Bank of Russia

The Central Bank of the Russian Federation

Regional heterogeneity of household lending based on the findings of the household finance survey: regional features and potential risks

Analytical note
by the Research and Forecasting Department
of the Bank of Russia

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According to the household finance surveys conducted in 2013 and 2015,[1] the credit penetration rate[2] varies across federal districts. For example, only 15% of households in the North Caucasian Federal District have loans (compared to 40% in the Urals Federal District).

Differences in credit penetration levels can be partly attributed to the loan demand factors. For example, low credit penetration in the Central Federal District stems from the relatively high level of accumulated net assets (especially as regards liquid assets), which reduces the demand for loans. In Eastern Russia, in districts with comparable income levels and less net assets, high credit penetration rates are primarily attributable to income growth expectations. In these regions, accumulated net assets are generally viewed as a supplement to loans. Analysis of the loan demand model in Southern Russia points out a relatively high level of risk, with loan demand growing despite deterioration of the financial situation (including financial expectations). Low credit penetration in the underperforming districts has largely to do with credit supply constraints as banks factor in higher risks associated with strong gross regional product (GRP) volatility and job market uncertainties.

This means that aggressive loan expansion driven by the growing number of new borrowers in the federal districts with small and volatile incomes and a lower credit penetration rate may threaten the social and financial stability in such regions.

The federal districts are highly homogeneous in terms of the household credit intensity (debt service ratio): according to the 2015 survey, the debt service ratio of households stood at around 18% with district variations falling within the 2.5 pp range. As some districts are more sensitive to drastic changes in the macro environment, the debt service ratio has a somewhat patchy structure, with certain regions being more leveraged than the others. As a result, in some federal districts banks charge higher interest rates on household loans due to a greater risk exposure.

We have therefore come to the conclusion that macroprudential policies aiming to curb the debt service ratio should take into account differences in the regions' sensitivity to income and job market fluctuations. The regions that are more sensitive to such negative developments should have a lower debt service ratio, with special attention being paid to regional banks as they have limited opportunities for diversification of their loan portfolio and the aftermath of regional shocks[3] is different for federal and regional banks. Federal banks operate in most or all of the country's regions and can easily diversify their region-specific risks when building up a regional loan portfolio. This is not the case with regional banks: the above risks, should they materialise, may have a significant negative impact on the regional banking system and social well-being.

[1] See the *Study of Financial Behaviours and Savings Habits of the Russian Population* commissioned by the Russian Ministry of Finance. The authors take this opportunity to thank officials from the Russian Ministry of Finance for providing anonymised data to support this research.

[2] The share of households having applied for a loan over the past five years or having a loan outstanding at the time of the survey.

[3] For example, a decline in global coal prices for the coal mining regions.

1. Introduction

This analysis focuses on the borrowing behaviour of households across the federal districts.[4] The research builds on the microdata yielded by a household finance survey which was carried out by the Demoscope Research Centre at the request of the Russian Ministry of Finance in 2013 and 2015.[5]

In an attempt to analyse the household debt service ratios and break them down by federal district, we have considered the households' loan application figures (loan demand) and the rationale behind applying and not applying for the loans.

The sample covers households in just 33 out of the 86 Russian regions (see Table 1p in the Appendix), with the number of observations for nearly all of the regions only slightly exceeding 100 households. In order to mitigate random factors,[6] it was decided to analyse the data on a consolidated basis and scale them up to match the federal districts. This has provided each of the federal districts with a more sizeable sample and helped fine-tune the sample structure so that it matches the population structure in different federal districts more precisely (see Table 1).

Table 1. Population breakdown by federal district according to the 2013 survey and Rosstat data (as at 1 January 2017)

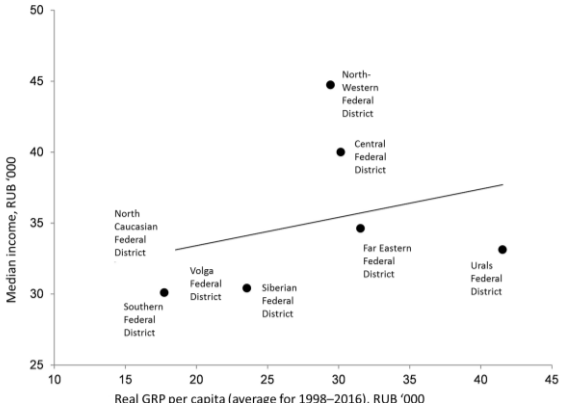
	Number of households	Share in the data sample	Share in the population
Central Federal District	1,396	27.3	26.7
North-Western Federal District	545	10.6	9.5
Southern Federal District	472	9.2	11.2
North Caucasian Federal District	273	5.3	6.7
Volga Federal District	1,097	21.4	20.2
Urals Federal District	347	6.8	8.4
Siberian Federal District	745	14.6	13.2
Far Eastern Federal District	244	4.8	4.2
Total	**5,119**	**100**	**100**

Sources: Rosstat, HFS.

Ranging federal districts by their gross regional product (GRP) per capita[7] shows a correspondent increase in the median household income, too (Figure 1). In general, the data sets are representative enough as they reflect key patterns at the level of federal districts.

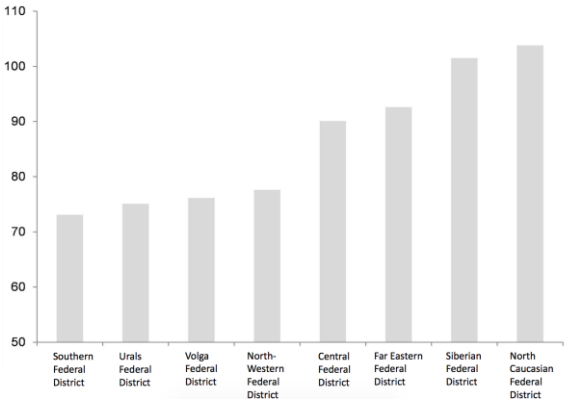
[4] This analytical note comes as a follow-up to *Consumer Lending in Russia: prospects and risks based on household finance survey* (an analytical note by the Research and Forecasting Department of the Bank of Russia focusing on the borrowing behaviour of households, September 2017).
[5] Detailed data description is available in the same analytical note, including a summary of the data used and an overview of the employed questionnaires (for both households and individuals). For that reason, this note has no dedicated section with data description.
[6] In the previous studies, we showed that only 20% of the households from the sample had loans, which means that 20 households in each region would have had to be analysed.
[7] GRP is calculated as an average for 1998–2016.

