

Credit Dynamics of Various Entities in Russia: Impact of Oil Prices and Sanctions

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Abstract: In this paper we analyze the dynamics of external borrowing and internal credit provided by the banking system to the various entities of Russian economy. Using data from either end of 2002 or end of 2005 (depending on availability of the corresponding variables) we identified in most cases at least two credit booms periods. Most of the private sector external credits saw the boom coinciding with the time of the world financial crisis of 2008-2009, while for the government the boom in external borrowing was identified in 2012-2013. The government-affiliated companies and banks had another external credit boom at the end of 2014 – early 2015. It should be stressed that it is visible that financial sanctions have changed the composition of external borrowing from direct investments, bonds and credits to more short-term and less direct external financing.

External credit was partly substituted for by internal credit as the boom at the end of the study period suggests. Again, the government has somewhat different timings of credit booms in relation to internal credits. Mostly total internal credit has the same timings of booms as credit in national currency, which is not surprising taking into account the dominant share of credit in national currency in the total outstanding credit, especially after the crisis of 2008-2009 when the banking system became aware of the necessity to deal with the currency mismatch between assets and liabilities.

Results of decomposing the effects on external borrowing and domestic credit into effect related to decreasing oil prices and effect due to financial sanctions show that sanctions are felt more compared to decrease in oil prices (in case of external borrowing), and that short-term borrowing decreased less for government companies and banks. Domestic credit market was also influenced by sanctions and decreasing oil prices to varying degrees.

Keywords: credit cycles, external borrowing, domestic credit, Russia, financial sanctions.

1. Introduction

The recent crisis of 2007–2008 has demonstrated the vulnerability of different economies – developed, developing, in transition – to the availability and price of credit. The crisis has demonstrated that all countries in the world are very interdependent, especially in terms of financial and trade relations, and mounting the problems of one large economy (or a group of economies) threaten the stability and development of the world economy as a whole. The response of countries to the problems of the recent economic and financial crisis has been very diverse. Some countries were quick in their recovery process, and some are still in recession or close to it. While there might be many competing or complementary explanations of this diversion in the post-crisis trends depending on the case chosen for analysis, the crisis has reinforced the importance of credit in the economy, and the importance of understanding the dynamics of credit, credit booms and credit recessions for understanding the dynamics of economic development.

An important issue in the analysis of credit dynamics is the identification of credit booms and the analysis of the corresponding dynamics of the main macroeconomic indicators in the periods of credit booms, i.e. unusually high credit expansion. In a recent paper by Mendoza [2006] it has been shown that high external credit exposure is responsible for the phenomenon of so-called “sudden

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stops” – cases of sudden reversals of current account positions and following severe recessions in emerging economies. The importance of credit, especially external credit, in producing adverse effects on economic development has been also documented for resource-dependent countries due to the propensity of both governments and private sector to borrow abroad in times of high resource prices [see e.g. Gavin et al. 1996; Kaminsky, Reinhart, Vegh 2005; Mendoza, Terrones 2008; Reinhart, Reinhart 2009; and Frankel 2010]. Appended with the now famous financial instability hypothesis of Hyman Minsky [see e.g. Minsky 1964, 1977, 1991], these considerations stress that credit is an important source of instability, especially for emerging economies with resource dependence. At the same time, credit – both domestic and international – is an important source of financing supporting economic growth and development for this group of countries.

It has been also well-documented empirically and grounded theoretically that credit developments and subsequent instability are contagious due to a number of reasons. Kaminsky, Reinhart, Vegh [2003] group all explanations into three major themes: *herding behaviour* (related to information constraints, observed behaviour and costs of being out of surrounding network – see e.g. [Banerjee 1992; Bikhchandani, Hirshleifer, Welch 1998; Calvo, Mendoza 2000]), *trade linkages* (extensive trade linkages create sensitivity to the economic stance or economic policy decisions of major trading partners, such as devaluation – see e.g. [Nurkse 1944; Gerlach, Smetts 1996; Charemza et al. 2009]), and *financial linkages* (external credit, openness of capital flows, potential for speculative attacks – see e.g. [Shleifer, Vishny 1997; Kaminsky, Reinhart 2000; Kodres, Pritsker 2002]). Out of these three groups the latter two are especially relevant for countries that create an economic union of some sort, as first trade and then financial ties are the first to develop in such a setting.

The issues of interdependence through trade and financial linkages as well as resource dependence become important when some external, non-economic events contribute to fragility of some borrowing arrangements. This is clearly the case of Russia in its present and quite recent history. The Soviet Union’s fall was largely assisted by the joint events of increasing grain prices and decreasing oil prices on the one hand and the mounting reluctance of credit provision from its Western trade partners. Russia’s 1998 crisis was provoked by the change in expectations of foreign investors into domestic debt pyramid that resulted in ruble devaluation and default on short-term government loans. Recently Russia has been deprived of the usual sources of long-term financing from foreign counterparties, and this has played an important role in the slowdown of growth. Other important sources of such impacts are low oil prices and structural crisis in Russia.

In this paper we study the dynamics of Russian external debt and internal credit dynamics through identifying credit cycles and credit booms and then we check whether the change in external credit complies with the explanation of the sanctions’ effectiveness and if the internal credit is able to substitute external constraints. The paper is structured as follows: the next section presents briefly overview of the sanctions literature and describes the sanctions introduced against Russia. The next section describes the data and methodology applied in the study. The further two sections describe the results of analysis of external debt and internal credit respectively. Then the results of analysis of the impact of sanction and oil prices are presented. The final section concludes.

2. Sanctions: overview of the literature and description of sanctions against Russia

The imposition of sanctions usually serves to demonstrate disapproval with the policies of the sanctioned country as well as to impose economic hardship and weaken economic (and often military) potential of the nation under sanctions. The literature on sanctions comprises a number of

approaches varying in their explanation of what the sanctions are intended to convey to the sanctioned country. Some approaches (e.g. symbolic approach or signaling approach – see Kaempfer and Lowenberg, 2007, Drezner, 2000, Shadrina, 2015) intend to imply the disagreement with the political actions of the targeted nation and also to provide credibility to the threat of decreasing economic potential of the country under sanctions. The political economy approach (see e.g. Kaempfer and Lowenberg, 2007, Shadrina, 2015) leads to the stress on trade sanctions and potential disinvestment of the sanctioned economy. Shadrina (2015) notes that during the 1990s there appears more of the smart of targeted sanctions that apply to specific members (both persons and companies) of the elite of the sanctioned country (see also Kaempfer and Lowenberg, 2004, 2007).

The following sanctions were introduced against Russia in September 2014:

- US financial sanctions (Directive 2 of Executive Order 13662²): prohibition of US persons ‘transacting in, providing for, or otherwise dealing in new debt of longer than 90 days maturity for the listed persons, their property, of their interests in property’ (Rosneft, Novatek, Transneft, Gazpromneft were listed in September 2014);
- EU financial sanctions (EU Council Regulation 833/2014³): prohibition for an EU entity to ‘directly or indirectly purchase, sell, provide services for or assist in the issuance of, or otherwise deal with transferable securities and money-market instruments with a maturity exceeding 30 days issued after 12th of September 2014’ by Rosneft, Transneft, Gazpromneft (or their more than 50%-owned EU subsidiaries); incidentally this means that even using Asian SPVs acting as initial purchaser of oil won’t work;
- US export controls (US Treasury Department’s Office of Foreign Asset Control) imply sanctions against specified energy companies and their 50%+ subsidiaries; in particular, Directive 4 of Executive Order 13662 prohibits US persons from ‘the provision, exportation, or re-exportation, directly or indirectly, of goods, services, or technology in support of exploration or production for deepwater, Arctic offshore, or shale projects that have the potential to produce oil in the Russian Federation, or in maritime area claimed by the Russian Federation and extending from its territory, and that involve any person determined to be subject to this Directive, its property or its interests in property’ (Rosneft, Gazprom, Gazpromneft, Surgutneftegaz, Lukoil were listed);
- EU export controls on technology export (Article 3(1) of EU Council Regulation 833/2014): prior authorization is required for the ‘sale, supply, transfer or export, directly or indirectly, of items as listed in Annex II, whether or not originating in the EU, to any natural or legal person, entity or body in Russia, including its Exclusive Economic Zone and Continental Shelf or in any other State, if such items are for use in Russia, including its Exclusive Economic Zone and Continental Shelf’; the list includes the following items of exploration and production projects in Russia: oil exploration and production in water deeper than 150 meters, oil exploration and production in the offshore area north of the Arctic Circle, projects that have potential to produce oil from resources located in the shale formations by way of hydraulic fracturing; also additional provisions are concerned with services and financing of such projects.

The sanctions introduced in September 2014 against Russia can be classified as smart sanctions targeting the industries that form the backbone of Russian economy. They can be best explained through the lenses of political economy since they impede economic development and might result

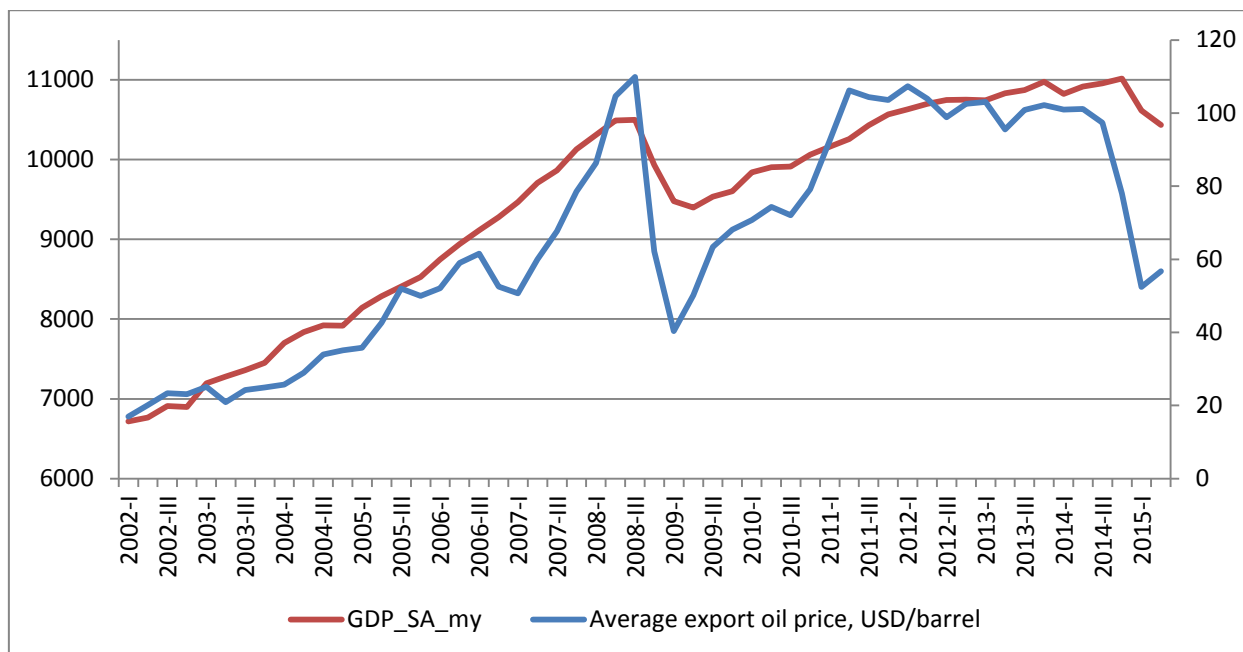
² http://www.treasury.gov/resource-center/sanctions/Programs/Documents/ukraine_eo3.pdf

³ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32014R0833>

in potential disinvestment of the Russian economy in its oil- and gas-producing industries forming presently the core of the Russian economy.

An illustration of how much Russia depends on oil can be seen from the following figure (see Fig. 1). In fact, the best forecast of the Russian GDP can be made from a simple regression using oil prices as the main exogenous factors.⁴

Fig. 1. Russian GDP, seasonally adjusted, in constant 2008 prices; average export oil price (USD/bbl).



Intending to impede not only transfer of technologies (that requires time to have meaningful economic effects) but also external credit, these sanctions should have economy-wide effect, which, however, might not be immediate.

3. Credit cycles and sanctions: data and methodology

Our main hypothesis is that Russia, like many other resource-dependent countries, got used to high oil prices and engaged into a number of ambitious projects requiring external finance supplied during 'good times' (of high oil prices) at very low costs. The 2008 world crisis has put a stop on the credit boom that was present (worldwide in fact). But later on the government found itself in need of higher borrowing due to non-reducible budget obligations and a new credit boom was about to develop if it were not for the Western financial sanctions. We use data on various items of external liabilities, internal credit, and GDP to derive the credit cycles and to identify credit booms.

In our study the following data for Russia are used:

- external debt: (quarterly data 2002:4 – 2014:4)
 - total;
 - government;
 - 'wide government' = government + government-affiliated companies and banks;
 - private banks and companies;
- internal credit (provided by the banking system): (quarterly data 2000:4 – 2015:1)

⁴ The details can be provided by the author upon request.

- total outstanding credit to all sectors of economy;
- credit to the government;
- credit to government-affiliated nonfinancial companies;
- credit to private nonfinancial companies;
- credit to other financial companies;
- credit to the population;
- CPI (2005 = 100);
- population (million people);
- real GDP (2005 = 100).

