Bank of Russia

The Central Bank of the Russian Federation

Two Russian credit booms and current expansion of mortgage lending: lessons for policymaking

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Actually no-one can see a bubble. That's what makes it a bubble.

The Big Short (2015)

In this analytical note we explore the term structure of bank lending broken down by group of banks. We look into two lending booms in Russia: in corporate lending in 2005-2007 and unsecured consumer lending in 2011-2013. The purpose of this paper is to examine the changes in the risk profile of new loans[1] on banks' balance sheets as a boom matures, and to draw important lessons for the mortgage market as a relatively new market for Russia.[2]

Our hypothesis is that as a credit boom matures, new loans become riskier than the ones banks issue at earlier stages of the lending spree. We confirm the hypothesis that suggests that the quality of new loans in banks' portfolios deteriorates as a credit boom matures (at least a year before the end of the lending boom) compared with previously issued loans.

Our findings allow us to make several important conclusions.

First, the source of banks' future problems emerges before a boom peaks (a negative macroeconomic shock occurs),[3] and the size of shocks capable of transforming a boom into a crisis is neither absolute nor permanent. As a boom matures, still smaller shocks (slight deviations from expectations) may cause serious credit risks to materialise.

Unfortunately, we cannot pinpoint why the quality of new loans on banks' balance sheets deteriorates as a boom matures. Is it the result of explicit (deliberate) risk-taking by banks as they try to win customers, or is it the result of implicit easing of creditworthiness requirements as a consequence of being overoptimistic about borrowers' financial standing? Both factors are very likely to be of equal importance.[4]

Second, there is indirect confirmation of a far from evident mechanism that involves shaping elevated expectations or incorrect risk assessment. That is, as a credit boom matures, it influences banks' and borrowers' expectations by way of its positive macroeconomic effects (aggregate demand in the economy, employment, wages, producer and consumer sentiment). Thus, overoptimistic banks underestimate risks and overoptimistic borrowers have elevated expectations. The stronger the boom, the more significant the shifts in credit risk assessments. In other words, the macroeconomic effects of a lending spree make risks seem low. On the back of GDP growth, the loan-to-GDP ratio (or DTI, or LTV) as a gauge for risk may even stop growing. This is because expanded lending increases the denominator of these key risk metrics on both the macrolevel and the level of individual borrowers. Thus, some banks make major mistakes when they approve loans to borrowers who would not obtain them in other macroeconomic conditions, while other banks would deny similar borrowers a loan. Hence, should mortgage lending accelerate, it is critical to

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[1] We determine new loans as a change in the cost of a loan portfolio between two dates, that is, on a net basis (new loan issues less new repayments). We adjust the cost change for FX revaluation.

[2] Our findings may also apply to the emerging second wave of consumer lending which differs from the previous one (2011-2013) in its longer loan maturities.

[3] Some say that banks suffer losses because of a crisis. Hence, should there be no crisis, losses could be avoided. It was only the *black swan* in the form of a shock that caused losses.

[4] We lean towards the latter factor because risk-taking assumes higher compensation for risk. This means that should a risk fail to materialise within a rather long period of time, the bank would earn higher profit than other credit institutions. Whereas, should a risk materialise, the compensation would suffice for the bank to demonstrate average profit over this long period of time. That said, our calculations suggest that this was not the case for risky banks, which points to irrational, that is, overoptimistic behaviour.

adjust risk metrics associated with the macroeconomic effects driving growth in this type of lending and the systemic effects from other banks.

__Third__, the regulator can make early predictions of banks' problems in real time. At the microlevel, focus should be directed on the reporting submitted by banks specialising on the types of lending the regulator sees as a source of risk for financial stability. At the macrolevel, as we identified in consumer loans, banks already had elevated risks on their balance sheets by the time macroprudential measures were announced. Macroprudential measures prevented further risk accumulation and crisis scenario materialisation in 2013; however, they failed to prevent bank losses which became evident later in 2014-2016. Thus, the analysis of previous lending booms suggests that proactive macroprudential policy may be the best possible response to credit growth in any segment the regulator deems excessive.

1. Introduction

This analytical note explores bank lending broken down by group of banks during the two stages of credit booms seen in Russia in the past 15 years. Our objective is to reveal common patterns which may be important for understanding risks associated with expanding mortgage lending in Russia, which showed a high growth pace in 2017-2018 (Figure 1).

Our hypothesis suggests that the quality of banks' balance sheets deteriorates as a credit boom matures. Data on the temporal growth profile of bank loans (changes in the loan portfolio) may facilitate statistical testing of this hypothesis. This is critical given that information on the quality of bank portfolios is either of a relatively poor quality or reflects credit risks ex post rather than ex ante, that is, as banks recognise them (if a risk is not recognised, its materialisation is considered inexistent). The data we use about lending growth pace before a boom peaks may seem immaterial for the analysis of risk accumulation at first; however, they provide important information which lags relative to the official risk recognition by banks or risk detection by the regulator.