Figure 1. Median household income according to the 2015 survey and real GRP per capita by federal district (the average for 1998–2016)



Sources: HFS, Rosstat, authors' calculations.

Figure 2. Coefficient of variation for household incomes according to the 2015 survey, %



Sources: HFS, authors' calculations.

As regards the coefficient of variation for household incomes within the federal districts, the sample for the Southern Federal District stands out as the most homogeneous, which is clearly not the case with the North Caucasian or Siberian Federal Districts (Figure 2). Surprisingly enough, this dispersion is not related to the districts' GRP.

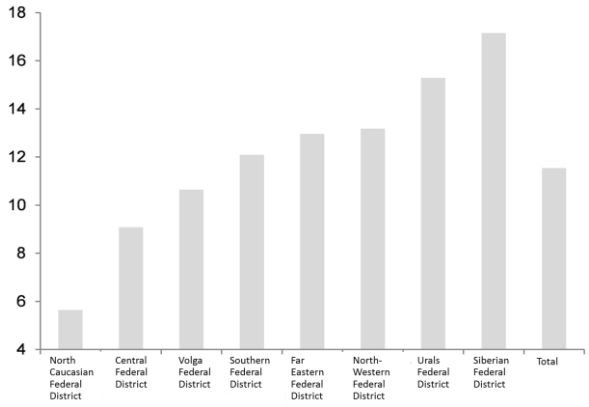
First, we will analyse credit penetration among the population of federal districts focusing on solvency limitations (according to the households' own estimates) as an important factor hampering households from taking out a loan. Then we will have a look at the credit penetration intensity calculated as a correlation between the debt service ratio and household income.

2.1. Reasons behind differences in quantitative characteristics of credit penetration by federal district

There is a substantial dispersion in the share of individuals (Figure 3) and households (Figure 4) with outstanding loans.[8]

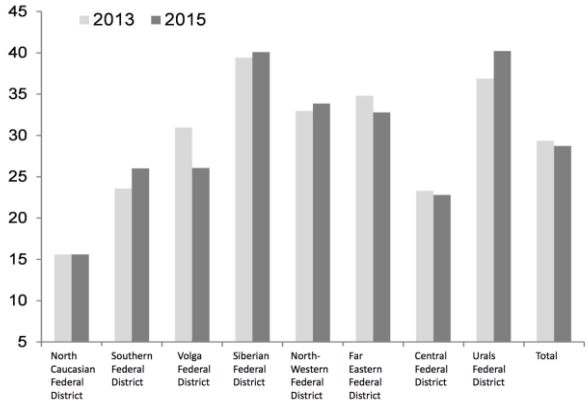
[8] The findings of the household finance survey are further confirmed by the special survey of the Bank of Russia (see Figure 6 in the *2016 Review of Financial Inclusion in the Russian Federation*, Moscow, 2017).

Figure 3. Share of **individuals** with outstanding loans according to the 2015 survey, % of all surveyed individuals in the relevant federal district



Sources: HFS, authors' calculations.
Note. Districts are ranked by GRP per capita.

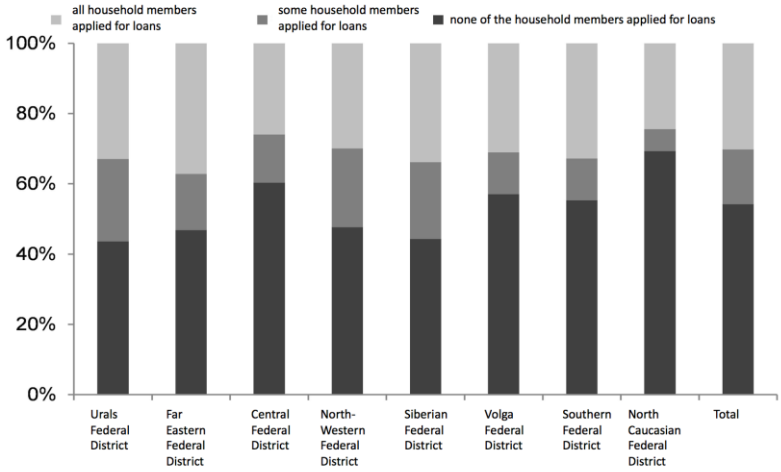
Figure 4. Share of **households** with outstanding loans according to the 2013 and 2015 surveys, % of all surveyed households in the relevant federal district[9]



Sources: HFS, authors' calculations.

Dispersion observable in the share of respondents with outstanding loans can also be traced in the share of respondents who had applied for a loan at least once in the five years preceding the survey (Figure 5).

Figure 5. Share of households with members applying for a loan over the past five years, % of all households according to the 2015 survey



Sources: HFS, authors' calculations.

Highlights:

1. The highest credit penetration rate is observed in Eastern Russia, namely in the Siberian, Urals and Far Eastern Federal Districts. For instance, in the Siberian Federal District some 20% of individuals and nearly 40% of households have

[9] By providing changes in the shares reported in the surveys, we do not seek to analyse differences between them, but rather want to show how these shares persist through time. Random factors play an essential role in the reported changes, while the changes themselves are too negligible to draw any meaningful conclusions about the evolution of credit penetration.

loans.[10] On the contrary, European Russia (North Caucasian, Central, Volga and Southern Federal Districts) has the lowest credit penetration rates. In the North Caucasian Federal District only 5% of individuals and 15% of households have loans.[11] In general, wealthier regions boast stronger credit penetration among both individuals and households.