We use the largest available datasets in all cases in order to use as much information as possible. For robustness check we also limit all samples by the common available period, and also for robustness check we exclude the period after 2013. Following methodology suggested by Mendoza and Terrones (2008) we use *per capita* data to investigate credit cycles. But we also use the same indicators in relation to GDP since outstanding debts and credits should be also compared to the capacity of the economy to produce valuable products able to generate cash flow to cover the outstanding debts. We compare the results received by using the two different measures as an additional robustness check.

Our major data sources are:

- Bank of Russia (<http://www.cbr.ru/statistics/>),
- Federal State Statistics Service, Russia (<http://www.gks.ru/>).

To identify credit booms and their relation to GDP dynamics, we adopt the approach suggested by Mendoza and Terrones in their 2008 paper, further developed in their 2012 paper. The method proposed by these authors is *threshold method* allowing for disaggregation of real *per capita* credit (or credit in relation to GDP) into trend and cyclical components. Unlike Mendoza, Terrones [2008, 2012], we use quarterly data, and therefore before deriving trend and cyclical components, we first exclude seasonality from our data using the additive Census X11 method built into the EViews 7 software, which we use in our estimations.

After the seasonal component is eliminated, we proceed with disaggregating time series we use for our study into long-run trend and cyclical components. For this we apply the Hodrick-Prescott (HP) filter. We favour its use compared to the Baxter-King filter since the latter cuts off some data at the beginning and the end of the times series, and since we have only 64 observations for the longest time series, we opted for HP filter that uses more information. The HP filter decomposes the time series into its long-run trend (T_t) and cyclical component (C_t) according to the following formula:

$$\sum_{t=1}^m C_t^2 + \lambda \sum_{t=2}^{m-1} ((T_{t+1} - T_t) - (T_t - T_{t-1}))^2,$$

where m is the sample size and λ is the smoothing parameter that equals 1600 for quarterly data [Hodrick, Prescott 1997].

Once the trend is accounted for, thresholds (of statistical nature) can be applied to determine the start and the end dates of the credit boom, denoting cyclical variations higher than average. More precisely, if l_{it} is the deviation of the logarithm of real *per capita* credit from its long-run trend and if $\sigma(l_i)$ is the standard deviation of the cyclical component of real *per capita* credit, then if on one or more particular sequential dates it is true that $l_{it} \geq \varphi \sigma(l_i)$ (φ is the *threshold*), we can claim that on this date(s) credit boom was observed. To check for robustness, alternative values of φ were used (1.75, 1.65, 1.5 and 2.0 as suggested in [Mendoza, Terrones 2008]). The peak date of credit boom is

the date when the difference between l_{it} and $\varphi\sigma(l_i)$ is the largest for a set of contiguous dates. The date preceding the credit peak with the smallest absolute difference between l_{it} and $\varphi_s\sigma(l_i)$ is the start date, and the date following the peak date with the smallest absolute difference between l_{it} and $\varphi_e\sigma(l_i)$ is the end date, where φ_s and φ_e we assume equal to 1, following Mendoza, Terrones [2012]. We also consider smaller values of φ_s and φ_e , with no substantial difference in results.⁵

The next stage consists of trying to distinguish between effect from sanctions and effect from drastic decrease in oil prices: since Russia is heavily dependent upon oil production and sales, most experts agree that oil prices have had an important part in stagnation of Russian GDP. To separate the effects (and to try to capture the effects from structural crisis in Russia) we use the following data:

- indicators of external and internal credit (same as in the previous part of the study, except that no scaling was applied) – *dependent variable*;
- appropriate interest rate (Bank of Russia's repo interest rate for internal credit and Fed's monetary policy rate for external borrowing) – *independent variable, proxy for the costs of borrowing*;
- GDP gap constructed on the basis of the Russian Economic Barometer indicators of capacity and labour utilization – *independent variable, proxy for the structural conditions in the Russian economy (overheating of the economy or stagnation)*;
- oil prices measured as Europe Brent spot price, USD/bbl⁶ - *independent variable, the major proxy for the condition of the Russian economy*.

We assumed that oil prices and external interest rate were exogenous in all cases, while internal interest rate and GDP gap were assumed as endogenous. The choice of GDP gap constructed from the surveys and not statistically drawn is explained by two facts: dependence of the statistically constructed GDP gap from the GDP series suffers seriously the choice of the period for filtering the series, and secondly, GDP closely correlates with oil prices, and our intention was to reduce the incidence of potential correlation.

VECM models were constructed to account for the interaction of endogenous variables. In all cases, however, the coefficients and the share of explained variation due to endogenous variables in the equation for credit indicator were statistically insignificant⁷, which allowed us to use a simple single-equation model for out-of-sample forecasting. The data until the 4th quarter 2013 were used for estimation, and then the data on exogenous variables were used for out-of-sample forecasting (dynamic). The difference until 4th quarter 2014 was used to measure the quality of the forecast and to judge if the quality of the forecast since 4th quarter 2014 could be used as a proxy of the sanctions effect. In order to determine the effect of oil prices, the out-of-sample forecast was also made using the average quarterly oil prices for 2012-2013.

Additionally it should be mentioned, that the impulse response analysis in VECM models in most cases demonstrated significant response of GDP gap on changes in the oil prices. In the case of internal credit indicators the internal interest rate also showed response to the GDP gap proxy changes and to the changes in the oil prices.

4. External debt dynamics and credit cycles

⁵ Details on the results with other values of φ_s and φ_e are available from the authors upon request.

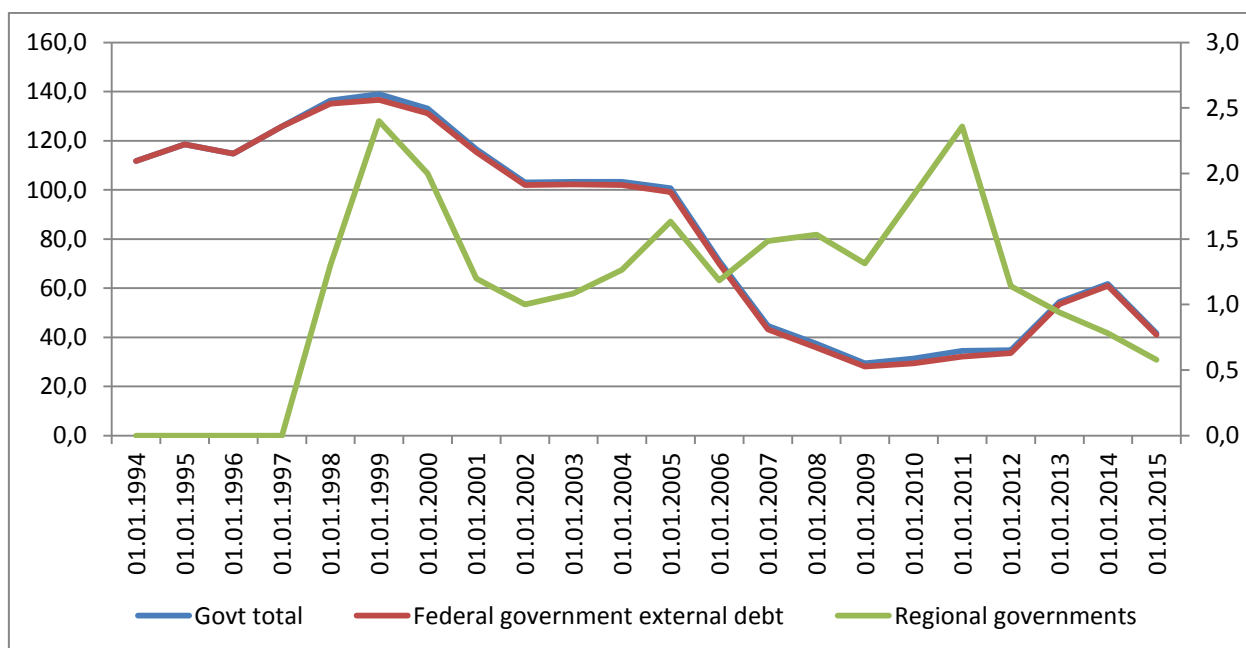
⁶ <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RBRT&f=D>

⁷ Results of VECM analysis are available from the author upon request.

When analyzing external debt dynamics we address several different entities: government (total, federal and regional), 'wide government' (government plus government-affiliated banks and companies with the share under government's control over 50%), banks, non-financial companies as well as separately government and private banks and companies.

We start with analyzing the general dynamics of the government external debt⁸, and a few observations are in order. After a clear peak of both federal and regional borrowing in 1998 there was a peak in regional borrowing around 2012 (very much related to the famous Presidential decrees of May 2012), and there was a peak in the external borrowing by the federal government in 2013-2014 that was stopped only by the introduction of sanctions (see fig. 2).

Fig. 2. External debt of total government (federal + regional) in 1993-2014, bln \$



As fig. 3 and fig. 4 demonstrate, the total government external credit taken was decreasing while the amount of government outstanding bonds in foreign currency was quite steady since 2001, and the borrowing in rubles suddenly increased around 2013-2014 (one of the explanations is that certain companies abroad affiliated with Russian structures had to buy bonds denominated in rubles to support the Olympics in Sochi). There is also a noticeable decrease of foreign-currency borrowing in 2008-2009 (due to closed international financial markets).

Fig. 3. External debt of total government (division by different sources of external debt) in 1993-2014, bln \$

⁸ We understand here by external debt the obligations of Russian residents to foreign residents, following the definition used in the BoP (6th guidebook) and the Bank of Russia. Ministry of Finance of Russian Federation uses a different definition of external debt considering as such only obligations due in foreign currency. We consider this approach too narrow as the events of 1998 crisis in Russia clearly demonstrate.

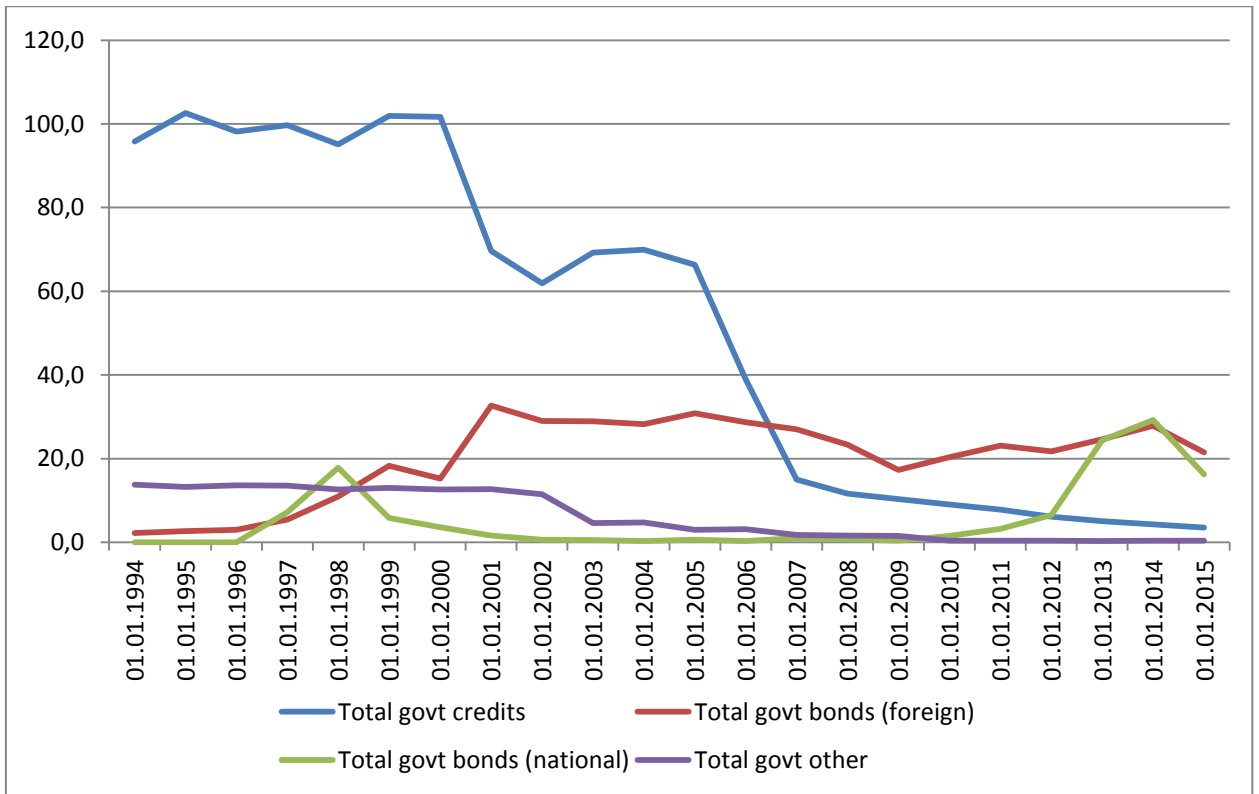
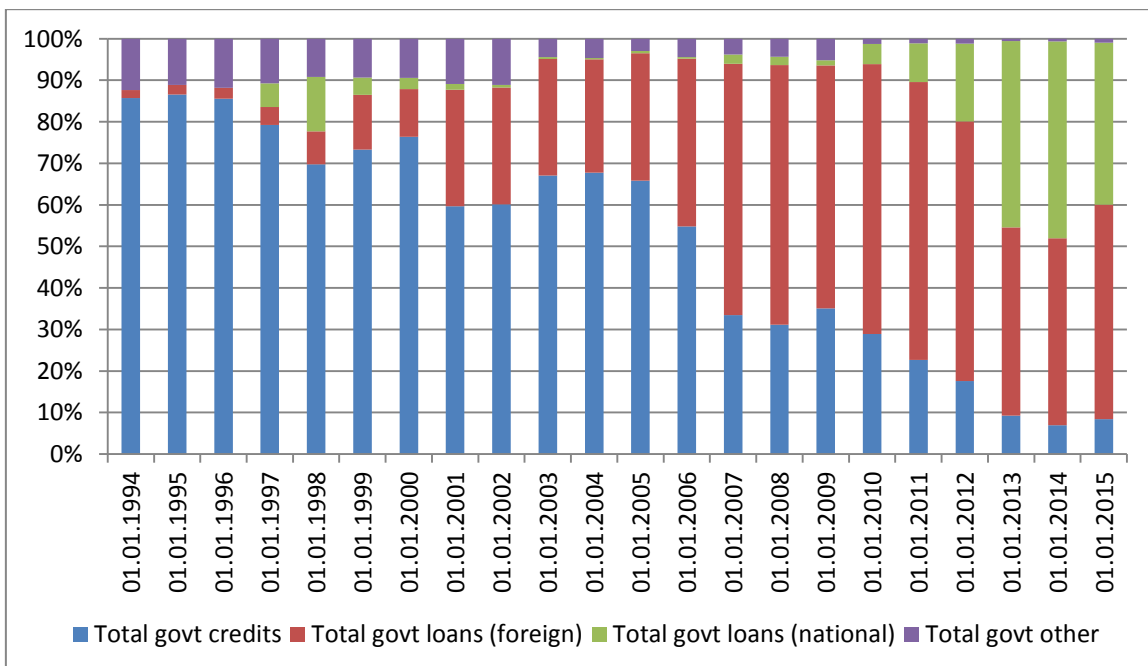


