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APPLICATION OF THE INTEGRATED
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EMPIRICAL INVESTIGATION
OF THE ECONOMIC AND FINANCIAL
CYCLE IN LITHUANIA



APPLICATION OF THE INTEGRATED ACCOUNTS FRAMEWORK FOR EMPIRICAL INVESTIGATION OF THE ECONOMIC AND FINANCIAL CYCLE IN LITHUANIA

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Table of contents

Summary	4
1. Introduction	5
2. The context of macroeconomic developments in the run-up to the crisis.....	5
3. Sectoral balance sheet expansion, contraction and reflation	8
4. The link between macroeconomy and finance – decomposition of the financial account of the total economy	10
5. The role of bank credit in the economic cycle	11
6. Replacement of accumulation of private debt with public debt.....	15
7. Monetary dynamics during the financial cycle	16
Concluding remarks.....	18
References	19

Summary

By resorting to the analytical integrated accounts framework, this paper investigates the relationship between economic and financial imbalances during the recent economic and financial cycle in Lithuania. There is clear evidence from the financial accounts data that there was a pronounced expansion of balance sheets of institutional sectors during the phase of the economic upturn, whereas the economic downturn was essentially a balance-sheet recession characterised by contracting private sector balance sheets and the reversal in credit flows and monetary dynamics. The boom-and-bust cycle was strongly associated with exuberant bank lending during the boom years, followed by a sudden reversal of lending conditions and the subsequent repatriation of debt financing by foreign banks.

The Lithuanian experience also confirms that strong credit and asset price boom accompanied by economic imbalances, and debt financing of current account deficits in particular, is a potentially risky mix of economic conditions. The policy response to crisis was a market-imposed austerity but nevertheless there was a sharp rise in public debt, essentially offsetting deleveraging in the private sector. The effective replacement of growth of private sector debt with a rapid accumulation of public debt was a very important stabilising factor

Certain characteristics of bank credit (namely, its partial self-financing) imply that under some conditions economic stabilisation could have been achieved through domestic financing. However, the government had to resort to foreign financing, which was rather costly. During the crisis the monetary dynamics was driven by government borrowing from abroad, stepped up capital transfers from abroad and positive current account adjustments, all of which allowed foreign parent banks to withdraw debt financing and replace it with domestic deposit financing.

1. Introduction

Advances in national accounting frameworks and the associated analytical tools, compilation of more detailed financial accounts and constantly improving statistical compatibility between economic and financial accounts allow economists to usefully apply the integrated accounts (IA) framework for the descriptive and normative analysis of macro-financial linkages, economic imbalances and factors affecting cyclical fluctuations. In this paper we take the IA perspective to analyse the case of the recent boom-and-bust cycle in Lithuania, namely, the run-up to the economic crisis of 2008, the crisis period and the subsequent recovery.

The current analysis is largely based on the integrated economic and financial accounts, the associated analytical IA tables and specific sectoral budget and summing-up constraints. These principles are discussed at a conceptual level in a companion paper (Ramanauskas, Matkėnaitė and Rutkauskas 2016), and therefore in some cases we will refer to that paper instead of reiterating conceptual arguments at length.

Lithuania's case is very well-suited for the IA analysis. Importantly, Lithuania has both from-whom-to-whom and instruments representation of financial accounts. The data starts from 2003 Q4, which is an early stage of the financial cycle leading to the crisis. The financial accounts data for Lithuania are tractable owing to a small and rather basic financial system dominated by traditional retail banking. Another aspect alleviating the IA analysis is that before adopting the euro from 2015, the economy operated under the currency board arrangement (a peg to the euro) – a particularly straightforward currency regime.

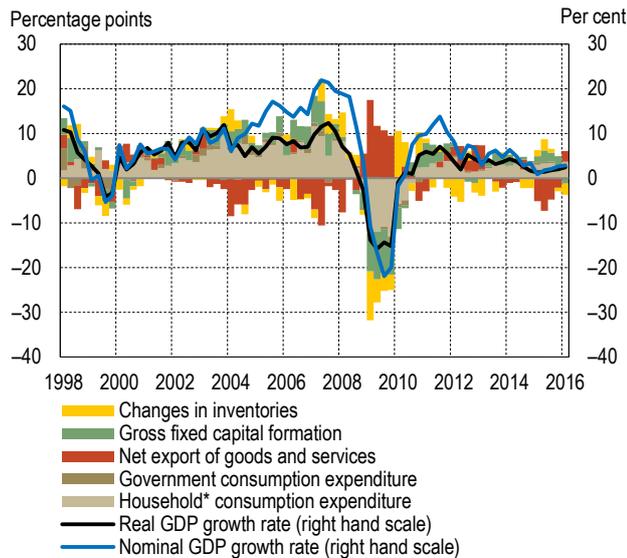
The financial and economic cycle in Lithuania was marked by very dynamic developments, quite typical for the boom-and-bust cycles (see, e.g., Kindleberger 2005; Reinhart, Rogoff 2011). The boom period was characterised by bubbling property and credit markets, large economic imbalances (primarily trade deficits) and the banking sector's heavy reliance on financing from foreign parent banks. The crisis was very deep, associated with a sudden unwinding of accumulated imbalances, collapse in lending, monetary contraction and the reversal of external financial capital flows. The recovery came on the back of a sharp increase in government debt (which effectively offset deleveraging processes in the rest of the economy) and was also underpinned by export recovery, real wage adjustments through "internal devaluation" (see, e.g., Aslund 2010; Aslund, Dombrovskis 2011) and the stepped up support from the European structural funds. Since a boom-and-bust cycle is generally characterised by the accumulation and subsequent unwinding of economic and financial imbalances, the IA analysis allows one to relate the developments in the different parts of the economic system, spot rising vulnerabilities and potentially trace back the origin of imbalances.

The paper is structured as follows. In Section 2 we briefly discuss the context of macroeconomic developments in Lithuania in the run-up to the crisis. In Section 3 we document the processes of expansion, contraction and the subsequent reflation of sectoral balance sheets during the recent economic boom, crisis and recovery in Lithuania. Section 4 explores the crucial link between real sector, balance-of-payments and financial developments. In Section 5 we investigate the role of bank lending behaviour and their procyclical financing from foreign parent banks in exacerbating the economic cycle. In Section 6 we show that during the crisis deleveraging of the private sector was offset by accelerated accumulation of government debt and discuss the economic implications of that. In Section 7 we briefly examine monetary dynamics and its contributing factors during the cycle. Section 8 concludes.

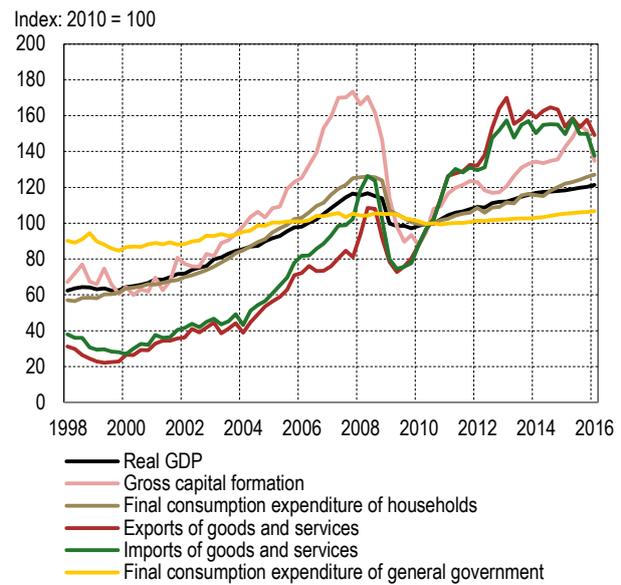
2. The context of macroeconomic developments in the run-up to the crisis

At the beginning of the past decade the Lithuanian economy set on the path of strong recovery from the Russian crisis (see Fig. 1 and 2). At the outset the recovery was driven by strong exports, household consumption and a broad-based rise in sectoral activity. A few years into the recovery, persistently high structural and cyclical unemployment rates decidedly turned downwards (see Fig. 3). Economic modernisation, financial liberalisation, stable currency regime and the prospective accession to the European Union (EU) lured in respectable foreign banking groups (mostly from Scandinavia), which were willing to facilitate strong credit expansion.

The economic recovery soon morphed into investment, consumption, credit and property price booms. From 2003 to 2007 the real gross domestic product (GDP) growth rate averaged 8.7 per cent per year. Household consumption was the main demand-side driver behind economic growth as it grew on average by 11.1 per cent during this period. Real investment expenditure grew at an even faster rate (16.9 % on average), though it was considerably more volatile. The unemployment rate declined steadily before reaching cyclical lows of 3.8 per cent in 2007 (see Fig. 3). Wage and income growth generally outpaced the productivity growth. Quite remarkably, nominal GDP more than doubled in the five years to 2007. Real income growth was slightly dampened by rising consumer prices but inflationary pressures became a real problem only in 2007. In any case, given the stable value of the national currency due to its peg to the euro, such nominal income growth reflected an immense increase in the purchasing power and standards of living.

