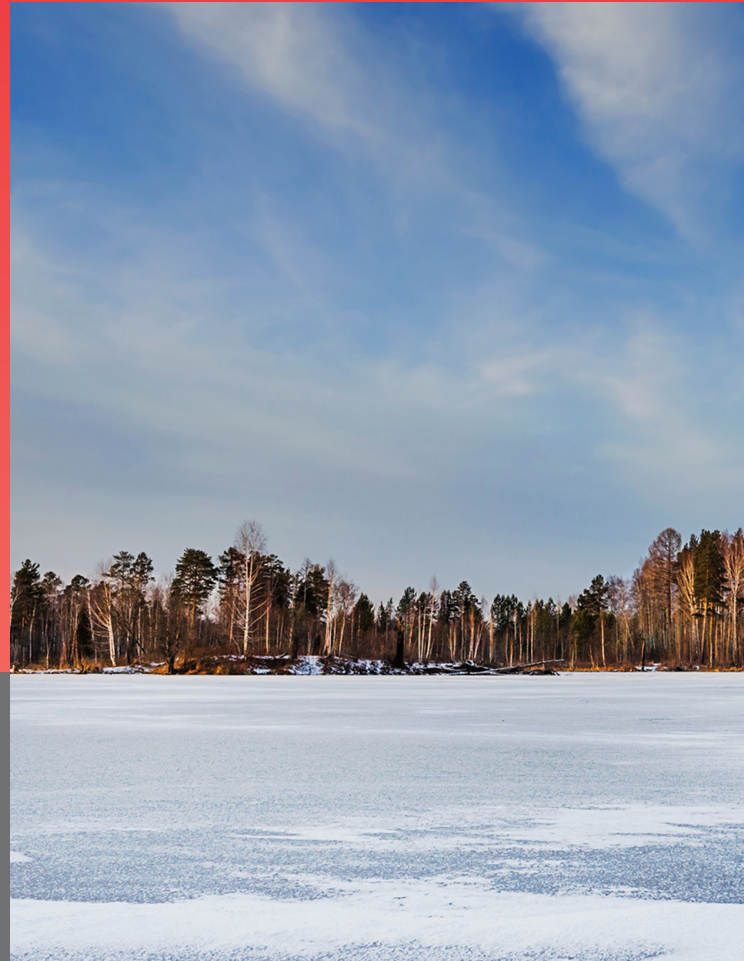




Bank of Russia



December 2021

ASSESSING THE EFFECTIVENESS OF THE BANK OF RUSSIA'S MACROPRUDENTIAL MEASURES IN UNSECURED CONSUMER LENDING

Report

Moscow
2021

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This report was prepared by the Financial Stability Department.

All statistical and other data in this report are provided as of 1 April 2021.

The electronic version of this report is available in Russian and English on the Bank of Russia website, section Financial stability/Analytics.

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1. INTRODUCTION

One of the priority tasks of the Bank of Russia as a regulator is to ensure stability of the Russian banking system in unfavourable macroeconomic environment. To this end, among other things, the Bank of Russia takes macroprudential measures to ensure financial stability, mitigate systemic risks in the banking sector and improve banks' ability to absorb loss that may arise from stress. The key instrument of the Bank of Russia's macroprudential policy is sectoral requirements for bank capital. The Bank of Russia sets these requirements through risk-weight add-ons which banks include into their calculations of capital adequacy ratios.

The Bank of Russia has been using the said tool to mitigate the risk of escalation of household debt burden since 2013. In particular, the Bank of Russia applies measures to unsecured consumer lending as this segment is the main contributor to the debt burden increase. Consumer lending tends to develop in cycles: fast growth in lending with building up risks at banks and rising household debt burden in the periods of economic growth and cyclical recession during crises. The scale of such recessions depends on credit quality, lending standards before crisis and the level of household debt burden during crisis. In this regard, the Bank of Russia uses macroprudential measures in this segment in order to mitigate the consequences for banks after the credit cycle phase changes.

This report analyses the period of consumer lending growth from 2015 to late 2020. Over this period, seven times did the Bank of Russia decide to amend the macroprudential capital requirements for such loans.

This report presents the qualitative and quantitative assessment of the effect made by the Bank of Russia's macroprudential policy on unsecured consumer lending, namely, how the capital requirements impact the loan portfolio growth, the pace of new loans issue, and the lending structure in terms of effective interest rate and borrowers' debt burden.

