[0.0650]	[0.0649]			[0.0808]	[0.0807]
Capital Inflow(t-1)	**0.0251** **	**0.0252***	**0.0269** **	**0.0266** **	**0.0272***	**0.0273***	**0.0294***	**0.0288***
	[0.0117]	[0.0117]	[0.0127]	[0.0127]	[0.0148]	[0.0149]	[0.0164]	[0.0164]
△RER(t-1)	-0.0432	-0.0437	0.0256	0.0228	-0.0246	-0.0255	0.0086	0.0052
	[0.0287]	[0.0288]	[0.0335]	[0.0330]	[0.0213]	[0.0213]	[0.0410]	[0.0396]
VIX(t-1)	0.0011	0.0015	**0.0144*** **	**0.0158*** **	0.0023	0.0028	**0.0144*** **	**0.0171*** **
	[0.0046]	[0.0045]	[0.0035]	[0.0036]	[0.0051]	[0.0049]	[0.0039]	[0.0042]
△VIX	0.0173	0.0167	0.0181	0.0144	**0.0301** **	**0.0293***	**0.0324** **	**0.0267***
	[0.0125]	[0.0130]	[0.0136]	[0.0148]	[0.0143]	[0.0147]	[0.0153]	[0.0161]
△Interoffice(t-1)	**0.0075*** **	**0.0075*** **	**0.0054** **	**0.0051** **	**0.0082*** **	**0.0082*** **	**0.0078*** **	**0.0072*** **
	[0.0022]	[0.0022]	[0.0022]	[0.0021]	[0.0022]	[0.0022]	[0.0021]	[0.0019]
QE		-0.0020		-0.0102		-0.0023		**-0.0159***
		[0.0049]		[0.0079]		[0.0046]		[0.0086]
Real GDP Growth(t-1)	**0.1186** **	**0.1118***	**0.2696*** **	**0.2281*** **	0.0894	0.0804	**0.1806*** **	0.1055
	[0.0510]	[0.0568]	[0.0693]	[0.0792]	[0.0558]	[0.0615]	[0.0659]	[0.0856]
Inflation(t-1)	**0.1025*** **	**0.1010*** **	**0.1995*** **	**0.1876*** **	**0.0943** **	**0.0925** **	**0.1831*** **	**0.1575** **
	[0.0359]	[0.0357]	[0.0438]	[0.0403]	[0.0352]	[0.0347]	[0.0692]	[0.0641]
△Debt/GDP(t-1)	-0.0269	-0.0269	0.0204	0.0181	-0.0397	-0.0400	0.0166	0.0116
	[0.0259]	[0.0260]	[0.0433]	[0.0422]	[0.0246]	[0.0246]	[0.0537]	[0.0521]
Constant	0.0137	0.0130			0.0133	0.0124		
	[0.0142]	[0.0139]			[0.0157]	[0.0154]		
Observations	2646	2646	2640	2640	2134	2134	2134	2134
# of Countries	45	45	45	45	45	45	45	45
R^2 Within	0.0183	0.0184			0.0289	0.0290		
R^2 Between	0.6637	0.6659			0.6058	0.6100		
R^2 Overall	0.0307	0.0305			0.0427	0.0424		
AR(1) *p*-value			0.0001	0.0001			0.0006	0.0006
AR(2) *p*-value			0.0603	0.0670			0.9818	0.9673

Standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table 9b: Determinants of M0 Growth: Capital flows given by BIS 7B+12D
Panel regressions with quarterly data on the determinants of M0 growth.