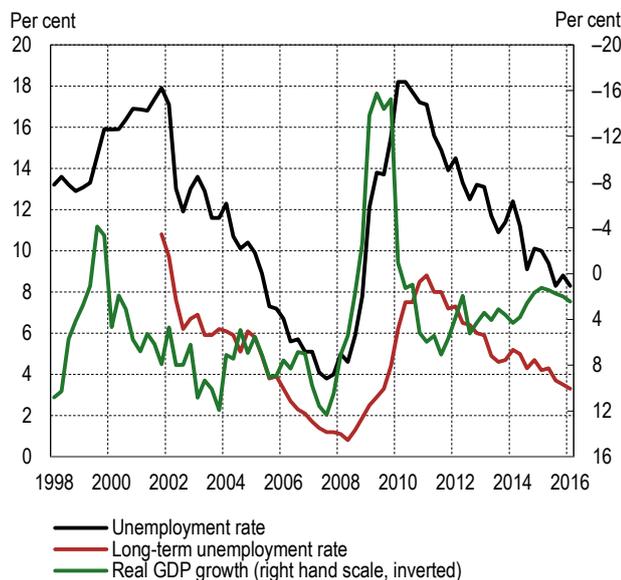
Fig. 1. Demand contributions to real annual GDP growth

* Including non-profit institutions serving households
Source: Statistics Lithuania.

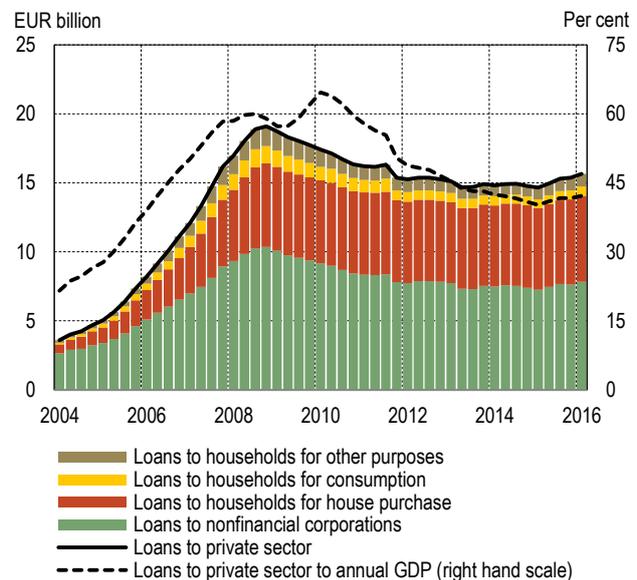
Fig. 2. Dynamics of selected real GDP expenditure components

Source: Statistics Lithuania.

It should come as no surprise that the extraordinary rise in income and activity levels during such a short period of time should be closely linked to credit developments. There was more than a five-fold increase in the size of other monetary and financial institutions' (MFIs) loan portfolio in the five years leading to its peak in end-2008 (see Fig. 4), and especially strong growth in lending to households (both consumer lending and housing loans). As detailed in Ramanauskas (2011), the main drivers behind strong credit growth were rising income levels, upward trending property prices and very low or even negative real rates on loans and deposits (see Fig. 5 and 6).

Fig. 3. Unemployment rates and real economic activity

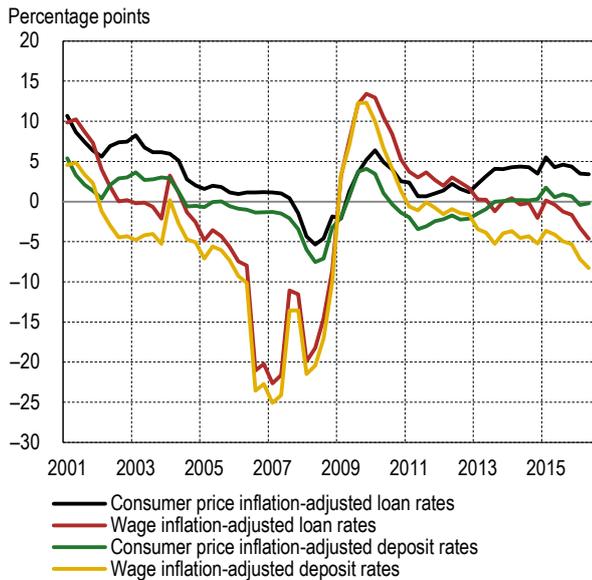
Source: Statistics Lithuania.

Fig. 4. Breakdown of loans of other MFIs to the private sector

Source: Bank of Lithuania.

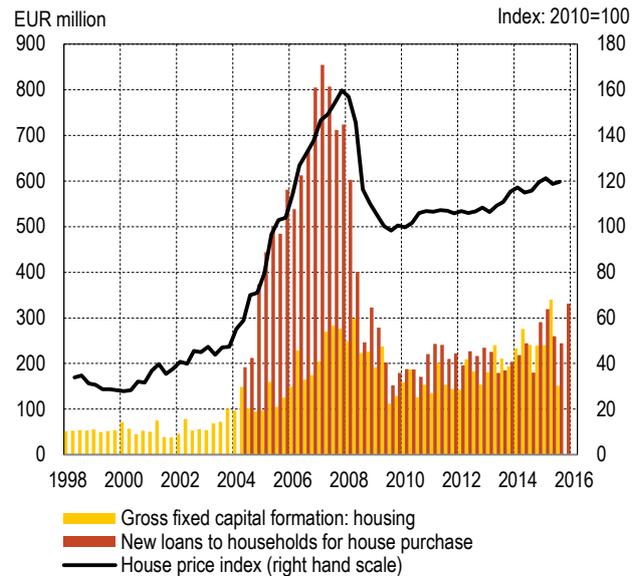
Of course, such relationships have a significant element of reflexivity. A large part of credit-fueled expenditure translated into a rise of nominal incomes of domestic residents, and a rapid increase in the nominal GDP slowed the rise in relative indebtedness figures such as the debt-to-GDP ratio allowing the economy to retain the capacity to absorb new credit. At the microeconomic level, rising prices and, especially, rising wages lowered the real debt-servicing cost encouraging people to take up new credit. Retail depositors were forced to accept very low and even negative real interest rates as major banks were able to fill funding gaps by acquiring financing from their foreign parent banks (which seemingly did not need to worry about local inflation risks because they provided euro-denominated funding). Thus, in the environment of extremely low or even negative real interest rates there were strong incentives to borrow and invest in risk assets, primarily in the booming real estate, rather than passively save and let inflation erode the real value of savings.

Fig. 5. Dynamics of real average interest rates on new loans and new deposits



Source: Statistics Lithuania; Bank of Lithuania.

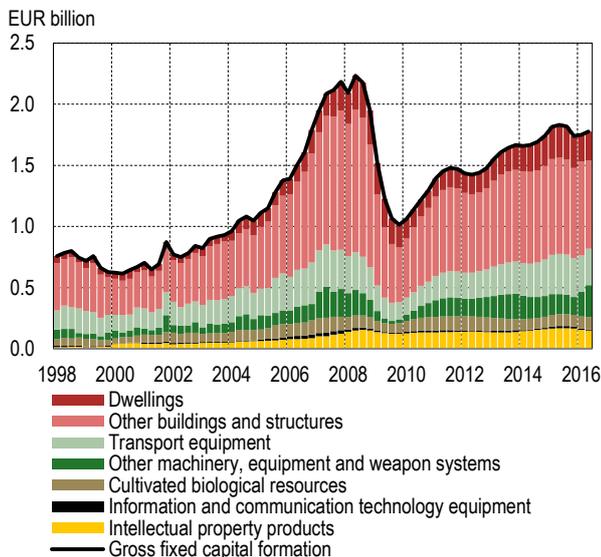
Fig. 6. Selected housing market indicators



Source: Statistics Lithuania; Bank of Lithuania.

The economy's ability to absorb credit at a frantic pace was eventually exhausted, as evidenced by a sharp increase in economic imbalances. First of all, there were obvious supply-side bottlenecks in the residential real estate sector, as the flow of credit to support demand for housing significantly exceeded the insufficient supply of new housing, adding upward pressures on housing prices, which recorded roughly a five-fold increase from the start of the decade to their peak in 2008. Also, excesses in credit-driven domestic demand were reflected by large and rising external imbalances. Credit-led investment activity levels were well in excess of national savings, resulting in an outsized current account gap, which was abruptly closed during the crisis, and the current account subsequently remained roughly balanced owing primarily to a considerably lower investment activity (see Fig. 7 and 8).

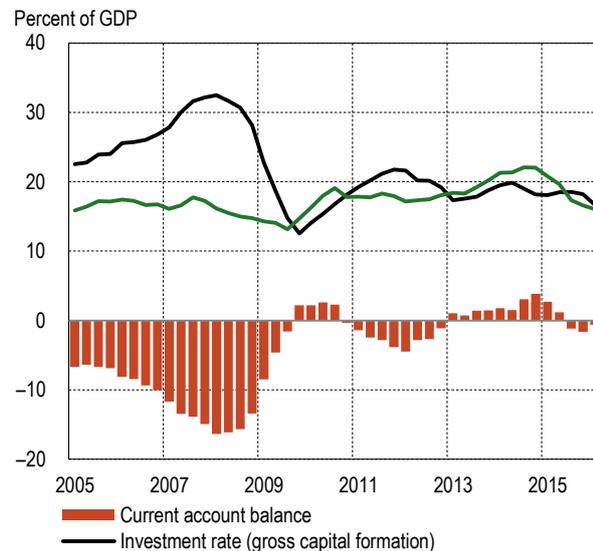
Fig. 7. Breakdown of nominal gross fixed capital formation



Note: Quarterly, seasonally adjusted.

Source: Statistics Lithuania.

