Impact of Bank of Russia Macroprudential Policy on Risk Exposure of Banks' Consumer Loan Portfolios¹

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In this paper, the author examines the efficiency of risk weight add-ons introduced by the Bank of Russia depending on borrowers' debt burden in terms of discouraging high-risk unsecured rouble consumer lending and the effect of these add-ons on banks' capital adequacy. The analysis is based on open bank reporting data for the period from October 2019 through August 2020. We show that in this time frame, most banks increased their capital. At the same time, the results obtained do not enable us to confirm the hypothesis that this measure has a pronounced effect on the reduction of the risk profile of consumer loan portfolios. We demonstrate that one of the factors that influenced the efficiency of measures introduced by the regulator is the substantially higher profitability of retail lending as compared to corporate lending.

Keywords: *macroprudential policy, capital adequacy ratio, debt burden indicator, consumer lending*

JEL Codes: E58, G21, G28

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1. Introduction

Effective 1 October 2019, within the scope of macroprudential regulation of the unsecured consumer lending segment, the Bank of Russia has introduced risk weight add-ons depending on the values of the borrower's payment-to-income ratio (PTI;² calculated as the ratio of the borrower's average monthly payments on all credit facilities and loans, including newly issued ones, to his or her average monthly income) and the total cost of loan (TCL).

¹ The author is grateful to Igor Safonov (Centre of Development Institute, HSE University) for active help in developing a model to compare profitability of retail and corporate loans (see online version of the paper, Appendix 3).

² See Bank of Russia (2018a).

This decision, made amid accelerated growth in unsecured consumer lending, pursued two goals (Bank of Russia, 2019a):

- 1) 'To discourage the issue of unsecured consumer loans to borrowers whose PTI is already high' by reducing the return on equity;
- 2) 'To promote an increase in banks' capital cushion against losses' in the event of the materialisation of external or internal risks that may lead to a decrease in household income and a deterioration in the quality of loans.

However, the employed mechanism for discouraging banks from investing in risky assets is not a mechanism of direct influence and may affect the business model of various credit institutions in different ways.

This mechanism is based on the banks' obligation to comply with prudential regulation, specifically, the capital adequacy ratio N1, which is the ratio of the bank's capital to risk-weighted assets.

The economic content of the N1 ratio can be expressed as follows: if a bank wants to increase the volume of its assets, it must have a sufficient amount of capital to cover possible losses. The riskier the operations that the bank conducts are, the higher the likelihood of losses is and the larger a capital cushion, all else being equal, the bank needs to have.

A bank's capital is calculated in accordance with Bank of Russia Regulation No. 646-P (see Bank of Russia, 2018b), which states that the bank's capital consists of two components: Tier 1 capital and Tier 2 capital. Tier 1 capital, in turn, consists of common equity Tier 1 capital and additional Tier 1 capital. The basis for such a division is the different stability of various components of capital and their ability to absorb losses. For example, Tier 2 capital includes unaudited profit, which may decrease following an audit. The bank's profit confirmed by the audit will be included in common equity Tier 1 capital. Another example: Tier 1 capital includes the part of the authorised capital formed as a result of the issue and placement of ordinary shares. At the same time, the part of the authorised capital that was formed at the expense of preferred shares, with the exception of specifically stipulated cases, is already included in additional Tier 1 capital. We can say that the more stable a given component of a credit institution's equity is, the higher is its quality (see Figure 1).

Figure 1. Structure of bank capital

Source: compiled by the author

Since the structure of capital reflects its quality, currently Russian banks are obliged to comply with three bank capital adequacy ratios at once: the common equity Tier 1 capital adequacy ratio (N1.1), the Tier 1 capital adequacy ratio (N1.2), and the bank's equity capital adequacy ratio (N1.0). Hereinafter, unless otherwise indicated, by N1, we will mean the entire family of capital adequacy ratios.

So, if for some reason the regulator believes that the growth of any kind of assets on the balance sheets of banks poses an increased risk for the entire system, it may instruct credit institutions to recognize such assets with a weighted factor when calculating the adequacy ratio by introducing special add-ons to the existing risk ratios. As a result, the values of the banks' N1 ratios decrease.

However, the response of banks to such a decrease may differ depending on how much capital they have. Basically, one can speak of three scenarios according to which banks may react to the regulator's decision to introduce risk weight add-ons (see Figure 2).

Figure 2. Options for a bank's response to the introduction of risk weight add-ons using the example of the N1.0 ratio

Source: compiled by the author

First scenario. The bank cannot tolerate a reduction of at least one of the three capital adequacy ratios without infringing the minimum value of this ratio established by the regulator and is forced to reduce the volume of its assets to 'release' capital. In this case, the bank has two options: it can reduce higher-risk assets (that is, the assets to which the add-ons introduced by the regulator apply) or it can reduce lower-risk assets, but in a greater amount. It should be emphasised that, in general, the scenario where a bank reduces its assets is only relevant if the current value of the bank's capital adequacy ratio is close to the minimum threshold value established by the regulator (in Russia currently: 8% for N1.0, 4.5% for N1.1, and 6% for N1.2).