Fig. 4. External debt of total government (division by different sources of external debt) in 1993-2014, %

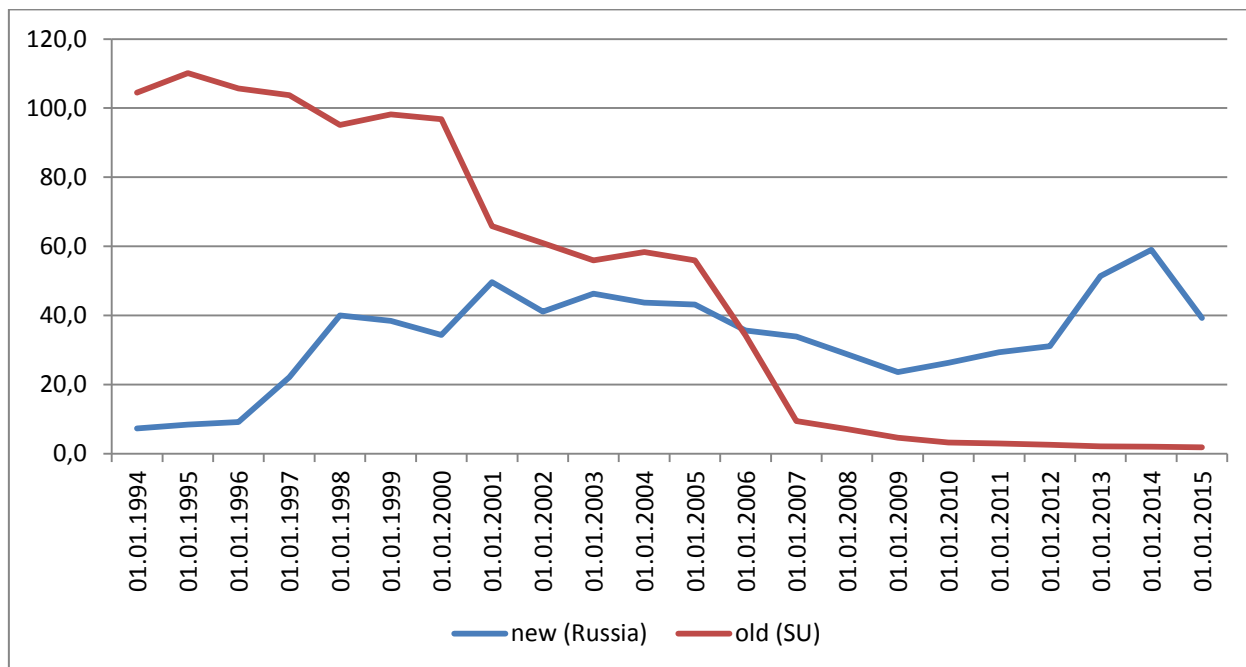


It can be seen also that credits were coming in waves and in general there was a decrease in reliance on credits. External borrowing in national currency comes in since 2009 and accelerates in 2013-2014 before a drop by 2015. Surprisingly the share of bonds denominated in foreign currency increases in 2014.

An important part of Russian external debt dynamics that was determining largely the macroeconomic development of the country in 1990s – early 2000s was the inherited Soviet debt (see fig. 5 and fig. 6). In 2006 Russia has paid out a large share of its debts to the Paris club of

creditors and after that the 'real' Russian external debt dominates the dynamics. Therefore, in 2013 and 2014 the increase in external government borrowing was due to Russian government's own actions, but inherited debts in need of servicing.

Fig. 5. Russian and Soviet external debt to be paid by Russia (Federal government loans and credits), 1993-2014; bln \$



If we look at the CBR (Central Bank of Russia), it has some external loans (mostly short-term liquidity provision), and since 2010 it lists among its external liabilities SDR distribution (after the IMF has decided in late 2009 to distribute SRDs more equally between the member countries). However in general these are more technical issues and almost none serious loans and credits of CBR are circulating. Therefore we exclude it from our analysis. In total debt related to the governments of various levels and the CBR, the government debt share is about 98%, so we can safely assume that it is the Federal government that governs the majority of the external government debt (not counting government-related companies).

Fig. 6. Russian and Soviet external debt to be paid by Russia (Federal government loans and credits), 1993-2014; %

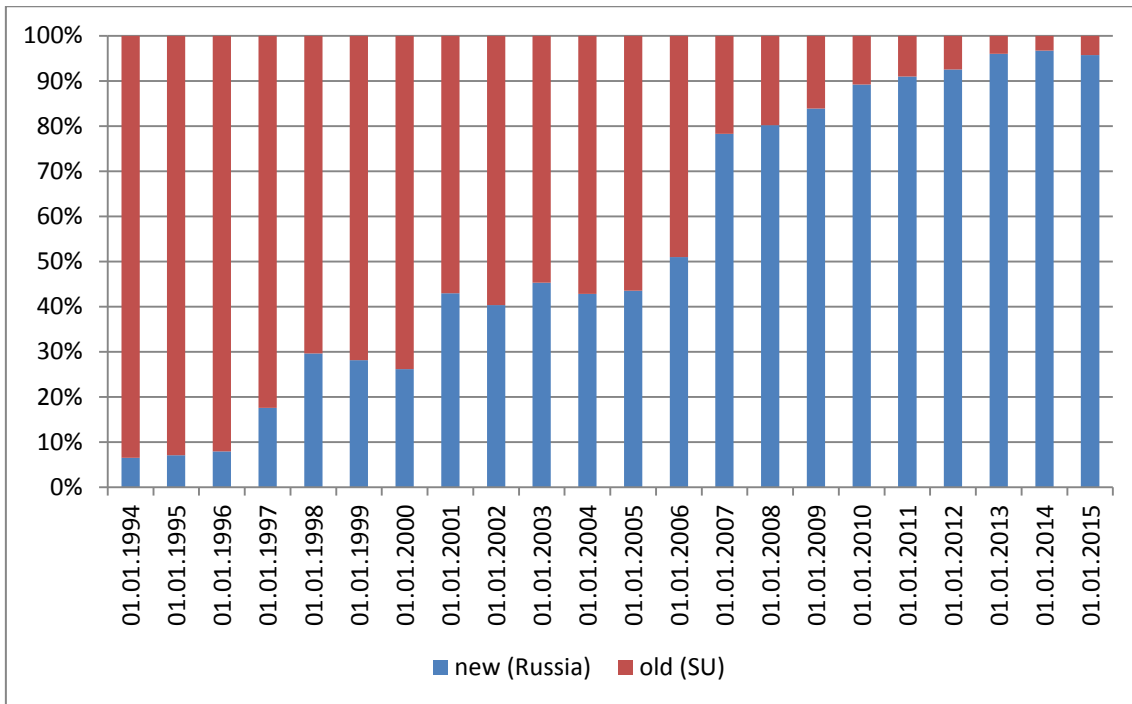
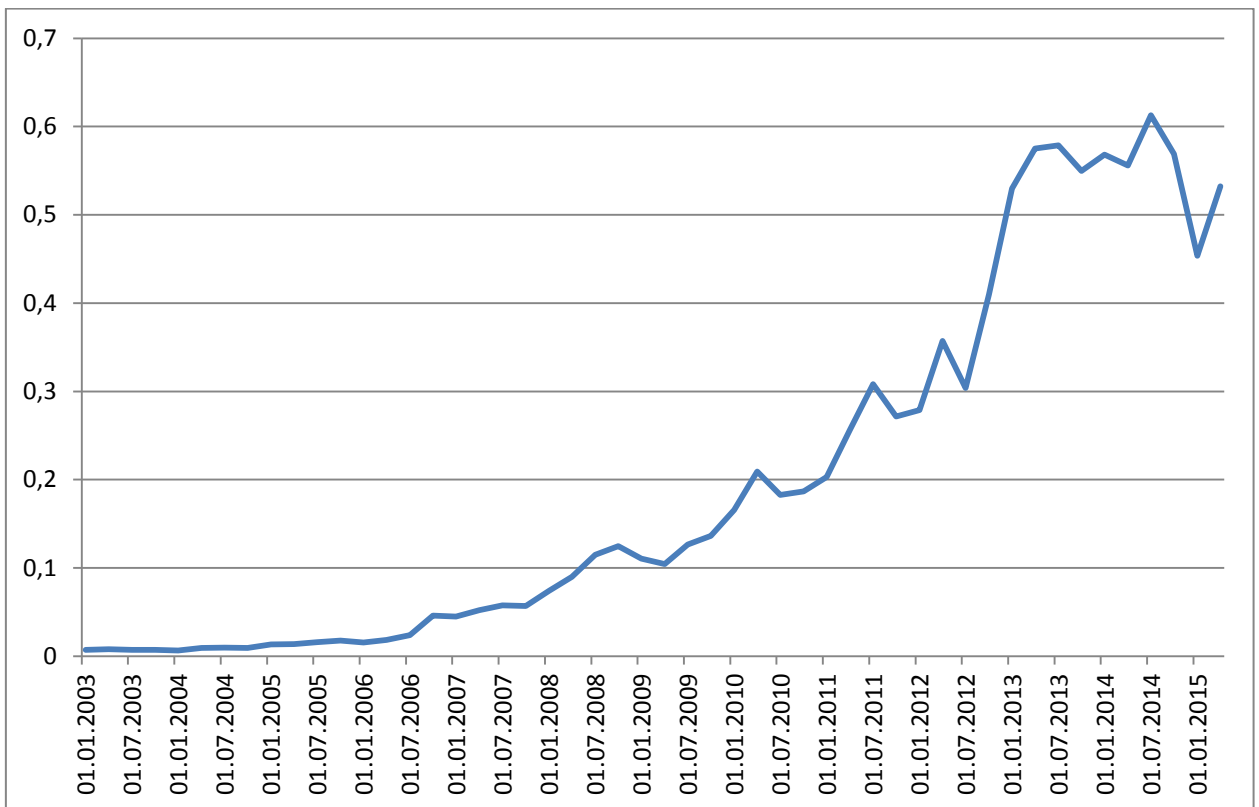


Fig. 7. Share of government external debt in national currency, 2003 – 2014



As fig. 7 demonstrates, after the world financial crisis of 2008-2009, the share of external government borrowing in rubles became larger than 10% and accelerated in mid-2012. As has been noted earlier, this might be due to funding the Olympics using some of the companies that are unofficially associated with the large Russian business.

The external liabilities of Russian banks are largely based on deposits taken from foreign investors in their foreign branches (see fig. 8 and fig. 9). Until now this is one of the largest sources of hard

currency in the Russian banking system – sanctions do not prohibit depositing money in the Russian-affiliated banks, and the latter offer high interest rates. It is also interesting to note that since 2012 there was an increase in external bond financing used by the banks. Besides, since mid-2012 there was an increase in liabilities to direct investors, but this saw a decline since mid-2014 after the Western sanctions took place, showing that some banks lost their foreign investors.