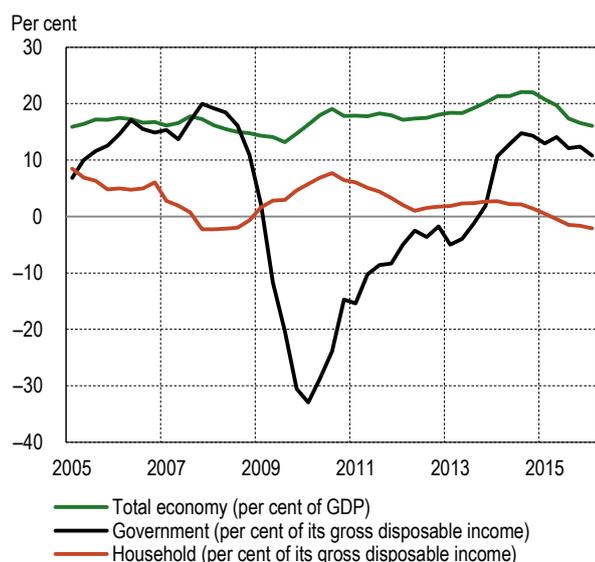
Fig. 8. Saving and investment balance



Note: Four-quarter moving averages.

Source: Statistics Lithuania; authors' calculations.

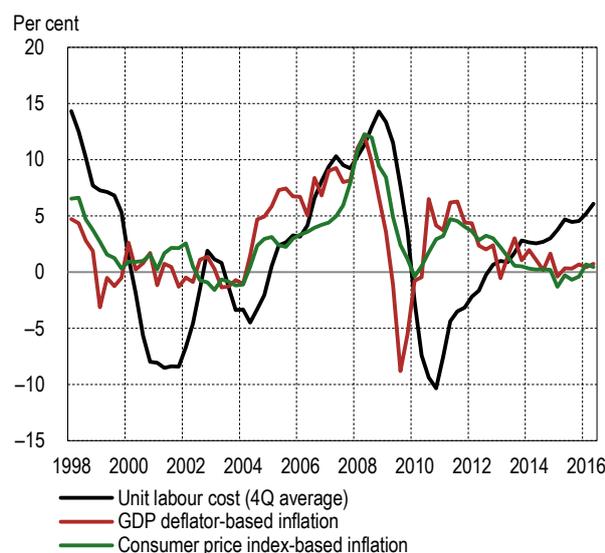
Fig. 9. Saving rates



Note: Four-quarter moving averages.

Source: Statistics Lithuania; authors' calculations.

Fig. 10. Wage and inflationary pressures



Note: Annual growth rates.

Source: Statistics Lithuania; authors' calculations.

During the boom years, exuberant household consumption also contributed to the formation of external imbalances, as household saving rates were on a steady decline and briefly turned negative in 2007 and 2008 (see Fig. 9). Other important constraints to the stimulating economic impact of the credit boom include bottleneck effects in the labour market, an increasing gap between the wage and productivity growth (as reflected in rising unit labour costs) and the consequent inflationary pressures, particularly evident in the dynamics of the GDP deflator-based inflation measure (see Fig. 10).

3. Sectoral balance sheet expansion, contraction and reflation

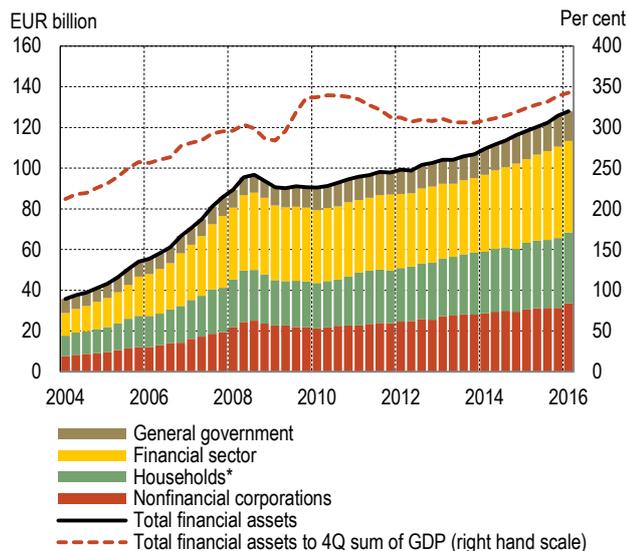
The past decade's strong economic growth in Lithuania could be partly attributed to fundamental factors, such as natural convergence processes, technological progress, economic integration, improving external competitiveness and booming exports (see the macroeconomic models developed in Andersen *et al.* 2003; Vetlov 2004; Rudzkis, Kvedaras 2005; Ramanauskas 2011). But, of course, there was also a huge credit and property price boom on top of that. It is outside the scope of the current paper to quantitatively determine the relative importance of fundamental and debt-related drivers behind economic growth. However, as we discuss in Ramanauskas *et al.* (2016), expenditure financing by running down net financial assets can provide a strong demand-side stimulus, whereas the aggregate repayment phase is generally associated with the sectoral balance sheet contraction and a balance sheet recession, which is often fought against by trying to reflate sectoral balance sheets. Financial accounts data confirm that this pattern is also relevant for Lithuania.

During the boom years, sectoral balance sheets in Lithuania expanded very rapidly, outpacing even the brisk nominal GDP growth (see Fig. 11 and 12). The instrument representation of financial accounts reveals that the sectoral balance sheet expansion can be primarily attributed to bank credit flows into the private nonfinancial sector, a concurrent rise in bank deposits and the appreciation in the value of equity holdings. Other studies, employing the IA analysis, document qualitatively similar balance sheet expansion in other countries.¹

Since financial liabilities of institutional units (sectors) are financial assets of other units (sectors), netting them out, i.e. taking the difference between financial assets and financial liabilities of institutional sectors, shows the financial net worth of sectors and the net financial international position of the national economy. We can see from Figure 13 that the net financial assets of the total economy were negative and were falling quite rapidly during the boom years, largely driven by the fall in the net financial worth of nonfinancial corporations. A few observations are in order. The net financial worth of the nonfinancial corporations sector is naturally very negative because the liabilities side of their balance sheets is mainly comprised of financial instruments (equity and debt), whereas the bulk of the asset side of their balance sheets is comprised by nonfinancial assets, i.e. tangible and intangible business capital. Moreover, an increase in equity valuations weighs down on the financial net worth of corporations, since the value of their financial liabilities (more precisely, equity) increases. Of course, this has the exactly opposite effect on the net worth of holders of equity (e.g. the household sector). Also note that prior to the crisis the general government sector had modestly positive net financial assets but its financial net worth turned negative when the crisis hit. Finally, the financial sector is effectively netted out because its net financial worth is generally tiny compared to the gross size of its financial assets or liabilities.

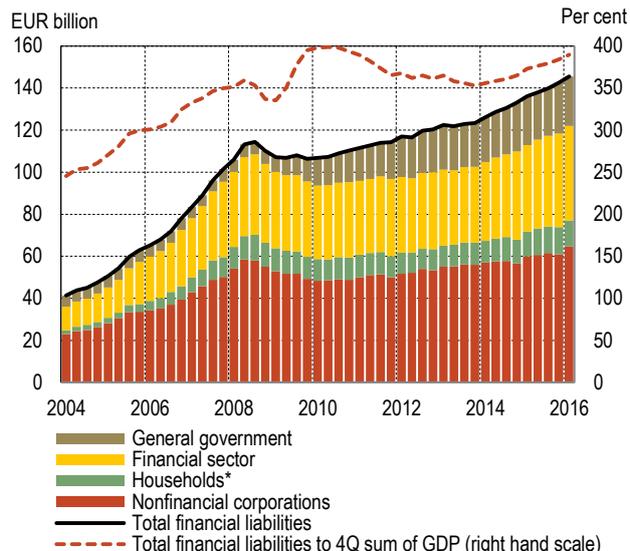
¹ See, e.g. Barwell and Burrows (2011), for the analysis of the United Kingdom case and Be Duc and Le Breton (2009), for the euro area analysis.

Fig. 11. Sectoral decomposition of financial assets of total economy



* Including non-profit institutions serving households
Source: Bank of Lithuania.

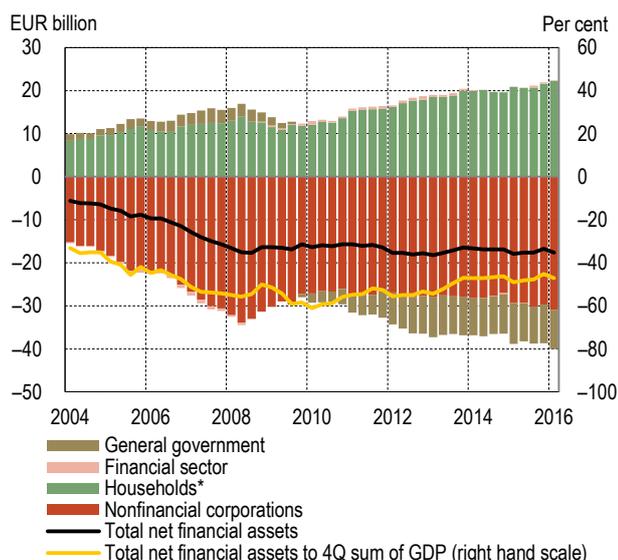
Fig. 12. Sectoral decomposition of financial liabilities of total economy



* Including non-profit institutions serving households
Source: Bank of Lithuania.