Analysis of the effectiveness of the macroprudential measures taken by the Bank of Russia helps grasp a better understanding of the impact the capital requirements have on the lending strategies of banks and, as a result, improve the effectiveness of macroprudential policy in future. Besides, given the planned expansion of the Bank of Russia's macroprudential toolkit, namely, the introduction of macroprudential limits, it is necessary to understand the boundaries of such tools' effectiveness to ensure their optimal mix.

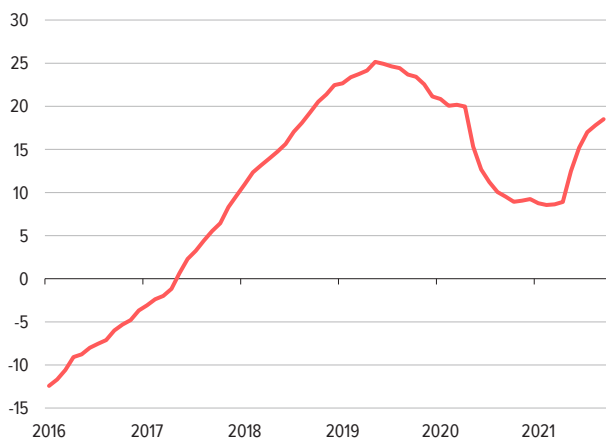
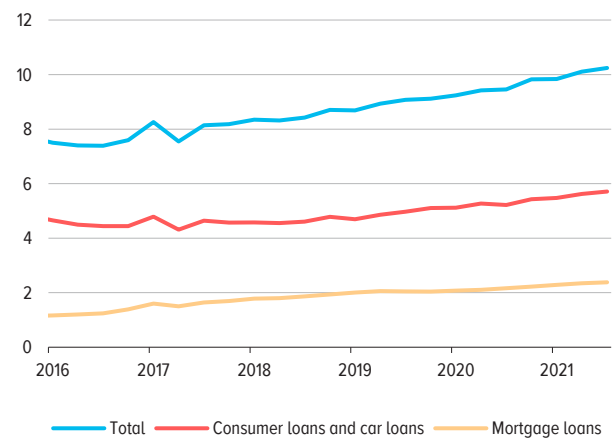
1.1. Faster growth of consumer lending and household debt burden

According to the Bank of Russia, the household debt burden is one of the major vulnerabilities of the financial sector.¹ The household debt burden can be measured in a number of ways: as a payment to income ratio (PTI or payment burden) or a debt service to income ratio (DSTI or debt burden). The Bank of Russia assesses the payment burden as applied to all households and individual borrowers. This ratio shows a borrower's ability to make loan payments when due, and serves as a good credit risk metric. DSTI for an individual borrower is calculated as a ratio of average monthly payments under all loans to the average monthly income of the borrower. DSTI calculated for all households is called the household debt service ratio (DSR) and is a ratio of all due loan payments under loan agreements to the total income of all households.²

Debt service ratio in Russia greatly depends on an increase in outstanding consumer loans. The debt burden related to consumer loans in Russia already reached the level of peer countries

¹ [Financial Stability Review for 2021 Q2–Q3](#).

² [Amendment to the methodology for calculating debt burden at the macrolevel](#).

UNSECURED CONSUMER LENDING GROWTH RATES (% YOY) *Fig. 1*DEBT SERVICE RATIO DYNAMICS (% OF DISPOSABLE INCOME) *Fig. 2*

and even advanced economies. Moreover, from 2018 to 2020, the segment recorded accelerating growth in lending boosted by a substantial reduction of loan rates. Lending was growing faster than household income causing escalation of debt burden at the macrolevel (Figure 1 and Figure 2).

Fast growing lending and escalating debt burden inevitably result in accumulation of risks in the banking sector as the financial losses of credit institutions directly depend on the borrowers' ability to make due loan payments from their income which tends to shrink during crisis. To regulate the increase in household debt burden, on 1 October 2019, the Bank of Russia made it mandatory for banks to calculate DSTI when making decisions on loans to households. Since then, banks have been calculating their capital adequacy given the risk-weight add-ons based on DSTI for a loan. Such macroprudential regulation of debt burden is supposed to help banks to build up their capital buffers and prevent consumer lending from rapid expansion driven by borrowers with accumulated debt burdens.