Figure 1. Corporate loans (January 2005 = 100%), consumer loans (January 2011 = 100%), and mortgage loans (June 2017 = 100%), %
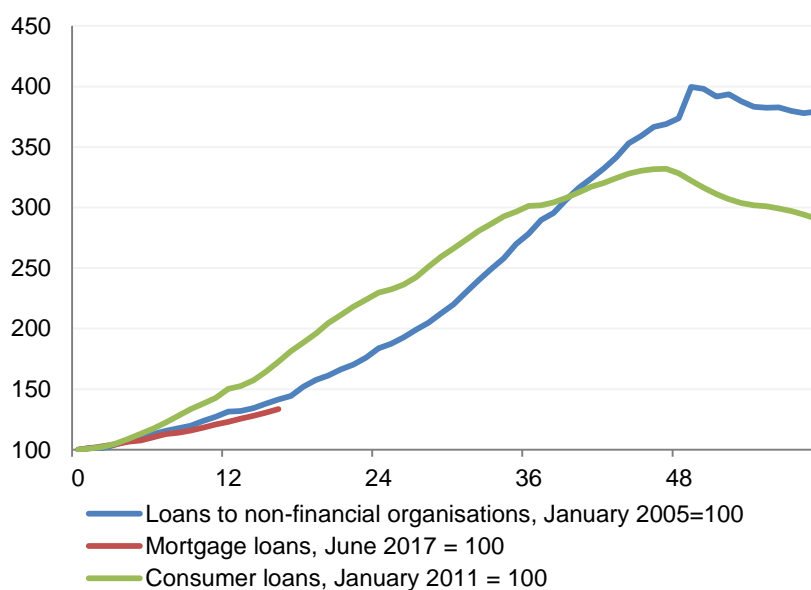
Sources: Bank of Russia, authors' calculations.

If banks take (even unconsciously) more risks as a lending boom matures, this brings us to a number of important conclusions.

First, the size and scope of any shocks capable of putting an end to the boom and reversing the dynamics – crisis and lending shrinkage, – diminish as banks' balance sheet exposure increases. This signals to the regulator and risk managers that they should increase the elasticity of the impact (effects) of the same shock scenarios on banks' balance sheets as the boom matures.

Second, where banks underestimated credit risks rather than intentionally chose a riskier strategy, the hypothesis makes it possible to link risk underestimation to macroeconomic effects of the credit boom. Its effects (the rise in employment, income and collateral cost on the back of expanding demand driven by lending growth) improve banks' assessment of borrowers'

creditworthiness. Individual banks may be unaware of the fact that their decisions affect macroeconomic developments which, in turn, influence their risk assessment and rising optimism. Therefore, should mortgage lending expand, it is critical to adjust risk metrics associated with the macroeconomic effects driving growth in this type of lending and systemic effects from other banks. Mortgage risk assessment models should factor in mechanisms of direct and inverse relationships between lending and the economy through which a lending boom affects the macroindicators that are important for credit risk assessments. Thus, a macroeconomic scenario will depend on the lending growth pace. This means that macroeconomic disturbances may be consequences of credit growth rather than shocks.

Third, the regulator can and has to give an early response to possible imbalances. This is true because, among other things, during a boom commercial banks may factor out changes in the economy's sensitivity to external shocks or endogeneity of macroeconomic variables (such as GDP, income and profit, and their dependence on lending), thus, underestimating risks.

We will further set forth the data and the hypothesis testing procedure, as well as the outcomes of the analysis.

2. Data and testing procedure overview

The hypothesis under test suggests that banks take more credit risks on their balance sheets ex ante as a credit boom matures. Consequently, the quality of their loan portfolios deteriorates.[5] Their ex post reporting data reveal consequences of the decisions banks made long before the reporting period. Sometimes they manifest themselves several years later as banks recognise them. We will judge the quality of ex post loan portfolios by banks' statements which describe the financial result, profitability and loan loss provisions over several years after the credit boom.

We used Form 0409101 data as a source of information. For details of the data refer to **Appendix 1**. To analyse the first credit boom, we considered banks where the share of corporate loans exceeded 50% of their assets. To analyse the second episode, we looked at banks where the share of retail loans exceeded 25% of assets.

For each bank in the sample we analyse the temporal profile of lending growth (growth of a loan portfolio against the corresponding month of the previous year). The test was based on the observation that bank lending broken down by group of banks varies considerably even when overall lending in the economy is on a clear uptrend. Banks accumulate loans in different ways during boom periods. Some of them increase lending before others join in, while other banks join later and continue to ramp up lending even when other banks reduce it (see Figure 2 for the size of portfolio and Figure 3 for its growth in two real banks). Figure 3 clearly shows that in mid-2012, when bank B reduced new loan issues (macroprudential measures were announced in autumn 2012), bank A increased lending until mid-2013.

