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A note on money creation in emerging market economies

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Abstract

This paper discusses the money creation mechanisms in emerging markets with special focus on external transactions. We argue that one should not rule out the possibility that fluctuations in the loans-to-deposits and non-core liabilities ratios are driven by the banks. We also argue that, under a flexible exchange rate regime in which the central bank is not trying to accumulate foreign reserves, external transactions are unlikely to contribute significantly to money growth. To make our argument, we analyze a historical episode of these flows in Korea and Russia and conduct a canonical correlation analysis for a cross-section of emerging market economies.

Keywords: Money supply, non-core liabilities, loans-to-deposits ratio, emerging markets.
JEL classification: E51, F30, G21.

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1 Introduction

Money is created by bank lending. When a bank grants a loan, it books the loan as an asset and the newly created deposit as a liability. Therefore, when banks lend to borrowers, they thereby create deposits (initially held by the borrowers). Deposits may later be used as payment media and thus may be spread among customers of different banks. This mechanism, which is present in a number of comprehensive (if somewhat heterogeneous) theoretical economic models (Goodley and Lavoie (2007), Jakab and Kumhof (2015), Brunnermeier and Sannikov (2015), Hanson et al. (2015)) and has found empirical support (Badarudin et al. (2013), Werner (2014)), is widely accepted as state of the art in monetary analysis (ECB (2011), McLeay et al. (2014), Borio and Disyatat (2015)). The concept is crucial for understanding monetary policy transmission. Money being a by-product of credit, however, shifts the focus of monetary analysis from the liability side of the banking system to the asset side (see e.g. Friedman (2012), Turner (2013)), i.e. from money to credit. Accordingly, credit extension creates new purchasing power and is thus crucial for economic analysis. The creation of various combinations of instruments on the liability side of the banking system balance sheet becomes irrelevant in this context.

Nonetheless, there is a strand of literature that spotlights monetary aggregates and especially to the divergence between deposits and loans. One reason for this is the connection between such developments and movements in important financial stability indicators such as the loans-to-deposits and Net Stable Funding ratios. Hahm et al. (2013) find that disproportional growth of non-core bank liabilities has significant predictive power for currency and credit crises. Furthermore, Kim et al. (2013) and Chyung et al. (2015) argue that certain components of monetary aggregates may represent a non-core (i.e. unstable) segment of bank liabilities. Specifically, Chyung et al. (2015) point out that money stock may see rapid increases due to the cross-border operations of non-financial corporations, either via direct borrowing from abroad or via operating overseas subsidiaries.

In this paper we look closely at this mechanism as well as more general aspects of the money creation process. We focus on an analysis of emerging markets, as we believe there may be important differences here compared to the recent literature on advanced countries (e.g. the description of money creation in the euro area countries by Kuzin and Schobert (2015)). In particular, we believe that the importance of external transactions in money creation may be conditional on the central bank's foreign reserves policy.

The rest of the paper is structured as follows. Section 2 outlines the flow of funds framework so as to illustrate possible sources of divergence between loan and deposit growth and the actual evolution of these flows in Russia and Korea. Section 3 presents the results of an empirical analysis that identifies the most common combinations of these sources for a cross-section of emerging markets. Section 4 concludes.

2 Sources of deposit leakages

Loans create deposits, but the two are not necessarily equal. That the deviation between them may be significant is evident from the ample amount of analysis that has been done on fluctuations in the loans-to-deposits ratio.

Kim et al. (2013) and Chyung et al. (2015) argue that the much of the divergence between loans and deposits may occur during credit booms because the growth of retail deposits cannot exceed the growth of household-sector wealth. However, the mechanism through which this adjustment may take place is not described explicitly. For example, excess deposits may be used to repay debt (Lavoie (1999)) or the prices of alternative assets may increase in response to deposit expansion (Brunnermeier and Sannikov (2015)). In such cases, the share of deposits in total wealth remains stable, but the loans-to-deposits ratio is also unaffected.

Choi and Choi (2016), on the other hand, argue that monetary tightening reduces deposit supply and leads to banks' greater reliance on wholesale funding. They reasonably point out that deposits will contract due to less money creation by banks (i.e. lending). Interestingly, under this assumption, it is not clear why there should be an increase in either the amount of banks' wholesale funding or in the loans-to-deposit ratio. The alternative explanation for deposit contraction simply assumes that depositors replace them by other less liquid claims on banks[1] because the interest rates on these instruments are more responsive to hikes in policy rates. Borio and Lowe (2004) also mention portfolio shifts as the main source of the wedge between private credit and money growth rates.

It is may thus be useful to discuss the sources of deviations between loans and deposits in more detail. Economists have long known about these sources, which are transactions of the non-banking sector with other sectors and are sometimes referred to as 'leakages'.[2] The outside sectors are the government, the banking sector and the foreign sector. The role of the