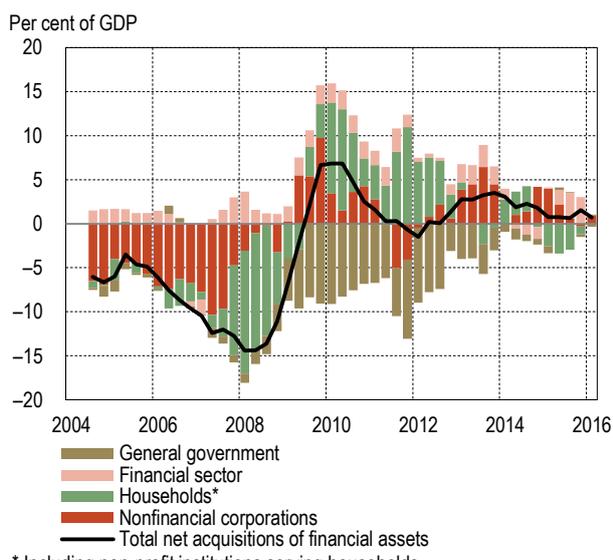
Bearing in mind the large fluctuations in equity valuations during the analysed period, it makes sense to eliminate the revaluation effects on the sectoral balance sheet positions if one wants to analyse the direct relationship between sectoral expenditure, such as household consumption, and its sources of financing. Even though economic theorists and policy makers often suggest that an increase in nominal wealth of households should lead to a rise in household consumption, it is reasonable to think that it is exactly the realised gains or proceeds from asset sales that should be much more important in enabling additional expenditure than a mere psychological effect related to unrealised gains. In this light, it is useful to look into sectoral net acquisition of financial assets, which is the difference between asset and liability transactions (see Fig. 14). This representation clearly shows that both household and nonfinancial corporations sectors were running down their net financial assets (mostly by borrowing from banks) right until the onset of the crisis, when the nonfinancial private sector became a net lender, primarily because of the reversal of financial flows between banking sector and the private nonfinancial sector. Amid depression-like economic conditions and a rapidly deteriorating fiscal position during the crisis, the government sector had to drastically step up borrowing, consequently leading to the above-mentioned decline in its financial net worth.

Fig. 13. Sectoral decomposition of net financial assets of total economy



* Including non-profit institutions serving households
Source: Statistics Lithuania; Bank of Lithuania.

Fig. 14. Net acquisition of financial assets

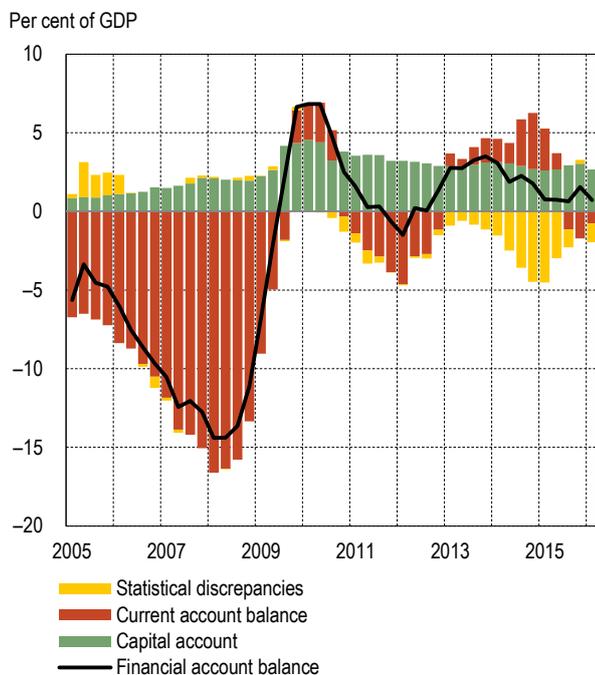


* Including non-profit institutions serving households
Note: Four-quarter sum to GDP ratios.
Sources: Statistics Lithuania; Bank of Lithuania.

4. The link between macroeconomy and finance – decomposition of the financial account of the total economy

Strong credit expansion *per se* may not necessarily be a cause for concern from the sustainable development and financial stability perspective. To better understand risks to the economy, it is instructive to have a systemic approach that takes account of the flow of funds among sectors, the evolution of the sectoral balance sheet positions and the formation of macroeconomic imbalances.

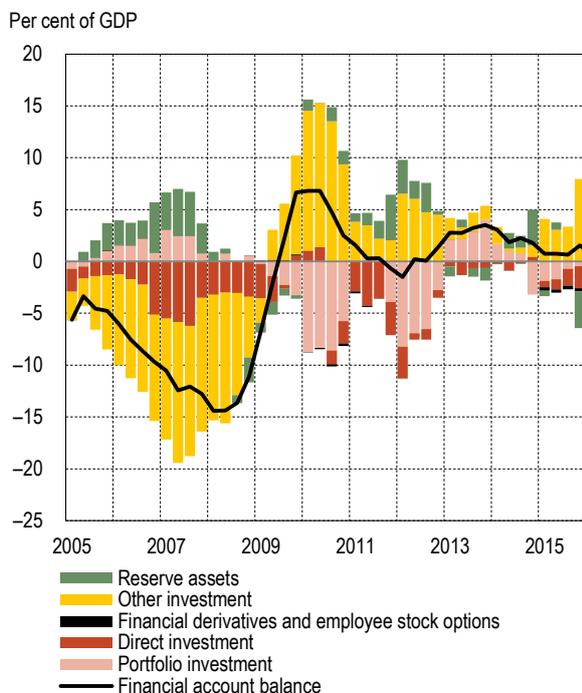
Fig. 15. The balance-of-payments identity



Note: Four-quarter sum to GDP ratios.

Sources: Statistics Lithuania; Bank of Lithuania.

Fig. 16. Decomposition of financial account



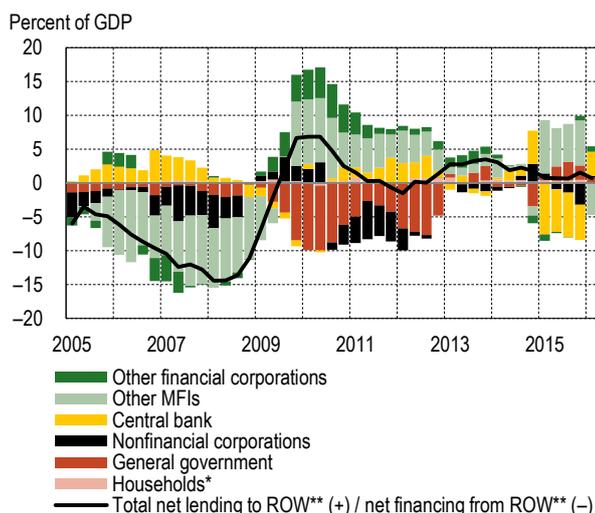
Note: Four-quarter sum to GDP ratios.

Sources: Statistics Lithuania; Bank of Lithuania.

At the total economy level, the financial account position in the balance of payments serves as the crucial link between economic and financial transactions. The financial account of the total economy records net acquisition of financial assets by the total economy but it is also linked by the balance-of-payments (BOP) identity to the current and capital account balance. The BOP identity simply states that – abstracting from statistical errors and omissions – the sum of net income, net current transfers and net capital transfers from abroad must be reflected in the BOP's financial account position. For Lithuania, this is visualised in Figure 15. During the boom years, the current account deficit was growing very rapidly, driven by large trade deficits and, in particular, by imports of investment goods. Before the crisis, the current account deficits were largely financed through the financial account, though the role of capital transfers from the EU structural funds has increased significantly since the start of the crisis. It can be seen from Figure 16 that historically one of the main components of the BOP's financial account balance was "Other investment", which mainly is foreign bank lending to their Lithuanian subsidiaries and branches and which exhibited highly procyclical behaviour. In contrast, portfolio investment was anticyclical mainly owing to the sovereign debt issuance. Notably, foreign direct investment seems to be a quite stable source of foreign financing.

Figure 17 provides the from-whom-to-whom perspective on the drivers behind the net acquisition of foreign financial assets. We can observe financial inflows in the banking sector and subsequent outflows from it, as well as the stabilising impact on financing flows by the government borrowing from abroad during the crisis period. Note that Figures 16 and 17 offer two alternative decompositions of the total economy's financial account. Comparing these figures reveals that the nonfinancial sector is usually the ultimate borrower (saver), whereas the financial sector, borrowing from non-residents or lending abroad, acts as the intermediary. This does not imply, however, that banks do not exert significant control over credit processes in the economy.

The above empirical analysis suggests that strong credit and asset price growth, accompanied by rising pressures on prices, tensions in the labour market and, importantly, persistent trade imbalances financed by foreign debt (as opposed to foreign direct investments) – all together serve as the indication of excessive credit growth and provide a strong warning about risks to the sustainable economic development and financial stability.

Fig. 17. Net acquisition of foreign financial assets

* Including non-profit institutions serving households

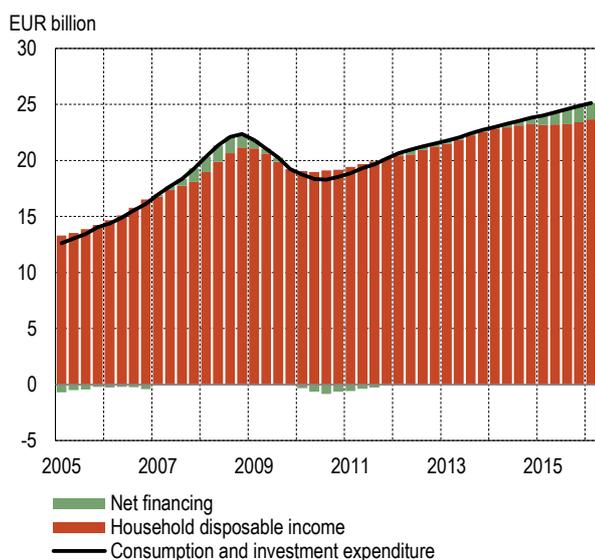
** Rest of the world

Note: Four-quarter sum to GDP ratios.

Sources: Statistics Lithuania; Bank of Lithuania.