Fig. 8. Russian banks – total outstanding foreign liabilities, 2003-2014, mln \$

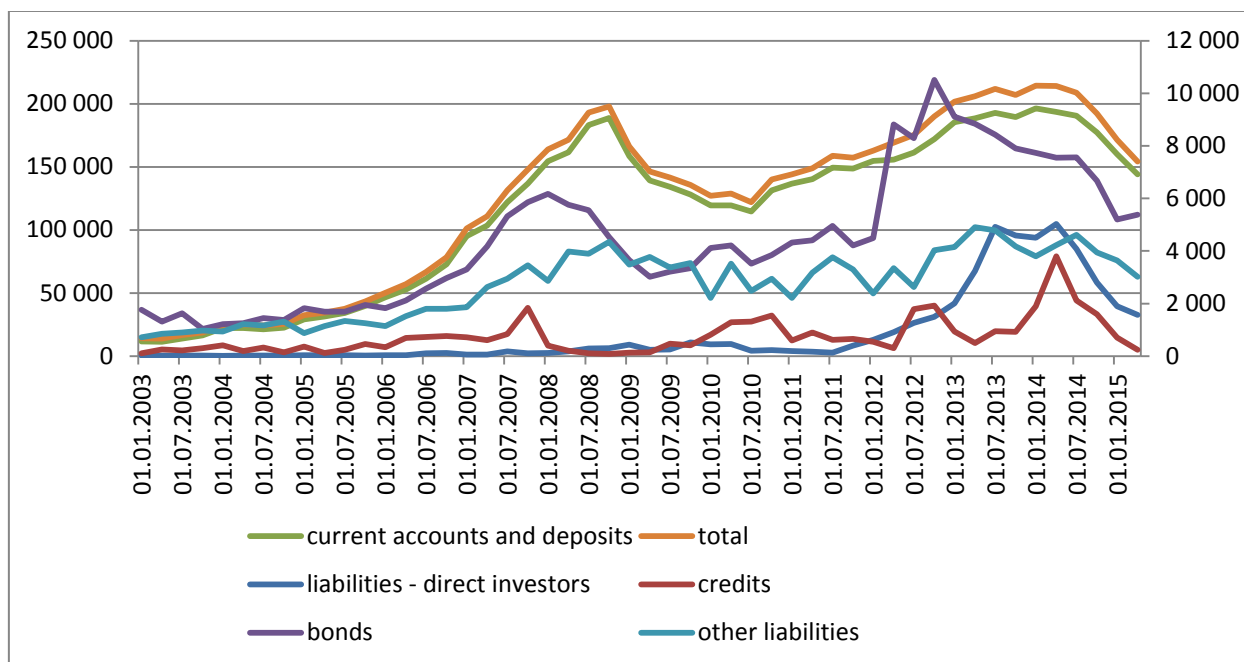
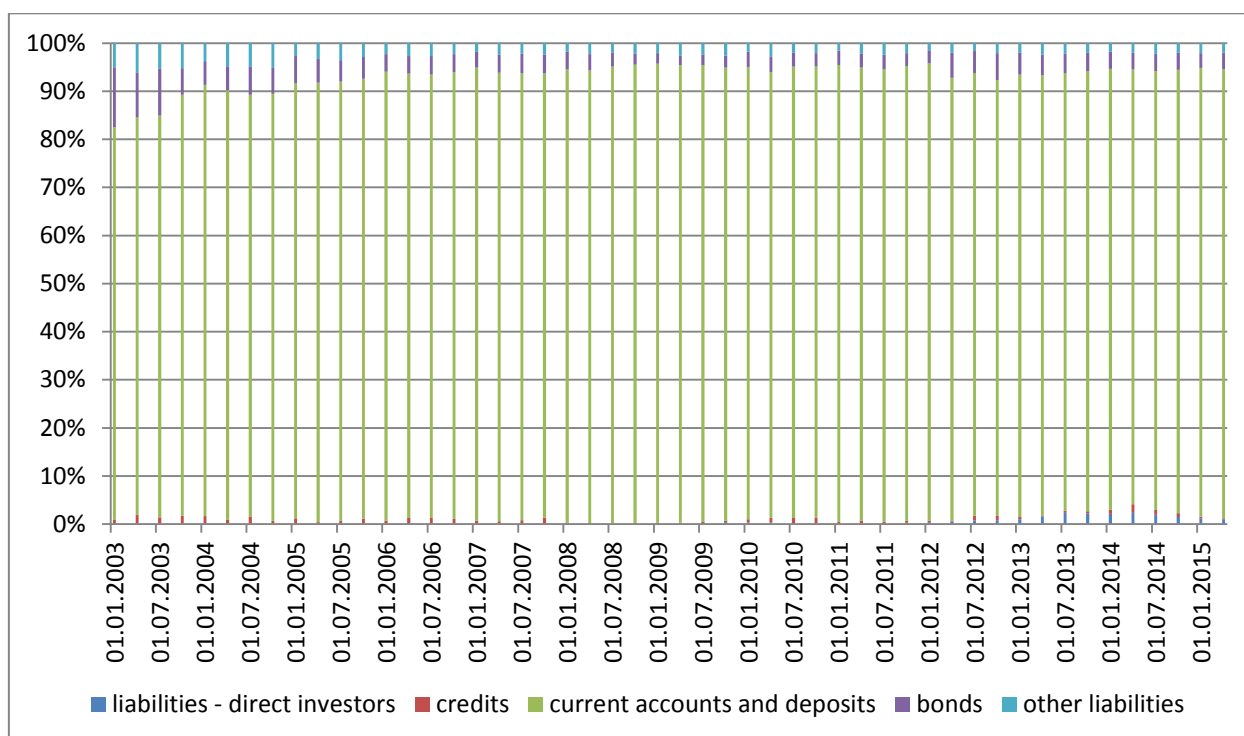


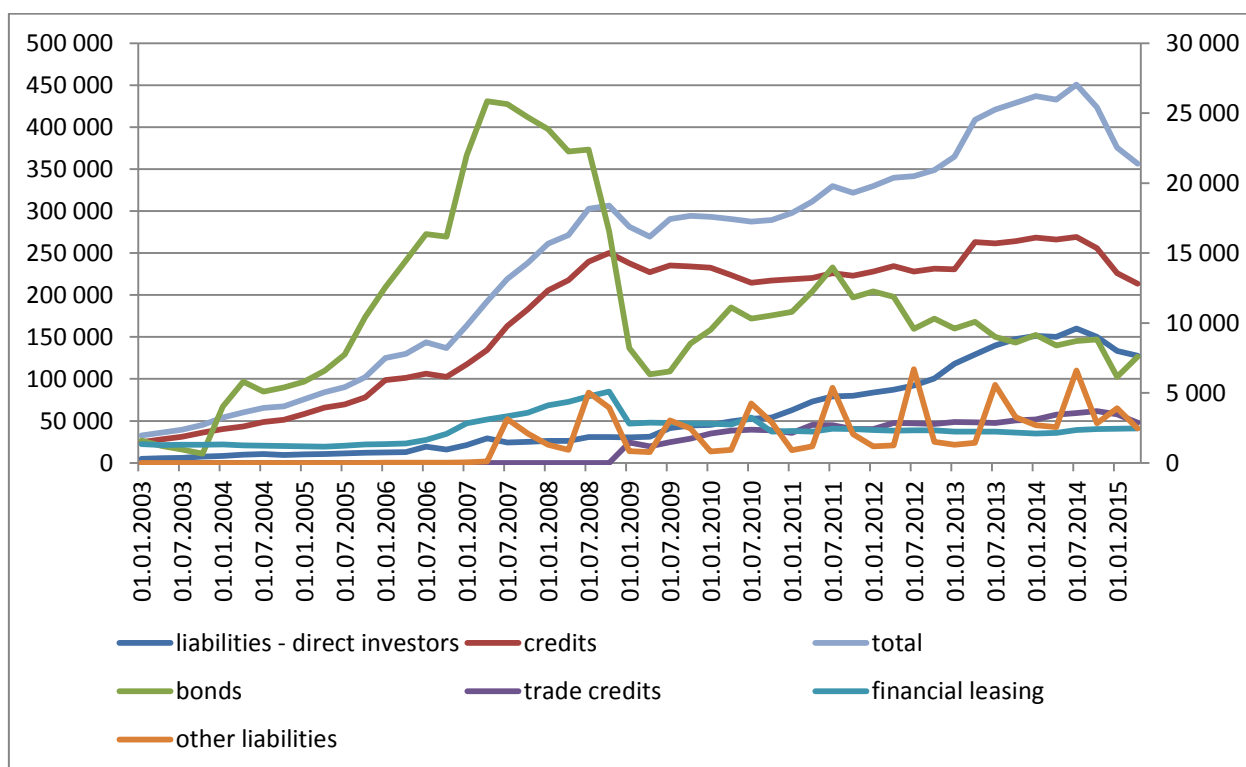
Fig. 9. Russian banks – total outstanding foreign liabilities, 2003-2014, %



Russian nonfinancial companies were mostly relying on external credits of all forms of external financing (see fig. 10 and fig. 11). Credits were increasing until mid-2008 and continued in more or

less the same way with an obvious decrease since mid-2014. Also liabilities towards direct investors were increasing since after the crisis and especially after mid-2012, again with decrease after the sanctions were introduced. Trade credits increased seriously since the crisis of 2008. The world financial crisis of 2008-2009 has led to a sharp decrease in external bond financing of Russian companies. It resumed slightly by 2011 but then was decreasing steadily. Among the possible explanations of the phenomenon is the fact that credits in national currencies were taken instead (see e.g., Matovnikov, 2013). Another possible explanation is that part of bond financing was substituted for foreign ownership until early 2014.

Fig. 10. Russian private non-financial sector foreign outstanding liabilities, 2003-2014, mln \$



Few more notes are in order: in the 1st quarter of 2015 the total amount of outstanding deposits of Russian banks due foreign residents is approximately 94% of Russian GDP. For the same time period the direct liabilities to foreign investors of Russian companies constitute about 83% of GDP. Outstanding foreign credit is about 139% of GDP. Total foreign liabilities of Russian banks are about 100% of GDP. Total foreign liabilities of Russian companies are about 233% of GDP.

If we take into account the statistics on the 'wide government' (only available since late 2005), we can see that the role of the government (and its guarantees behind the affiliated companies and banks) is much larger than just government external liabilities (see fig. 12), especially since mid-2012.

Fig. 11. Russian private non-financial sector foreign outstanding liabilities, 2003-2014, %