	Sample period: 1995Q1 - 2012Q2				Sample period: 2000Q1 - 2012Q2			
	Fixed effects		Dynamic (System GMM)		Fixed effects		Dynamic (System GMM)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M0 Growth(t-1)			**-0.2992*** **	**-0.2992*** **			**-0.2148*** **	**-0.2165*** **
			[0.0652]	[0.0650]			[0.0812]	[0.0811]
Capital Inflow(t-1)	0.0185	0.0187	0.0228	0.0229	0.0231	0.0234	0.0274	0.0279
	[0.0131]	[0.0130]	[0.0156]	[0.0157]	[0.0169]	[0.0170]	[0.0213]	[0.0215]
△RER(t-1)	-0.0439	-0.0444	0.0252	0.0224	-0.0253	-0.0261	0.0082	0.0048
	[0.0288]	[0.0288]	[0.0335]	[0.0330]	[0.0215]	[0.0215]	[0.0408]	[0.0395]
VIX(t-1)	0.0006	0.0011	**0.0143*** **	**0.0157*** **	0.0019	0.0024	**0.0144*** **	**0.0171*** **
	[0.0046]	[0.0045]	[0.0035]	[0.0036]	[0.0050]	[0.0049]	[0.0039]	[0.0042]
△VIX	0.0172	0.0165	0.0181	0.0143	**0.0300** **	**0.0292** *	**0.0325** **	**0.0267** *
	[0.0125]	[0.0130]	[0.0136]	[0.0148]	[0.0143]	[0.0146]	[0.0153]	[0.0161]
△Interoffice(t-1)	**0.0075*** **	**0.0074*** **	**0.0054** **	**0.0050** **	**0.0082*** **	**0.0081*** **	**0.0078*** **	**0.0072*** **
	[0.0022]	[0.0022]	[0.0022]	[0.0021]	[0.0022]	[0.0022]	[0.0021]	[0.0019]
QE		-0.0020		-0.0103		-0.0024		**-0.0161** *
		[0.0049]		[0.0079]		[0.0046]		[0.0086]
Real GDP Growth(t-1)	**0.1219** **	**0.1151** **	**0.2740*** **	**0.2319*** **	0.0916	0.0823	**0.1845*** **	0.1079
	[0.0507]	[0.0564]	[0.0698]	[0.0795]	[0.0557]	[0.0612]	[0.0661]	[0.0852]
Inflation(t-1)	**0.1030*** **	**0.1015*** **	**0.2006*** **	**0.1886*** **	**0.0953*** **	**0.0933** **	**0.1841*** **	**0.1582** **
	[0.0357]	[0.0355]	[0.0439]	[0.0403]	[0.0351]	[0.0345]	[0.0697]	[0.0645]
△Debt/GDP(t-1)	-0.0263	-0.0264	0.0207	0.0183	-0.0394	-0.0397	0.0170	0.0119
	[0.0259]	[0.0260]	[0.0434]	[0.0423]	[0.0246]	[0.0246]	[0.0538]	[0.0522]
Constant	0.0152	0.0144			0.0145	0.0136		
	[0.0141]	[0.0138]			[0.0155]	[0.0151]		
Observations	2646	2646	2646	2646	2134	2134	2134	2134
# of Countries	45	45	45	45	45	45	45	45
R^2 Within	0.0177	0.0178			0.0282	0.0283		
R^2 Between	0.6667	0.6691			0.6114	0.6158		
R^2 Overall	0.0302	0.0300			0.0423	0.0420		
AR(1) *p*-value			0.0001	0.0001			0.0006	0.0006
AR(2) *p*-value			0.0612	0.0681			0.9870	0.9722

Standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table 10a: Determinants of M2 Growth: Capital flows given by BIS 7B
Panel regressions with quarterly data on the determinants of M2 growth.

	Sample period: 1995Q1 - 2012Q2				Sample period: 2000Q1 - 2012Q2			
	Fixed effects		Dynamic (System GMM)		Fixed effects		Dynamic (System GMM)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M2 Growth(t-1)			**-0.3838*** **	**-0.3831*** **			**-0.2997*** **	**-0.2995*** **
			[0.0800]	[0.0799]			[0.1151]	[0.1140]
Capital Inflow(t-1)	**0.0145***	**0.0146***	**0.0178***	**0.0177***	**0.0199***	**0.0200***	**0.0336****	**0.0338****
	[0.0082]	[0.0082]	[0.0101]	[0.0100]	[0.0106]	[0.0106]	[0.0164]	[0.0164]
△RER(t-1)	**-0.0420***	**-0.0431***	0.0064	0.0036	**-0.0312***	**-0.0321***	0.0177	0.0146
	[0.0245]	[0.0250]	[0.0381]	[0.0382]	[0.0170]	[0.0172]	[0.0362]	[0.0356]
VIX(t-1)	**-0.0072****	**-0.0064***	**0.0151****	**0.0163*** **	**-0.0058***	**-0.0051***	**0.0160*** **	**0.0181*** **
	[0.0030]	[0.0030]	[0.0029]	[0.0031]	[0.0030]	[0.0029]	[0.0041]	[0.0047]
△VIX	0.0020	0.0007	0.0080	0.0045	0.0058	0.0049	0.0132	0.0087
	[0.0059]	[0.0063]	[0.0081]	[0.0090]	[0.0062]	[0.0065]	[0.0084]	[0.0087]
△Interoffice(t-1)	0.0029	0.0028	0.0037	0.0033	0.0027	0.0026	0.0038	0.0033
	[0.0018]	[0.0018]	[0.0024]	[0.0023]	[0.0017]	[0.0017]	[0.0024]	[0.0023]
QE		-0.0037		**-0.0095****		-0.0027		**-0.0127*** **
		[0.0025]		[0.0037]		[0.0019]		[0.0045]
Real GDP Growth(t-1)	**0.1642*** **	**0.1518*** **	**0.4003*** **	**0.3648*** **	**0.1937*** **	**0.1833*** **	**0.3779*** **	**0.3231*** **
	[0.0262]	[0.0288]	[0.0603]	[0.0579]	[0.0279]	[0.0318]	[0.0505]	[0.0452]
Inflation(t-1)	**0.0805*** **	**0.0778*** **	**0.1397*** **	**0.1296*** **	**0.0381****	**0.0360****	0.0663	0.0442
	[0.0181]	[0.0186]	[0.0356]	[0.0347]	[0.0179]	[0.0177]	[0.0424]	[0.0421]
△Debt/GDP(t-1)	-0.0442	-0.0444	0.0334	0.0329	**-0.0461***	**-0.0463***	0.0243	0.0238
	[0.0298]	[0.0299]	[0.0861]	[0.0857]	[0.0259]	[0.0259]	[0.0837]	[0.0834]
Constant	**0.0388*** **	**0.0374*** **			**0.0359*** **	**0.0349*** **		
	[0.0089]	[0.0090]			[0.0090]	[0.0088]		
Observations	2623	2623	2614	2614	2134	2134	2134	2134
# of Countries	45	45	45	45	45	45	45	45
R^2 Within	0.0328	0.0332			0.0475	0.0478		
R^2 Between	0.8291	0.8346			0.6594	0.6593		
R^2 Overall	0.0776	0.0761			0.093	0.0914		
AR(1) *p*-value			0.0067	0.0067			0.0124	0.0126
AR(2) *p*-value			0.2079	0.2044			0.6865	0.6667

Standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1

Table 10b: Determinants of M2 Growth: Capital flows given by BIS 7B+12D
Panel regressions with quarterly data on the determinants of M2 growth.

	Sample period: 1995Q1 - 2012Q2				Sample period: 2000Q1 - 2012Q2			
	Fixed effects		Dynamic (System GMM)		Fixed effects		Dynamic (System GMM)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M2 Growth(t-1)			**-0.3844*** **	**-0.3837*** **			**-0.3003*** **	**-0.3001*** **
			[0.0800]	[0.0799]			[0.1153]	[0.1142]
Capital Inflow(t-1)	0.0111	0.0114	0.0140	0.0144	0.0179	0.0182	**0.0349***	**0.0360***
	[0.0088]	[0.0089]	[0.0123]	[0.0123]	[0.0117]	[0.0118]	[0.0199]	[0.0202]
△RER(t-1)	**-0.0424***	**-0.0435***	0.0060	0.0032	**-0.0316***	**-0.0326***	0.0174	0.0144
	[0.0246]	[0.0250]	[0.0382]	[0.0383]	[0.0170]	[0.0173]	[0.0364]	[0.0358]
VIX(t-1)	**-0.0075****	**-0.0067****	**0.0151*** **	**0.0162*** **	**-0.0060***	**-0.0054***	**0.0159*** **	**0.0180*** **
	[0.0030]	[0.0030]	[0.0029]	[0.0031]	[0.0030]	[0.0030]	[0.0041]	[0.0047]
△VIX	0.0019	0.0007	0.0080	0.0045	0.0057	0.0048	0.0133	0.0088
	[0.0059]	[0.0063]	[0.0081]	[0.0090]	[0.0061]	[0.0065]	[0.0084]	[0.0086]
△Interoffice(t-1)	0.0029	0.0028	0.0036	0.0033	0.0027	0.0026	0.0037	0.0033
	[0.0018]	[0.0018]	[0.0024]	[0.0023]	[0.0017]	[0.0017]	[0.0024]	[0.0023]
QE		-0.0037		**-0.0095****		-0.0028		**-0.0128*** **
		[0.0025]		[0.0038]		[0.0020]		[0.0046]
Real GDP Growth(t-1)	**0.1659*** **	**0.1535*** **	**0.4041*** **	**0.3680*** **	**0.1950*** **	**0.1843*** **	**0.3802*** **	**0.3243*** **
	[0.0263]	[0.0291]	[0.0614]	[0.0589]	[0.0284]	[0.0325]	[0.0502]	[0.0451]
Inflation(t-1)	**0.0808*** **	**0.0782*** **	**0.1403*** **	**0.1301*** **	**0.0387****	**0.0365****	0.0677	0.0452
	[0.0181]	[0.0185]	[0.0355]	[0.0346]	[0.0179]	[0.0176]	[0.0415]	[0.0413]
△Debt/GDP(t-1)	-0.0440	-0.0441	0.0337	0.0332	**-0.0459***	**-0.0461***	0.0245	0.0240
	[0.0298]	[0.0298]	[0.0864]	[0.0860]	[0.0259]	[0.0259]	[0.0839]	[0.0836]
Constant	**0.0396*** **	**0.0382*** **			**0.0367*** **	**0.0356*** **		
	[0.0090]	[0.0090]			[0.0089]	[0.0088]		
Observations	2623	2623	2623	2623	2134	2134	2134	2134
# of Countries	45	45	45	45	45	45	45	45
R^2 Within	0.0323	0.0327			0.0466	0.0469		
R^2 Between	0.8272	0.8328			0.6634	0.6637		
R^2 Overall	0.0773	0.0758			0.0927	0.0910		
AR(1) *p*-value			0.0067	0.0068			0.0124	0.0126
AR(2) *p*-value			0.2086	0.2051			0.6900	0.6714

Standard errors in brackets.

*** p<0.01, ** p<0.05, * p<0.1