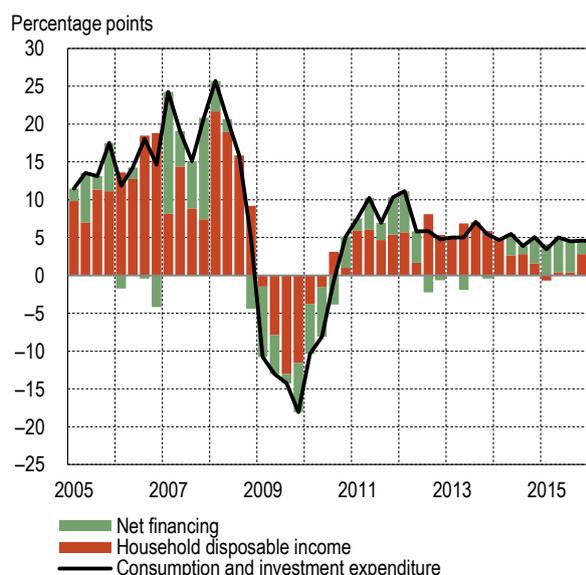
5. The role of bank credit in the economic cycle

It is a formidable task to pinpoint the exact impact of bank credit on the economy — it requires setting up a structural economic model with a fully functional financial sector, making behavioural assumptions, dealing with endogeneity issues and keeping track of flows and stocks of financial variables.² Most often credit variables are included in the quantitative analysis in an *ad hoc* way.³ Often no sufficient attention is devoted to making appropriate transformations of credit data (i.e. choosing among stocks, flows, changes in flows, ratios, etc.) before quantitatively analysing economic relationships, potentially leading to false conclusions about the economic role of credit (see, e.g., Calvo *et al.* 2006; Biggs *et al.* 2010). The empirical IA analysis helps to shed more light on these issues by suggesting some reasonable transformations of credit variables and indicating the need to take into account the indirect effects of credit (money) creation.

Fig. 18. Household consumption and investment expenditure and its financing sources

Note: Four-quarter sums.

Source: Statistics Lithuania; Bank of Lithuania.

Fig. 19. Contributions to the annual growth of household expenditure

Source: Statistics Lithuania; Bank of Lithuania.

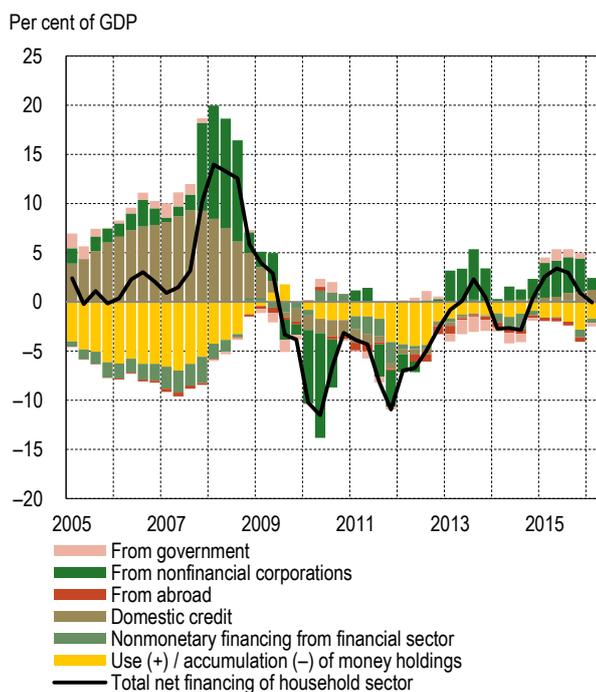
Consider, for example, the dynamics of the total household sector expenditure in Lithuania. By the vertical IA constraint, households' total expenditure on consumption and investment can be financed either from disposable income or by running

² Ramanauskas (2011) is one such attempt to model the Lithuanian economy with a functional banking sector.

³ See, e.g., Ramanauskas *et al.* (2015), Stakėnas, Stasiukynaitė (2016), for the analysis of the Lithuanian case.

down net financial assets (see Fig. 18). Notably, this constraint implies that expenditure levels⁴ should be associated with net financing flows. It can be seen from Figure 18 that only a small fraction of household expenditure levels can be directly linked to net financing flows, and the bulk of sectoral spending depends on the sector's disposable income. However, if we are interested in the drivers behind expenditure growth, we need to associate (percentage) changes in expenditure levels with (percentage) changes in financing flows. Incidentally, that is why in quantitative analyses credit stock variables often need to be transformed by taking second-order differences, as is also pointed out in Biggs *et al.* (2010). Figure 19 is a contribution chart showing how much income and net financial funding contributed to the household sector's nominal expenditure growth. We can immediately see that, in contrast to the levels case, a significant part of household expenditure growth is associated with financial funding and it has a strongly procyclical effect. Qualitatively similar effects were also found for the financing of the nonfinancial corporate sector's expenditure.

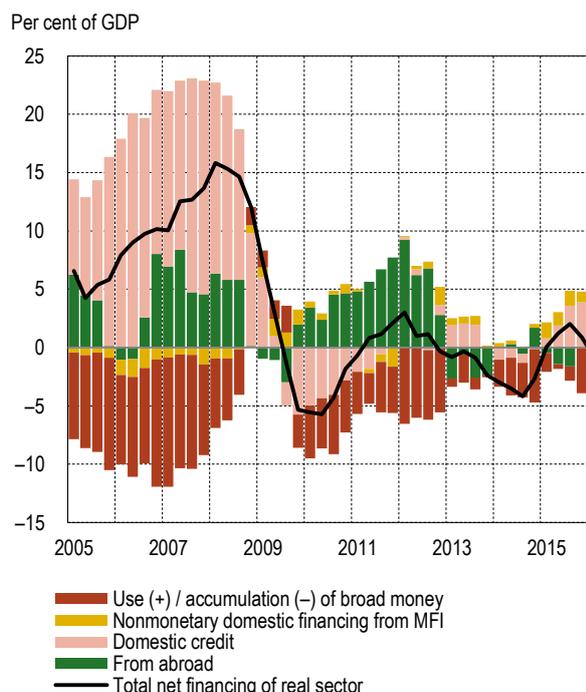
Fig. 20. Net financing of household sector



Note: Four-quarter sums to GDP ratios.

Source: Statistics Lithuania; Bank of Lithuania.

Fig. 21. Net financing of national economy excluding the MFI sector



Note: Four-quarter sum to GDP ratios.

Source: Statistics Lithuania; Bank of Lithuania.

Financial accounts allows us examine further which specific financing transactions (with whom and with what instruments) enabled an increase in sectoral spending. Continuing with the household sector's example, we again use the vertical constraint of financial accounts in the analytical IA table to decompose net financing (see Fig. 20). Bank credit is one of the financing instruments, though, as can be seen from the Figure 20, its impact on sectoral expenditure can be either smaller or larger than that of net financing. In this particular case households' borrowing from banks before the crisis significantly contributed to households' net financing and directly added to nominal expenditure levels. However, it does not end there because part of this increase in household spending results, in a circular manner, in a rise in the household income, which is to some extent reflected by a rise in money holdings of the household sector. In other words, bank credit boosts the overall amount of money in the economic system, and the dynamics of sectoral money holdings reflects subsequent changes in sectoral income and spending. Figure 20 shows that a strong growth in bank credit to households was accompanied by a similar increase in the household sector's money holdings, which serves as a rough indication that the household income and deposit levels also rose strongly, making credit to households largely self-financing. The gap between credit flows and dynamics of money holdings began to widen before the crisis suggesting that it might be important to monitor such gaps for macroprudential purposes. A similar graph for the total economy excluding the MFI sector (see Fig. 21) provides a slightly clearer picture of the relative impact of credit on the expenditure and income sides because at the aggregate level the dynamics of money stock is not affected by financial transactions among domestic nonmonetary sectors.

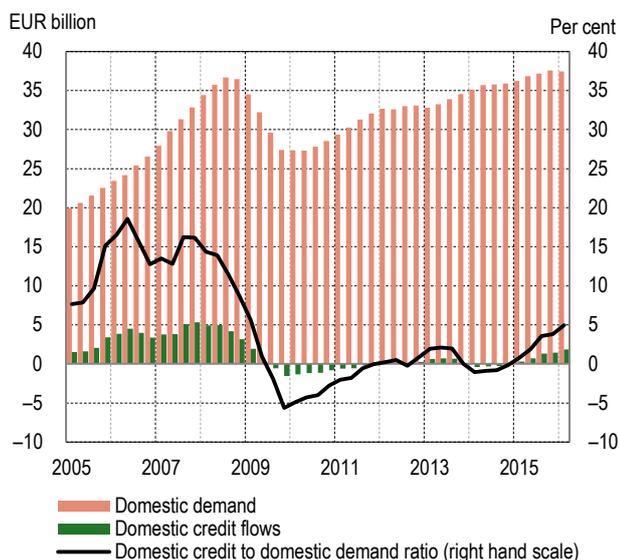
As we discuss in Ramanauskas *et al.* (2016), since bank credit is not predicated on existing savings but rather creates new purchasing power, credit flows directly contribute to nominal expenditure levels but the impact on domestic income is not so clear-cut because credit-fuelled expenditure might become income of non-residents (if foreign goods or services are imported). Therefore we cannot easily discern the direct stimulating impact of bank credit on the nominal GDP but we can do that for domestic demand.⁵ Figure 22 shows the (annualised) flows of domestic credit as a share of domestic demand. We can see from the figure that at the height of the credit boom up to 19 per cent of nominal domestic expenditure were financed

⁴ Note that, from the statistical viewpoint, expenditure levels (for a given period) are flow variables.

⁵ Domestic demand is defined here as nominal private and public consumption and investment excluding changes in inventories.

by domestic credit, before credit flows became a drag of about 5 per cent on domestic demand at the trough during the crisis. A reversal of bank credit flows at the beginning of the crisis resulted in a very strong but relatively short-lived (lasting almost two years) demand-side shock to the Lithuanian economy despite the fact that a steady decline in the stock of the bank loan portfolio lasted much longer – about five years. The explanation is that changes in domestic demand are linked to changes in credit flows and these changes turned positive at the end of 2010 (see Fig. 23), even as the flows themselves remained negative.