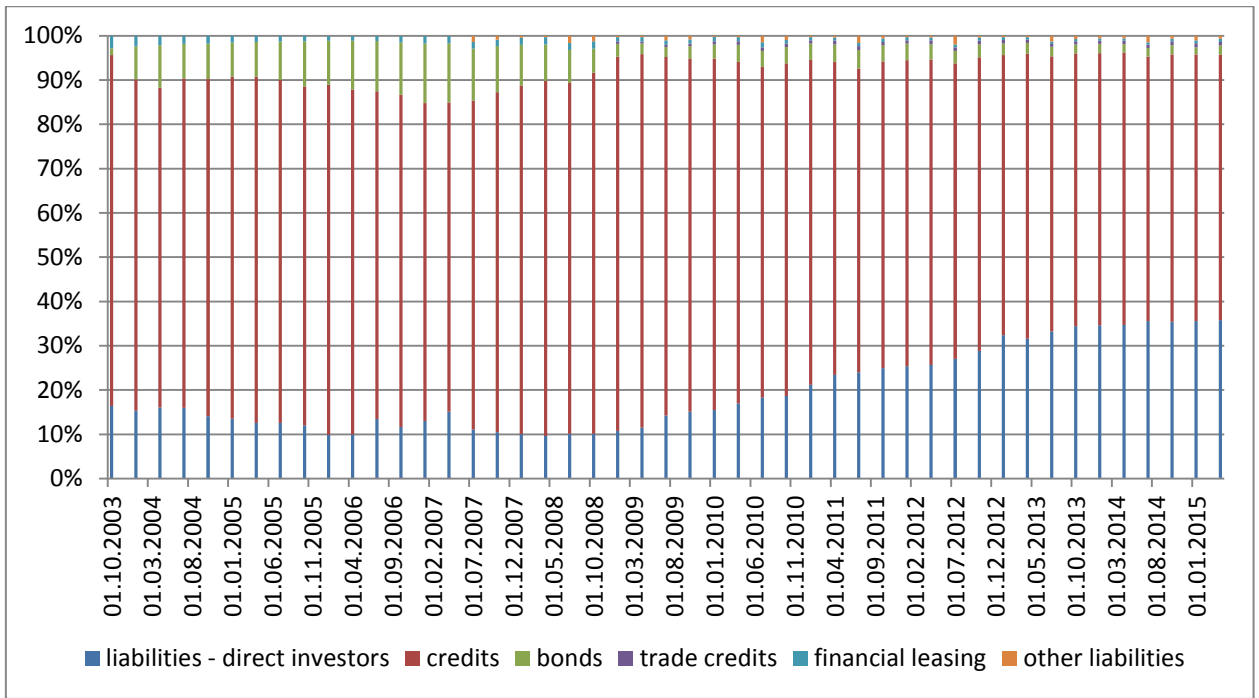
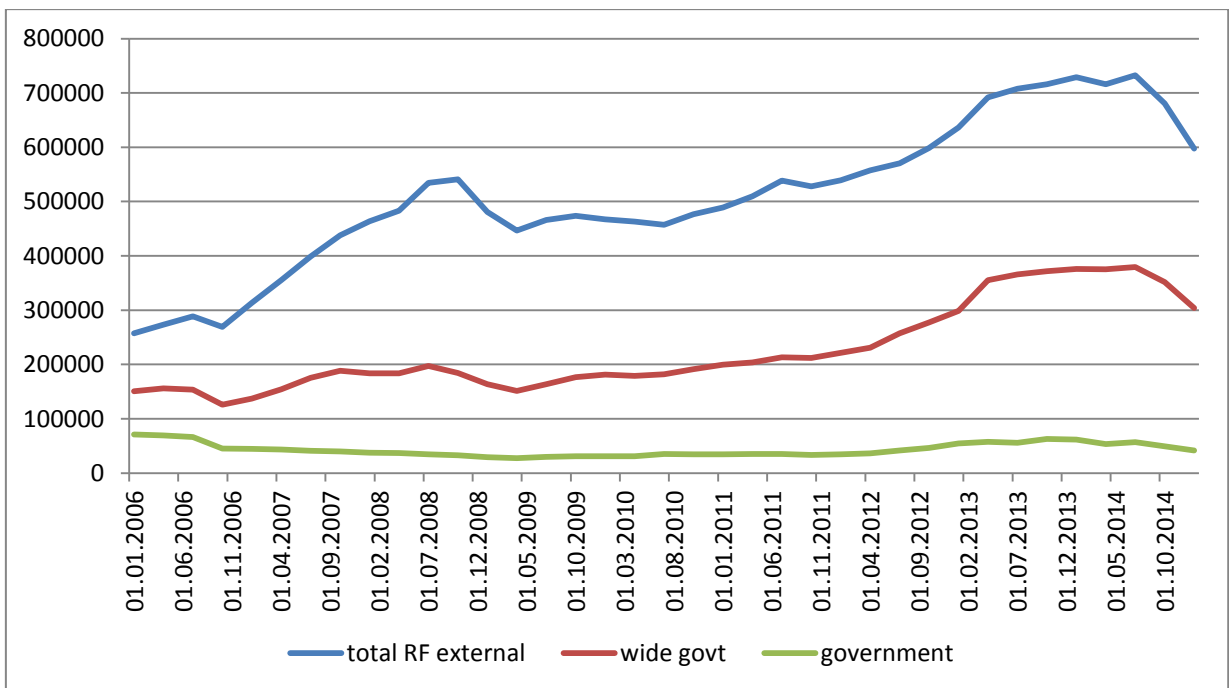
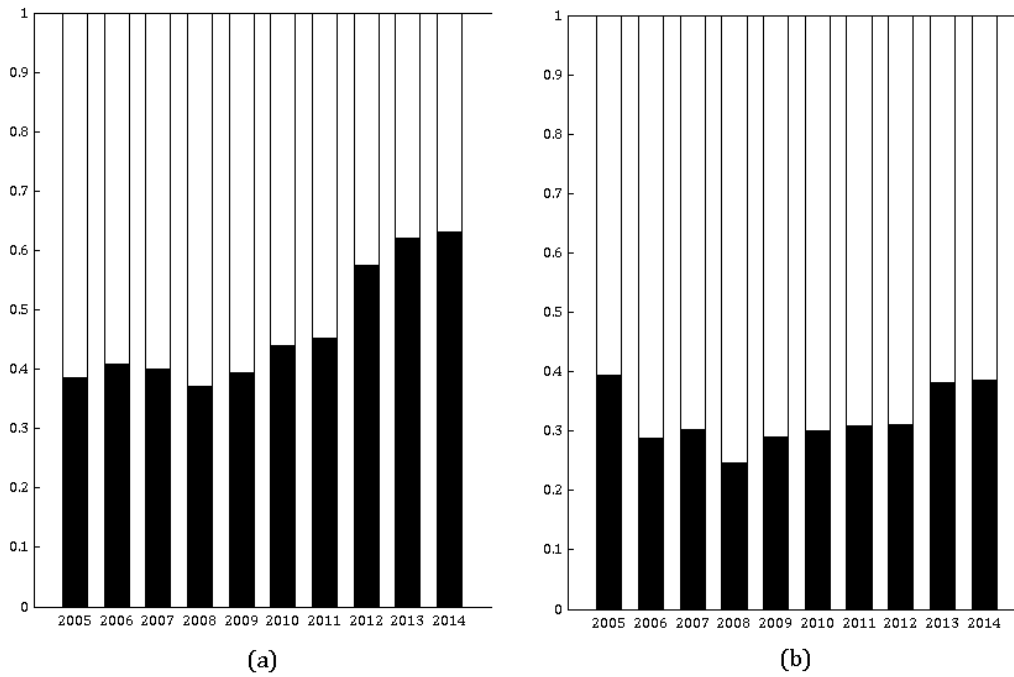


Figure 12. Total external debt of Russia, 'wide government' external debt, government external debt, \$ mln.



As fig. 13 clearly demonstrates, the share of external debt of the banking sector since 2012 has been dominated by the government-related banks. However government-related companies kept their share in external borrowing at around 35% on average from total nonfinancial companies borrowing.

Figure 13. (a) Shares of state-related banks in the total external debt of banking sector; (b) Shares of state-related companies in the total external debt of companies. Source: Bank of Russia



4.1. Cycles and external borrowing booms: results

Figs. 14 and 15 illustrate the major difference between results related to credit cycles and booms depending on whether the indicators are scaled to *per capita* basis or to GDP: due to GDP drop in late 2014 – early 2015 indicators scaled to GDP tend to indicate a boom at the end of the period under study unlike *per capita* scaled indicators.

Fig. 14. Cyclical component for total external Russian debt (per capita), 2003 - 2014

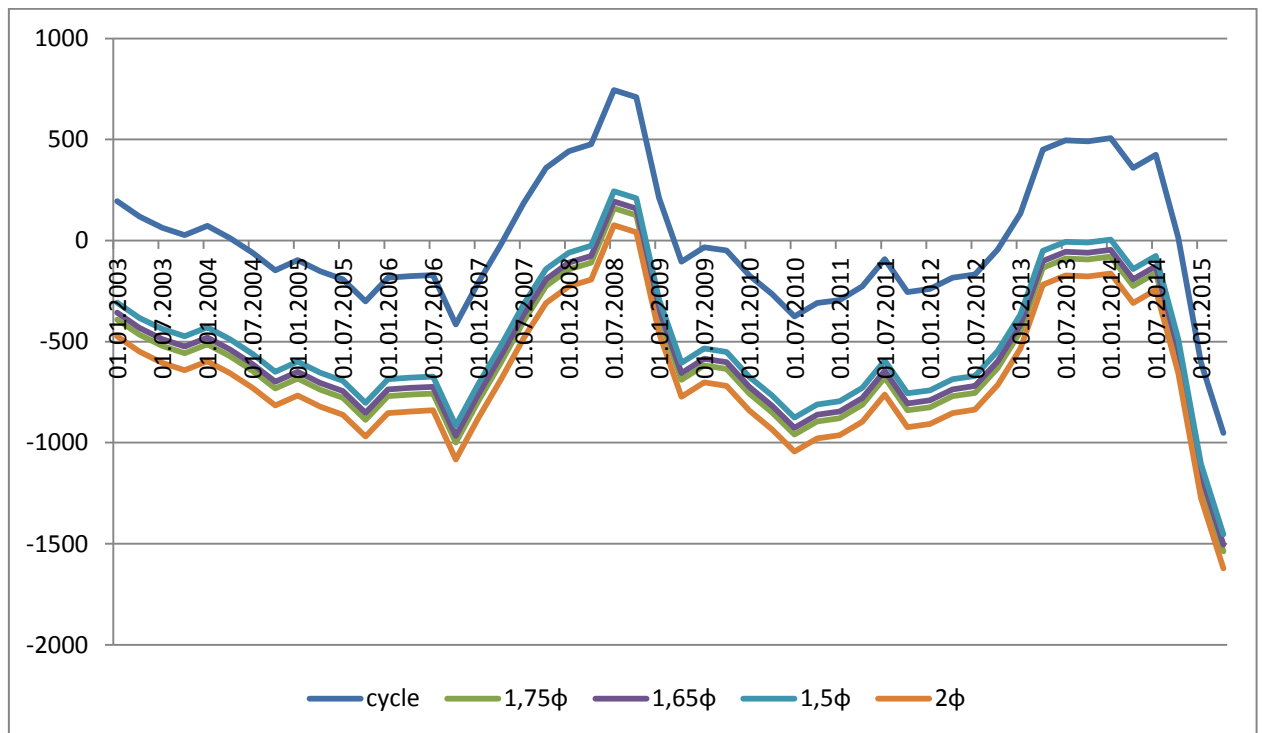
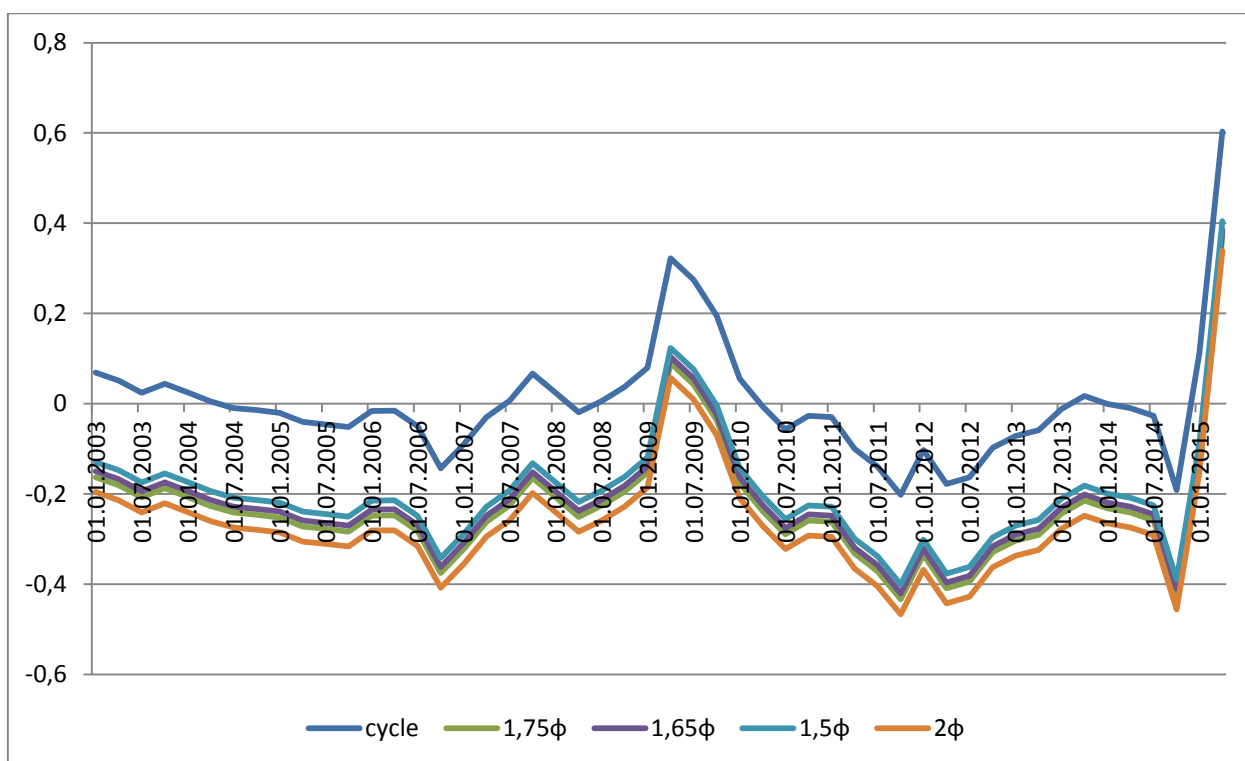


Fig. 15. Cyclical component for total external Russian debt (to GDP), 2003 - 2014



Tables 1, 2 and 3 provides information on the timings of external credit booms identified for various indicators for the government, banking system and non-financial companies.

Table 1. External credit booms identified for total Russian outstanding debt, total government debt, federal government debt and government external debt denominated in national currency.

	Total RF		Government		Federal government		Government (rubles)	
	per capita	GDP	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2008:2 – 2008:3	2009:1 – 2009:2	2004:4	2004:3 – 2004:4	2004:4	2004:3 – 2004:4	2012:4 – 2013:4	2012:4 – 2013:4
Boom 2		2015:1	2005:2		2005:2			2014:2
Boom 3			2013:3 – 2013:4	2013:3	2013:1			
Boom 4					2013:3 – 2013:4	2013:3		

In **bold** results that are robust to the measure of scaling are highlighted⁹.

As table 1 indicates the boom in external liabilities for the country as a whole was just before crisis of 2008 or, if one considers GDP-scaled indicators, just after the crisis. The latter results seems less intuitive in terms of timing and is explained by the GDP decline, but it is important in terms of indicating a potential problem – low and declining GDP, potentially not allowing to service the outstanding external debt. It is interesting to note that the government external debt had more or less two peaks in the period: late 2004 and late 2013. And the external government borrowing in rubles peaked in later 2012 – 2013. The 2013 peak logically coincides with the Olympics financing as well as with the necessity to upkeep the economy going after the crisis and to finance the ‘Mays’ decrees’ of 2012 expenditures.

⁹ All results until 2014 are robust to the change in the sample length.

Table 2. External credit booms identified for the outstanding external debt of Russian banks (various indicators).

	Total banks		Deposits		Credits		Bonds	
	per capita	GDP	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2007:4 - 2008:3	2008:2 - 2008:3	2007:4 - 2008:3	2008:2 - 2008:3	2007:2		2007:3 - 2007:4	2007:3
Boom 2		2009:1 - 2009:2		2009:1 - 2009:2	2013:4	2013:4	2012:1	2012:1
Boom 3		2015:1		2015:1			2012:3 - 2012:4	2012:3 - 2012:4
	Direct investors							
	per capita	GDP						
Boom 1	2013:2 - 2014:1	2013:2 - 2014:1						

In **bold** results that are robust to the measure of scaling are highlighted.