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[5] We use macrodata to test the hypothesis that credit booms can forecast bank crises (see Gourinchas (2001), Schularick & Taylor (2012), Boissay et al. (2016). This hypothesis is often defined through hypotheses about the inverse macroeconomic effects of a credit boom (such as growth in collateral prices) on the availability of bank lending (e.g., see Gertler & Kiyotaki (2015)), or as similar amplification mechanisms of a credit boom affecting owners' urge to continue lending (see Bernanke & Gertler (1989), Kiyotaki & Moore (1997)). Sometimes the hypothesis is formulated as the easing of lending standards as a credit boom matures. For the reasons see Institutional memory (Berger & Udel, JFI 2004), Information capital and adverse selection (Dell'Aricia & Marquez' JF 2006).

**Figure 2. Term profile of retail lending by two real banks, January 2010 = 100%**
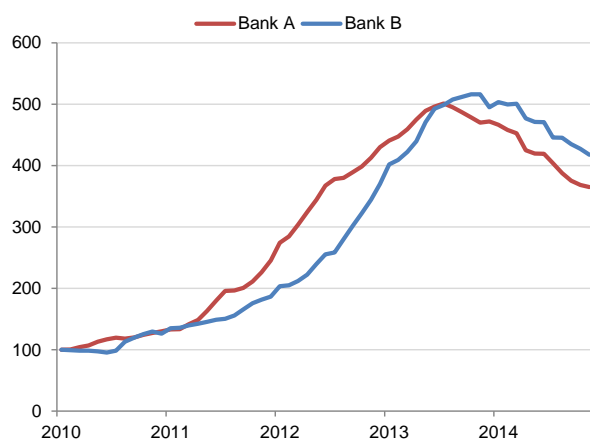
Figure 3. Annual growth of retail lending in two real banks, % YoY
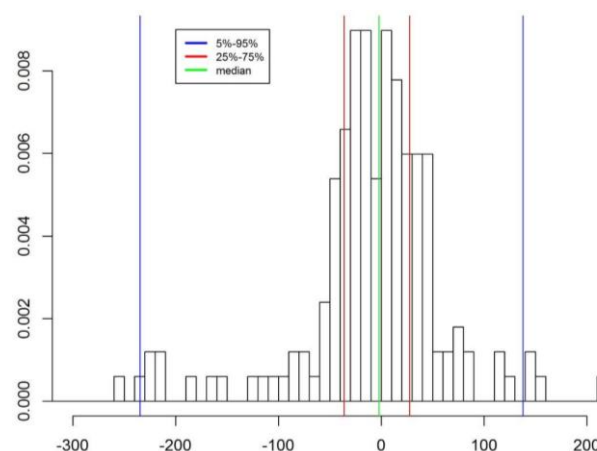

Source: Bank of Russia.
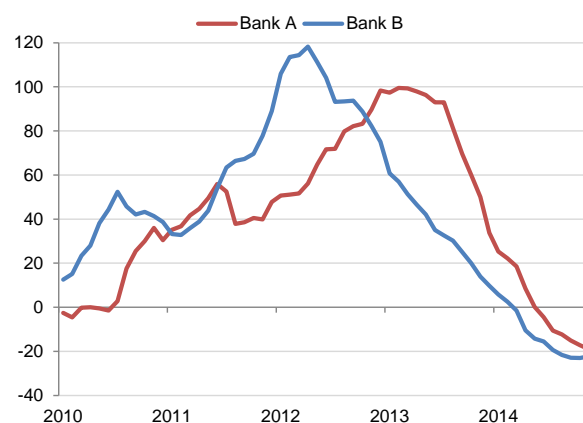
Source: Bank of Russia.

The idea of test is following. Let us look at two fictional banks C and D, which differ in terms of growth of their loan portfolio during the boom (Figure 4). Point E is the month when lending growth takes a U turn towards crisis (as in September 2008) or the regulator announces macroprudential measures (as in October 2012). Figure 4 demonstrates that banks C and D have equal loan portfolios in terms of the size in point E (integral under the curve in the segment [0, E]). However, their portfolio structures in terms of credit risks are different. Should banks' and borrowers' overoptimistic sentiment increase or should banks ease their requirements to borrowers in pursuit of profit (herd behaviour) as the boom ends, then bank D, whose principal lending growth fell in a later period, will have a riskier portfolio structure on its balance sheet compared with bank C whose loan portfolio expanded in an earlier period. Thus, should the null hypothesis be right, the manner in which banks accumulate their loan portfolios during a boom gives an idea of their risks.

To verify the null hypothesis for all banks we calculated the difference between the annual lending growth pace in point E and the annual lending growth pace in the year preceding point E (as the difference between annual growth rates). The obtained figure characterises an acceleration in lending growth during a boom. January 2008 (point E) is taken as a baseline for the two-year period of the credit boom of 2005-2007, as lending started shrinking before Lehman Brothers went bankrupt. The baseline for the 2011-2013 boom is October 2012 (point E) when an upward revision of risk ratios from 2013 was announced to reduce systemic risks in the segment of unsecured consumer lending.