2. Among districts with real GRP per capita above the median, the lowest share of individuals/households having loans is observed in the Central Federal District.
3. Districts with higher GRP tend to have more loan applications over the past five years. The share of households with no loan applications in such districts is also lower.

We cannot help but ask ourselves a question about the factors accounting for such differences. Those can be factors having to do with either credit demand or credit supply.

Role of credit demand factors

The demand of households for loans may vary from region to region. Modern economic theory views consumption smoothing as the key underlying factor of credit demand. Loan demand from both individuals and households is driven by the desire to optimise consumption over their lifetime ('life-cycle hypothesis')[12] or in response to temporary negative income or employment shocks ('permanent income hypothesis')[13]. According to these hypotheses, those population groups that expect a steady increase in their incomes (young people/families or households from fast-growing regions) or have experienced temporary difficulties (transitory income and employment shocks) take more loans. From the theoretical perspective, household wealth (stock variables as opposed to income) is another important credit demand driver. Affluent population groups have higher consumption standards, especially in the segment of consumer durables. This drives their credit demand and makes them more likely to apply for loans. At the same time, households with a lot of liquid assets (cash savings) tend to have a smaller loan demand.

To get a better understanding of various credit demand factors, we analysed the econometric logit model representing correlation between loan demand and the above factors both across the country and by federal district.

The used equation is as follows:[14]

$$Probability\left(credit_{demand_{2015-2013}} = 1\right) = Logit[\alpha + \beta_{expect} ExpectedIncomeChange_{2013} +$$

$$+\beta_{1shock} WageShock_{2015-2013} + \beta_{2shock} EmploymentShock_{2015-2013} + \theta_1 Age_{2013} +$$

$$\theta_2 NetWealth_{2013} + \theta_3 Savings_{2013} + \theta_4 Income_{2013} + \theta_5 Education_{2013} + \theta_6 CitySize_{2013}],$$

[10] The difference stems from the fact that a household can be classified as having a loan even if only some of its members borrowed from a bank.

[11] This differentiation is confirmed by the findings of the United Credit Bureau. See the United Credit Bureau's press release dated 19 January 2017.

[12] Ando, Modigliani (1963), Hall (1978).

[13] Friedman (1957), Campbell, Mankiw (1990).

[14] A more detailed specification of this model, data description, regression variables, and analysis findings applying to the wider Russian economy can be found in an article by Mariam Mamedli and Andrey Sinyakov (2018).

where $credit\_demand$ takes the value of 1 if, during the 2013 survey, a household member claimed not to have applied for a loan over the past five years and then, as part of the 2015 survey, admitted to having applied for a loan in the span of the past five years.

We also made it a point to analyse those households that, according to the 2013 survey, did not have debt and had not previously applied for a loan ('new borrowers') and those who had debt as early as 2013. Description of the remaining variables can be found in Appendix 2.

The findings of our analysis focusing on the probability of a household becoming a new borrower are shown in Table 2, whereas the credit demand model assessment results for households that had debt as early as 2013 are detailed in Appendix 3.

Table 2. Results of the credit demand logit model analysis for 2014–2015 pursuant to the findings of the household finance survey (by federal district and across the country) for households that did not have loans as at the time of the 2013 survey

Dependent variable (loan_demand)	Across the country (pooled regression)	Central Federal District	North-Western Federal District	Southern Federal District	North Caucasian Federal District	Volga Federal District	Urals Federal District	Siberian Federal District	Far Eastern Federal District
Expected income change (2013 survey)	-0.1	-0.2	0.3	-0.6*	-1.2*	-0.3	0.8	0.0	1.2*
Wage shock	-0.2*	0.1	-0.1	-0.2	0.1	-0.6**	-0.9*	-0.2	0.1
Employment shock	0.1	-0.8	-0.2	0.9	3.5**	1.3*	0.0	-0.7	0.8
Average age of adult household members in 2013	-0.1***	-0.0	0.0*	-0.0	-0.1*	-0.1*	-0.0	-0.0	0.0
Household savings in 2013 (^-6)	-1.3***	-3.3***	-0.8	0.3	0.6	0.6	-3.9	-1.3	-0.0
Average monthly household income in 2013	0.0	0.0	-0.0	0.0*	0.0	0.0	-0.0	-0.0	0.0
Average education level of adult household members in 2013	0.0	0.1	-0.1	-0.1	0.1	0.1	-0.2	-0.1	0.1
Size of the city where the household lived in 2013	-0.1	-0.3	-0.0	-0.2*	-0.1	0.1*	-0.1	-0.2*	-0.1
Constant	-0.5	-0.8	-1.9	1.2	1.9	-0.2	0.4	0.0	-5.3**
Number of observations	1,376	376	145	157	110	284	80	164	55
p-value of LR statistics	0.08	0.3	0.9	0.5	0.4	0.03	0.2	0.8	0.3
Adding a *Net Financial and Non-Financial Assets in 2013* variable (10^-7)	-0.4	-0.7*	1.1	-6.3	-3.5	-2.6	1.6	8.0**	–
Number of observations after adding the *Net Wealth* variable	468	150	54	47	32	71	29	57	7

Note. *, **, *** define statistical significance of coefficients at 10%, 5%, and 1% levels, respectively.
Sources: HFS, authors' calculations.

The calculations show that, in 2014–2015, significant factors of credit demand (on the part of borrowers who had no debt according to the 2013 survey) applicable to the entire data sample included the volume of accumulated liquid assets (the greater size of accumulated savings in 2013 tended to translate into lower loan demand going forward), demographics and wage shocks. As expected, younger households take out more loans.

At the same time, negative income shocks tend to reduce loan demand instead of increasing it.[15]

The analysis by federal district reveals no clearly defined (statistically significant) model of credit demand (especially as regards the North-Western Federal District). This may be due to material income differentiation in regions belonging to the same federal districts. For some regions, though, we were able to identify patterns in the behaviour of potential borrowers.