Second scenario. A more common situation is when a bank's capital adequacy level across the entire family of N1 ratios is noticeably higher than the minimum

permissible value, so the introduction of a risk weight add-on for any type of assets in the short term will not cause the bank any difficulties in meeting these ratios. At the same time, in the future, the bank's management may still face a dilemma: which types of assets to continue increasing by 'spending' its available capital cushion: those that are riskier from a regulatory perspective, or those that are less risky, but in a greater volume. It should be noted that, for the first type of investments (that is, investments in riskier assets) to be unprofitable, risk weight add-ons established by the central bank must be at a sufficiently high level.

Third scenario. The bank has a significant capital reserve that is substantially higher than the minimum permissible level, and the decision to reduce the riskiness of assets based only on new regulatory requirements seems illogical from the management's perspective. In this case, the agenda will more likely include the question of adjusting the bank's existing business model towards accepting more risk to use underutilised capital.

It should be noted that the actually observed change in the dynamics of banks' build-up of certain risky assets may be associated not with the regulator's actions to discourage such investments and not with the banks' willingness/unwillingness to make such investments, but with limited demand for the respective bank products – quite a probable situation during a period of economic slowdown, all the more so during an economic recession. For example, it is simply impossible for a bank to build up its loan portfolio if there are no borrowers on the market who meet the established marginal level of risk to be assumed by the bank.

The above-described variability of the impact on banks of measures for discouraging risky investments by increasing the burden on capital is supported by the literature.

It should be noted that a rather detailed review of both the international practice of macroprudential regulation in the field of retail lending and foreign research in this subject is contained in a Bank of Russia report (2019b) whose authors conclude that 'sectoral capital requirements are more efficient for limiting 'bubbles' than a countercyclical capital buffer, but should be introduced in a timely manner and established at a sufficiently high level. Banks with a surplus of capital can maintain high lending dynamics.'

Following the authors of the above report, the paper by Altunbas et al. (2017) is worth noting; it shows that banks' response to macroprudential measures depends on their balance sheet characteristics, and small, weakly capitalised banks with a high share of wholesale funding respond to such measures more strongly.

In addition to those mentioned in the Bank of Russia report, the work by Kuttner and Shim (2016) addressing the impact of various types of macroprudential measures on the housing market is noteworthy. The econometric analysis conducted on a sample of 57 countries did not enable the authors to identify 'statistically or economically significant evidence' of any impact on the housing lending market or the housing market of measures intended to regulate loan

offerings by increasing bank costs, including such sectoral measures as risk weight add-ons. According to their assessment, in terms of curbing lending, measures limiting the demand for loans on the part of borrowers, such as maximum possible PTI values, are effective. This conclusion is consistent with the IMF's findings on the efficiency of macroprudential measures taken in Israel (see International Monetary Fund, 2014).

A number of papers dedicated to the efficiency of macroprudential instruments as measures for curbing lending point out that such an effect can only be statistically significant if the business cycle phase is taken into account; outside credit booms, the effect is statistically insignificant (e.g. Lim et al., 2011).

A review of recent studies, including those presented at the joint international seminar of the Bank of Russia and NES, on assessing the effects of macroprudential policy (Penikas, 2021) is published in this journal issue (see pp. 94–104).

In this paper, we analyse the impact that macroprudential measures adopted by the Bank of Russia had on banks' business for the period from the beginning of their action (1 October 2019) through August 2020. We analyse how effective the introduction of risk weight add-ons turned out to be in terms of achieving both stated goals and consider the existence of limitations for the efficiency of this mechanism in terms of both the capital adequacy of the main players in this market and the ratio of the profitabilities of different types of lending.

In our work we used open reporting data of Russian banks published on the Bank of Russia website, namely Form 101 (data on the turnover balance sheet for ledger accounts) and Form 102 (profit and loss statement) for the period from January 2016 through August 2020 and Form 135 (information on required ratios) for the period from October 2019 through August 2020.

The empirical studies of the efficiency of macroprudential measures known to us generally use either standard measures of banks' risk exposure, such as EDF (Expected Default Frequency) or Z-Score, or information on the total portfolio of bank loans whose dynamics the regulator wants to change using macroprudential policy measures for analysis. However, the subject of this study is not so much related to the dynamics of the entire portfolio of unsecured retail loans, but rather to the dynamics of the share of high-risk loans (that is, to the portfolio structure); therefore, in subsequent analysis, we develop and apply our own methodology that can be used to study this particular aspect of the problem.

Section 2 is dedicated to the analysis of the impact of add-ons on N1 capital adequacy ratios. The methodology that we use to assess the changes in the risk profile of the banks' unsecured retail loan portfolios is described in Section 3. In Section 4, we present the results of the assessment of such changes over the entire interval to be analysed (October 2019 – August 2020) and for two sub-intervals: before the beginning of anti-epidemic measures (November 2019 – March 2020) and after (May 2020 – August 2020), and discuss possible reasons for the recorded behaviour of banks. Section 5 contains conclusions.