Figure 4. Term profile of lending growth of two fictional banks C and D
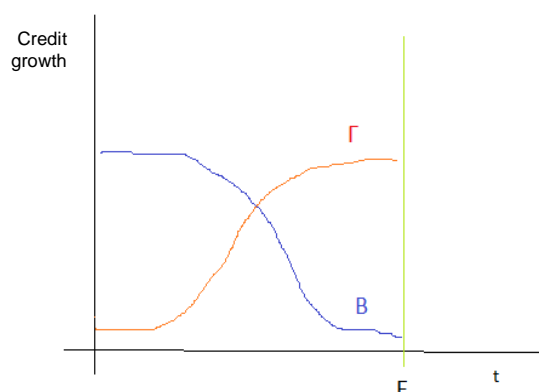
Source: authors' chart.

Figure 5. Annual growth of retail lending in bank sample as of 1 October 2012, pp

Sources: Bank of Russia, Bank of Russia calculations.

Moving forward, we drew up a distribution of growth acceleration broken down by bank (Figure 5). We formed four groups of banks based on the quartiles of this distribution. In Appendix 2 we present a breakdown into two groups illustrating lending growth and slowdown over the past year. Thus, we placed each bank of the sample in one of the four groups:[6] *Aggressive banks* are those in the upper quartile of the annual lending growth acceleration distribution; *Risky banks* are in the quartile between 50% and 75% of the distribution; *Risk-neutral banks* are between the 25% and 50% percentiles; and *Prudent/Passive banks* are those in the first quartile of the distribution, that is, banks which significantly reduced growth of their portfolio or intensified its shrinkage.

We studied two crisis episodes.

Episode 1. The 2008 crisis (Lehman Brothers bankruptcy)

The analysis was conducted for banks whose corporate loan portfolio exceeded 50% of their assets as of the beginning of 2008. We examined how much annual growth rates of the corporate loan portfolio changed in 2007 (as of 1 January 2008) compared with 2006 readings (as of 1 January 2007). Table 1 provides descriptive statistics for the bank groups formed in this manner.

Episode 2. The consumer lending boom of 2011-2013

We analysed banks whose retail loan portfolio exceeded 25% of their assets. We examined how much annual growth rates of the retail loan portfolio changed in 2012 (as of 1 October 2012) compared with 2011 readings (as of 1 October 2011). For descriptive statistics refer to Table 2.

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[6] Changes in the growth rate fall between the 95% and 5% percentiles of this value's distribution. We excluded 5% outliers on both sides of the acceleration distributions.

Table 1. Descriptive statistics for the sample of banks with a high share of corporate loans (as of 1 January 2008)

	Total banks	Share in the corporate portfolio of selected banks, %	Share in the corporate portfolio of the banking sector, %	Share in banking sector assets, %
Aggressive	48	2.3	0.6	0.9
Risky	60	70.4	18.1	28.9
Risk neutral	60	23.4	6.0	9.7
Prudent/Passive	48	3.9	1.0	1.6

Sources: authors' calculations.

Table 2. Descriptive statistics for the sample of banks with a high share of retail loans (as of 1 October 2012)

	Total banks	Share in the retail portfolio of selected banks, %	Share in the retail portfolio of the banking sector, %	Share in banking sector assets, %
Aggressive	33	25.5	3.9	2.0
Risky	41	33.5	5.1	3.6
Risk neutral	41	32.4	4.9	6.3
Prudent/Passive	33	8.6	1.3	1.5

Source: authors' calculations.

3. Findings

Having classified banks into groups, we compared the financial result, profitability and loan loss provisions of these banks broken down by group before and after the boom (point E).

3.1. The credit boom of 2005-2007

We focused primarily on the frequency of licence revocations (including resolutions) by bank group. It varies across the bank groups presented, but the difference is statistically insignificant (Table 3). Licences were least frequently revoked from banks which demonstrated slowing growth of corporate lending one year before the 2008 financial crisis. The unexpectedly high frequency of licence revocations in the group of banks with a passive/prudent approach to the expansion of loan portfolio in the run-up to the global financial crisis may be associated with a large share of captive or zombie banks in this group of banks (their lending capacity is restricted by capital limitations). Their share in banking system assets was modest. The presence of zombie banks in the group of *prudent* banks suggests that it would be more logical to name it *passive*.

Table 3. Frequency of licence revocation (resolution) by group of banks and the significance of testing for equality of probability of licence revocation in the group compared with the aggressive bank group

	Frequency of licence revocation, %
Aggressive	54.2
Risky	43.3
Risk neutral	51.7
Prudent/Passive	60.4

Note: *** - 1% level of significance, ** - 5% level of significance, * - 10% level of significance of the statistical test of the null hypothesis of equivalence to results in aggressive bank group.

Source: authors' calculations.

Table 4 features average[7] indicators describing the fallouts from the materialisation of risks associated with the credit boom of 2005-2007 for a permanent sample of banks which remained operational as of 1 November 2018.