For example, in the Central Federal District household savings (liquid assets that can be used for consumption purposes) and a considerable amount of net financial and non-financial assets come as a significant factor undermining overall credit demand, while in other districts availability of liquid assets (accumulated savings) does not seem to produce any material impact. Total net wealth is also a factor to be reckoned with in the Siberian Federal District, but, contrary to the Central Federal District, growth of net assets here appears to drive up household credit demand. This may come as a result of rising consumption standards as they grow in line with the net assets, or higher net wealth making it easier for households to apply for loans. According to the survey and our calculations, the median net assets of households in the Central Federal District are 50% higher than those in the Siberian Federal District. This probably makes borrowers from the Central Federal District consider their assets (primarily the liquid ones) sufficient to finance consumption. As a result, a higher level of net wealth partly explains low credit penetration in the central part of Russia.

As GRP per capita in Southern Russia (Southern and North Caucasian Federal Districts) and the Volga regions is below the median, income growth expectations have a significant impact on the credit demand model. In these districts, negative income growth expectations increase loan demand. Moreover, actual employment shocks (job loss) come as a material demand driver in these regions, as actual job losses (in addition to the expectations of lower income) boost credit demand. According to this model, loan demand grows on the back of actual or expected deterioration of the financial situation in households. Broadly speaking, this corresponds to the key assumptions of the consumption smoothing theory. But to estimate the banks' credit risks or wider social and financial stability implications, it is important to understand how realistic potential borrowers (and the banks issuing loans) are in differentiating between temporary and permanent shocks. With permanent shocks incorrectly perceived as temporary, this model of borrower behaviour gives rise to significant credit risks. In addition, this type of demand model fails to explain why the districts in question have relatively lower credit penetration rates. Consequently, to get a better understanding of these districts, we should probably look into the loan supply factors.

While credit penetration rate is the highest in Eastern Russia (the Siberian, Urals and Far Eastern Federal Districts), it is difficult to clearly identify the underlying loan demand factors except for the wage shocks (reducing the credit demand) and applicants living in a big city. In the Far Eastern Federal District, income growth expectations boost

[15] This does not, however, mean that the hypothesis is false. Unfortunately, the survey findings do not contain information on whether households perceive respective shocks as temporary or permanent.

loan demand in line with the consumption smoothing theory. In terms of credit risk accumulation and social and financial stability, growth of credit demand on the back of improvements in the households' financial situation is a relatively safe strategy of borrowing behaviour, the only caveat being that it increases the business cycle fluctuations of consumption. To a large extent, strong credit penetration in these districts results from the relatively high incomes.

According to the calculations of the credit demand model for households that had debt as early as at the time of the 2013 survey (Table 3, Appendix 3), wage shocks were a significant factor both countrywide and in most of its districts. A negative wage shock translates into a statistically significant decrease in demand for new loans, which makes this factor universal and applicable to both new and existing borrowers. Moreover, for existing borrowers it proves to be significant in a larger number of districts. A new factor that had no effect on new borrowers as opposed to the existing ones is the educational background: a higher level of education tends to drive down incremental demand for loans. But this factor proves to be significant only in the Central Federal District and does not manifest itself in other districts. For existing borrowers, applying for a new loan no longer depends on their accumulated savings or demographics. As regards federal districts, an employment shock has a considerable effect on the demand for new loans: in the North Caucasian Federal District a negative employment shock increases the demand for loans from existing borrowers.

To a certain extent, factors on the demand side can explain differences in credit penetration across federal districts. Given high incomes and substantial accumulated net wealth, low credit penetration in the Central Federal District can be attributed to the importance of savings as a credit demand factor. On the contrary, in eastern districts with similar income levels strong credit penetration can be attributed to the relatively high incomes and relatively low net wealth (especially as regards less liquid assets) as opposed to high (or heightened) expectations of their growth in the future (especially in small settlements). Weak credit penetration in Southern Russia, though, can hardly be explained through the high-risk credit demand model, so it probably has to do with the loan supply factors.

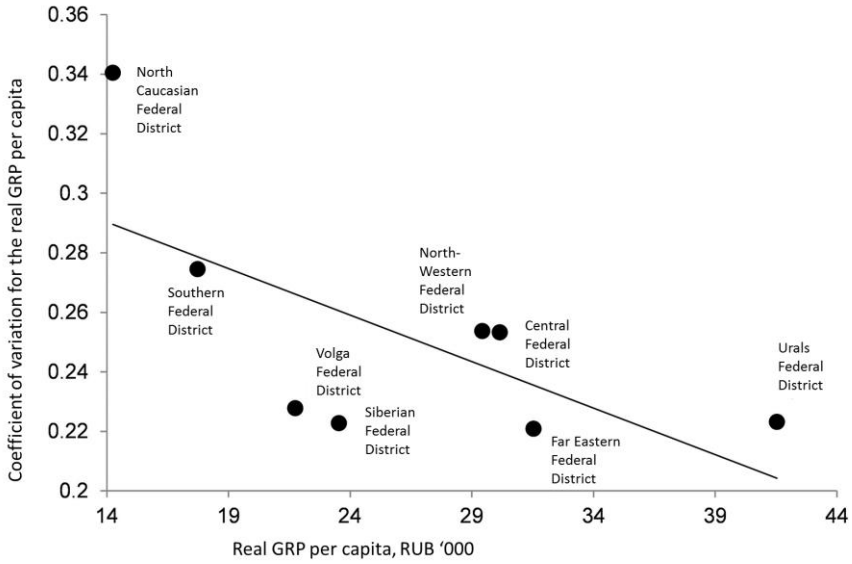
Role of supply factors in credit penetration differences

Differences in credit penetration can stem from the fact that commercial banks limit loan supply to households from regions with low or volatile incomes. Low but stable household incomes should primarily put a damper on the loan size, affecting loan availability to a much lesser extent. However, banks can limit the availability of credit in low-income (albeit fast-growing) regions by refusing to develop a branch network there. At the same time, volatile revenues mean higher credit risks for the banks. Hence, banks either refuse to assume such risks by tightening loan supply or charge a rather high interest rate scaring away potential responsible borrowers.