2. Dynamics of the N1 capital adequacy ratio

In this section, we examine how efficient the measures for introducing PTI were in terms of the Bank of Russia achieving the second of the declared goals, namely, increasing banks' capital cushion against losses. To this end, we analyse monthly data from Section 8 of Form 135 on the issuance of retail loans for the period from September 2019 through August 2020.

Here we should explain why we limit the range of data analysed through August 2020 in particular. The reason is that, effective September 2020, the Bank of Russia introduced a new matrix of risk weight add-ons, as a result of which the part of loans for which the add-ons had been set at zero disappeared from banks' reports, and, thus, starting in September 2020, the reporting data became incomparable with the data for the previous period. Another important point is that we only analyse the impact on unsecured rouble consumer loans. The volume of consumer loans in foreign currencies issued in this period is negligible, so we thought it fit not to additionally complicate our calculations.

Risk weight add-ons themselves do not lead to an increase in the volume of a bank's equity which can absorb losses, but only increase the volume of risk-weighted assets in the denominator of the capital adequacy ratio calculation formula. Therefore, it is hardly possible to determine with certainty whether a bank created an additional capital cushion in response to the increase in the risk weights for an individual asset based on the analysis of financial statements. Nevertheless, analysis of the dynamics of the capital adequacy ratio and its individual components makes it possible to assess whether this hypothesis is realistic. To that end, we introduce the following definitions.

'Full capital utilisation' means a situation where the capital adequacy ratio calculated without taking macroprudential buffers into account is at a level that is minimally acceptable for a credit institution based on the assessment of its risks assumed under ordinary business conditions. Each bank determines this level itself.

'Capital cushion against losses' means the excess of the current volume of capital over the volume ensuring its full utilisation in the bank.

A capital cushion may arise in the following cases:

- 1) Weak demand for banking products leading to the impossibility of a build-up of assets adequate to the existing volume of equity;
- 2) The bank has increased its capital, but has not yet managed to proportionally increase its assets;
- 3) Voluntary limitation of growth or reduction of assets for reasons of precaution in conditions of uncertainty that may potentially lead to an upwards reassessment of existing risks;
- 4) Reduction of assets following a decrease in the capital adequacy ratio to below the minimum acceptable level for a credit institution due to regulatory innovations associated with an increase in risk weights.

If we are talking about the creation of a capital cushion by credit institutions in response to the introduction by the Bank of Russia of regulatory innovations related to the establishment of increased risk weights, we mean the third and fourth options. Thus, based on the definition of a cushion, it can be postulated that, during its formation, there should be an increase in the value of the capital adequacy ratio (in the fourth option, if it is calculated using the previous risk weights). If this value was not growing (or was even decreasing), the hypothesis of the formation of such a special cushion must be discarded: the bank already had an excess of capital.

When forming a sample of banks for the analysis, we proceeded from a very simple idea: the effectiveness of measures taken should be assessed based on an analysis of those credit institutions for which they were primarily intended – and they were intended for banks issuing significant volumes of high-risk loans. Therefore, for our analysis, we selected credit institutions that in October 2019 issued the greatest volume of loans that were subject to increased risk weight add-ons.

As part of the selection procedure, we calculated the total amount of exposures with a higher than average risk level for each of the credit institutions operating in Russia as of October 2019. After that, we selected the 30 banks with the greatest amount of exposures that arose in that month which were subject to the increased add-on.³ Three banks were excluded from consideration: Asian-Pacific Bank and VUZ-Bank, which were undergoing rehabilitation, and Soyuz Bank, due to its specific subordinate position in the financial group of Public Joint-Stock Insurance Company Ingosstrakh. The list of analysed banks is provided in Appendix 2.

The capital adequacy ratio N1.0 was chosen as an indicator reflecting the scale of the impact of add-ons. As mentioned above, there are currently three required capital adequacy ratios in Russia. For each specific bank, depending on its equity structure, any of these ratios may be a factor limiting the expansion of the volume of assets. For example, a bank may have a large cushion in terms of compliance with N1.0 and N1.1, but have an N1.2 capital adequacy ratio that only slightly exceeds the established minimum value. In such a situation, it is the need to comply with this ratio that will serve as a limitation for the growth of assets.

As of 1 October 2019, for 23 banks from our sample, N1.0 was such a limiting factor; for six banks, N1.2; and for one bank, N1.1. Therefore, for those credit institutions for which the bottleneck was N1.0, we took the value of this ratio from the respective reporting form. If, for a bank, one of the other two ratios turned out to be the limiting indicator, we calculated an equivalent value of N1.0 and then worked with this value. Let us give an example: for Public Joint Stock Company ‘The Ural Bank for Reconstruction and Development’ (UBRD, PJSC) the limiting factor was the N1.2 ratio, which had a value of 7.0%, while the value of N1.0 was 10.4%. To unify the information used in the analysis, we calculate at what value N1.0 would become the same limiting factor for the growth of the bank’s assets as N1.2. The

³ The definitions of the average risk level and the increased add-on are given in Section 3.

resulting value is 9.4%, and subsequently we use it in the calculations. This operation enables us to achieve comparability of data without the need to perform calculations of the same type for each of the three ratios for all banks in the sample.