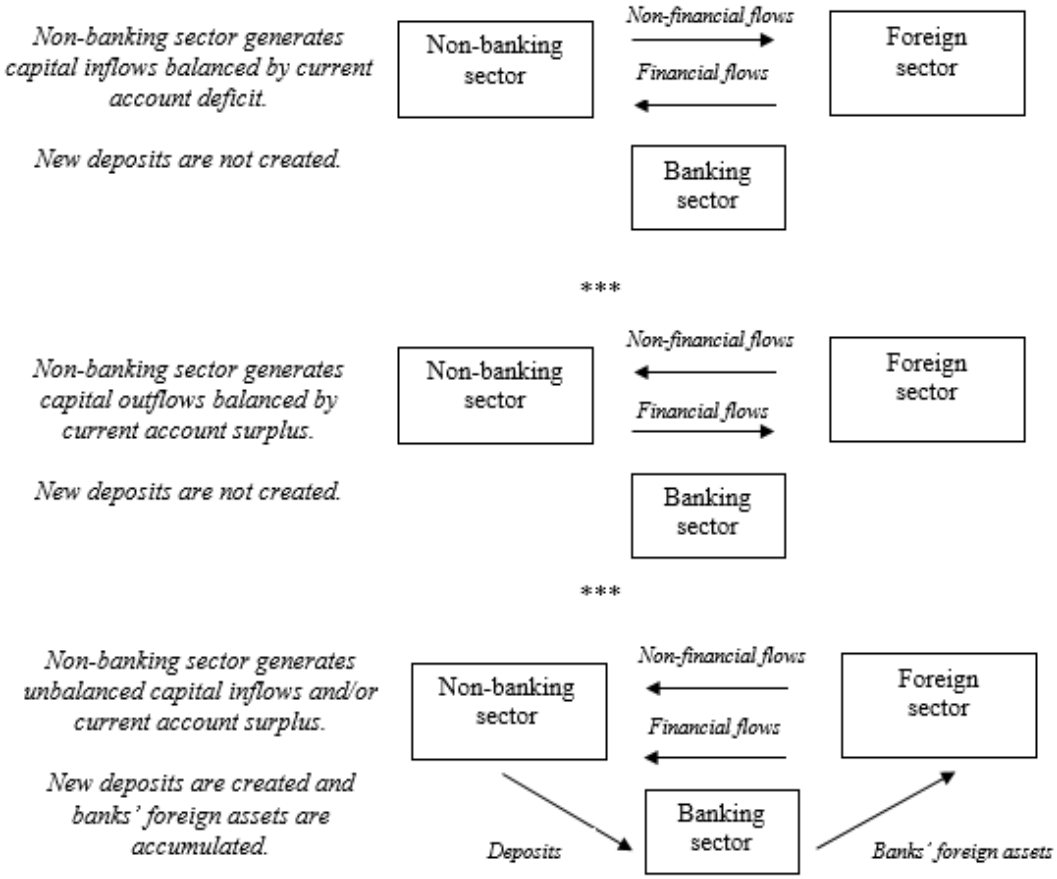
[1] Note that non-banking agents' investments in other non-banking agents' financial liabilities do not lead to deposit outflows.

[2] See e.g. Tobin (1982) for theoretical discussion as well as Berg (2012), Kuzin and Schobert (2015) and Kauko (2015) for recent applications.

government (if it is not accumulating sovereign funds) is usually quite straightforward. It may borrow from the banking[3] sector and transfer funds to the private non-banking sector, which lowers its loans-to-deposits ratio. As regards transactions with banking sector, any investments by the non-banking sector in financial instruments other than bank deposits will result in a decrease in deposits. Non-financial transactions that create undistributed profits and accumulation of capital in the banking sector is another type of leakage.

In this paper we, however, focus on transactions with the foreign sector. The non-banking sector may conduct financial and non-financial external transactions. The sum of these transactions constitutes the change in funds owned by the non-banking sector. In the balance of payments, this sum also equals the sum of the banking sector's external transactions. For simplicity we ignore the non-financial external transactions of the banking sector and assume that the change in net foreign assets summarizes all transactions (see Bê Duc et al. (2008) for a detailed discussion of the monetary approach to the balance of payments). From the banks' balance sheet perspective, it is equally correct to regard increasing claims on the foreign sector as the counterpart of accepting liabilities into domestic non-banking sector (Figure 1).

Figure 1 Flow of funds during external transactions



[3] For simplicity, we will not specifically discuss the case of government borrowing from the foreign sector.

An increase in banks' net foreign assets is therefore crucial for deposits growth. Arguably, the fact that the banking system wishes to increase its net foreign assets predetermines deposits expansion via external transactions of the non-banking sector (irrespective of whether funds flow in via the financial or current account).[4]

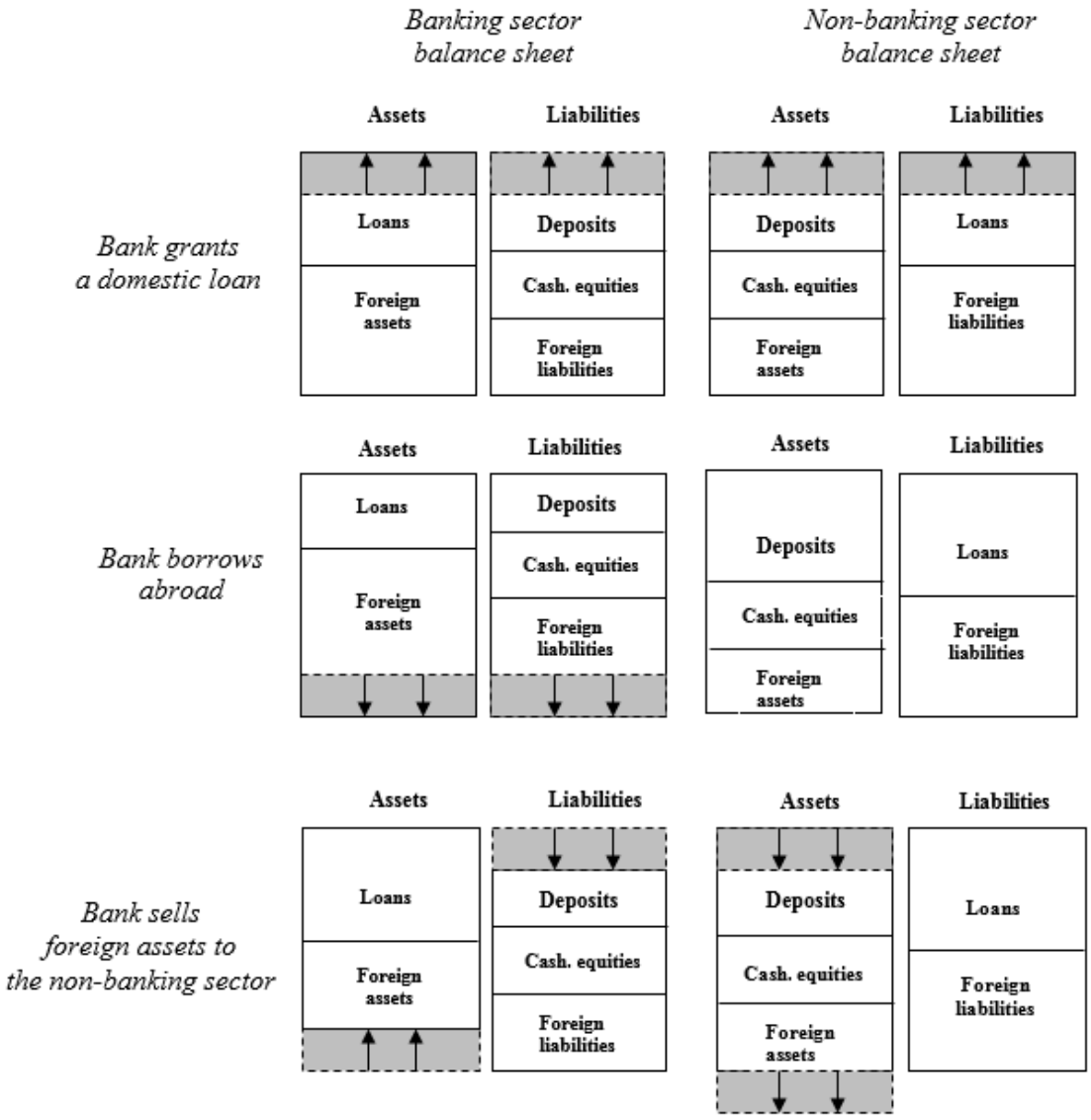
Obviously, this also means that an increase in banks' net foreign liabilities is mechanically linked with a corresponding decrease in deposits. Therefore, the notion of banks supplementing insufficient deposits on their balance sheet by borrowing from abroad in order to grant a loan may be misleading. An alternative interpretation could be that banks facing a leakage of deposits to the foreign sector (which may or may not be correlated with increased lending) respond by accumulating net foreign liabilities. It is also equally plausible to claim that banks cause a decline in deposits by increasing their foreign liabilities.