Table 4. Banks' performance by groups demonstrating corporate lending growth during the 2005-2008 boom (for the permanent sample of banks as of 1 November 2018), %

Group of banks	Average ROA in 2006-2007	Average ROA in 2009-2010 vs average ROA in 2005-2007[8]	Average ROA in 2011-2013 vs average ROA in 2005-2007[8]	Average ROA in 2014-2017 vs average ROA in 2005-2007[8]	Average profit in 2009-2010 vs average profit in 2006-2007[8]	Average profit in 2009-2013 vs average profit in 2006-2007[8]	Average profit in 2014-2017 vs average profit in 2006-2007[8]	Loan loss provisions in 2010 vs loan loss provisions in 2007	Loan loss provisions in 2013 vs loan loss provisions in 2007	Loan loss provisions in 2017 vs loan loss provisions in 2007
Aggressive	2.2	0.8***	0.5***	0.8***	1.6***	1.6***	3.9***	2.9	4.4	9.2
Risky	3.6	0.4***	0.9**	0.6***	1	2.7***	4.6***	5.7	5.3	11.1
Risk neutral	2.2	0.5***	0.9***	0.7***	1.2	2.4***	4.0***	3.2	3.9	8.9
Prudent/Passive	2.8	0.5***	0.6***	0.3***	1.5***	2.4***	1.6***	2.7	4.4	8.1

Note: *** - 1% level of significance, ** - 5% level of significance, * - 10% level of significance of the statistical test of the null hypothesis of equality of means.
*Sources: authors' calculations, Bank of Russia.*

Banks included in the Aggressive and Risky groups created provisions considerably faster than banks of other groups, especially when the Bank of Russia stepped up supervision (since 2014). At the same time, risk neutral banks pursued a prudent lending policy over the 10-year horizon and, hence, demonstrated moderate creation of provisions. By all appearances, this points to a higher quality of their loan portfolio.

The need to create additional provisions made aggressive banks generate low profits and explained their low profitability (see also Figure 6 and Figure 7).

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[7] Average for the period. The indicators were calculated as the total for all banks included in the table.
[8] We tested the hypothesis of equality of means in the two samples (by period) using Student's t-distribution.

Figure 6. Loan loss provisions (permanent sample), January 2007 = 100%
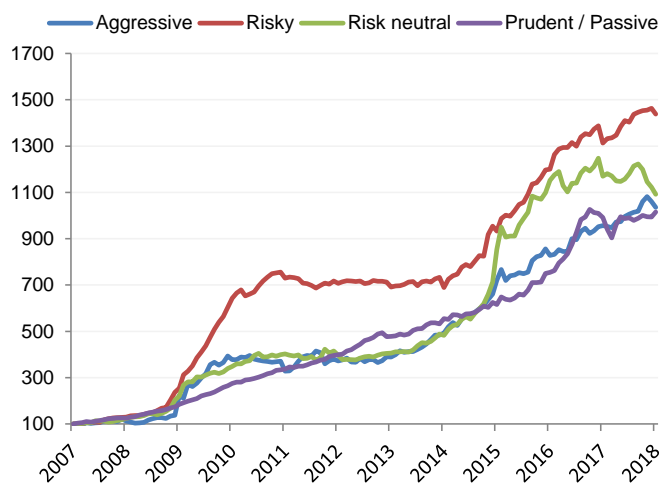
Source: authors' calculations.

Figure 7. ROA (permanent sample), %
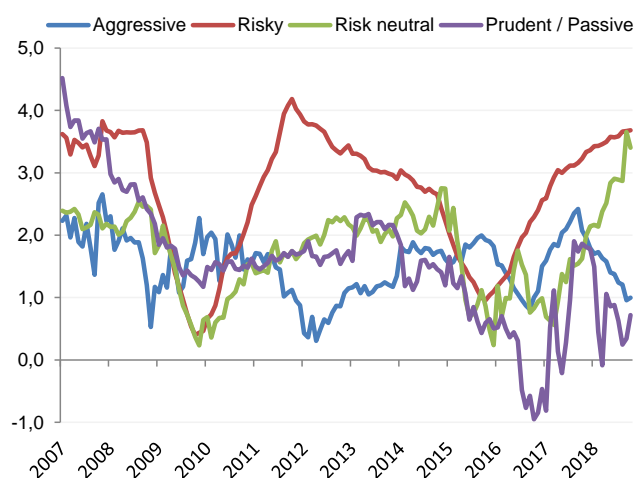
Source: authors' calculations.

3.2. The consumer lending boom of 2011-2013

Table 5 and Table 6 provide the results of calculating banks' performance by groups demonstrating acceleration of lending growth during the retail lending boom.

Table 5 shows that the frequency of licence revocations in the group of banks which accelerated lending while others slowed it, comes in at the highest at 61%. [9] Banks which significantly contracted lending one year before the boom ended also post high statistics of licence revocations (compared with intermediate groups). We also assume that this is associated with the fact that these are captive or zombie banks given their low weight in the assets of all selected banks (Table 2, column two).