For the assessment, we fixed risk weights based on the add-ons that were in effect in September 2019. Next, the add-ons on the portfolio of rouble consumer loans for each bank in the sample as of each date were recalculated based on the weights fixed in this way. This allowed us to identify the influence of the regulatory innovations in question by comparing the calculated add-on value with the actual one. As a result, for each of the credit institutions in the sample, it became possible not only to determine the calculated amount of add-ons used in calculating the N1.0 ratio, but also to:

- Calculate the amount of additionally allocated (bound) capital;
- Recalculate the N1.0 ratio value using the previous risk weights as of each reporting date for the period in question.

It should be noted that additionally allocated capital and a capital cushion have different roles. The capital cushion, with a constant risk level, allows the bank to build up assets due to its ability to absorb losses. Additionally allocated capital, on the contrary, does not allow the credit institution to increase its business volume. Let us dwell on this fundamental difference in more detail.

As noted above, risk weight add-ons for a given asset do not create a capital cushion, but lead to its additional spending by banks. In this context, the spending of capital does not mean losing it, but using the potential to build assets. Let us give a simple example. Suppose a bank:

- Has capital of 20 units;
- Has an asset that is not considered high-risk by the regulator (included in the calculation of the adequacy ratio with a weight of 100%) in the amount of 100 units;
- Has determined the minimum acceptable value of the capital adequacy ratio for itself at 10%.

In such a situation, we can say that out of 20 available units of capital, the bank used (spent) $(100 \times 100\%) \times 10\% = 10$ units to acquire assets. Next, the bank purchased another 50 units of another asset of the same risk level, spending another five units of its capital. Again, in this case, spending does not mean a decrease in the amount of capital, but the use of its potential to increase assets. That is, it ends up bound by a certain type of assets, or, as bankers also say, it is allocated to this asset.

So, now the bank is still in a situation of underutilisation of capital. At the same time, the value of the capital adequacy ratio amounts to 13.3%, which is above the minimum acceptable limit for it. Potentially, the bank could increase its assets by another 50 units, but at this time the regulator decides to discourage banks from acquiring the second type of asset, increasing the risk ratio for it when calculating the capital adequacy ratio from the standard 100 to 200%. Then the value of the N1 ratio of our bank when using this add-on will decrease from 13.3 to

$20/((100 \times 100\%) + (50 \times 200\%)) = 10\%$. That is, the remaining free five units of capital end up allocated to the second asset, but not as a result of an increase in operations, but solely as a result of regulatory innovation. Thus, a situation has developed where the bank has exactly the same amount of capital to absorb potential losses and continues to be in a position of essentially forced underutilisation of capital. Now, if the bank wants to fully utilise its equity for business growth, it will have to get rid of the second asset type and, thus, obtain the ability to increase the volume of the first one.

It follows from the above that the binding of banks' capital is a mechanism for the implementation of macroprudential regulation measures performed by increasing the risk weights for certain types of assets. The greater the volume of the capital of credit institutions additionally allocated to these assets is, the more potentially efficient the introduced measures are.

The dynamics of capital additionally bound as a result of the introduction of risk weight add-ons for all the banks in the sample are shown in Figure 3.

Figure 3. Bound capital (for the entire sample) and its share in total capital

Source: author's calculations

Our calculations show that, by September 2020, the additionally bound capital for the entire sample of banks that took the greatest risk on their balance sheets had reached 111.6 billion roubles, which was 1.1% of the banks' total equity.

We performed a similar exercise with respect to all credit institutions whose respective reports are publicly available. For them, the aggregate amount of bound capital at the beginning of September 2020 had reached 118.6 billion roubles. This confirms that our sample is sufficiently representative to assert the presence of certain trends across the entire Russian banking system on its basis.

However, let us return to the question of whether the binding of capital has influenced the creation of an additional capital cushion by banks against potential losses. It should be recalled that the hypothesis of the creation of such a cushion in response to the introduction of risk weight add-ons for unsecured rouble consumer loans depending on the borrower's PTI is not rejected if the value of the

bank's adequacy ratio grows. Figure 4 shows the dynamics of changes in the value of the aggregate N1.0 ratio for the banks in the sample that we calculated using the risk ratios that were in effect until October 2019 (hereinafter, the 'calculated ratio value') as compared to its value as of 1 October 2019.

Figure 4. The dynamics of the increase in the calculated value of the N1.0 ratio against its actual value as of 1 October 2019 (p.p.) and the share of banks in the sample that increased the ratio value (%)

Source: author's calculations

After the introduction of new risk weights and before the start of the pandemic, the calculated value of the capital adequacy ratio for five out of six months turned out to be at a lower level than before their introduction. That is, if we take the whole sample, the capital cushion was shrinking. At the same time, if we analyse each bank individually, it will appear that more than half of the credit institutions from our sample (60% as of 1 April 2020) increased their equity adequacy during that time. Thus, for these banks, the hypothesis that they began to build up a capital cushion in response to the introduction of higher risk weights cannot be rejected. With the onset of the pandemic, the share of such banks increased, and as of 1 September 2020 it already amounted to 76.7%. As for the aggregate capital adequacy for all banks in the sample, at the end of the period being analysed, it had increased by 0.69 percentage points (p. p.) as compared to 1 October 2019.