Surely, through several transactions banks may end up with more loans and more foreign liabilities on their balance sheet (Figure 2). We may consider loan extension (which also implies creation of new deposits) as the first independent step. Next, banks increase their net foreign liabilities (by borrowing abroad and selling the obtained foreign assets). At this stage we will see the following adjustment in the balance of payments: financial inflows generated by the banking sector will be balanced by either financial outflows from the non-banking sector or by current account deterioration (probably together with exchange rate appreciation). In both cases there will be an outflow of funds from the non-banking sector[5]. It is possible that replacing domestic liabilities by foreign ones leads to lower funding costs and therefore may fuel a credit boom. Typically (see e.g. Hahm et al. (2013)) we thus see a pattern of rapid credit and foreign liabilities growth accompanied by slower growth of deposits.

[4] For example, non-financial external transactions typically contributed to deposit creation in Germany prior to the crisis of 2008 (Kuzin and Schobert (2015)) whereas for the euro area as a whole money creation in 2013 -2014 was driven by both sizable capital inflows and a surplus in the current account. Chyung et al. (2015) note that borrowing by an overseas subsidiary that is used to cover costs of the domestic corporation will not be reflected in capital flow statistics. Such transaction will increase the current account.

[5] Alternatively, commercial banks may sell foreign reserves to the central bank. This will not change banking sector's net foreign assets or loans-to-deposits ratio. However, commercial banks' non-core liabilities ratio (as defined in e.g. Hahm et al. (2013)) will increase.