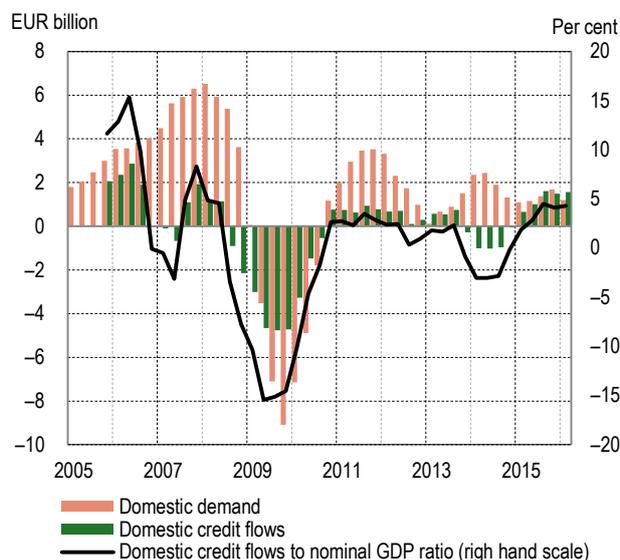
Fig. 22. Domestic demand and credit flows



Note: Four-quarter sums.

Source: Statistics Lithuania; Bank of Lithuania.

Fig. 23. Domestic demand and credit impulse



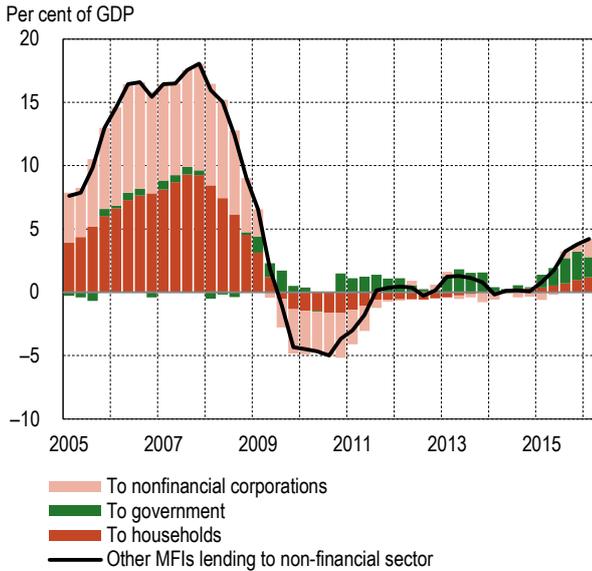
Note: Annualised changes.

Source: Statistics Lithuania; Bank of Lithuania.

More generally, the credit impulse, which is defined here as the ratio of the change in credit flows and the nominal GDP (Biggs *et al.* 2010), summarises the direct stimulating demand-side impact of credit flows. As can be seen from Figure 23, the credit impulse subsided before the crisis, implying that during the last two years of the boom period credit directly accounted for a relatively small part of domestic demand growth. However, this does not capture the earlier discussed indirect effects, whereby credit-fuelled domestic demand induces income growth, which again stimulates demand. In any case, a drop in domestic demand during the crisis seems very strongly associated with changes in credit flows.

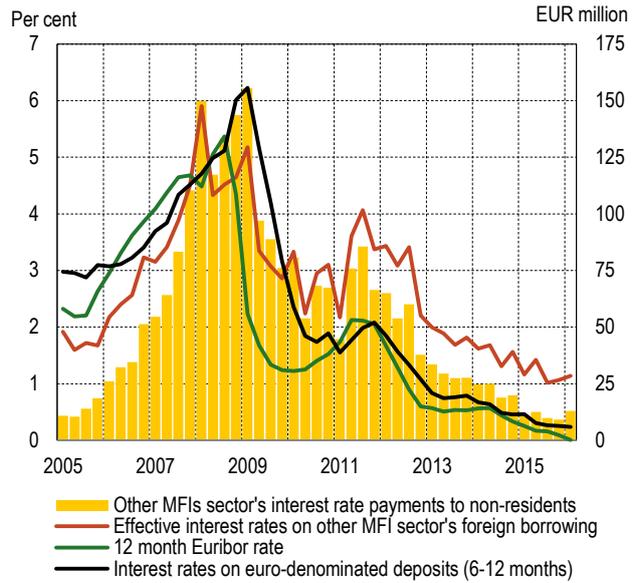
A deeper look at the dramatic change in bank credit flows at the beginning of the crisis helps to explain why the level of indebtedness matters for the severity of the crisis. A change in bank risk perceptions and the sharply deteriorating economic outlook led to a collapse in new bank lending (see Fig. 24). At the same time, the outstanding debt needed to be serviced, and financial flows from the nonfinancial sector to the banking sector continued. This stream of debt service payments naturally depends on the overall indebtedness of the nonfinancial sector: the higher the level of debts, the larger debt repayment flows (relative to the size of the economy) and the stronger downward pressure on broad money aggregates and the overall purchasing power. In this particular crisis episode, the downward pressure on credit flows and money aggregates was further aggravated by sharp adverse movements in interest rates. Facing devaluation risks, trying to optimise the foreign-exchange structure of loan and deposit portfolios, and preparing the ground for repatriation of financial capital to parent institutions, banks drove up Vilibor interbank rates, together with interest rates on loans and deposits.

Fig. 24. Flows of other MFIs lending to nonfinancial sector



Source: Statistics Lithuania; Bank of Lithuania.

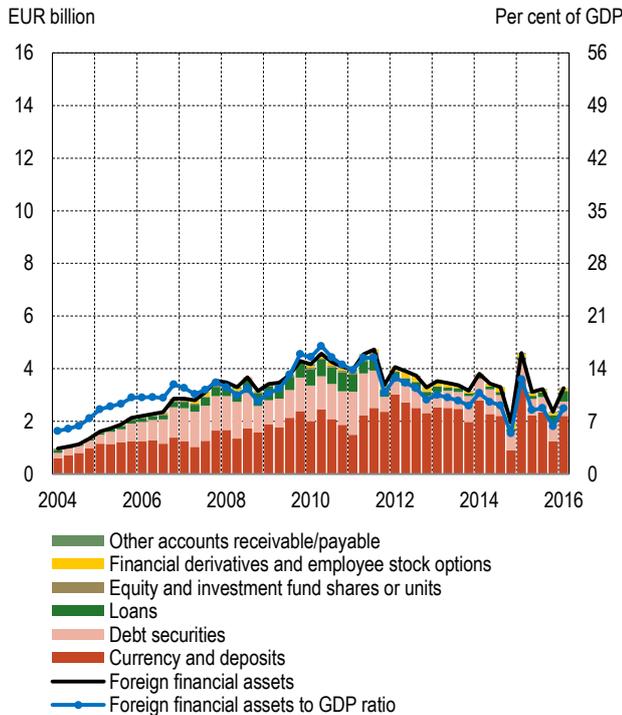
Fig. 25. Interest payments on external debt of other MFIs



Source: Statistics Lithuania; Bank of Lithuania; authors' calculations.

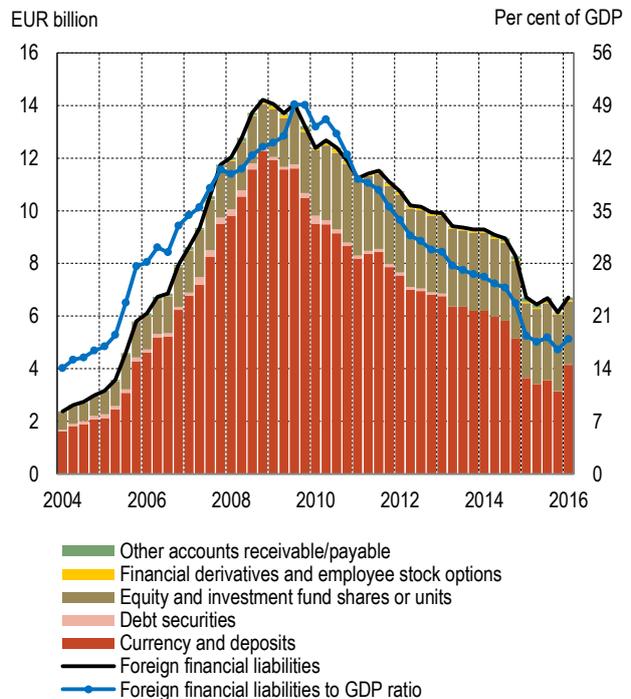
Highly procyclical flows of “hot” financial capital between foreign parent banking institutions and their Lithuanian counterparts played a special role in exacerbating the recent financial and business cycle in Lithuania. Since the banking system’s ability to extend new credit is limited by money outflows from the economy via the current account (especially when the economy is overheating), domestic banks become reliant on foreign funding. A back-to-back comparison of foreign assets and liabilities of deposit-taking institutions reveals that during the boom they amassed significant amounts of foreign liabilities, which peaked at 14 billion euros (or 44% of GDP) in 2008 (see Fig. 26 and 27). By far the biggest part of these liabilities was constituted by continuously rolled over short-term deposits from foreign parent banks, and they amounted to around 12 billion euros at the peak. During the crisis, foreign parent banks bolstered capital of their Lithuanian subsidiaries but at the same time started withdrawing debt financing, albeit on a much larger scale.

Fig. 26. Stock of foreign assets of other MFIs



Source: Statistics Lithuania; Bank of Lithuania.

Fig. 27. Stock of foreign liabilities of other MFIs



Source: Statistics Lithuania; Bank of Lithuania.