1.2. Mechanism of macroprudential regulation

Macroprudential regulation is a set of proactive regulatory measures to curb financial stability risks and to ensure, among other things, resilience of the financial system if these risks realise. Macroprudential policy mitigates credit cycle fluctuations by limiting disbursements of risky loans during the expansion phase of credit cycle and supporting lending through release of accumulated capital buffers during the downward phase of credit cycle. Hence, macroprudential policy has two main objectives: to prevent overheating in the lending market and ensure stability of the banking system.

If lending grows actively across all segments and in a large number of banks (expansion phase of the credit cycle), the regulator sets a countercyclical capital buffer (CCyB) thereby toughening the bank capital adequacy requirements. To meet these requirements, credit institutions have to allocate capital and lower lending growth. Since 2016, the Bank of Russia has been calculating CCyB based on the analysis of credit cycle phase indicators, including credit gap. The said indicators have not triggered the establishment of a positive CCyB so far. That is why, CCyB has been 0% since 2016.

If risks are accumulating in individual lending segments the Bank of Russia uses the risk-weight add-ons which enhance the capital adequacy requirements as applied to the relevant type of assets (e.g. mortgage, consumer loans, corporate loans in foreign currency) with certain characteristics (e.g. the EIR, DSTI, mortgage down payment, etc.). The Bank of Russia most actively uses such an

instrument of macroprudential regulation as a modification of risk-weight add-ons, in particular in unsecured consumer lending. Since 2013, the add-ons in this segment have been modified 10 times. The nature, objectives, and structure of these modifications were different (Annex A.1). Before October 2019, the regulator used only the value of effective interest rate (EIR) to differentiate the add-ons within the segment. Prior to September 2018, the regulator sharply raised the add-ons (+200-500 pp) but only for loans with high EIRs in order to curb the issue of risky loans. From late 2018, accelerating growth of consumer lending made the Bank of Russia modify the add-ons more smoothly (+20-70 pp) but for all loans with the EIRs of above 10% in order to slacken growth of the entire segment. Starting from 1 October 2019, the size of add-ons also depended on borrower's DSTI. Notably, further changes in macroprudential risk-weight add-ons for different EIR and DSTI levels remained smooth. In September 2020, risk-weight add-ons were temporarily lowered owing to a sharp drop in consumer lending caused by the pandemic. As soon as the lending growth regained its pre-pandemic pace, the Bank of Russia re-established the previous risk-weight add-ons in July 2021 and continued to increase them starting from October 2021.

Macroprudential add-ons make it possible to influence the banks' capital cushions indirectly and impact the growth rate of lending at the same time. Through toughening bank capital requirements for unsecured consumer lending the Bank of Russia discourages banks from issuing them. There are two channels for transmitting macroprudential policy. The first one is to influence banks with small capital cushions. In the event of persistently high growth rate of unsecured consumer lending these banks may violate ratios or add-ons. This may limit their growth potential. However, slower growth in lending of these banks may be set off by expansion of loan portfolios by banks with significant capital cushions.

The second channel is to impact the profitability of consumer loan portfolios. Higher capital requirements decrease the profitability of such loans. Banks making high profit may sacrifice some part of it in order to maintain the lending volumes if the profitability is acceptable. However, other banks will have to either pass through their expenses to the cost of lending which results in a lower demand for loans, or stop issuing certain types of unsecured consumer loans, for example, loans with high EIR and DSTI. If the values of add-ons are very high, the lending profitability may shrink so much that loan issue may become economically unreasonable even for banks with sizable capital cushions and margins. If this is the case, such add-ons would work as a ban on issue of loans and they will become less accessible for households.

Theoretically, the above mechanism of risk-weight add-ons makes it possible to influence the pace of disbursement of new loans in certain segments and with certain characteristics, and build up necessary capital cushion to cover possible loan losses. Thus, macroprudential risk-weight add-ons have two effects on banks: they curb lending growth and encourage banks to increase their capital cushions.