This difference in the behaviour of banks before and during the pandemic deserves separate attention. In Figure 5, one can see how the calculated value of the N1.0 ratio for each bank in the sample had changed as of 1 April 2020 as compared to its actual value as of 1 October 2019, and in Figure 6 as of 1 September 2020 as compared to 1 April 2020.

The violet circle on the Figures denotes the results obtained for all the banks in the sample. If, starting 1 October 2019, risk weight add-ons depending on the borrower's PTI had not been introduced, then at the beginning of April 2020 the calculated value of the N1.0 ratio would have decreased by 0.17 p.p. from 13.63

to 13.46%, and as of 1 September 2020, it would have increased by 0.86 p.p. to 14.32% versus the beginning of April.

Figure 5. The increase in the calculated value of N1.0 as of 1 April 2020 versus its actual value as of 1 October 2019 (p.p.) and its value as of 1 October 2019

Source: author's calculations

Figure 6. The increase in the calculated value of N1.0 as of 1 September 2020 versus its calculated value as of 1 April 2020 (p.p.) and its value as of 1 April 2020

Source: author's calculations

The Figure also shows that, in the pre-pandemic period, a decrease in the value of the capital adequacy ratio was demonstrated to a greater extent by credit institutions that initially had a significant capital cushion, which is fully in line with normal business logic (see Figure 2). However, with the onset of the pandemic, this connection practically disappears. Incidentally, it can be noted that during this period, only banks that had a sufficient capital cushion permitted a reduction in the level of capital adequacy.

Thus, based on the results obtained, we can conclude that the second of the goals set by the Bank of Russia, namely, an increase in the banks' equity cushion against losses, in the period before the beginning of the pandemic was not achieved for at least 40% of credit institutions. The calculated value of N1.0 for them turned out to be lower than its actual value as of 1 October 2019. The subsequent corrections in banks' behaviour were more likely due to changed external conditions. As a result, for 80% of the banks in the sample, the calculated value of N1.0 as of the beginning of September 2020 increased as compared to the calculated value as of 1 April 2020.

3. Methodology for analysing the dynamics of the risk profile of banks' consumer loan portfolios

Since the main purpose of this paper is to study the efficiency of measures for discouraging the issuance of unsecured consumer loans to borrowers with a high

debt burden indicator value, the description of the method used should begin by defining the level of PTI that is considered high in this paper.

In determining this level, we are governed by Bank of Russia Ordinance No. 4892-U (see Bank of Russia, 2018a), according to which the bank has the right not to calculate PTI for a number of loans. In particular, this includes small loans of up to 10,000 roubles. In the matrix of risk weight add-ons, the amounts of such loans are reflected under the code 1000.i (see Appendix 1). That is, the regulator suggests that banks use a simplified scheme for these loans without considering them as bearing increased risk. Therefore, we take risk weight add-ons corresponding to such loans as average, and those exceeding this level as increased. Proceeding from this, a level that corresponds to these increased add-ons was taken as a high level of PTI. The amounts of such loans are reflected under the codes 1005.i–1007.i.

Accordingly, we included unsecured loans with a $PTI \geq 60\%$ ('loans with increased risk') in the sample for analysis. Within it, we allocated a separate group of unsecured loans issued to borrowers with a $PTI \geq 80\%$ ('loans with maximum risk'). The classification of loans used is shown schematically in Figure 7.

Figure 7. Schematic presentation of a loan portfolio depending on the level of PTI

Source: compiled by the author

Next, for the analysis we need to find a formalised presentation for banks' behaviour with respect to the risk structure of the portfolio. We need an indicator that would tell us whether or not the bank's behaviour has changed, and if it has changed, whether this change was towards decreasing or increasing investments in risky assets.

Since the initially stated goal of the regulator's actions was to discourage the issuance of high-risk loans by banks, the positive result of the implementation of this policy should have been a reduced share of high-risk loans in the total volume of consumer loans (hereinafter, the 'total volume of loans'). Consequently, in the simplest case, the analysis may involve the dynamics of such an indicator as the structure of issued unsecured consumer loans, namely, the share of high-risk loans in the total volume of loans. However, since we are not willing to neglect the available technical feasibility of singling out a sub-group of loans with maximum risk within the group of loans with increased risk, we used three coefficients for research purposes:

C1 – the share of loans with increased risk in the total volume of loans;

C2 – the share of loans with maximum risk in the total volume of loans;

C3 – the share of loans with maximum risk in loans with increased risk.

At the same time, we postulate that if the regulator's macroprudential policy is successful, these three indicators should tend to decrease.

As the respective changes in banks' reporting were introduced starting in October 2019 and the statistics we are interested in have only existed since this time, we take the indicators as of this month as benchmarks. Accordingly, we can reformulate the condition for the success of macroprudential measures as follows: if in the following months these three indicators tended to decrease relative to the value of October 2019, the hypothesis of achieving the goal set by the regulator is not discarded. To test this hypothesis, we used monthly data from Section 8 of Form 135 on the issuance of retail loans in the period from October 2019 through August 2020 for each of the selected banks.