Table 5. The frequency of licence revocation (resolution) by group of banks and the significance of testing for equality of probability of licence revocation in the group compared with the aggressive bank group

	Frequency of licence revocation, %
Aggressive	60.6
Risky	31.7***
Risk neutral	39.0*
Prudent/Passive	45.5

Note: *** - 1% level of significance, ** - 5% level of significance, * - 10% level of significance of the statistical test of the null hypothesis of equivalence to results in aggressive bank group.
Source: authors' calculations.

In contrast, the financial indicators of survivor banks (which kept their licences and avoided resolution) allow us to explore statistically important differences between banks within groups formed during the boom even years after its end (Table 6).

Notably, banks which aggressively increased lending in the closing year of the retail boom posted the highest ROA compared with other banks. This may either point to their low-quality

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[9] It does not differ significantly from the frequency of licence revocations in the group of prudent/passive banks.

reporting or suggest that they really earned high profits in 2011-2013. However, immediately after the boom, both in 2014-2015 and in the longer period of 2014-2017, they were outsiders in terms of ROA and average profit (compared with the 2011-2013 period). They were also leaders in terms of growth of loan loss provisions both in 2014 and 2017.[10]

Table 6. Banks' performance by retail lending growth during the 2011-2013 boom (for the permanent sample of banks), %
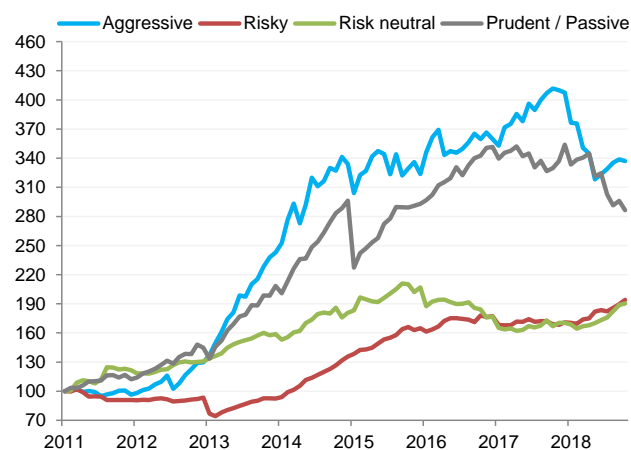
Group of banks	Average ROA in 2011-2013	Average ROA in 2014-2015 vs average ROA in 2011-2013	Average ROA in 2014-2017 vs average ROA in 2011-2013	Average profit in 2014-2015 vs average profit in 2011-2013	Average profit in 2014-2017 vs average profit in 2011-2013	Loan loss provisions in 2014 vs loan loss provisions in 2011	Loan loss provisions in 2017 vs loan loss provisions in 2011
Aggressive	4.6	0.07***	0.2***	0.12***	0.43***	3.4	4.0
Risky	3.3	0.24***	0.1***	0.35***	0.21***	1.5	1.9
Risk neutral	2.6	0.7***	0.8***	0.95	1.14**	1.5	1.4
Prudent/Passive	2.2	0.7***	0.6***	0.99	0.88**	2.2	3.2

*Note: *** - 1% level of significance, ** - 5% level of significance, * - 10% level of significance*
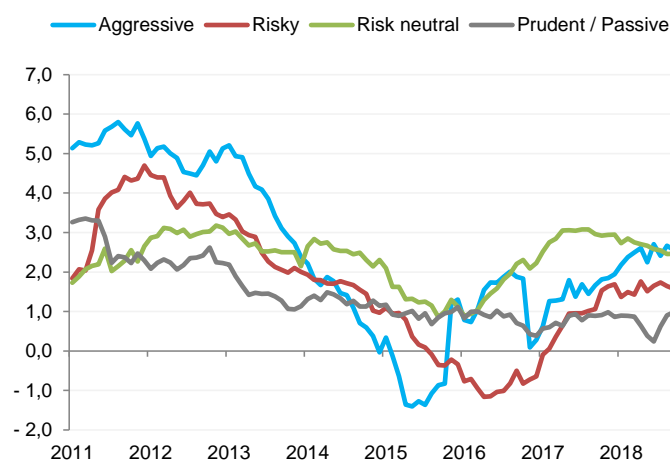*Source: authors' calculations.*

In the period of fast provision build-up, the profits and profitability of this group of banks dived into negative territory (Figure 9), and provisions proved highly volatile (Figure 8).

Figure 8. Loan loss provisions (permanent sample of banks), January 2011 = 100%

Source: authors' calculations.

Figure 9. ROA (permanent sample of banks), %

Source: authors' calculations.