Based on this hypothesis, it would be logical to assume that credit penetration is weaker in regions with low (vs the nationwide average) and volatile incomes. In terms of income size, this hypothesis is confirmed by the available data (Figures 3–4). Moreover,

in the regions, where GRP is high, it also tends to be more stable: the richer the region, the less volatile its GRP is (Figure 6).

Figure 6. Federal districts' average real GRP per capita in 1998–2016 and the coefficient of its variation for the same period



Note: if the Y axis represented the standard deviation of the real GRP, the results would remain the same (1998 rebased to 100)
Sources: Rosstat, authors' calculations.

As a matter of fact, of the four districts with the lowest credit penetration, the North Caucasian, Southern and Volga Federal Districts have the highest share of agriculture in their GRP. For this sector, income volatility is a common feature (Table 2, Appendix). On the other hand, of all the districts, the Urals and Siberian Federal Districts have the largest share of mining (Urals FD) or manufacturing (Siberian FD) industries in their GRP[16] and boast the highest credit penetration rates.

Consequently, the survey findings, if anything, prove that banks have regional preferences in terms of loan supply. Low credit penetration in poorer regions comes as a result of limited credit supply (either direct, such as a refusal to issue a loan, or indirect, through restrictions on the availability of financial services in the region).

Broadly speaking, the potential for extensive (through the attraction of new borrowers) credit growth by districts is highest in the districts where GRP is below the national average. If unlocked, it can spur demand in these regions. On the other hand, extensive expansion which is not underpinned by steady income growth will translate into accumulation of credit risks on the regional banks' balance sheets and put the banks in a bad spot compared to the situation where they issue the same loan to a new borrower in a region with higher and more stable incomes.

Credit-driven stimulation of demand can only deliver a short-term boost until the amount of newly issued loans stops growing. Such accelerated growth in the districts with

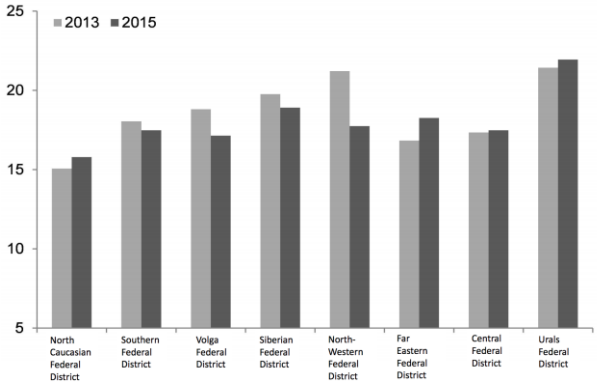
[16] The Volga and North-Western Federal Districts rank second and third by the share of manufacturing industries in the GRP, respectively. This mixed type of GRP structure is the reason why these two districts find themselves in the middle of the list of districts grouped by the household credit penetration rate.

GRP below average (and effectively more volatile incomes) is possible. However, at some point in time, banks will inevitably start issuing higher risk loans. As a result, risk-free credit growth in that context can only be temporary. In the long run, materialisation of credit risks will lead to losses on the part of regional banks as their borrower portfolio does not cover other federal districts and is therefore not diversified enough. Such banks will be forced to leave the market or engage in a different type of business, which will have a negative long-term impact on the financial sector of respective districts and increase concentration in the regional banking industry. Needless to say, neither borrowers nor depositors are likely to benefit from such developments.

2.2. Credit intensity by federal district: household debt service ratios

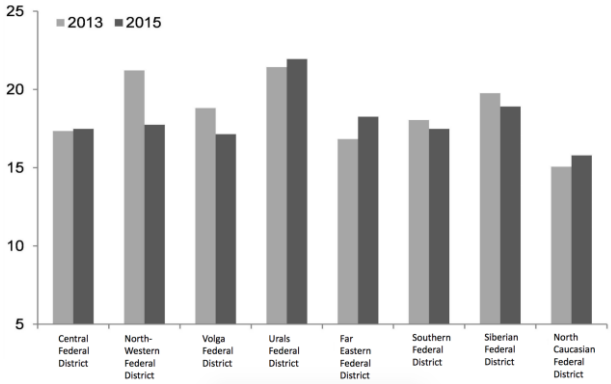
We have calculated the debt service ratios of households[17] and grouped the results by federal district (Figures 7–8). We have also calculated the debt service ratios sorting districts in the ascending order by their unemployment rate (Figure 9).

Figure 7. Median debt service ratio of households with outstanding loans in districts sorted in the ascending order by their GRP in 2013 and 2015



Sources: HFS, authors' calculations.

Figure 8. Median debt service ratio of households with outstanding loans in districts sorted in the ascending order by their unemployment rate in 2013 and 2015



Sources: HFS, authors' calculations.

In general, debt service ratios (DSR) are congruent across the federal districts, with no clear upward or downward debt burden trend traceable in response to an increase in the districts' GRP or unemployment rate.[18] Regional DSR deviations from the average fall within the +/- 2.5 pp range.

As regions demonstrate different sensitivity to macroeconomic shocks and changes in federal spending and have different levels of GRP volatility, initially we expected to see a greater variation in debt service ratios by district. There might be certain differentiation, but it is probably best seen at the regional level. **Anyway, lack of material differentia-**

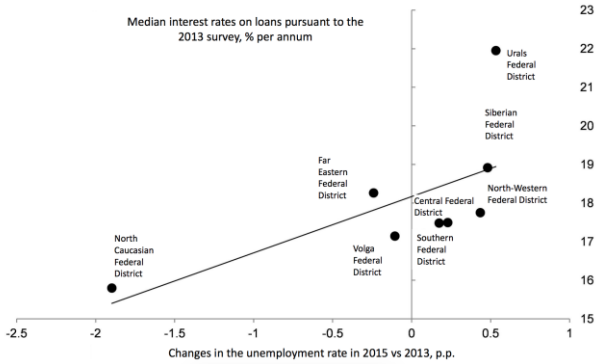
[17] For more details on the calculation methodology and other data groupings see *Consumer lending in Russia: prospects and risks based on household finance survey*.