Figure 2 Expanding banks' balance sheet via loans and foreign liabilities

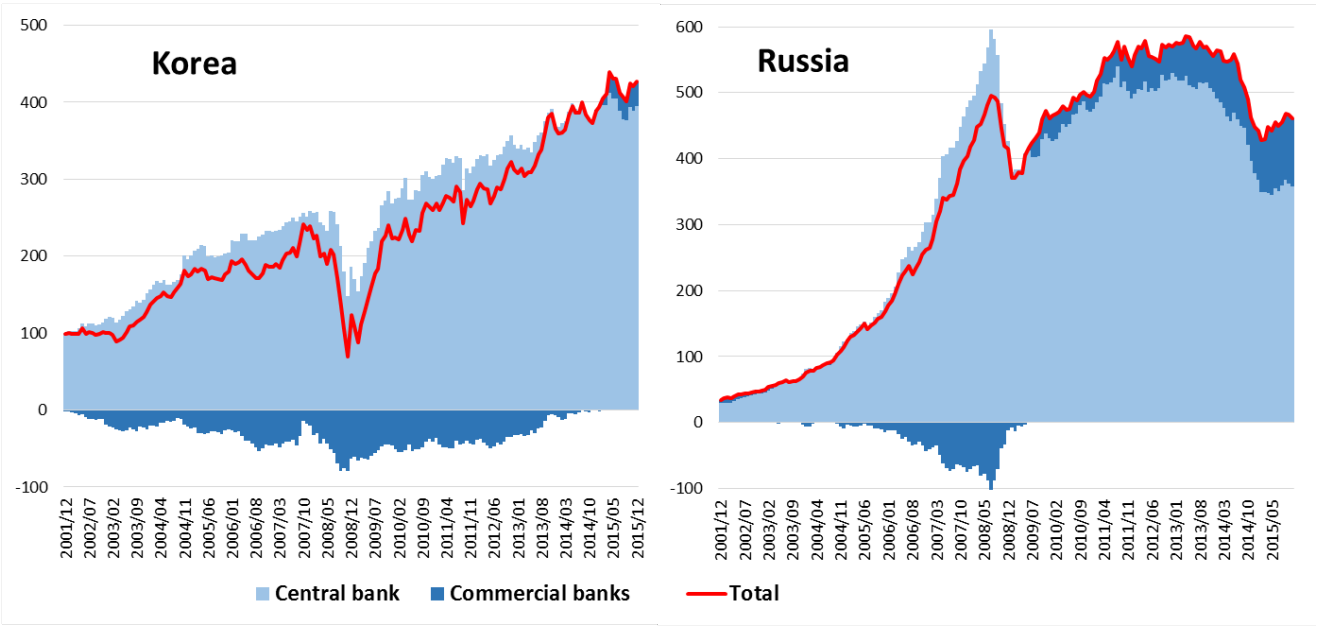


The definite link between changes in the banking sector's net foreign assets and external transactions of the non-banking sector can thus also be considered to seriously restrict money creation. The accumulation of net foreign assets/liabilities is usually associated with a widening of currency mismatches, which are undesirable (and in many cases forbidden by the banking regulation). This may not be a problem for countries in a monetary union, but for other emerging markets the most likely driver of changes in the banking sector's net foreign assets are actions of the respective central banks. Accordingly, once the monetary policy set-up no longer implies significant foreign exchange operations the role of external transactions in money creation diminishes.

We will further pursue this point by looking at two countries: Korea and Russia. These countries are illustrative because the net foreign assets in their banking systems changed significantly during the last several decades, albeit for different reasons. The Bank of Russia

was managing its exchange rate prior to 2009 and accumulated a large amount of foreign reserves while preventing ruble appreciation in 2006–2008. The Bank of Korea, which had no explicit exchange rate target, used interest rate steering as its main monetary policy tool. Nevertheless, it also accumulated foreign reserves as a means of preventing future financial crises, carried out via sterilization interventions in the foreign exchange market. In both cases, the contribution of commercial banks to foreign reserves accumulation was limited, although they transitioned to positive net foreign reserves holdings in 2008–2010 in Russia and in 2013–2015 in Korea (Figure 3).

Figure 3 Net foreign assets of the banking system (bln. USD)



We proceed to a more detailed analysis of flow of funds for these two economies. For this purpose, we express deposit growth in terms of its counterparts on the banking sector balance sheet:[6]

$$\Delta D = \Delta C^{P} + \Delta NC^{G} + \Delta NFA + \Delta OTHER \quad (1)$$

where D is bank deposits, C^{P} is credit to the private non-banking sector, NC^{G} is net claims on general government, NFA is net foreign assets of the banking sector and OTHER is the balancing item (notably including cash, equities and other instruments).

For convenience, we rewrite relationship (1). We replace ΔNFA by its counterpart: non-financial external transactions (NFET, proxied by current account surplus) and financial

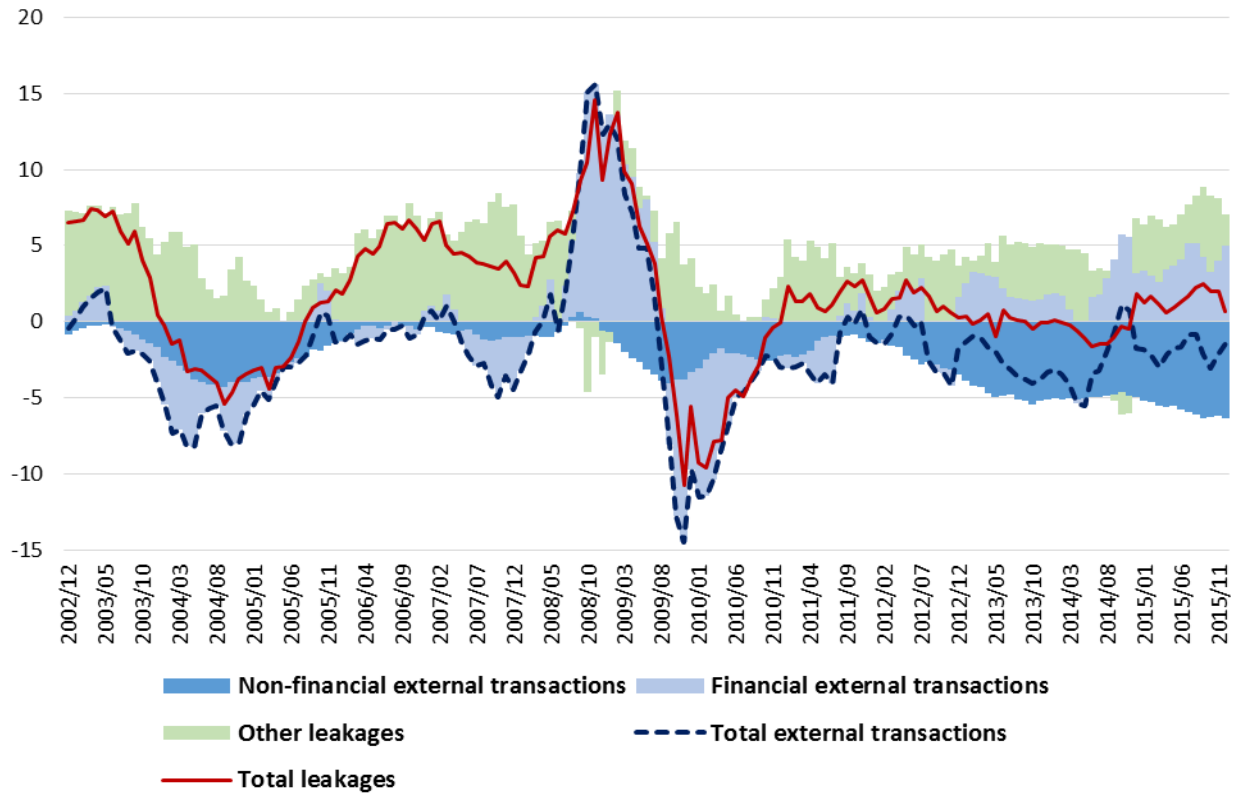
[6] This approach, which is in line with money counterparts analysis, has been regularly presented in the ECB's Monthly Bulletins.