4. Conclusion

We explored the creation of loan loss provisions, profits and profitability by group of banks which were formed based on lending dynamics in the two phases of active lending growth. The research showed that banks which aggressively increased their loan portfolios during the last phase

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[10] Given the short average maturity of a consumer loan, high loan loss provisions in 2017 are unlikely to reflect consequences of lending decisions made in 2012. They most likely suggest that banks fail to learn from their own mistakes and continue to make risky decisions.

of active lending growth, afterwards demonstrated higher growth of provisions whereas their profits and profitability were more modest than in other banks. The differences persist in the multi-year horizon which may in part be attributed to the switch in the Bank of Russia's prudential policy regimes. Furthermore, banks which demonstrated a balanced approach to risk management during the consumer lending boom of 2011-2013, later faced licence revocations considerably less frequently. That is, licence revocations were in part associated with the accumulated problems in loan portfolio from risk mismanagement.

This result suggests that banks may underestimate credit risks. This is triggered by, among other things, the dependence of loan issue decisions on other banks, which can jointly affect the dynamics of macroeconomic variables. Such shortcomings in credit risk assessment require that the regulator interferes and imposes macroprudential measures in a timely manner.

Appendix 1

Utilised indicators

No.	Indicator	Source	Calculation specifics
1	Corporate loans	Form 0409101	Reporting data on 'loans and other placements with non-financial organisations (including individual entrepreneurs)'. The indicator is adjusted for FX revaluation and the effect of bank reorganisation through mergers and acquisitions
2	Retail loans	Form 0409101	Reporting data on 'loans to individuals (excluding individual entrepreneurs)', The indicator is adjusted for FX revaluation and the effect of bank reorganisation through mergers and acquisitions
3	Loan loss provisions	Form 0409101	Reporting data on 'loan loss provisions'
4	Profit	Form 0409101	Reporting data on 'current year profit (loss)'. The indicator is reported year-to-date, we recalculated profit as a moving average for the past 12 months.
5	Profitability (ROA)	The indicator is based on reporting form 0409101	The ratio of profit for the past 12 months (line 4) to average assets for the past 12 months
6	Mortgage loans	Form 316	Reporting data on 'housing mortgage loans'
7	**For Figure 1** Consumer loans	Form 115	Reporting data on 'other consumer loans, total'

Appendix 2

An alternative approach to the classification of banks provides for their division into two groups depending on whether their loan portfolio growth accelerates or slows in the run-up to a boom

1. The credit boom of 2005-2007

We put banks whose corporate loan portfolio (adjusted for FX revaluation and restructuring) slowed growth in the run-up to the crisis (annual lending growth in August 2008 compared with annual growth in August 2007) in the first group, which we titled *Prudent banks*. We put banks whose corporate loan portfolio showed accelerated growth in the run-up to the crisis in the group of *Risky banks*.

The results of comparison of the banks' performance are as follows:

- The difference in the frequency of licence revocations (including resolution) between the groups is statistically insignificant (chi-squared distribution) (Table 1).

- Provisions in the risky banks grew at an outpacing rate before they reached the level of provisions in the prudent banks. (Figure 1). Hence, they showed more volatile profits and ROA in 2009-2010 (Figure 2 and Figure 3).

Table 1. Frequency of licence revocation (including resolution)

	Total banks	Frequency of licence revocation, %
Risky	121	71.1
Prudent	172	64.5

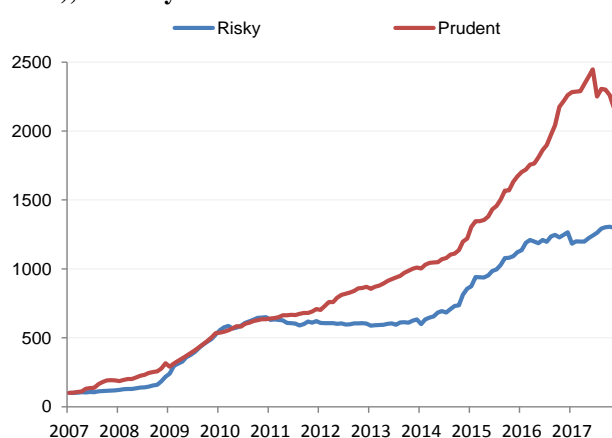**Figure 1. Loan loss provisions (permanent sample of banks), January 2007 = 100%**

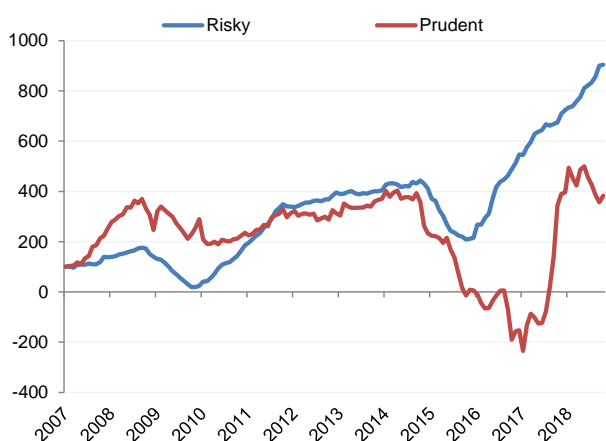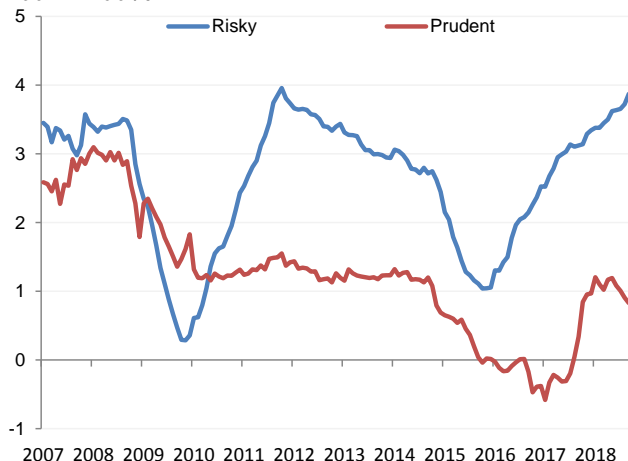**Figure 2. Profit (permanent sample of banks), January 2007 = 100%**