As can be seen from table 2, booms of external deposits in foreign currency also determine the booms in total banks external liabilities. As could be expected the first boom of external banks liabilities was just before the crisis of 2008 – this was true for total external banks liabilities, deposits and bonds. Another wave of external financing increase is related to 2012-2013 (and early 2014) and is visible in credits, bonds and liabilities to direct investors. The sanctions introduced had probably intercepted the process of a new credit booms developing among Russian entities. As the data relative to GDP suggest, deposits remained the only possible source of attracting hard currency and financing from abroad for Russian banks, and they are using this course extensively.

Table 3. External credit booms identified for the outstanding external debt of Russian companies (various indicators).

	Total companies		Direct investors		Credits		Bonds	
	per capita	GDP	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2008:2 - 2008:3	2009:1 - 2009:2	2013:2 - 2013:4	2015:1	2008:1 - 2008:4	2009:1 - 2009:3	2006:4 - 2008:2	2006:4 - 2007:3
Boom 2	2014:2	2015:1	2014:2			2015:1		
	Financial leasing		Trade credits					
	per capita	GDP	per capita	GDP				
Boom 1	2007:4 - 2008:3	2008:3	2009:4 - 2010:2	2009:4 - 2010:2				
Boom 2		2015:1		2015:1				

In **bold** results that are robust to the measure of scaling are highlighted.

The results for credit booms of different indicators for companies (see table 3) are not very robust in relation to the scaling parameter (population or GDP) except for trade credits (they, predictably, peaked after the crisis) and bonds (they peaked before the crisis). The peak of liabilities to direct investors in 2013-2014 might be related to capital reallocation as is suggested by some experts in the field (see Matovnikov, 2013).

Now we look at the data that account for the division between government-affiliated and private banks and companies (also with division into short-term and long-term debt) and check how the picture changes. Tables 4 and 5 summarize the results.

Table 4. External credit booms identified for total Russian outstanding debt, total government debt (short and long), wide government debt, and government banks and government companies external debt.

	Total RF		Wide government		Government total		Government short	
	per capita	GDP	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2008:2 - 2008:3	2009:1 - 2009:2	2013:1 - 2013:3	2005:4	2005:4 - 2006:2	2005:4 - 2006:2	2005:4 - 2006:1	2005:4 - 2006:1
Boom 2				2014:1		2013:2		
	Government long		Govt banks total		Govt banks short		Govt banks long	
	per capita	GDP	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2005:4 - 2006:2	2005:4 - 2006:2	2008:2	2014:1	2013:2	2010:3	2008:2	
Boom 2		2013:2				2014:1		
	Govt companies total		Govt companies short		Govt companies long			
	per capita	GDP	per capita	GDP	per capita	GDP		
Boom 1	2013:1 - 2013:3	2014:4	2008:2 - 2009:1	2008:2 - 2009:1	2013:1 - 2013:3	2013:3		
Boom 2						2014:4		

In **bold** results that are robust to the measure of scaling are highlighted.

As table 4 suggests, the results for the wide government and government-affiliated banks and companies are less robust to the chosen measure of scaling. At the same time we can conclude that the long-term borrowing was a determining force in the total borrowing of the corresponding type. The peak in government borrowing at the beginning of 2006 is explained by the fact that just after that a large part of ex-Soviet debt was repaid. Again the data suggest that in 2013 – early 2014 a new credit boom was developing, and the sanctions might have caught it up.

Table 5. External credit booms identified for Russian private banks and companies.

	Total private		Companies total		Companies short		Companies long	
	per capita	GDP	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2008:1 - 2008:3	2009:1 - 2009:3	2008:1 - 2008:4	2009:1 - 2009:3	2007:3 - 2008:1	2007:2 - 2008:1	2008:2 - 2008:4	2009:1 - 2009:3
Boom 2					2008:3			
	Banks total		Banks short		Banks long		Direct investors	
	per capita	GDP	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2008:1 - 2008:3	2008:3	2008:1 - 2008:3	2008:2 - 2008:3	2008:2 - 2008:4	2009:1 - 2009:4	2011:1 - 2011:3	2011:1
Boom 2		2009:1 - 2009:2		2012:3				

In **bold** results that are robust to the measure of scaling are highlighted.

Table 5 summarizes results for long-term and short-term external debt of private entities and it can be seen that results are also not robust in relation to the scaling parameter. In general the results suggest that apart from the peak at around the crisis time the only suggestion at another peak of external liabilities is related to those to direct investors at the beginning of 2011, at least a year before the new peak for the government-related banks and companies.

Overall the analysis suggests that while both private and government-affiliated companies and banks were increasing their external liabilities around the crisis time of 2008-2009, it was largely the government and its affiliated companies that continued to borrow abroad extensively until the sanctions have cut short the process. Next we examine the internal dynamics of credit provided by the banking system inside the country¹⁰.

5. Internal debt dynamics and credit cycles

As can be seen from fig. 16, internal credit saw a steady increase since late 2005 (when oil prices were on the rise for some time), and even the crisis of 2008-2009 had not stopped the increase in credit, though, admittedly, credit to population resumed its growth rates only in late 2011 and decreased at the beginning of 2015.

Figure 16. Dynamics of internal credit: total, private nonfinancial companies, financial sectors, government nonfinancial companies, population and government, mln rubles.

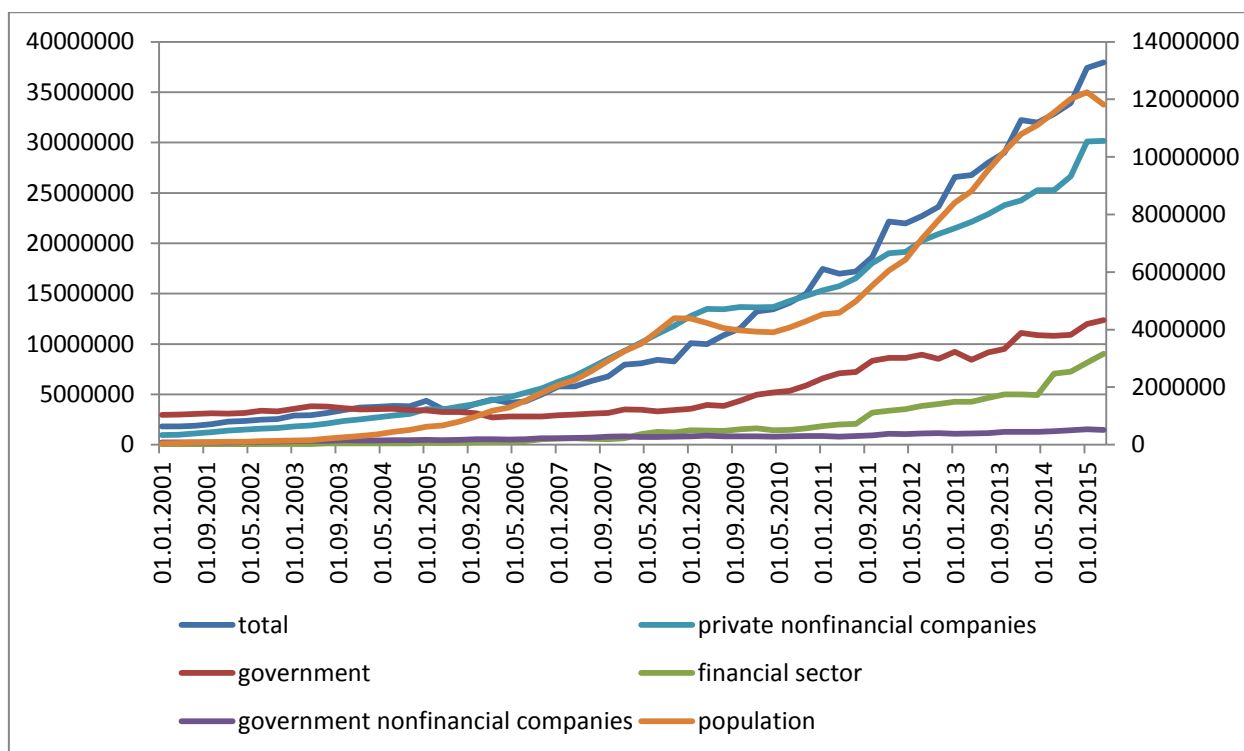
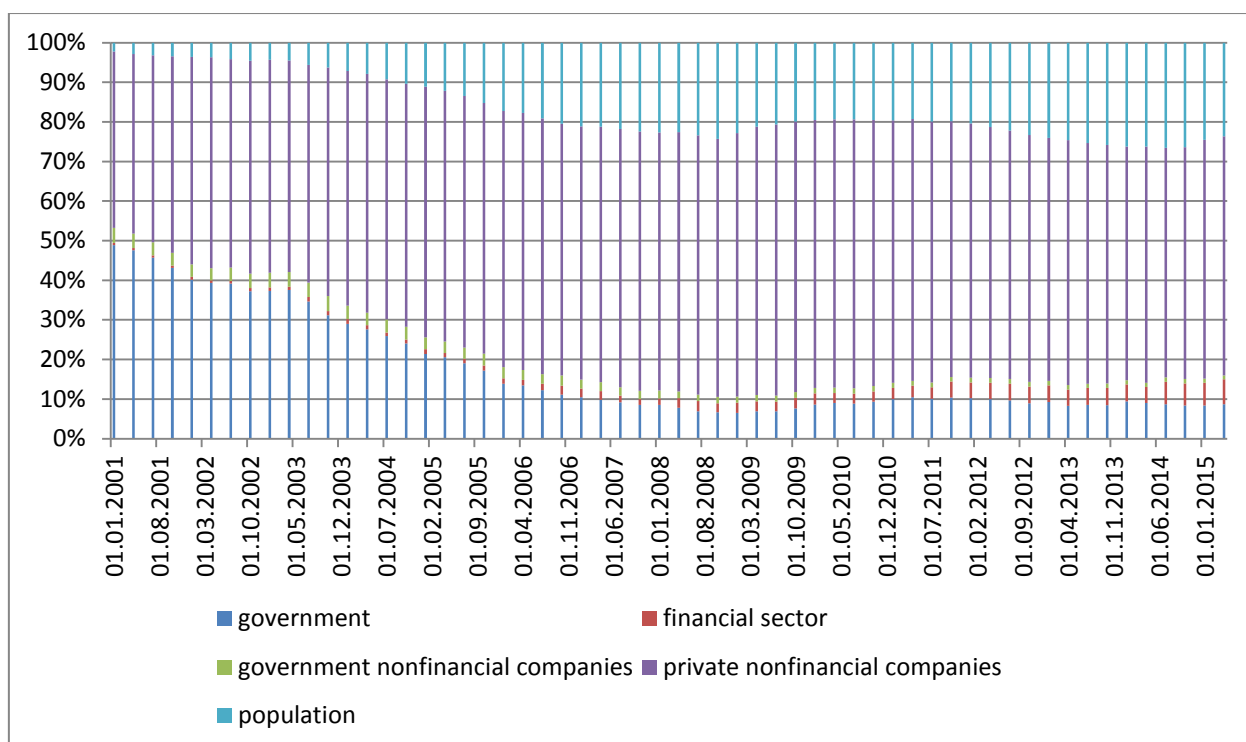


Fig. 17 demonstrates the importance of various sectors in the credit dynamics. Private nonfinancial companies gradually took the largest share, after the share of government borrowing from the banks steadily declined. Population was increasing its share in the total outstanding credit with little reduction in the share in the last quarters.

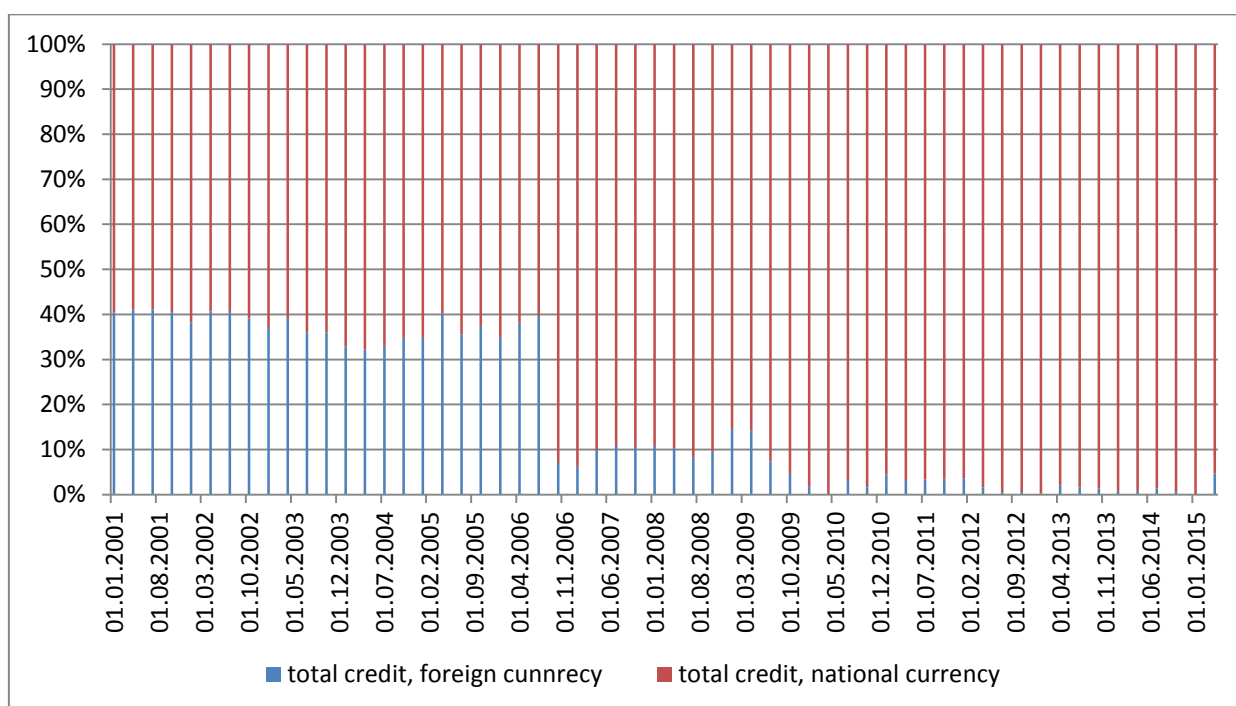
¹⁰ Our ambition is also to include into the analysis the corporate debt and internal government debt, this will be the next step in the research.