2. THE IMPACT OF THE BANK OF RUSSIA'S MACROPRUDENTIAL POLICY ON CREDIT INSTITUTIONS' CAPITAL CUSHIONS

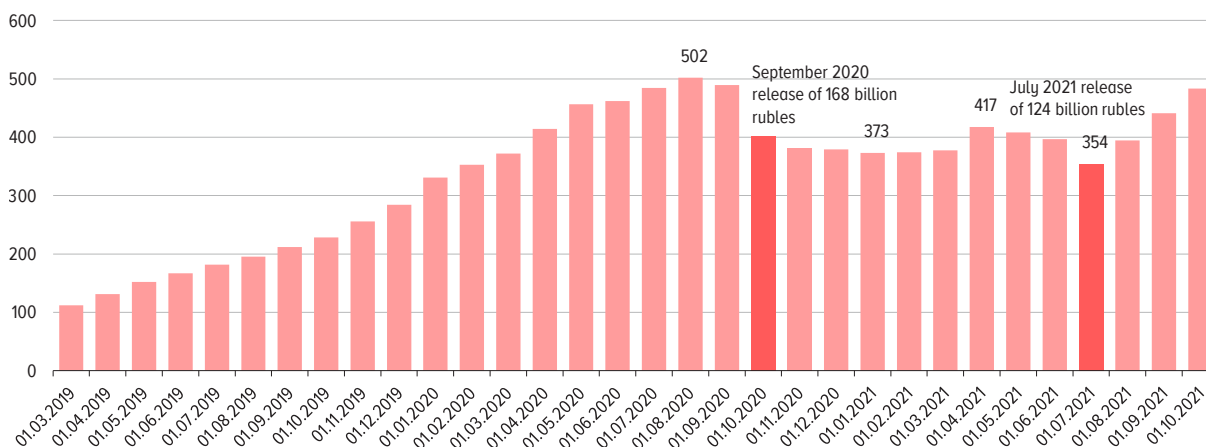
Macroprudential capital buffer is accumulated to cover losses credit institutions may make in stressful macroeconomic conditions, and to support lending. In turn, this make it possible to facilitate faster recovery of the economy. The buffer is accumulated by increasing capital requirements through setting risk-weight add-ons. The accumulated capital buffer is released during crisis by cancelling the add-ons for earlier issued loans. Cancellation of the risk-weight add-ons decreases the capital requirements to credit institution and enables it to use the earlier allocated capital to make loan loss provisions and build up lending. Reasonable countercyclical policy of accumulating and releasing the macroprudential buffers supports the banking system stability. The key criterion of the macroprudential policy effectiveness in terms of banks' capital cushions management is comparability of actual loss during crisis and the amount of accumulated macroprudential buffer.

The active development of unsecured consumer lending from 2018 to 2020 coupled with a rise in household debt burden made it necessary for the banking sector to intensively accumulate the macroprudential buffer. That is why, the Bank of Russia was consistently raising the risk-weight add-ons relative to consumer loans over this period. By August 2020, the size of macroprudential buffer for unsecured consumer loans had reached 502 billion rubles. In the beginning of the pandemic, slackening lending prompted by a plummeting demand and tougher banks' requirements for borrowers caused a sharp shrinkage of the unsecured consumer loan portfolio. Moreover, decline in the household real incomes resulted in high NPLs and prompted borrowers to actively restructure their loans. This increased the amount of expected losses. In this regard, in 2020, the Bank of Russia adopted the first regulatory easing for consumer loans¹. Starting from 1 September 2020, the regulator cancelled add-ons for loans issued before 31 August 2019. To support consumer lending, the Bank of Russia reduced the macroprudential capital requirements for new loans (Figure 3).

The further regulatory easing was adopted on 1 July 2021. As the applicable regulatory easing for provisions expired and borrowers' loan repayment holidays were over, the Bank of Russia decided to cancel the risk-weight add-ons for consumer loans granted prior to April 2020. Thanks to both decisions to annul the risk-weight add-ons made it possible to release 292 billion rubles of the

MACROPRUDENTIAL CAPITAL CUSHION DYNAMICS
(BILLION RUBLES)

Fig. 3



¹ In the beginning of the pandemic, the accumulated buffer on mortgage loans was also released.

macroprudential buffer. In the period from the beginning of the pandemic to the first regulatory easing, 90+day NPLs under unsecured consumer loans increased by 214 billion rubles as adjusted for the amount written-off over this period. By the time of the second regulatory easing decision, the expected loss under restructured loans were estimated at 110 billion rubles. Thus, the amount of released capital cushion matches the actual and expected loss related to consumer loans.