First of all, for each of the banks in the sample, all three indicators were calculated for twelve months: from October 2019 through August 2020. The calculation took into account only credit obligations that arose during the reporting month, that is, only for newly issued loans. In other words, data on loans issued in October were selected from the statements as of 1 November 2019, etc. As a result, three data series were obtained for each of the credit institutions.

In the course of the analysis, we compared the value of each of the indicators *C1–C3* for each month with the benchmark value (that is, the value for October 2019) and converted the comparison results into the integral indicator *Int* (expressed in points) that we had constructed, which allows us to unambiguously determine whether or not the credit institution increased the risk exposure of its portfolio of consumer loans in the period in question.

The integral indicator is the sum of 'penalty points' that we assigned to the bank, depending on the dynamics of each of the indicators *C1–C3*. If the bank's values of the indicator in question (*C1–C3*) in the majority of months for the period covered were significantly higher than in October 2019, the bank received a 'penalty point': 1 for the indicator *C1* and 0.5 for the indicators *C2* and *C3*. If there was no significant excess in most months as compared to the benchmark value for October 2019, the bank received 0 'penalty points'.

Such 'penalties' were determined based on the following logic: as the Bank of Russia's ultimate goal was to reduce the share of high-risk loans issued, the *C1* indicator was assigned the maximum weight. At the same time, the *C2* and *C3* indicators reflect the structure of the loan portfolio in terms of the presence of the riskiest loans, a decrease in the share of which may also be considered an important result of regulator's measure, as it is in this stratum that the most potentially bad loans are concentrated. To illustrate this thesis, Figure 8 shows three hypothetical options for changing the structure of the bank's loan portfolio. In all options, the share of high-risk loans decreases to 40%, but in the third option, the share of

loans with maximum risk grows simultaneously from 10 to 15%. Obviously, the first two options are much more preferable from in terms of achieving the goal of discouraging banks from issuing loans to borrowers with a high PTI value.

Figure 8. Options for changing the structure of the bank's loan portfolio at time $T + 1$, %

Source: compiled by the author

Table 1. The integral indicator *Int* of the portfolio risk profile trend: the example of Russian Standard Bank JSC

	10.2019	11.2019	12.2019	01.2020	02.2020	03.2020
The share of riskier loans in total loans (C1)	36.0	33.8	35.0	30.3	49.5	33.6
The share of the riskiest loans in total loans (C2)	24.0	23.4	24.1	20.9	35.2	25.7
The share of the riskiest loans in risky loans (C3)	66.8	69.2	68.8	69.0	71.1	76.6

	Percentage of periods in which the October 2019 value was exceeded	'Penalty point'
C1	20.0	0
C2	40.0	0
C3	100.0	0.5
Int	0.5	

Note: Periods when indicators' values have significantly exceeded those of October 2019 are marked violet.

Source: author's calculations

If the integral indicator *Int* – the sum of 'penalty points' – of the bank is 0 or 0.5, this means that in the period analysed its operations for issuing unsecured retail loans tended to decrease risk exposure. If the amount is more than 0.5, then, on the contrary, we may speak of a tendency towards increasing risk exposure.

An important element of the calculation is setting the level of significance of the excess of the C1–C3 indicators over the benchmark. The purpose of its introduction was to cut off the noise occurring when the share of loans with a certain PTI fluctuates over time during the bank's normal business activities. To that end, for each month we calculated the volume of loans with increased risk which would have been issued if the C1–C3 indicators had remained at the benchmark level. If the actually issued volume of loans exceeded the volume we calculated by 1%, we considered such an excess to be significant.

For greater clarity, we will illustrate the methodology for calculating the integral index *Int* with a specific example. As one can see from the data presented in Table 1 on Russian Standard Bank JSC for the period from October 2019 through March 2020, the available open information indicates that during this period, the bank, in our terminology, did not actually increase the risk exposure of its retail lending operations, despite the fact that in some months the values of the *C1–C3* indicators exceeded the benchmark values.

If one looks at the second line in the table above, one can see that the value of the *C2* indicator in December 2019 was 24.1%, which slightly exceeded the October value. Thus, if we did not set a certain level of significance for such an excess, the penalty of 0.5 would be imposed for this indicator, which would formally identify the bank among those credit institutions that increased the risk exposure of their portfolios of unsecured consumer loans.

4. Changes in the risk exposure of unsecured consumer loan portfolios

Applying the above methodology to the available data sets gives the following results.

If we talk about the behaviour of all banks in the sample over the entire period from November 2019 through August 2020, we can say that exactly half (15 out of 30) banks showed a downward trend in the risk exposure of their consumer loan portfolio (see Table 2).