external transaction (FET, calculated as NFET-ΔNFA). For Russia, we also decompose ΔNC^G into net credit of commercial banks to the government (ΔC^G) and changes in liabilities of the Bank of Russia to the government that represent sovereign fund accumulation (ΔSF). Finally, we rearrange the balance sheet items to express the deposit leakages (difference between increases in credit and deposits).[7]

$$\underbrace{\Delta C^P + \Delta C^G - \Delta D}_{\text{Total leakages}} = \underbrace{FET - NFET}_{\text{Total external transactions}} + \Delta SF + \Delta OTHER \qquad (2)$$

We begin by examining the developments in these flows in Korea (Figure 4). In this economy, external transaction contributed significantly to money stock growth in 2004–2005 when both trade and financial channels generated an inflow of funds to the non-banking sector. In 2008–2009 drastic financial flows from/to the banking sector were also accommodated by the banking system. Starting from 2011 the deposit leakages produced by external transactions were limited, although the capital outflow from the commercial banking sector in 2013–2014 was offset by a larger current account surplus, which resulted in money creation.

Figure 4 Deposit leakages in Korea (flows over 12 months, % of deposits)



[7] In this section we use data reported by the Bank of Korea and the Bank of Russia. We use changes in stocks to represent flows and adjust changes in net foreign assets for currency reevaluation effects.

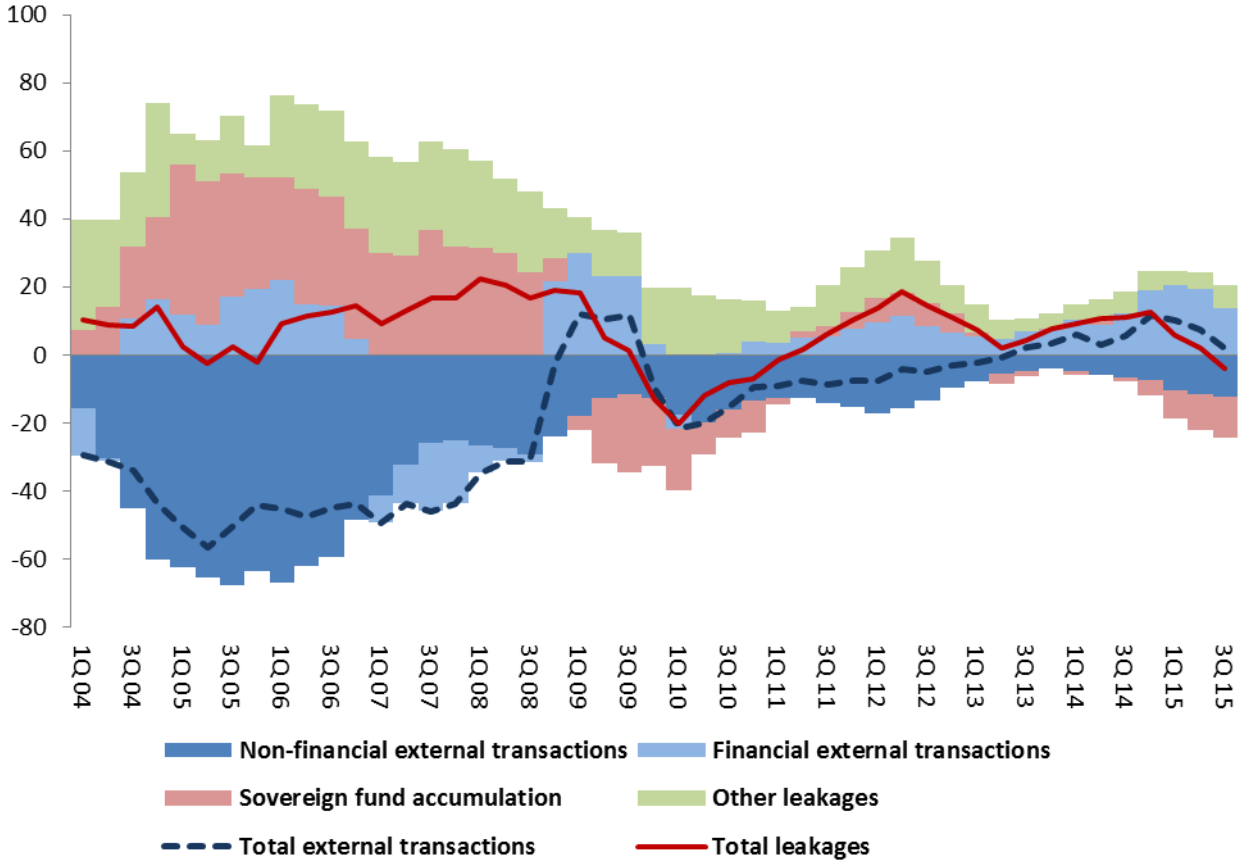
We now proceed to examine the flow of funds in Russia (Figure 5). Notably, external transactions played a very important role in money creation prior to 2009. A large current account surplus, which was not fully balanced by capital outflows, contributed significantly to the accumulation of funds in the non-banking sector. In fact, in 2007–2008 the inflow of funds occurred through both trade and financial channels. Conversely, in late 2008 and early 2009 external transactions resulted in monetary contraction. These developments were made possible by the Bank of Russia's managed exchange rate regime of that period. Foreign reserves were purchased to prevent ruble appreciation prior to the crisis of 2008 and sold during the financial turmoil in late 2008. After 2009 there was a gradual transition to a flexible exchange rate regime, which resulted in a balancing of financial and non-financial transactions of the non-banking sector and predetermined the decline of the role of the foreign sector (or at least of its transactions with the non-banking sector) in money creation. In the current circumstances, it is highly unlikely that, for example, an increase in the revenues of the Russian exporters will have any effect on money stock, since these flows will have be balanced by other outflows from the non-banking sector (i.e. an increase in imports or capital outflow). On the other hand, should Russian commercial banks increase their net foreign assets (e.g. by having to repay their foreign debt) the money stock increase will be predetermined since these outflows will be balanced by inflows to the non-banking sector (e.g. by means of a larger current account surplus).