Banks' losses during the period of macroeconomic shocks match the accumulated and released buffer. This goes to show that the macroprudential policy pursued by the Bank of Russia is reasonable in terms of capital management. As for the impact of the policy on the lending growth pace and quality, the assessment of its effectiveness is beyond simple quality description and requires a stricter quantitative analysis presented in section 3.

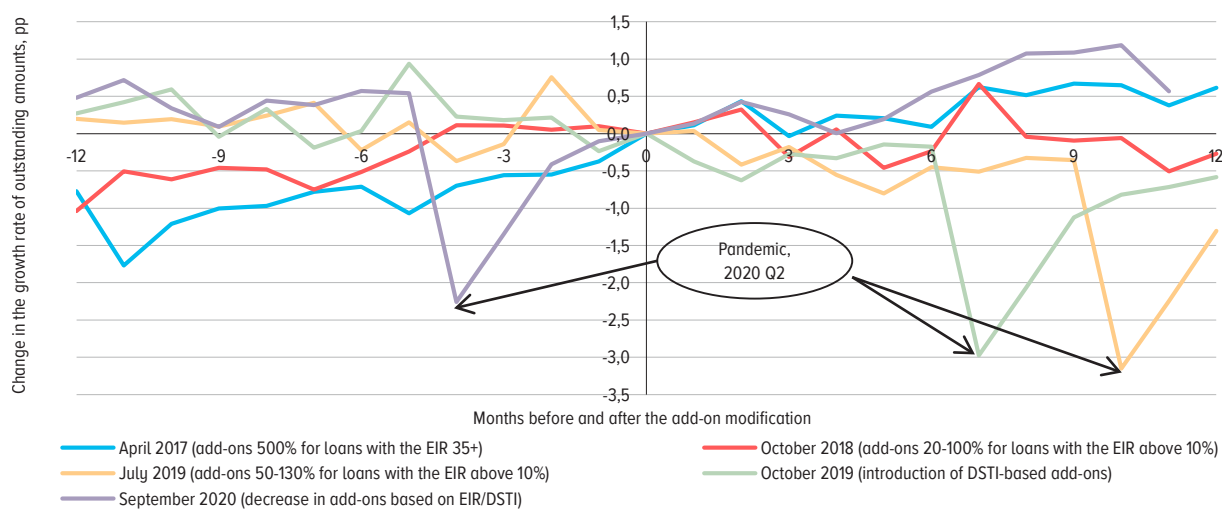
3. THE IMPACT OF THE BANK OF RUSSIA'S MACROPRUDENTIAL POLICY ON THE CONSUMER LENDING PACE AND STRUCTURE

The Bank of Russia finds it important to make a historical analysis of the impact made by the macroprudential policy on the lending growth rates as it enables the regulator to make more effective decisions in future. It appears impossible to visually observe any direct effect of the changes in capital requirements on lending as the lending growth depends on numerous factors which makes its dynamics complicated. (Figure 4)

To receive interpretable results describing a marginal effect of the changes in capital requirements it is necessary to build a linear regression model which links the rates of loans' issue and their distribution by the EIR and DSTI with the size of risk-weight add-ons modification. However, it is necessary to take into account the impact of macroeconomic and individual banking factors on the lending pace by using them as control variables in regression. In this case, the main criterion of the macroprudential policy effectiveness is obtaining statistically significant regression coefficients implying that the macroprudential risk-weight add-ons have impact on the growth pace and structure of lending.

CHANGE IN THE GROWTH RATE OF THE CONSUMER LOAN PORTFOLIO BEFORE
AND AFTER THE ADD-ONS MODIFICATION
(GROWTH RATE IN THE MONTH OF THE ADD-ON ADOPTION IS EQUAL TO ZERO)

Fig. 4



3.1. Model structure

The regression was built based on the model used in the research by the Bank for International Settlements¹ and previous study by the Bank of Russia² of the macroprudential policy efficiency. As in the above studies, the general form of the model is a panel regression with fixed effects: the linear regression is built on data describing several banks over a certain period of time with the differences between the banks treated in the model as dummy variables (0 or 1) produced especially for each bank. Like the above studies, our regression also uses a list of banks' individual parameters changing over time which influence the lending pace. Finally, based on the previous studies, the macroprudential policy variable is treated with a few lags thereby describing a gradual response of the banks to the modification of macroprudential add-ons.