[18] It stands to note, though, that in districts where GRP per capita is below the average, debt service ratios slightly decreased (except for the North Caucasian Federal District), while in districts with GRP above the average they saw a moderate rise.

tion suggests that in a number of federal districts debt service ratios exceed the equilibrium level.

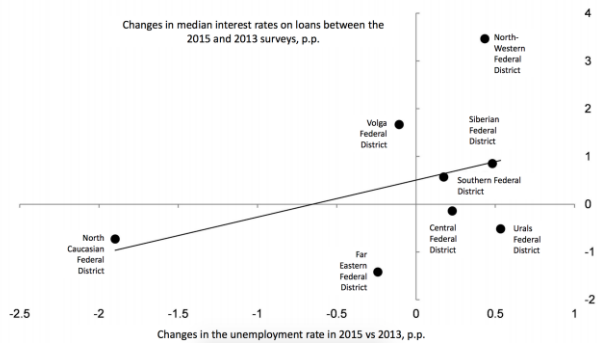
Figure 9 shows that there is a direct correlation between the district's interest rates in 2013 and the change in the 2015 unemployment rate as compared to 2013.[19] Moreover, as follows from Figure 10, interest rates rose in the districts where employment had declined. This means that commercial banks issuing loans expressly or implicitly differentiate regions based on how sensitive their income and employment rates are to macroeconomic shocks. In districts boasting more stable employment rates during the 2014 crisis (probably thanks to the favourable fiscal policy), households had enjoyed lower interest rates before the crisis compared to districts where the unemployment rate rose later on.

Figure 9. Median interest rates pursuant to the 2013 survey and changes in the unemployment rate in 2014–2015



Sources: Rosstat, HFS, authors' calculations.

Figure 10. Changes in median interest rates on loans held by households between the surveys of 2015 and 2013 and changes in the unemployment rate in 2014–2015



Sources: Rosstat, HFS, authors' calculations.

2.3 Risks

Should macroprudential policies take into account the specific regional context and different sensitivity to macroeconomic shocks? Is it possible to develop such policies?

Generally speaking, regions demonstrating greater sensitivity to income and employment shocks should have lower debt service ratios compared to the less sensitive regions. Consistency in debt service ratios by district is at odds with various credit risk exposures in different regions. Once materialised, these risks will have different consequences for federal and regional banks.

Federal banks operating in all or most of the country's regions can diversify their region-specific risks when building a regional loan portfolio. Even though the risks in question are macroeconomic, their impacts vary from region to region, while banks are required to decide on an acceptable risk profile. Those are the factors that determine the regional structure of bank portfolios (household debt burden), which can prove to be rather homogeneous. While signalling strong risk appetite on the part of the banks, such homogeneity of the debt burden (portfolio of loans for individuals) in different regions may

[19] This correlation remains evident even if we do not consider the extremes of the North Caucasian Federal District (points to the left) and the Urals Federal District (points to the right).

not automatically threaten financial stability as banks' losses tend to average out with higher losses in some regions offsetting profits in others.

As the operations of regional banks are restricted to only one region or federal district, they do not have an opportunity to diversify their region-specific risks. All other things being equal, banks operating in regions with stronger sensitivity to macroeconomic shocks should have stronger capital reserves and smaller risk appetite, while households should demonstrate lower debt service ratios. In the event of shocks, banks with higher risk appetite or without capital buffers will suffer bigger losses. This may have a negative effect on the regional banking system and lead to a bleak social aftermath such as higher insolvency rates among individuals and growing inequality.

From the macroeconomic perspective, risks to financial stability are limited because Russia has no large systemically important mono-regional banks.

Hence, regulatory measures aimed at curbing debt service ratios may prove to be more effective if they factor in the vulnerabilities of certain regions or federal districts. The big concern here is how to prevent arbitrary regulatory moves. One option would be to link the said measures to the borrower's place of residence, as borrowers from sensitive regions should have lower debt service ratios.

Appendix 1

Table A1. Russian regions participating in the survey[20]

Region	Number of households	Share in the data sample, %	Share of local population as percentage of total population in all regions (Rosstat), %
Republic of Altai	124	2.4	0.3
Kabardino-Balkar Republic	135	2.6	1.0
Komi Republic	249	4.9	1.0
Republic of Tatarstan	131	2.6	4.6
Udmurt Republic	115	2.2	1.8
Chuvash Republic	131	2.6	1.5
Altai Territory	140	2.7	2.8
Krasnodar Territory	231	4.5	6.7
Krasnoyarsk Territory	243	4.7	3.4
Primorye Territory	109	2.1	2.3
Stavropol Territory	138	2.7	3.3
Amur Region	135	2.6	0.9
Volgograd Region	132	2.6	1.4
Kaluga Region	122	2.4	1.2
Kurgan Region	96	1.9	1.0
Leningrad Region	134	2.6	2.2
Lipetsk Region	121	2.4	1.4
Moscow Region	261	5.1	8.9
Nizhny Novgorod Region	115	2.2	3.8
Novosibirsk Region	114	2.2	3.3
Orenburg Region	114	2.2	2.3
Penza Region	136	2.7	1.6
Perm Territory	132	2.6	3.1
Rostov Region	109	2.1	5.0
Saratov Region	223	4.4	2.9
Smolensk Region	118	2.3	1.1
Tambov Region	137	2.7	1.2
Tver Region	131	2.6	1.5
Tomsk Region	124	2.4	1.3
Tula Region	106	2.1	1.8
Chelyabinsk Region	251	4.9	4.1
Moscow	400	7.8	14.8
St Petersburg	162	3.2	6.4
Total	**5,119**	**100**	**100**

Sources: HFS, Rosstat.