Figure 3. ROA (permanent sample of banks), January 2007 = 100%

2. The consumer lending boom of 2011-2013

We put banks whose retail loan portfolio (adjusted for FX revaluation and restructuring) slowed growth before the measures to restrict growth of this type of loans were announced in the group of *Prudent banks*. We compared the annual growth pace as of 1 October 2012 with the annual growth pace as of 1 October 2011. We put banks whose retail loan portfolio showed accelerated growth in the run-up to the announcement of macroprudential measures in the group of *Risky banks*.

- The difference in the frequency of licence revocations (including resolution) between the samples is statistically insignificant based on chi-squared distribution (Table 2).

- Provisions in prudent banks proved less volatile than in risky banks, whereas ROA was higher than in banks which accelerated lending growth in the run-up to the boom peak (Figure 4, Figure 5 and Figure 6).

Table 2. Frequency of licence revocation (including resolution)

	Total banks	Frequency of licence revocation, %
Risky	75	49.3
Prudent	83	56.6

Figure 4. Loan loss provisions (permanent sample of banks), January 2011 = 100%
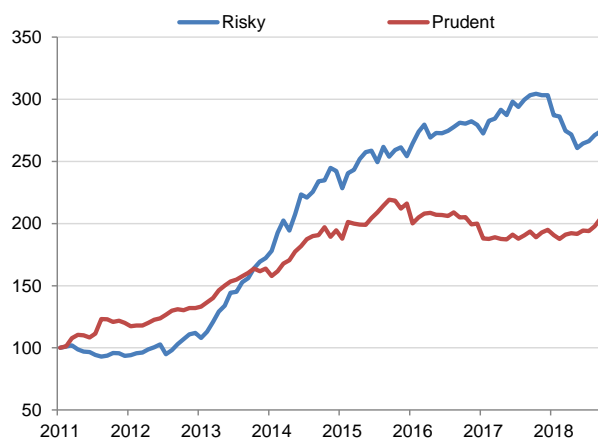

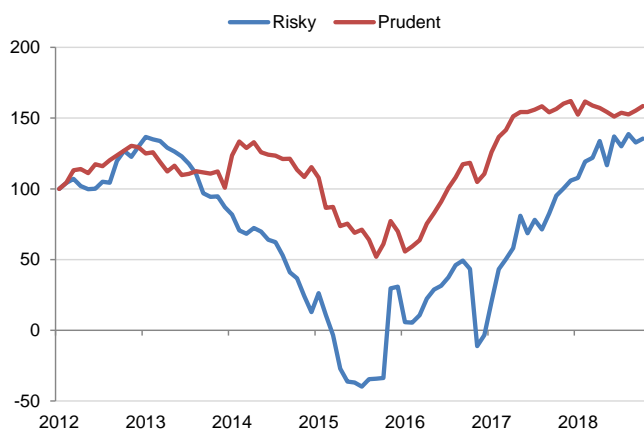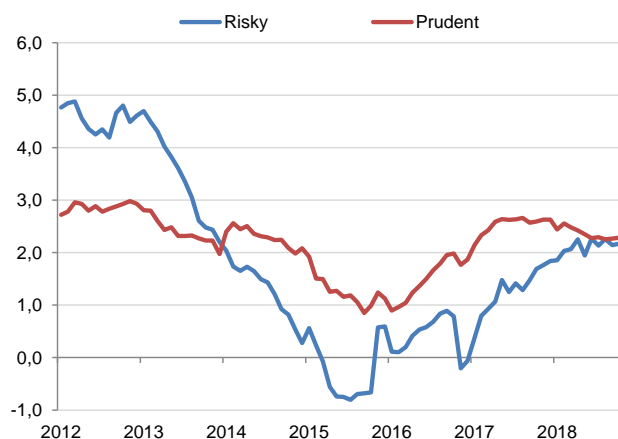**Figure 5. Profit (permanent sample of banks), January 2012 = 100%**

Figure 6. ROA (permanent sample of banks), January 2012 = 100%

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Research and Forecasting Department

Andrey Sinyakov

Yulia Ushakova