Figure 17. Shares in internal credit of private nonfinancial companies, financial sectors, government nonfinancial companies, population and government, %.



Another important indicator of internal credit dynamics is related to the currency of the credit – national or foreign. General division is presented on fig. 18. Credits in foreign currency were popular prior to 2007 with a little spike again in 2009 when some companies played on the expected ruble devaluation.

Figure 18. Dynamics of shares of internal credit in national and foreign currencies, %.



5.1. Cycles and internal borrowing booms: results

Tables 6-11 present the identified credit booms for: total internal credit, internal credit to the government, internal credit to government nonfinancial companies, credit to financial sector, private nonfinancial sector and population, scaled both to GDP and per capita basis.

Table 6. Internal credit booms: total credit, credit in national and foreign currency.

	Total credit		Total credit, foreign currency		Total credit, national currency	
	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2013:2		2006:1 - 2006:2	2005:4 - 2006:2		2009:1 - 2009:2
Boom 2	2015:1	2015:1	2015:1	2015:1		

In **bold** results that are robust to the measure of scaling are highlighted.

Table 7. Internal credit booms for government credit: total, and in national and foreign currency.

	Government total		Government, foreign currency		Government, national currency	
	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1		2003:1 - 2003:2		2002:4 - 2003:1	2011:2 - 2012:2	2011:1 - 2012:2
Boom 2	2011:3 - 2012:2	2011:3 ; 2012:2	2014:4 - 2015:1	2014:4 - 2015:1		
Boom 3		2015:1				

In **bold** results that are robust to the measure of scaling are highlighted.

Table 8. Internal credit booms for financial sector credit: total, and in national and foreign currency.

	Financial total		Financial, foreign currency		Financial, national currency	
	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2014:2				2014:2	2014:2
Boom 2	2014:4 - 2015:1	2014:4 - 2015:1	2015:1	2015:1	2014:4 - 2015:1	2014:4 - 2015:1

In **bold** results that are robust to the measure of scaling are highlighted.

Table 9. Internal credit booms for government nonfinancial sector credit: total, and in national and foreign currency.

	Government nonfinancial total		Government nonfinancial, foreign currency		Government nonfinancial, national currency	
	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2007:3 - 2007:4		2007:1 - 2007:4	2007:1 - 2007:4	2008:1 - 2008:2	2009:1
Boom 2	2009:1	2009:1 - 2009:2	2009:1	2009:1	2012:1 - 2012:3	2012:1 - 2012:2
Boom 3	2014:4	2014:4 - 2015:1			2014:4	2014:4 - 2015:1

In **bold** results that are robust to the measure of scaling are highlighted.

Table 10. Internal credit booms for private nonfinancial sector credit: total, and in national and foreign currency.

	Private nonfinancial total	Private nonfinancial, foreign currency	Private nonfinancial, national currency

	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2008:3 - 2009:2	2008:4 - 2009:3	2009:1 - 2009:2	2009:1 - 2009:2	2008:2 - 2008:4	2008:4 - 2009:3
Boom 2	2014:4 - 2015:1	2014:4 - 2015:1	2014:4 - 2015:1	2014:4 - 2015:1		

In **bold** results that are robust to the measure of scaling are highlighted.

Table 11. Internal credit booms for population credit: total, and in national and foreign currency.

	Population total		Population, foreign currency		Population, national currency	
	per capita	GDP	per capita	GDP	per capita	GDP
Boom 1	2008:2 - 2008:4	2008:3 - 2009:1	2008:3 - 2009:2	2008:4 - 2009:2	2008:2 - 2008:4	2008:3 - 2009:1
Boom 2	2014:1	2014:1	2015:1	2015:1	2014:1	2014:1

In **bold** results that are robust to the measure of scaling are highlighted.

Few notes on internal credit cycles are in order. First of all, most entities saw a new boom of internal credit at the end of 2014 – beginning of 2015. Therefore, at least partly there was substitution of foreign financing for internal financing by the banking sector. This is especially true for the financial sector (other than banking system) that had the only credit boom at the end of the period in question. Companies (both government and private) and population also had the credit boom at around the time of the world financial crisis, which could only be expected. It should be noted that most credit booms related to internal credit indicators are robust in relation to the chosen measure of scaling.

An interesting timing is related to the government credits – it had an early peak of crediting at the beginning of 2000s and then a boom around 2011 – too early to be explained by the Olympics or presidential decrees. According to the data, most of the borrowing in that credit boom by the government was in national currency. This also pre-dates the boom in government external borrowing.

6. Assessing oil prices and sanctions effects on credit dynamics

It was already mentioned in the sanction on data and methodology, we used single equation modelling for out-of-sample forecasting and to detect the effects of sanctions and oil prices. The equations used for forecasting for different indicators are listed in Appendix 1. The period used for estimation was 2006:1 – 2013:4 for external borrowing dynamics, and 2002:1 – 2013:4 for internal credit.

We summarize the results on the relative influence of oil prices and sanctions against Russia for the periods of 2014:4 – 2015:3 (external credit) and 2014:4 – 2015:2 (internal credit) in tables 12 and 13 below.

Table 12. Relative importance of oil prices decrease and sanctions against Russia for various indicators of external borrowing. Averaged results for 2014:4 – 2015:3.

Indicator of external borrowing	Share of change due to oil prices (“+” - increase, “-“ - decrease)	Share of change due to sanctions (“+” - increase, “-“ - decrease)
Total external borrowing	-13.94%	-86.06%
Wide government borrowing	-20.17%	-79.83%
Private sector borrowing	-33.70%	-66.30%

Direct investments	-2.77%	-97.23%
Long-term government borrowing	-47.06%	-52.94%
Short-term borrowing by government banks	+123.09%	-23.09%
Long-term borrowing by government banks	-7.87%	-92.12%
Short-term borrowing by government companies	-82.57%	-17.43%
Long-term borrowing by government companies	+1.67%	-101.97%
Short-term borrowing by private banks	-17.45%	-82.55%
Long-term borrowing by private banks	-10.17%	-89.83%
Short-term borrowing by private companies	+126.77%	-226.77%
Long-term borrowing by private companies	-38.77%	-61.23%

Table 13. Relative importance of oil prices decrease and sanctions against Russia for various indicators of internal banking credit. Averaged results for 2014:4 – 2015:2.

Indicator of internal bank credit	Share of change due to oil prices (“+” - increase, “-“ - decrease)	Share of change due to sanctions (“+” - increase, “-“ - decrease)
Total banking credit (1 st difference)	+46.22%	-146.22%
Credit to government of various levels	+25.34%	-125.34%
Credit to financial entities (1 st difference)	-88.21%	-11.79%
Credit to government non-financial companies	-28.79%	-71.21%
Credit to private non-financial companies	+34.19%	-134.19%
Credit to population	-2.85%	-97.15%

We can see from Table 12 that contrary to the general assessment of the influence of sanctions on the GDP level in Russia it seems to have profound influence on the level of total external borrowing. The share of decline in the total external credit due to sanctions can be estimated as being 86.06% compared to only 13.94% due to oil prices. A notable exception where the influence of oil prices is more important compared to sanctions is related to the increase in short-term borrowing by the government banks. While short-term borrowing due to decrease in oil prices increase for private companies it was more than outweighed by decrease of such borrowing due to sanctions. In general even though external borrowing was constrained mostly for government-affiliated companies and banks, the decrease in external borrowing is noticeable for private companies as well. In their case we might consider that there was a general change of trend in relation to external borrowing in the private sector. As we mentioned earlier, they were not among the drivers of the new wave of credit boom that came to a halt after sanctions were introduced. It might well be the case that they were changing their model of financing their operations. And it is also noticeable that the percentage

decrease of short-term borrowing by government banks and companies is smaller compared to long-term borrowing, which means that sanctions are effective.

As Table 13 demonstrates, the repercussions of external borrowing constraints are felt in the market for domestic credit as well. Decrease in oil prices meant general decrease in revenues, hence increase in this respect of total domestic credit, government credit and private non-financial credit. The governments (especially regional) have to engage in excessive borrowing from commercial banks in order to meet their social obligations transferred to them from the federal budget without the necessary support of the falling tax revenues. Private non-financial enterprises also feel seriously the drop in oil prices and are likely to try to support their businesses. The effects of sanctions work to decrease domestic credit in all cases, meaning that banks are less certain in their ability to sustain usual levels of internal credit (especially since the major banks are constrained in their ability to borrow abroad and since Bank of Russia in its policy is not very much favouring the increase of domestic credit having their preferences towards lower inflation.

7. Conclusions

Results for external borrowing cycles analysis suggest that the government had somewhat different timings of the borrowing peaks, partly explained by the dynamics of pay-offs the old Soviet debts during 2006. Banks and companies, especially private, had a boom in their external borrowing just around the time of the world financial crisis of 2008-2009. However, the government and the government-affiliated companies and banks had another credit boom around 2013 (the government) or the end of 2014 – beginning of 2015 (companies and banks affiliated with the government). These results suggest that the financial sanctions introduced helped the country to escape increasing external debt beyond the limits when it can be reasonably repaid.

In part external credit was substituted for by internal banking credit as almost all indicators of internal credit demonstrate credit boom at the end of the period in question regardless of the scaling variable. Again, the government has somewhat different timings of credit booms in relation to internal credits. Mostly total internal credit has the same timings of booms as credit in national currency, which is not surprising taking into account the dominant share of credit in national currency in the total outstanding credit, especially after the crisis of 2008-2009 when the banking system became aware of the necessity to deal with the currency mismatch between assets and liabilities.

We can conclude that effects of sanctions on external and domestic borrowing are more serious than effects of decreasing oil prices. This shows that sanctions are effective and that we might further expect decreasing investments, especially in the oil and gas sectors, as well as lower GDP once the fields that are currently in use run out of oil/gas.

The analysis of debt dynamics of various entities in Russian economy should be appended with the analysis of internal corporate debt and internal government debt as well as with a more thorough event analysis of boom periods in external and internal borrowing of the different sectors of economy. Another promising strain of research would be to look at the dynamics of investments and at the projected investments (and their timing) needed to sustain oil and gas production at the current level in Russia.

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Appendix 1. Results of single-equation modelling of credit indicators

In all cases residuals were tested for stationarity, autocorrelation, normality, heteroscedasticity. The only problem (in some cases) was related to normality, which is often the case.

Part A. External credit

Total external borrowing

Dependent Variable: CRTOT
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CRTOT(-1)	1.026558	0.060839	16.87339	0.0000
GDPGAP	-212820.3	90035.98	-2.363725	0.0258
INT(-1)	3249.292	2506.717	1.296234	0.2063
OIL	359.3070	312.4142	1.150098	0.2606
C	-61221.66	47102.68	-1.299749	0.2051
R-squared	0.975379	Mean dependent var		489471.2
Adjusted R-squared	0.971591	S.D. dependent var		115101.5
S.E. of regression	19400.34	Akaike info criterion		22.73066
Sum squared resid	9.79E+09	Schwarz criterion		22.96195
Log likelihood	-347.3252	Hannan-Quinn criter.		22.80605
F-statistic	257.5006	Durbin-Watson stat		1.765689
Prob(F-statistic)	0.000000			

Wide government (including government banks and government companies)

Dependent Variable: WIDEGOV
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WIDEGOV(-1)	1.034209	0.057786	17.89709	0.0000
OIL	257.4198	184.2721	1.396955	0.1738
OIL(-1)	-147.8510	200.2984	-0.738154	0.4668
INT	-1288.176	654.6974	-1.967590	0.0595
R-squared	0.957017	Mean dependent var		207625.0
Adjusted R-squared	0.952241	S.D. dependent var		64303.55
S.E. of regression	14052.76	Akaike info criterion		22.05894
Sum squared resid	5.33E+09	Schwarz criterion		22.24397
Log likelihood	-337.9136	Hannan-Quinn criter.		22.11926
Durbin-Watson stat	1.596578			

Private sector total borrowing

Dependent Variable: PRIV
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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PRIV(-1)	0.914963	0.054549	16.77323	0.0000
GDPGAP(-1)	-94989.54	54690.31	-1.736862	0.0947
INT	-5252.091	2343.724	-2.240917	0.0342
INT(-1)	7415.184	2505.547	2.959507	0.0067
OIL(-1)	377.7967	181.7923	2.078178	0.0481
C	-22644.22	24156.68	-0.937389	0.3575
R-squared	0.976672	Mean dependent var		281846.0
Adjusted R-squared	0.972007	S.D. dependent var		64322.27
S.E. of regression	10761.87	Akaike info criterion		21.57739
Sum squared resid	2.90E+09	Schwarz criterion		21.85494
Log likelihood	-328.4496	Hannan-Quinn criter.		21.66787
F-statistic	209.3375	Durbin-Watson stat		1.705899
Prob(F-statistic)	0.000000			