Another peculiar source of deposit leakage in Russia is the sovereign fund. Its accumulation had a substantial restrictive effect on monetary expansion in 2005–2008. It has subsequently been used to finance fiscal deficits in 2009 and 2015. Consequently, countercyclical fiscal policy helped to create money during the contractionary phases of the credit cycle. Arguably, the sovereign fund proved to be a useful addition to both the monetary and fiscal policy toolkits.

Other leakages steadily contributed to deposit outflows. Predictably, these were larger during the credit boom of 2006–2008, when balance sheets were expanding very rapidly.

These two cases illustrate that it is not changes in commercial banks' net foreign assets, but rather changes in net foreign assets of the central bank, that accommodate money creation via external transactions. Once the presence of a central bank on the foreign exchange market diminishes, the net external transactions of the non-banking sector will become more balanced. In the above cases, this occurred via larger net capital outflows from the non-banking sector in both countries in 2011–2015 (as well as via deterioration of the current account surplus in Russia).

Figure 5 Deposit leakages in Russia (flows over 4 quarters, % of deposits)



3 Canonical correlation analysis

In this section we examine deposit leakages in the cross-section of emerging market economies. We provide some preliminary description of the most common combinations of inflows and outflows that determine deposits fluctuations.

3.1 Data

We divide flow of funds indicators that determine deposit fluctuations into inflow and outflow indicators.[8]

The inflow indicators are change in claims of banking sector on private non-banking sector (ΔC^P), change in net claims of banking sector on central government (ΔC^G), and non-financial external transaction (NFET, proxied by current account surplus).

[8] Admittedly, this division is somewhat arbitrary because any item may potentially produce either an inflow or an outflow. The division presented here represents the most common flow directions in our cross section of countries.

The outflow indicators are change in shares and other equity (ΔCAP), change in currency outside depository corporations (ΔCASH), financial external transaction (FET, i.e. non-financial external transaction less change in net foreign assets of depository corporations).

We also add the balancing variable: other outflows (OTHER, equates *change in deposits to inflows-outflows-other outflows*).

Our cross-section includes 37 emerging market economies (see Table 3 in the Annex). We use annual time series data mainly for 2002–2014, giving us 471 observations in all.[9]

Our main data source is Depository Corporations Survey (based on Standardized Report Forms) from the IMF IFS database. The current account and exchange rate data are from the World Bank WDI database.

All variables are in per cent of total depository corporations' assets (see Table 4 in the Annex for descriptive statistics).

3.2 Method

We apply the canonical correlation method developed by Hotelling (1935, 1936), which has been used in balance sheet analysis (Stowe et al. (1980), Simonson et al. (1983), Obben and Shanmugan (1993), DeYong and Yom (2008)). In a canonical analysis, vectors of weights for each of the two subsets of variables (inflows and outflows) are derived so as to maximize the correlations between the linear combinations using the derived canonical weights.

The linear combinations are known as the canonical variates. Several pairs of weight vectors can be derived and each additional pair produces scores which are uncorrelated with the previous scores. As many canonical variates can be derived as there are variables in the smaller subset, if the variables are not perfectly multicollinear (here, 3 variables in the inflow subset). One can conduct overall tests of any linear relationships between the two sets of variables. Because the derived canonical variates may not all be statistically significant we report the Wilk's lambda indicator and use Chi-square to approximate its distribution for the purpose of formal statistical testing (Bartlett (1941)).

The nature of the canonical variates, derived to have maximum correlations, can be examined by utilizing canonical loadings. Canonical loadings are the correlations between the original variables and the respective canonical variates.

[9] The choice of countries and time series was determined by data availability at the IMF IFS database, although we purposefully excluded countries in the European Monetary Union.

3.3 Empirical results

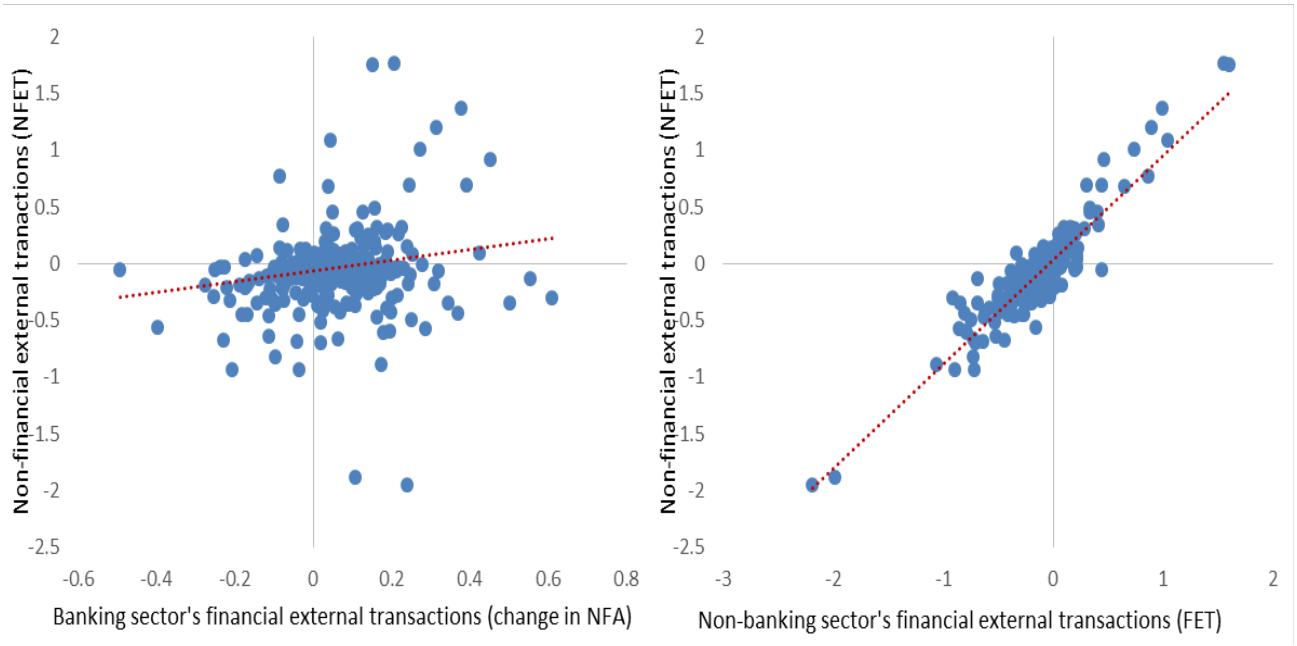
We estimated three pairs of canonical variates, the last one of which being clearly statistically insignificant (Table 1). We therefore omit the third canonical function from the canonical loadings analysis.