[20] Pursuant to the 2015 survey.

Table A2. Gross value added by industry
(at current basic prices; as percentage of the total)

	Total	by economic sector														
		Agriculture, hunting and forestry	Fishing and fish farming	Mining and quarrying	Manufacturing	Production and distribution of electricity, gas and water	Construction	Wholesale and retail trade[21]	Hotels and restaurants	Transport and communications	Finance	Real estate, rentals and other services	Public administration and defence; compulsory social security	Education	Healthcare and social services	Other community, social and personal services
	2005															
Russia (the total of regions)	100	5.2	0.3	12.8	18.5	3.8	5.7	21.8	0.9	10.6	1.1	9.0	2.9	2.8	3.1	1.5
Central Federal District	100	2.9	0.0	0.8	17.1	3.9	5.1	35.2	1.2	8.7	2.6	13.1	2.5	2.2	2.4	2.3
North-Western Federal District	100	3.8	0.8	7.6	24.0	4.1	6.6	16.3	1.0	14.1	0.4	8.2	3.6	3.4	4.3	1.8
Southern Federal District	100	13.1	0.1	2.8	18.6	4.6	7.9	16.8	1.5	13.7	0.2	7.5	4.0	3.5	4.3	1.4
North Caucasian Federal District	100	18.9	0.1	2.3	10.7	4.7	8.4	18.1	1.2	12.3	0.1	4.9	6.2	5.5	5.1	1.5
Volga Federal District	100	8.3	0.0	15.1	24.0	4.0	6.2	13.4	0.7	10.4	0.3	7.3	2.9	3.1	3.2	1.1
Urals Federal District	100	2.4	0.0	43.5	11.1	2.1	4.5	15.7	0.5	8.1	0.4	5.8	1.6	1.6	2.1	0.6
Siberian Federal District	100	7.3	0.0	9.4	27.9	4.7	4.7	12.4	0.8	13.2	0.3	6.3	3.6	3.9	4.3	1.2
Far Eastern Federal District	100	5.7	4.3	14.9	7.7	5.3	9.3	13.4	0.9	15.2	0.2	7.7	5.3	4.3	4.5	1.3

Source: Rosstat.

[21] This category also includes the repair services for motor vehicles, motorcycles, household goods and personal items.

Appendix 2

Overview of the survey questions and the methodology for selecting variables of the econometric calculations

This note relies on the findings of the *Study of Financial Behaviours and Savings Habits of the Russian Population* (the "*household finance survey*" or "*HFS*"), a nationwide household survey carried out by the Demoscope Research Centre at the request of the Russian Ministry of Finance in September–October 2013 and April–May 2015. The research was conducted on a longitudinal basis, with both surveys focusing on the data samples obtained from the same households.

In 2013, 6,103 households and 12,650 individuals participated in the survey. In 2015, the survey covered 6,027 households and 12,443 individuals.[22] Key descriptive statistics used to form a picture of Russian households in terms of their incomes, expenses, savings, financial assets and debt service ratios are available in the materials published by the Russian Ministry of Finance.[23]

The household survey questionnaire includes a broad range of questions relating to the household expenses, incomes, savings, housing conditions, financial and non-financial assets (real estate, vehicles) and outstanding loans. The individual survey focuses on the socio-economic characteristics of households' adult members and their financial assets. The questionnaire on financial assets is highly detailed and, in addition to the types of current financial assets (bank deposits, shares, bonds, mutual funds, etc.) and liabilities (bank loans, borrowings), covers the structure of such assets and liabilities. For example, questions on bank deposits require provision of additional information on each bank, as well as on the deposit currency, amount and maturity. Detailed household finance profiling is the distinctive feature of the survey, which sets it apart from RLMS, the major survey conducted in Russia. For a brief description of the questions and methodology to select variables, please see Table A3.

To factor in the respondent-owned real estate properties, some questions covered apartments, rooms, houses, land plots and garages owned, with respondents giving their estimates of the property value at the time of the survey. The net wealth variable was calculated taking into account the outstanding amounts on real estate loans.[24]

[22] The number of households and individuals may vary because of changes in the composition of households polled in the first survey.
[23] Results of the first All-Russian survey of household consumer finances published on 5 June 2015.
[24] Including loans in rubles, US dollars and euro. Outstanding loans were converted at the average exchange rate of the relevant currency to the ruble effective in the month of the survey.