Direct investments in banks and companies (total)

Dependent Variable: DIRINV
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIRINV(-1)	0.991477	0.064373	15.40216	0.0000
OIL(-1)	7.478026	66.65102	0.112197	0.9115
C	2450.560	4541.759	0.539562	0.5938
R-squared	0.940354	Mean dependent var		50007.42
Adjusted R-squared	0.936093	S.D. dependent var		24702.52
S.E. of regression	6244.740	Akaike info criterion		20.40863
Sum squared resid	1.09E+09	Schwarz criterion		20.54741
Log likelihood	-313.3338	Hannan-Quinn criter.		20.45387
F-statistic	220.7173	Durbin-Watson stat		1.781482
Prob(F-statistic)	0.000000			

Government long-term borrowing

Dependent Variable: GOVL
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GOVL(-1)	0.851494	0.053410	15.94248	0.0000
OIL	66.27017	23.79510	2.785034	0.0093
R-squared	0.845278	Mean dependent var		39496.61
Adjusted R-squared	0.839943	S.D. dependent var		10802.41
S.E. of regression	4321.736	Akaike info criterion		19.64304
Sum squared resid	5.42E+08	Schwarz criterion		19.73556
Log likelihood	-302.4672	Hannan-Quinn criter.		19.67320
Durbin-Watson stat	1.809522			

Government banks short-term borrowing

Dependent Variable: GBS
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GBS(-1)	0.882937	0.092978	9.496174	0.0000
GDPGAP	-18319.68	8338.597	-2.196974	0.0371
INT	-466.6727	262.5251	-1.777631	0.0872
OIL	-29.05578	34.72497	-0.836740	0.4104
C	7592.919	4437.189	1.711200	0.0990
R-squared	0.871093	Mean dependent var		12447.84
Adjusted R-squared	0.851261	S.D. dependent var		5878.852
S.E. of regression	2267.276	Akaike info criterion		18.43724
Sum squared resid	1.34E+08	Schwarz criterion		18.66852
Log likelihood	-280.7772	Hannan-Quinn criter.		18.51263
F-statistic	43.92404	Durbin-Watson stat		2.430781
Prob(F-statistic)	0.000000			

Government banks long-term borrowing

Dependent Variable: GBL
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GBL(-1)	1.030749	0.047761	21.58148	0.0000
GDPGAP	-52565.80	12936.13	-4.063488	0.0004
OIL	67.10959	46.49916	1.443243	0.1605
OIL(-1)	-72.76478	51.26018	-1.419518	0.1672
R-squared	0.976490	Mean dependent var		55858.48
Adjusted R-squared	0.973878	S.D. dependent var		21852.65
S.E. of regression	3531.905	Akaike info criterion		19.29698
Sum squared resid	3.37E+08	Schwarz criterion		19.48201
Log likelihood	-295.1031	Hannan-Quinn criter.		19.35729
Durbin-Watson stat	2.182528			

Government companies short-term borrowing

Dependent Variable: GCS_SA
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPGAP	10317.38	1705.688	6.048811	0.0000
INT	396.7699	106.6577	3.720032	0.0010
INT(-1)	-249.5392	112.0629	-2.226778	0.0348
OIL(-1)	31.64448	6.773917	4.671519	0.0001
C	-2469.629	950.2518	-2.598921	0.0152
R-squared	0.705676	Mean dependent var		1056.089
Adjusted R-squared	0.660395	S.D. dependent var		896.8709
S.E. of regression	522.6574	Akaike info criterion		15.50242

Sum squared resid	7102439.	Schwarz criterion	15.73371
Log likelihood	-235.2875	Hannan-Quinn criter.	15.57781
F-statistic	15.58447	Durbin-Watson stat	2.424039
Prob(F-statistic)	0.000001		

Government companies long-term borrowing

Dependent Variable: GCL
Method: Least Squares
Sample (adjusted): 2006Q3 2013Q4
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GCL(-1)	0.846571	0.197889	4.277998	0.0002
GCL(-2)	-0.239043	0.197812	-1.208434	0.2382
INT	-2011.787	1172.058	-1.716458	0.0984
OIL	6.098485	99.91414	0.061037	0.9518
C	45649.68	21427.23	2.130452	0.0432
R-squared	0.782803	Mean dependent var		77968.23
Adjusted R-squared	0.748052	S.D. dependent var		16930.86
S.E. of regression	8498.357	Akaike info criterion		21.08415
Sum squared resid	1.81E+09	Schwarz criterion		21.31768
Log likelihood	-311.2622	Hannan-Quinn criter.		21.15885
F-statistic	22.52572	Durbin-Watson stat		2.068284
Prob(F-statistic)	0.000000			

Private banks short-term borrowing

Dependent Variable: PRBS
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRBS(-1)	0.658944	0.074116	8.890755	0.0000
GDPGAP(-1)	-42081.77	9689.777	-4.342904	0.0002
INT(-1)	454.5242	167.2759	2.717212	0.0114
OIL(-1)	69.19916	22.18789	3.118780	0.0043
R-squared	0.875255	Mean dependent var		30811.81
Adjusted R-squared	0.861395	S.D. dependent var		8417.029
S.E. of regression	3133.635	Akaike info criterion		19.05769
Sum squared resid	2.65E+08	Schwarz criterion		19.24272
Log likelihood	-291.3942	Hannan-Quinn criter.		19.11800
Durbin-Watson stat	1.977681			

Private banks long-term borrowing

Dependent Variable: PRBL
Method: Least Squares
Sample (adjusted): 2006Q2 2013Q4
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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PRBL(-1)	1.030824	0.055929	18.43091	0.0000
GDPGAP(-1)	-43258.96	14807.58	-2.921406	0.0071
INT(-1)	1124.248	342.6092	3.281430	0.0029
OIL(-1)	47.39605	45.71829	1.036698	0.3094
C	-14418.10	6188.967	-2.329645	0.0279
R-squared	0.959821	Mean dependent var	49714.90	
Adjusted R-squared	0.953640	S.D. dependent var	13938.26	
S.E. of regression	3001.107	Akaike info criterion	18.99804	
Sum squared resid	2.34E+08	Schwarz criterion	19.22933	
Log likelihood	-289.4696	Hannan-Quinn criter.	19.07343	
F-statistic	155.2766	Durbin-Watson stat	1.943850	
Prob(F-statistic)	0.000000			

Private companies short-term borrowing

Dependent Variable: PRCS

Method: Least Squares

Sample (adjusted): 2006Q2 2013Q4

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRCS(-1)	0.955132	0.087571	10.90698	0.0000
GDPGAP	-36942.61	13054.40	-2.829897	0.0089
INT	-1782.690	771.6783	-2.310146	0.0291
INT(-1)	1973.994	733.4627	2.691335	0.0123
OIL	-17.80655	23.26581	-0.765353	0.4510
R-squared	0.838399	Mean dependent var	20905.77	
Adjusted R-squared	0.813537	S.D. dependent var	8643.559	
S.E. of regression	3732.402	Akaike info criterion	19.43418	
Sum squared resid	3.62E+08	Schwarz criterion	19.66547	
Log likelihood	-296.2298	Hannan-Quinn criter.	19.50958	
Durbin-Watson stat	1.946518			

Private companies long-term borrowing

Dependent Variable: PRCL

Method: Least Squares

Sample (adjusted): 2006Q2 2013Q4

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRCL(-1)	1.014434	0.068458	14.81844	0.0000
GDPGAP(-1)	-45826.38	27562.87	-1.662613	0.1084
INT(-1)	2526.195	952.0438	2.653445	0.0134
OIL	241.6743	85.49581	2.826738	0.0089
C	-41229.01	19096.24	-2.159012	0.0403
R-squared	0.956095	Mean dependent var	130406.1	
Adjusted R-squared	0.949340	S.D. dependent var	29442.94	
S.E. of regression	6626.936	Akaike info criterion	20.58236	
Sum squared resid	1.14E+09	Schwarz criterion	20.81365	
Log likelihood	-314.0266	Hannan-Quinn criter.	20.65776	
F-statistic	141.5465	Durbin-Watson stat	1.981402	
Prob(F-statistic)	0.000000			

Part B. Internal credit indicators.

Total internal credit

Dependent Variable: DCRTOT_SA
 Method: Least Squares
 Sample (adjusted): 2002Q3 2013Q4
 Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DCRTOT_SA(-1)	0.344722	0.147394	2.338782	0.0242
GDPGAP	1760532.	998351.4	1.763439	0.0851
INTR	-12956.79	6965.273	-1.860198	0.0699
OIL	7693.985	1904.018	4.040920	0.0002
R-squared	0.639239	Mean dependent var		593160.1
Adjusted R-squared	0.613471	S.D. dependent var		511064.1
S.E. of regression	317736.1	Akaike info criterion		28.25877
Sum squared resid	4.24E+12	Schwarz criterion		28.41778
Log likelihood	-645.9517	Hannan-Quinn criter.		28.31834
Durbin-Watson stat	1.983906			

Government internal credit

Dependent Variable: GOV
 Method: Least Squares
 Sample (adjusted): 2002Q2 2013Q4
 Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GOV(-1)	0.987883	0.029880	33.06118	0.0000
GDPGAP(-1)	536795.4	323675.1	1.658439	0.1043
OIL	1187.448	714.2207	1.662578	0.1035
R-squared	0.981060	Mean dependent var		1683340.
Adjusted R-squared	0.980199	S.D. dependent var		784017.5
S.E. of regression	110322.9	Akaike info criterion		26.12191
Sum squared resid	5.36E+11	Schwarz criterion		26.24001
Log likelihood	-610.8649	Hannan-Quinn criter.		26.16635
Durbin-Watson stat	2.344984			

Borrowing by financial sector

Dependent Variable: DFIN_SA
 Method: Least Squares
 Sample (adjusted): 2002Q2 2013Q4
 Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTR	4705.472	2258.134	2.083788	0.0432
OIL	1504.567	322.4442	4.666130	0.0000
C	-126081.0	45075.94	-2.797080	0.0077
D114	303874.9	31341.54	9.695598	0.0000

R-squared	0.790780	Mean dependent var	36648.54
Adjusted R-squared	0.776184	S.D. dependent var	64496.48
S.E. of regression	30512.79	Akaike info criterion	23.57094
Sum squared resid	4.00E+10	Schwarz criterion	23.72840
Log likelihood	-549.9172	Hannan-Quinn criter.	23.63020
F-statistic	54.17523	Durbin-Watson stat	1.817081
Prob(F-statistic)	0.000000		

Credit to government non-financial entities

Dependent Variable: GOVNONFIN
Method: Least Squares
Sample (adjusted): 2002Q2 2013Q4
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GOVNONFIN(-1)	0.998531	0.044297	22.54185	0.0000
INTR	5264.028	2619.125	2.009843	0.0507
INTR(-1)	-4731.606	2501.557	-1.891465	0.0653
OIL	60.85180	140.4082	0.433392	0.6669

R-squared	0.975928	Mean dependent var	250517.7
Adjusted R-squared	0.974248	S.D. dependent var	93560.54
S.E. of regression	15014.04	Akaike info criterion	22.15262
Sum squared resid	9.69E+09	Schwarz criterion	22.31008
Log likelihood	-516.5867	Hannan-Quinn criter.	22.21188
Durbin-Watson stat	1.794353		

Credit to private non-financial sector

Dependent Variable: PRNONFIN
Method: Least Squares
Sample (adjusted): 2002Q2 2013Q4
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRNONFIN(-1)	1.007022	0.013251	75.99444	0.0000
GDPGAP	2308511.	1346881.	1.713968	0.0941
GDPGAP(-1)	-3623578.	1219131.	-2.972262	0.0049
INTR	88986.49	44348.05	2.006548	0.0514
INTR(-1)	-83152.76	42552.46	-1.954123	0.0575
OIL	4918.519	2585.550	1.902311	0.0642

R-squared	0.998934	Mean dependent var	10113423
Adjusted R-squared	0.998804	S.D. dependent var	7032753.
S.E. of regression	243254.0	Akaike info criterion	27.76034
Sum squared resid	2.43E+12	Schwarz criterion	27.99653
Log likelihood	-646.3681	Hannan-Quinn criter.	27.84922
Durbin-Watson stat	1.695780		

Credit to population

Dependent Variable: POP
Method: Least Squares
Sample (adjusted): 2002Q2 2013Q4
Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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POP(-1)	1.067626	0.010743	99.37425	0.0000
GDPGAP	-901642.3	431255.7	-2.090737	0.0428
GDPGAP(-1)	-1865449.	458970.4	-4.064421	0.0002
INTR	22335.24	6877.381	3.247637	0.0023
OIL(-1)	1672.662	1192.460	1.402698	0.1682
C	-394501.8	133500.6	-2.955056	0.0052
R-squared	0.999150	Mean dependent var	3263823.	
Adjusted R-squared	0.999047	S.D. dependent var	2793524.	
S.E. of regression	86258.28	Akaike info criterion	25.68682	
Sum squared resid	3.05E+11	Schwarz criterion	25.92301	
Log likelihood	-597.6404	Hannan-Quinn criter.	25.77570	
F-statistic	9640.995	Durbin-Watson stat	2.103476	
Prob(F-statistic)	0.000000			