Table 2. Distribution of banks depending on the value of the integral indicator of the loan portfolio risk profile trend (*Int*)

	Decrease of portfolio's riskiness		Increase of portfolio's riskiness		
<i>Int</i>	0	0.5	1	1.5	2
Number of banks	12	3	3	4	8

Source: author's calculations

However, it would not be quite methodologically correct to give one assessment for the entire period covered, since during this period the Russian economy in general and the banking system in particular began to live in a different reality associated with the COVID-19 pandemic and the anti-epidemic measures introduced. When considering the monthly dynamics of the total volume of consumer loans issued by all banks in the sample, we can see its almost 35% drop in April 2020 as compared to the average level of January – March (see Figure 9).

To illustrate the processes taking place at the same time in terms of changes in the risk profile of consumer loan portfolios, we will use the same methodology as for an individual credit institution on the aggregate portfolio of all banks in the sample. The calculation results are shown in Figure 10.

As one can see from the data, the period covered (from October 2019 through August 2020) actually falls into two parts: before the onset of the COVID-19 pandemic and the introduction of anti-epidemic measures in Russia, and after these events. This turning point was reflected in bank reporting for April 2020, when there was not only a significant reduction in the volume of unsecured retail loans issued, but their structure changed significantly towards an increase in the share of loans with maximum risk in loans with increased risk (C3). This happened because, on the one hand, banks significantly reduced the issuance of cash loans, and the population, on the other, continued to actively use credit cards, for which PTI is generally higher.

Figure 9. Monthly disbursement of consumer loans, billion roubles

Source: author's calculations

Figure 10. Dynamics of coefficients C1–C3 (for the entire sample), %

Source: author's calculations

To get rid of the influence on the research results of this short-term and to a great extent forced structural shift, we decided to distinguish two periods within the period covered:

- 1) From November 2019 through March 2020;
- 2) From May through August 2020.

Based on this division into periods, we modify the methodology slightly: when analysing the behaviour of banks for the period from November 2019 through March 2020, we still take October 2019 as the benchmark month (as in the analysis over the entire time interval), while for the analysis for the period from May through August 2020, the benchmark is March 2020.

4.1. Change in the risk exposure of portfolios in November 2019 – March 2020

The distribution of banks depending on the amount of ‘penalty points’ received in the period from November 2019 through March 2020 is provided in Table 3. The presented data show that, during this period, the majority of credit institutions (19 out of 30) increased the risk exposure of their retail lending operations, which might indicate the low efficiency of measures taken by the Bank of Russia to reduce them.

Table 3. Distribution of banks depending on the value of the integral indicator of the loan portfolio risk profile trend (*Int*), November 2019 – March 2020

<i>Int</i>	Decrease of portfolio's riskiness		Increase of portfolio's riskiness		
	0	0.5	1	1.5	2
Number of banks	12	1	3	8	6

Source: author's calculations

This result can hardly be called unexpected. As we noted above (see Section 1), the mechanism for reducing the risk exposure of unsecured consumer loan portfolios which was chosen by the Bank of Russia is based on the increase in the load on the capital of commercial banks that issue loans to borrowers with a high PTI value, and the options for a bank's response to regulatory impact may depend on the level of capital adequacy, while the actual dynamics of the portfolio risk exposure are determined not only by the way the bank prefers to react, but also by the overall economic situation.

To check to what extent the result is related to the level of capital adequacy, let us compare the values of the N1 ratio of the banks analysed and the change in the risk exposure of their retail portfolios. As seen in Figure 11, there is practically no relationship between the bank's capital adequacy level as of 1 October 2019 and the increase/decrease in the risk exposure of the retail portfolio of unsecured loans in the period from November 2019 through March 2020. Considering that the vast majority of banks analysed had a sufficient capital cushion, that is, they could operate according to the second and third scenarios (see Figure 2), the most likely explanation for what happened during this period is that most credit institutions have severe household demand constraints on their credit products.

Figure 11. The value of the N1.0 ratio as of 1 October 2019 and the amount of 'penalty points' of the bank for November 2019 – March 2020

Note: the green dotted lines are the threshold values of minimal, adequate and substantial capital (see Figure 2), the violet line separates banks with an increased level of the consumer loan portfolio risk exposure (above the line) from those with a decreased level.

Source: author's calculations

Figure 12. Change in the value of the N1.0 ratio for the period from 1 October 2019 through 1 April 2020 and the value of the risk portfolio trend indicator (*Int*) of banks for November 2019 – March 2020

Source: author's calculations

It makes sense to see if the introduced add-ons had an impact on the capital adequacy level. Data showing how the value of the N1.0 ratio changed for each of the banks analysed for the period from 1 October 2019 through 1 April 2020 and the value of the integral indicator of the risk profile trend of the portfolio of unsecured consumer loans for November 2019 – March 2020 are shown in Figure 12.

From Figure 12 it can be concluded that there is no pronounced relationship between the change in the risk exposure of the portfolio of unsecured consumer loans and the change in the N1 level. For example, three credit institutions increased their capital adequacy despite the increased risk exposure of operations (two 'penalty points'), and for four banks the N1 value decreased, while the risk exposure of the retail loan portfolio decreased simultaneously.

4.2. Changes in the risk exposure of portfolios in May – August 2020

Considering separately the period from May to August 2020, we can assess not only the changes in the behaviour of banks in terms of the risk profile of the formation of unsecured consumer loan portfolios in this interval, but also how stable the behaviour they had demonstrated in the previous period was.