Table A3. Survey questions serving as a basis for the selected variables

Indicator	Question	Variable
Household size	How many people are there in your household (including you)? (1, 2, 3, 4, 5 people or more)	hh_size
Average household age	All household members	av_age_hh_all
Settlement size	Rural settlements – 1; less than 10,000 people – 2; from 10,000 to 100,000 people – 3; from 100,000 to 500,000 people – 4; from 500,000 to 1 million people – 5; over 1 million people (excluding capital cities) – 6; Moscow – 7; St Petersburg – 8	city_size
Education level	*Average education level of adult household members* What is your highest education level attested by a valid certificate or a diploma? Primary school or incomplete secondary education – 1; secondary school – 2; vocational training for drivers, tractor operators, accountants, typists, etc. – 3; vocational school, factory or plant apprenticeship (no secondary education) – 4; technical school – 5; training college, medical, musical, art or pedagogical school – 6; institute, university or academy, including a graduate school, – 7; postgraduate school, residency and academic degree – 8	education
Principal occupation, employment status	*Average for adult household members* Please tell us about your current occupation. Please advise if you are currently employed and exercise your job duties – 1; you are on official maternity or child care leave (to attend to a child of up to three years old) – 0.5; you are on any other kind of paid leave – 1; you are on unpaid leave – 0; undecided, refuse to comment = NA	empl_status
Expected income changes	*Average for adult household members* How do you see the financial situation of your household changing over the next year? Improving – 3; remaining unchanged – 2; likely to worsen – 1; undecided, refuse to comment = NA	ExpectedIncomeChange
Average monthly salary	*Average for adult household members* How much have you earned at your principal place of employment in the past 30 days (after taxes and deductions)? If you were paid in a foreign currency, in part or in full, please convert the earnings into rubles and state the total amount. Undecided, refuse to comment = NA	wage
Savings	What are your estimates of total savings in your household? Undecided, refuse to comment = NA	savings
Loans for the last month	Have members of your household taken out loans from credit institutions in the past 30 days? If yes, how much have they borrowed? Did not take out loans = 0; undecided, refuse to comment = NA	loans_month
Loan application	*Average for adult household members* Have you personally applied for a loan in the past five years? Yes =1; no = 0; undecided, refuse to comment = NA	loan_5_y
Refusal to issue a loan	*Average for adult household members* Have your loan applications been rejected in the past five years? (only for those who applied for a loan in the past five years) Yes = 1; other = 0; undecided, refuse to comment = NA	loan_refusal
Outstanding real estate loans	*Based on responses to the questions on loans for each type of property* What is the outstanding amount of your loan? If you find it difficult to state the exact amount, please select the appropriate interval from those listed on the card. Loan for the purchase or construction of housing or purchase of a land plot for housing construction; loan for the purchase of apartments or rooms (for all properties); loan for the purchase or construction of a house; loan for the purchase of a land plot without buildings; loan for the purchase or construction of a garage Refuse to comment, no = 0	real_estate_debt
Owned property	*Aggregate property value* Supposing you sell the property in question today, how much would you get for it? If you find it difficult to state the exact amount, please select the appropriate interval from those listed on the card. Housing; apartments/rooms; houses; land plots; garages Total amount in rubles, US dollars and euro (non-numerical responses = 0)	real_estate_worth
Real estate net worth	Value of all properties less liabilities	real_estate_net_worth
Net wealth	Real estate net worth and savings less other loans	NetWealth

Demand for credit is measured using a dummy variable assumed to equal one if households did not apply for a loan in 2013 and over the past five years, but stated that they had applied for a loan in the span of the past five years when answering the same question in 2015. *Debt payment* is the monthly average for all household loans. The *DSR* variable was calculated as the share of debt payment in the average monthly income.

The list of shocks includes a job loss (*empl_shock*) and a decrease in nominal wages (*wage_shock*).[25] To assess changes in the employment status (*empl_shock*), we picked out those household members of working age who had a job according to the 2013 survey but lost it in 2015 for economic reasons (as opposed to child care leaves and studies; excluding the respondents who had reached the retirement age by 2015). We believe that the main drivers of involuntary unemployment in the period of time between the 2013 and 2015 surveys were the macroeconomic shocks, which had not been expected during the first survey. Negative demographic developments in Russia have been contributing to the decline in unemployment for quite some time now. Against this backdrop, involuntary job losses registered in between the two surveys come as a big surprise. We have also assessed the income shock suffered by those household members who witnessed reduction in their nominal wages (*wage_shock*).[26] Different studies show that the Russian labour market is very flexible.[27] By and large, it adapts to negative shocks through salary adjustments (such as a drop in wages) rather than changes in the employment levels.

[25] Two other shock factors from the article by Mariam Mamedli and Andrey Sinyakov (2018) were not used as they are considered to be statistically insignificant.
[26] A decline in real wages is a less pronounced and more general manifestation of the income shock compared to the decline in nominal wages. As a result, a drop in real wages revealed using a narrative approach can hamper shock identification.
[27] For example, see *Gimpelson V., Kapeluishnikov R. (2011)*.

Appendix 3

Table 4p. Results of the credit demand logit model analysis for 2014–2015 pursuant to the findings of the household finance survey (by federal district and across the country) for households that had loans as at the time of the 2013 survey

Dependent variable (loan_demand)	Across the country (pooled regression)	Central Federal District	North-Western Federal District	Southern Federal District	North Caucasian Federal District	Volga Federal District	Urals Federal District	Siberian Federal District	Far Eastern Federal District
Expected income change in 2013	-0.1	-0.1	-0.3	-0.5	–	0.2	0.3	-0.4	-0.1
Wage shock	-0.5***	-0.7*	-1.0**	-0.3	-3.7*	-0.2	-0.5	-0.4	-1.7**
Employment shock	0.0	-0.7	-0.2	0.4	11.4*	-0.6	0.1	1.1*	0.1
Average age of adult household members in 2013	0.0	-0.0	-0.0	0.1	–	0.0	-0.0	0.1	-0.1
Household savings in 2013 (^-6)	1.0	3.1	2.2	-0.0	–	-0.1	-0.0	1.9	-0.0
Average monthly household income in 2013	0.0	0.0	0.0	-0.0	–	-0.0	0.0**	0.3	0.0
Average education level of adult household members in 2013	-0.1*	-0.4***	-0.1	0.2	–	0.1	-0.1	-0.0	0.0
Size of the settlement where the household lived in 2013	-0.0	-0.0	0.1	0.1	–	0.1	-0.4**	0.1	-0.2
Constant	-0.5	1.1	0.0	-2.1	-1.7	-1.9	-0.5	-1.1	1.6
Number of observations	933	191	105	73	21	232	83	180	48
p-value of LR statistics	0.03**	0.09*	0.5	0.5	0.7	0.9	0.04**	0.4	0.3
Adding the *Net Financial and Non-Financial Assets in 2013* variable (10^-7)	0.2	0.3	-0.1	9.0*	–	-0.5	14**	-0.7	–
Number of observations	449	104	46	40	–	104	46	85	13

Note: *, **, *** define statistical significance of coefficients at 10%, 5%, and 1% levels, respectively. There were too few observations (21 observations) on the North Caucasian Federal District data to assess the full model.

Sources: HFS, authors' calculations.

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