Table 1 Statistical significance of canonical functions

Canonical function	Canonical correlation	Wilk's lambda	Chi-square test p-value
1 through 3	0.97	0.03	0.00
2 through 3	0.63	0.58	0.00
3 through 3	0.19	0.96	0.98

Canonical loadings are presented in Table 2. The first set of common correlations (canonical function I) between inflows and outflows is quite straightforward. Predictably, inflow of funds from the foreign sector is usually strongly correlated with outflows to the foreign sectors (NFET and FET variables both have loading coefficients exceeding 0.9). This shows that fluctuations in non-financial transactions of the non-banking sector are balanced by the financial transactions in this sector and are not accommodated by banks (this point is visualized in Figure 6, which plots NFET against FET and against changes in banks' net foreign assets). Therefore, no money creation takes place. The existence of this relationship seems to be independent of other flows (correlations of other variables with this pair of variates are low).

Figure 6 Correlation of non-financial external transactions with financial external transactions in the banking and non-banking sectors



The second set of correlations is somewhat less interpretable. It follows that the extension of credit to private sector (loading of ΔC^P is 0.94) is positively correlated with investment into alternative domestic financial instruments (ΔCAP, ΔCASH and OTHER have loadings of about 0.4–0.5), but does not seem to be connected with capital outflows (loading of FET is –0.34). Judging by the sizes of loading coefficients, this pattern is clearly less distinct compared to the strong links with transactions with the foreign sector. Admittedly, a more comprehensive analysis of the link between lending and outflows of funds from deposits is needed.

Table 2 Canonical loadings

Variable	Canonical function	
	I	II
Inflows		
ΔC^P	0.13	0.96
ΔC^G	0.21	–0.07
NFET	0.94	–0.29
Outflows		
ΔCAP	0.03	0.39
ΔCASH	0.25	0.56
FET	0.94	–0.34
OTHER	0.23	0.46

The overall results of canonical analysis may be summarized as follows. The only distinct link between different types of deposit leakages that was identified is between financial and non-financial external transactions of the non-banking sector. We found that inflows coming through one of these sources are usually offset by the outflows through the other. [10] This implies that money creation through external transactions in emerging markets is uncommon (albeit clearly not unheard-of).

[10] This means that the introduction of the Net Stable Funding Ratio (NSFR) requirement is unlikely to have any significant destabilizing effect on credit creation in emerging markets (see Kauko (2015) for discussion). Arguably, one may expect that the introduction of NSFR may lead to the stabilization of banks' net foreign assets in advanced countries, making them more similar to emerging markets in terms of money creation.

4 Conclusions

Appreciation of the fact that money is a by-product of credit seems to be shifting the focus of monetary analysis from the liability side of the banking system to the asset side (i.e. from money to credit). Nonetheless, there is a strand of literature that directs special attention to monetary aggregates, the divergence between deposits and loans, and to the fluctuations of the share of deposits in total bank liabilities. Furthermore, recent papers offer valuable insights into how money may be driven by unsustainable external transactions and so advocate closer analysis of money growth sources in connection with issues related to financial stability. In this paper we make several contributions to this discussion.

Firstly, we argue that the common assumption that banks have to increase non-core liabilities during credit booms because of insufficient supplies of deposits is somewhat obscure. Banks create an equivalent volume of deposits when they lend. It seems more reasonable to argue that banks accommodate a leakage of funds to the foreign sector (which may or may not be correlated with increased lending) by accumulating net foreign liabilities. It is equally plausible to claim that banks purposefully increase their foreign liabilities thus generating an inflow of funds that has to be balanced by an outflow of funds from the non-banking sector (and an ensuing decrease in deposits). This process may fuel a credit boom if banks' funding costs decrease in the process. We therefore cannot rule out the possibility that fluctuations of loans-to-deposit and non-core liabilities ratios are driven by the banks' side.

Secondly, we discuss the implications of the link between money creation and changes of banking system's net foreign assets. In an emerging market (which is not in a monetary union) fluctuations in banks' net foreign assets are associated with changes in currency mismatches. Arguably, the scope of such fluctuations is thus limited unless driven by changes in the foreign reserves of the central bank. Under this assumption, the importance of external transactions for money creation in emerging markets may be conditional on the monetary policy set-up. We illustrate our argument by conducting canonical correlation analysis for a cross-section of emerging markets and presenting the flows of funds in Korea and Russia. We show that the role of external transactions in money creation has diminished under the flexible exchange rate regime in which the central bank is not trying to accumulate foreign reserves.

Some preliminary implications for financial stability implementation may be drawn from this analysis. Introducing the Net Stable Funding Ratio (NSFR) requirement is unlikely to have any significant destabilizing effect on credit creation (in this regard it is similar to the restriction on banks' foreign currency position, which is a common prudential measure).

Instead, it is likely to trigger an adjustment that will bring the financial and non-financial external transactions of the non-banking sector into balance and thus prevent leakage of deposits to the foreign sector. This adjustment is similar to that experienced by an economy during its transition from fixed to flexible exchange rate regime.