The distribution of credit institutions depending on the amount of ‘penalty points’ they received in the period from May through August 2020 is shown in Table 4.

Table 4. Distribution of banks depending on the value of the integral indicator of the loan portfolio risk profile trend (*Int*), May – August 2020

<i>Int</i>	Decrease of portfolio's riskiness		Increase of portfolio's riskiness		
	0	0.5	1	1.5	2
Number of banks	10	4	4	6	6

Source: author's calculations

As you can see, the picture does not fundamentally differ from that observed in the first months after the measures taken (that is, in November 2019 – March 2020). During the COVID-19 pandemic, the number of credit institutions that reduced the risk exposure of their portfolios grew from 13 in the pre-pandemic period to 14. At the same time, for the banks in the sample, no connection is observed between the changes in the portfolio risk profile in the first and second intervals (see Table 5).

Table 5. Bank migration matrix depending on the increase/decrease in the risk exposure of the consumer loan portfolio

		November 2019 – March 2020	
		Increase	Decrease
May – August 2020	Increase	9 (53%)	7 (54%)
	Decrease	8 (47%)	6 (46%)
	Total	17 (100%)	13 (100%)

Note: Banks which operated differently in the second sub-period compared to the first sub-period are marked in colour: those that have turned from an increase of the portfolios' riskiness to its decrease (green) and vice versa – from a decrease of portfolios' riskiness to its increase (violet).

Source: author's calculations

Slightly more than half of the banks (9 out of 17) that had formed a riskier loan portfolio before the pandemic than in the benchmark month (October 2019) continued this practice even after the commencement of anti-epidemic measures. A similar picture was demonstrated by credit institutions that reduced the risk exposure of their portfolios in November 2019 – March 2020. Almost half of them (6 out of 13) continued this trend in May – September 2020, while the remaining seven, on the contrary, shifted to a greater assumption of risk. Thus, we cannot speak of the existence of a stable model of banks' behaviour in terms of increasing/decreasing the risk exposure of their portfolios of consumer loans throughout the entire period covered. Hence, we can conclude that banks' adjustment of their business models was more likely due to changes in customer demand for loans rather than the influence of regulatory innovations.

Neither does a comparison of banks' behaviour in May – August 2020 with the capital adequacy level N1.0 as of 1 May 2020 allow us to draw a conclusion about any pronounced dependence. From Figure 13 it follows that, as in the pre-pandemic period, in May – September 2020, banks adjusted their business models under the influence of some other factors rather than based on the capital adequacy level.

Thus, the analysis of data from the bank reporting of the banks that issued the maximum volumes of high-risk consumer loans shows that the Bank of Russia's macroprudential policy has no clear impact on the dynamics of the riskiest segments of retail lending in the period from November 2019 through August 2020, and the fact that credit institutions had a sufficient capital cushion combined with the existing demand constraints may serve as a good explanation for the results obtained.

Figure 13. The value of the N1.0 ratio as of 1 May 2020 and the amount of the bank's 'penalty points' for May – August 2020

Note: the green dotted lines are the threshold values of minimal, adequate and significant capital (see Figure 2), the violet line separates banks with an increased level of the consumer loan portfolio risk exposure (above the line) from those with a decreased level.

Source: author's calculations

5. Conclusions

The analysis of the impact of the introduction of risk weight add-ons on consumer loans to borrowers with a high borrower PTI within the scope of the Bank of Russia's macroprudential policy does not allow us to confirm the hypothesis of its full efficiency. While the hypothesis of achieving the goal of increasing the capital cushion against losses cannot be discarded for most of the banks analysed, with a decrease in the risk profile of consumer loan portfolios the situation looks different. Most of the banks that had the largest volume of high-risk loans did not reduce their share in the portfolio after the introduction of increased capital load ratios, but, on the contrary, even increased them. A certain change in this trend occurred only after the introduction of measures related to countering the COVID-19 epidemic and was rather associated with the change in the structure of demand for loan products on the part of bank customers.

The paper also demonstrates the absence of a pronounced relationship between the values of capital adequacy ratios (N1) and the propensity of the main retail players to increase/decrease the riskiness of unsecured consumer lending.

In addition, our comparative analysis of the profitability of retail and corporate loans (see Appendix 3) indicates that the decision to introduce risk weight add-ons could not have been a serious incentive for banks to switch their lending activity from the retail to the corporate sector. In 11 out of 21 analysed banks with a share of their corporate loan portfolio in assets exceeding 10%, the profitability of this type of assets was negative, while the profitability of retail was positive. That is, essentially, these credit institutions subsidised the interest rate on corporate loans at the expense of profits from retail lending.

Thus, in the current conditions, the measures taken were unlikely to be able to change the business model of credit institutions. It seems that in order to achieve the first of the goals set by the Bank of Russia, a more efficient measure could be a direct restriction on banks lending to borrowers with the maximum value of the debt burden indicator.

Appendices are available at
[http://rjmf.econs.online/en;](http://rjmf.econs.online/en;doi.org/10.31477/rjmf.202103.73)
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