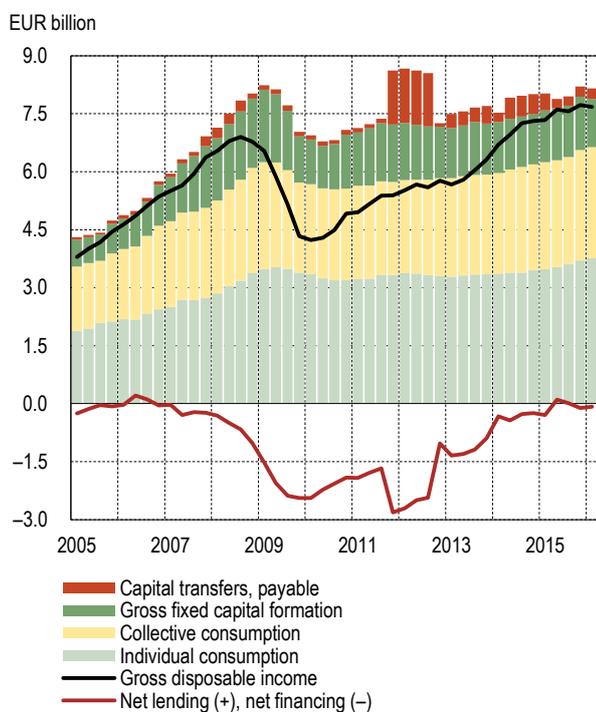
In hindsight, fast accumulation of short-term foreign debt by banks warrants close attention from the regulator because of the inherent risks of reversal of financial capital flows. It should also be recognised that bank business models based on strong reliance on financing from parent institutions open strategic possibilities for fuelling credit booms by providing financing at relatively favourable terms or, on the contrary, funnelling profits from subsidiaries by charging higher rates than those

prevailing in the market (see Fig. 25). It is important to ensure that such financial transactions are carried out transparently and at market terms. It can be noted in passing that over the period from 2005 to 2015 banks paid around 2.5 billion euros in interest to their non-resident depositors (essentially parent banks), which is very large in comparison to dividend payouts.

6. Replacement of accumulation of private debt with public debt

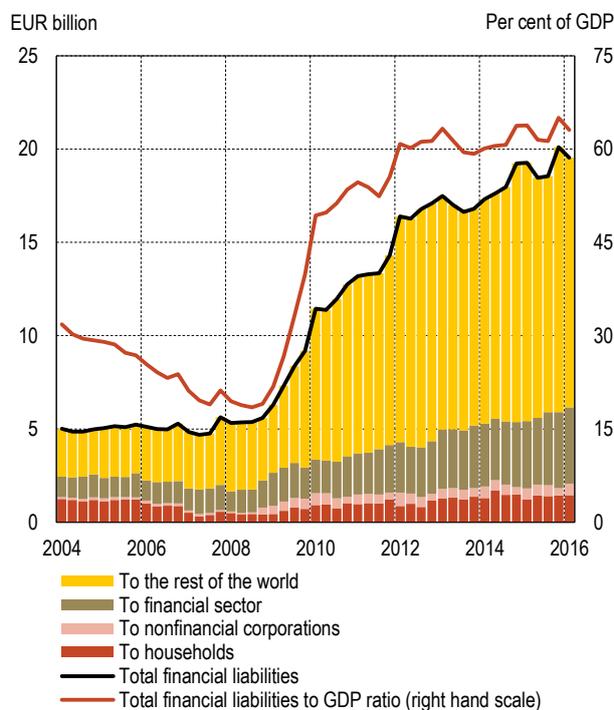
The burst of domestic credit and asset price bubbles, coupled with negative external shocks to foreign trade, resulted in a severe economic downturn in Lithuania. Moreover, adverse interest rate shocks (in particular, increases in rates on litas-denominated loans and deposits) effectively amounted to strong monetary policy tightening, adding downward pressures on prices, nominal wages and monetary aggregates. Given the strong dependence of public finances on nominal GDP dynamics (i.e. changes in both real economic activity and prices), the state of public finances sharply deteriorated during the crisis (see Fig. 28). In 2009, the general government's disposable income declined by 36 per cent, largely driven by a fall in income taxes and a rise in social (unemployment) benefits. Facing financing problems and soaring borrowing costs, government had to undertake fiscal consolidation measures. In 2009, actual discretionary spending was curbed by 12.4 per cent, mostly by reducing public investment and collective consumption expenditure. Nevertheless, since the decline in the general government's disposable income outweighed the reduction in discretionary spending, there was a strong cyclical increase in general government deficits and a consequent rise in government debt levels.

Fig. 28. Dynamics of government's disposable income and discretionary spending



Source: Statistics Lithuania; Bank of Lithuania.

Fig. 29. Financial liabilities of general government



Source: Statistics Lithuania; Bank of Lithuania.

As can be seen from Figure 29, total financial liabilities of general government quadrupled in nominal terms from around 5 billion euros in 2008 to 20 billion euros at the end of 2015 (at the same time gross general government debt rose from 16 to 45 % of GDP). The increase in government debt was primarily financed by borrowing from abroad. Domestic banks also added to their holdings of government debt at a similar pace, maintaining a relatively stable share (about a fifth) of debt holdings.

There is little doubt that the government's deficit spending and the associated debt accumulation were among the key factors that helped to prevent an even deeper economic downturn and support the economic recovery in Lithuania (see Ramanauskas 2011). Deleveraging of the private sector was effectively offset by accelerated accumulation of government debt, which is rather typical during debt crisis episodes (Tichy 2013; Rutkauskas 2015). From the IA perspective, the government spending was financed by running down net financial assets, i.e. by borrowing from abroad and, to a lesser degree, from domestic banks. As argued in Ramanauskas *et al.* (2016), such mode of expenditure financing is not conditioned on other sectors' savings and therefore has an immediate strong positive effect on domestic demand. Moreover, a large fraction of government spending is usually domestically oriented, which directly adds to nominal income and stimulates real economic activity.⁶ So the decision problem facing the government was essentially to choose the right amount of deficit spending. However, there was little fiscal leeway, as market financing might have been unavailable or prohibitively expensive without proper fiscal discipline, while overly tight austerity would have amplified the economic

⁶ Fiscal multipliers can be especially large in a recessionary environment with high unemployment (Ramanauskas 2011).

downturn, potentially further damaging public finances. Of course, the longer-term financial consequences of borrowing at rather unfavourable terms also had to be taken into consideration. Borrowing expensively for relatively long maturities during the crisis led to persistently high effective interest rates on public debt for a long period after the crisis. Accumulation of additional foreign public debt during the recent crisis has so far resulted, by rough estimates, in over 2 billion euros in additional interest payments.

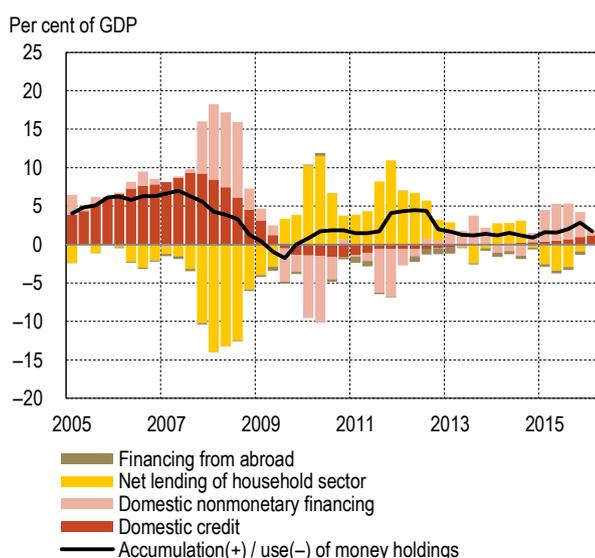
Extensive government borrowing from abroad and financial capital flight from the domestic banking sector were closely interlinked. First of all, the reversal of bank credit flows and parent banks' decisions to gradually withdraw financing of Lithuanian banks contributed to the severity of economic and fiscal crisis and the size of government's funding gap. Banks, as major players in the Lithuanian financial market, did not provide sufficient financing to the government and there was no appropriate financial infrastructure in place to effectively tap into financial resources of other domestic sectors, therefore the government was forced to borrow extensively from abroad. Large financial inflows related to government borrowing from abroad provided a big boost to the liquidity in the banking sector,⁷ effectively enabling domestic banks to siphon off the "excess" liquidity to their parent banks and gradually replace their liabilities to parent banks with domestic retail deposits.

Some important lessons can be drawn from this episode of financial capital repatriation enabled by government borrowing from abroad. The IA analysis reveals that, contrary to the beliefs of many economists and policy makers, in a similar crisis situation a large part of soaring government debt could in principle be financed domestically. One of the crucial conditions for this is the constructive and cooperating behaviour of banks. If banks had shown trust and provided sufficient amounts of credit to the government, this would have added to the liquidity of the banking sector (just like in the case of government borrowing from abroad), making such credit largely self-financing. In hindsight, banks could have profited from high yields of government debt and would have even been able to use the created liquidity to gradually reduce their foreign liabilities. From the state perspective, it would have been more beneficial for the economy if the high interest paid by the government during and after the crisis had been earned by domestic creditors (e.g., resident bondholders or bank depositors) rather than foreign bondholders. This serves as an indication of the risks associated with the concentrated, mainly foreign-owned banking sector and prevailing very similar banking business models. This also suggests that strong domestic banks, networks of credit unions (i.e. local financial intermediaries with distributed ownership) and developed domestic markets for government debt could be instrumental in dealing with similar crisis situations.