References

Badarudin, Z. E., M. Ariff and M. Khalid (2013) "Post Keynesian money endogeneity evidence in G7 Economies." Journal of International Money and Finance 33: 146–162

Bartlett, M. S. (1941) "The Statistical Significance of Canonical Correlations." Biometrika 32 (1): 29–37.

Bê Duc, L., F. Mayerlen and P. Sola (2008) "The monetary presentation of the euro area balance of payments." ECB Occasional Paper Series No 96.

Berg, A. S. (2012) "The declining deposit to loan ratio – What can the banks do?" Norges Bank Staff Memo Nr. 28.

Borio, C. and P. Disyatat (2015) "Capital flows and the current account: Taking financing (more) seriously." BIS Working Papers No 525.

Borio, C. and P. Lowe (2004) "Securing sustainable price stability: should credit come back from the wilderness?" BIS Working Papers No 157.

Brunnermeier, M. and Y. Sannikov (2015) "The i Theory of Money." Working Paper, Princeton University.

Choi, D.B. and H.-S. Choi (2016) "The Effect of Monetary Policy on Bank Wholesale Funding." Federal Reserve Bank of New York Staff Report No. 759.

Chung, K., J.-E. Lee, E. Loukoianova, H. Park and H.S. Shin (2015) "Global liquidity through the lens of monetary aggregates." Economic Policy (April): 231–290.

DeYong, R. and C. Yom (2008) "On the Independence of Assets and Liabilities: Evidence from U.S. Commercial Banks, 1990–2005." FDIC Center for Financial Research Working Paper No. 2008–05.

ECB (2011) "The supply of money – bank behaviour and the implications for monetary analysis." Monthly Bulletin, October.

Friedman, B.J. (2012) "Monetary Policy, Fiscal Policy, and the Efficiency of Our Financial System: Lessons from the Financial Crisis." International Journal of Central Banking 8(1): 301–309.

Godley, W. and M. Lavoie (2007) "Monetary economics: an integrated approach to credit, money, income, production and wealth." Palgrave Macmillan, Basingstoke.

Hahm, J.-H., H.S. Shin and K. Shin (2013) "Non-core bank liabilities and financial vulnerability."Journal of Money, Credit and Banking 45: 3–36.

Hanson, S.G., Shleifer, A., Stein, J.C. and R.W. Vishny (2015) "Banks as patient fixed-income investors." Journal of Financial Economics 117:449–469.

Hotelling, H. (1935) "The Most Predictable Criterion." Journal of Educational Psychology 26:139–142.

Hotelling, H. (1936) "Relations Between Two Sets of Variables." Biometrika 28: 321–377.

Jakab, Z. and M. Kumhof (2015) "Banks are not intermediaries of loanable funds — and why this matters." Bank of England Working Paper No. 529.

Kauko, K. (2015) "The net stable funding ratio requirement when money is endogenous." Bank of Finland Research Discussion Papers 1.

Kim, H.J., H.S. Shin and J. Yun (2013) “Monetary Aggregates and the Central Bank’s Financial Stability Mandate.” International Journal of Central Banking 9(1): 69–107.

Kuzin, V. and F. Schobert (2015) “Why does bank credit not drive money in Germany (any more)?” Economic Modelling 48: 41–51.

Lavoie, M. (1999) “The credit led supply of deposits and the demand for money: Kaldor’s reflux mechanism as previously endorsed by Joan Robinson.” Cambridge Journal of Economics 23: 103–113

McLeay, M., A. Radia and R. Thomas (2014) “Money creation in the modern economy.” Bank of England Quarterly Bulletin 54(1): 14–27.

Obben, J. and B. Shanmugam. (1993) “Canonical Correlation Analysis of Asset/Liability Structures of Malaysian Financial Institutions,” (Edited by Theodore Bos and Thomas A. Fetherston), Research in International Business and Finance, vol. 10. Greenwich, Conn. and London: JAI Press.

Simonson, D., J. Stowe, and C. Watson. (1983) “A Canonical Correlation Analysis of Commercial Bank Asset/Liability Structures.” Journal of Financial and Quantitative Analysis 18: 125–140.

Stowe, J., C. Watson, and T. Robertson. (1980) “Relationships between the Two Sides of the Balance Sheet: A Canonical Correlation Analysis.” Journal of Finance 35: 973–980.

Tobin, J. (1982) “The Commercial Banking Firm: A Simple Model.” Scandinavian Journal of Economics 84(4): 495–530.

Turner, A. (2013) “Credit, Money and Leverage.” Stockholm School of Economics Conference, 12 September.

Werner, R. (2014) “Can Banks Individually Create Money Out of Nothing? The Theories and the Empirical Evidence.” International Review of Financial Analysis 36: 1–19

Annex

Table 3 Countries in the cross-section

Armenia	Iceland	Philippines
Azerbaijan	Indonesia	Poland
Belarus	Kazakhstan	Romania
Bolivia	Korea	Russia
Brazil	Macedonia	South Africa
Bulgaria	Malaysia	Tajikistan
Chile	Mexico	Thailand
Colombia	Moldova	Turkey
Croatia	Mongolia	Ukraine
Czech Republic	Morocco	Uruguay
Egypt	Nigeria	Venezuela
Georgia	Pakistan	
Hungary	Paraguay	

Time series period for Thailand and Venezuela is 2005–2013, for Morocco 2002–2013, for other countries 2002–2014.

Table 4 Summary statistics for variables

Variable	Mean	Std Deviation	Min	Max
Inflows				
ΔC^P	0.135	0.155	–0.281	1.044
ΔC^G	0.001	0.075	–0.566	0.385
NFET	–0.046	0.282	–1.946	1.760
Outflows				
ΔCAP	0.026	0.064	–0.796	0.332
ΔCASH	0.024	0.044	–0.039	0.445
FET	–0.087	0.283	–2.185	1.598
OTHER	0.014	0.106	–0.507	1.252

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