7. Monetary dynamics during the financial cycle

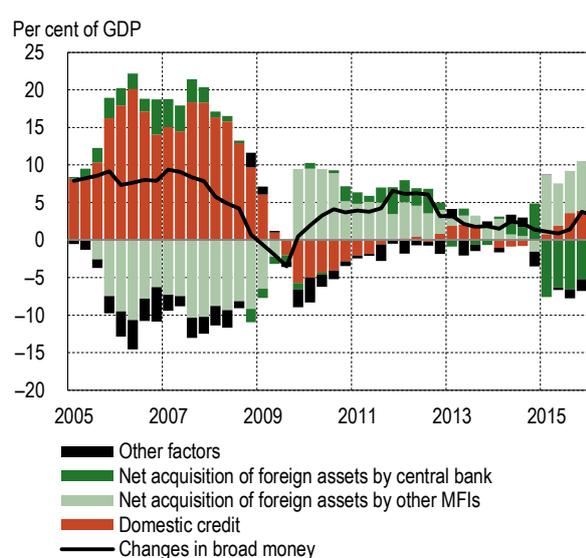
Analysis of monetary developments is important for policy makers because it helps to assess if developments in the credit market are sound, the level of deposit financing of banks is appropriate and if inflationary pressures related to changes in the nominal purchasing power are in check. The IA framework offers convenient ways to analyse drivers behind monetary dynamics from several perspectives, namely, the sectoral level, the money-issuing sector's perspective and the macroeconomic level.

Fig. 30. Contributing factors to dynamics of household sector's money holdings



Note: Four-quarter sum to GDP ratios.
Source: Statistics Lithuania; Bank of Lithuania.

Fig. 31. Broad money counterparts from MFI sector's balance



Note: Four-quarter sum to GDP ratios.
Source: Statistics Lithuania; Bank of Lithuania.

Changes in sectoral money holdings are driven by the sector's nonfinancial balance (basically the difference between income and expenditure) and net financing transactions.⁸ For example, rapid accumulation of money holdings by the household

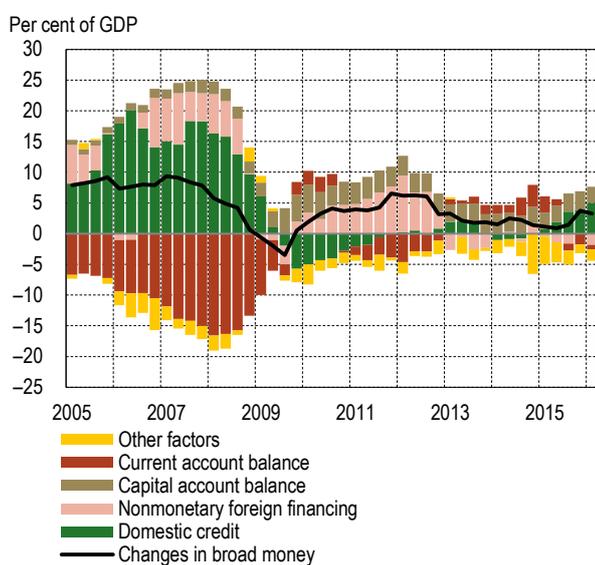
⁷ This is because a large fraction of government expenditure was domestically oriented and was transferred to the bank accounts of the beneficiaries.

⁸ See Ramanauskas *et al.* (2016) for a more detailed discussion about the factors contributing to the monetary dynamics.

sector during the boom period was primarily associated with strong bank credit flows to the household sector, whereas the nonfinancial balance – or, loosely speaking, saving – was negative and contributed negatively to the dynamics of sectoral money holdings (see Fig. 30).⁹ During the crisis, the reverse was true: household saving positively contributed to the accumulation of money balances while net repayment of debt to banks weighed down of money holdings of the household sector. A similar pattern also applied for the nonfinancial corporate sector. Notably, money holdings of the private nonfinancial sector were declining only very briefly, at the height of the crisis in 2009. The change in government sector's money holdings fluctuated around zero throughout the whole period; a notable development is the strong increase in the budget deficits in the period from 2009 to 2013 and the associated rise in borrowing, mostly from abroad.

Monetary developments can be seen through the prism of balance sheets of the MFI sector. In the IA table, the vertical financing constraint of the MFI sector relates monetary dynamics to other balance sheet items of the MFI sector (see Fig. 31),¹⁰ quite similarly to the decomposition of broad money aggregates to their counterparts in the monetary survey statistics. The boom period dynamics seems intuitive: bank credit was the main driver behind the growth in the money stock while rising net foreign liabilities of banks reflected the outflow of money from the economy. In contrast, during the crisis the money stock was growing at the same time when banks increased their net foreign assets (reduced foreign liabilities). It would be clearly wrong to draw the causal relationship here – banks' repayment of funding to their parent banks could not be a logical reason for the money stock to grow. The explanation to this apparent puzzle is that a change in the net foreign assets of the MFI sector reflects various underlying processes – in this case it reflects active general government's borrowing from abroad and the adjustment of the current account balance.

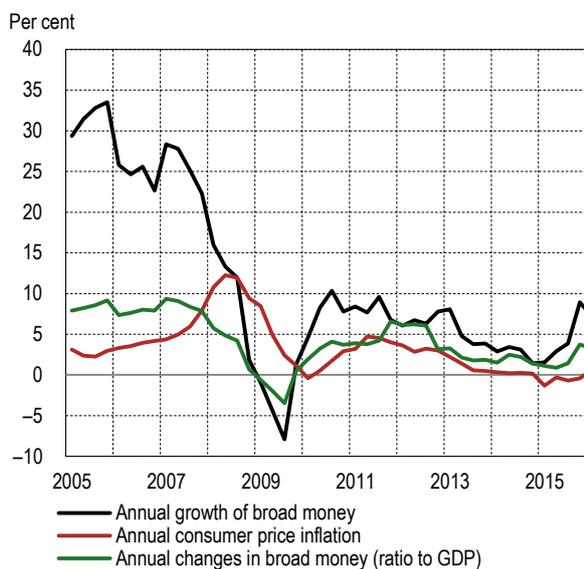
Fig. 32. Macroeconomic drivers behind money growth



Note: Four-quarter sum to GDP ratios.

Source: Statistics Lithuania; Bank of Lithuania.

Fig. 33. Broad money growth and inflation



Source: Statistics Lithuania; Bank of Lithuania.

Figure 31 serves as an example showing that certain identity relationships are overly general to correctly identify the drivers behind changes in the variables of interest. To identify the macroeconomic drivers behind monetary dynamics in Lithuania, we extend the analysis along the lines detailed in Ramanaukas *et al.* 2016 (in particular, see equation (10) therein). We can see from Figure 32 that during the boom period the growth in the money stock was primarily driven by credit expansion and, to some extent, by nonmonetary financing from abroad, whereas the main dampening factor was the current account outflows. During the crisis, nonmonetary financing from abroad (of which government borrowing was by far the most important) and capital account inflows (i.e. support from EU structural funds) were the main factors contributing to the growth of the money stock, while bank credit flows were negative (as loans were being repaid on aggregate) and negatively contributed to the monetary dynamics.

Empirical identification of macroeconomic drivers behind monetary dynamics offers some important insights. Bank credit is an important source of money creation but monetary dynamics can ultimately be very different from credit dynamics because there are other sources for money creation, such as nonfinancial sectors' financing from abroad,¹¹ and there are leakages of money from the economic system, mostly through financial and current accounts. Therefore, even though banks do create money by issuing loans, in the open economy credit might not necessarily be fully self-financing and banks may be constrained in their ability to extend new credit by their access to stable financing sources other than deposits. Finally, analysis of the macroeconomic drivers behind monetary dynamics is essential for macroprudential and monetary policy

⁹ The graph also shows that significant excess spending (i.e. a negative spike in household saving) in 2008 was enabled by nonmonetary financing from the nonfinancial corporations. There are statistical discrepancies between economic and financial accounts of the household sector around that time, and therefore these particular spikes have to be interpreted with caution.

¹⁰ In this and other figures we use the financial accounts' definition of broad money, which slightly differs from the monetary survey definition of broad money (M3) but the two series are quite similar in quantitative terms in Lithuania.

¹¹ That certainly holds true under the currency board arrangement, whereby the central bank issues the requested amounts of domestic currency in exchange for the anchor currency.

makers as it helps assessing whether monetary dynamics is balanced. For example, an exuberant credit growth coupled with large current account deficits is an immediate indication of unbalanced monetary dynamics. Also, as can be seen from Figure 33, strong money growth seems to lead to a build-up of inflationary pressures and generally is an important driver behind price dynamics.

Concluding remarks

We applied the IA analysis with the aim to empirically investigate the recent financial and economic cycle in Lithuania. We find clear evidence of the balance sheet expansion during the boom years followed by a balance sheet recession associated with economically very painful credit and monetary contraction. The boom-and-bust cycle was strongly associated with exuberant bank lending during the boom years, followed by a sudden reversal of lending conditions and the subsequent repatriation of debt financing by foreign banks. The Lithuanian experience also confirms that strong credit and asset price boom accompanied by economic imbalances, and debt financing of current account deficits in particular, is a potentially risky mix of economic conditions. The policy response to crisis was a market-imposed austerity but nevertheless there was a sharp rise in public debt, essentially offsetting deleveraging in the private sector. The effective replacement of growth of private sector debt with a rapid accumulation of public debt was a very important stabilising factor, and the IA analysis reveals that in principle under some conditions it could have been achieved through domestic financing, though in fact the government had to resort to foreign financing, which was rather costly. During the crisis the monetary dynamics was driven by government borrowing from abroad, stepped up capital transfers from abroad and positive current account adjustments, all of which allowed foreign parent banks to withdraw debt financing and replace it with domestic deposit financing.

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