However, this study has a number of significant differences in the model structure and the methodology for recording certain variables. One of these differences is a way to take into account the impact of macroeconomic environment on lending demand: in the above studies, the macroeconomic variables are explicitly set in a regression equation (GDP, inflation, unemployment, etc.), while our study treats the macroeconomic environment with time fixed effects – dummy-variables produced especially for each observed period. The regression coefficients of these variables reflect an aggregated macroeconomic environment in this period. This makes it possible to avoid an omitted macroeconomic variable bias. Another great difference is construction of an extra model with new target variable which describes the distribution of loan disbursements by the EIR and DSTI levels. Moreover, our study uses a new method for formalising the variable that reflects the modification of the macroprudential add-ons. This method enables us to cover an individual nature of the add-ons' impact on banks. The variables are further described in section 3.2.

Finally, the general regression formula is as follows:

$$\Delta Y_{i,t} = \alpha_i + \delta_t + \sum_{l=0}^3 \beta_l * \Delta MAP_{i,t-l} + \gamma * I_{i,t-1} + \varepsilon_{i,t},$$

where α_i – the fixed effect of the i-th bank – a dummy-variable describing time-constant individual features of banks;

δ_t – the time fixed effect – a dummy-variable describing individual features of the observed period t which are the same for all banks (i.e. macroeconomic background and lending demand in this period);

$I_{i,t}$ – a set of variables describing time-varying individual features of banks with a one-quarter lag (see these features described below);

$\varepsilon_{i,t}$ – the regression residuals;

$\Delta MAP_{i,t-l}$ – the key explanatory variable describing the modification of the macroprudential add-ons taken with four consistent lags;

$\Delta Y_{i,t}$ – a relevant change in the growth rate of portfolio, new disbursements or a change in the disbursements breakdown by the EIR/ DSTI for the i-th bank in the observed period t.

The said model specification suggests that the research is mainly focused on the regression coefficients β_l subject to the distributed lag of the variable $\Delta MAP_{i,t-l}$. The sign, size and statistical significance of these coefficients describe the banks' response to the macroprudential add-ons modification.

¹ [BIS: Measuring the effectiveness of macroprudential policies using supervisory bank-level data; Feb. 2020.](#)

² [Bank of Russia: Macroprudential Policy Efficiency: Assessment for the Uncollateralized Consumer Loans in Russia; Oct. 2020.](#)

3.2. Data and variables

To build the above model we used quarterly data on 30 largest Russian banks by retail loan portfolio over the period from 2016 to 2021. This selection of credit institutions is based on a number of banks which provided information on borrowers' debt burdens under form 0409704 by the time of research. Despite their small number, these credit institutions capture 95% of the market by unsecured consumer loan portfolio. The high quality of large banks' data enables us to receive less noisy data.

Control variables

To identify the net effect of the macroprudential add-ons modification the model takes into account the impact of other factors on growth pace and structure of consumer loan disbursements. To take these factors into account the model uses bank-level and time fixed effects as described above. Moreover, there are additional control variables describing time varying features of the banks, that may have an impact on the lending pace. The list of these variables includes a set of indicators traditionally used in the studies of banking sector (Table 1).

LIST OF CONTROL VARIABLES DESCRIBING TIME VARYING FEATURES OF BANKS
ALL THESE VARIABLES WERE USED WITH A ONE-QUARTER LAG

Table 1

Variable	Description
SIZE(-1)	Size of a bank – logarithm of the total assets
LIQ(-1)	Liquidity ratio – a share of liquid assets in the total assets
DEP(-1)	Funding sources – deposits to the banks' total assets ratio
N1_min(-1)	Capital adequacy – minimum of three main capital adequacy ratios (N1.0, N1.1 and N1.2)
CtA(-1)	Bank's lending profile – a share of consumer loans in assets

Key explanatory variable

There are a number of methods to give a quantitative description of the macroprudential policy as a variable (Annex A.2). In its study the Bank for International Settlements formalises the macroprudential policy as a discrete variable that takes the following values in each period: 1 – if the macroprudential policy toughened in the observed period; -1 – if it eased; and 0 – if no regulatory changes took place in the period. This methods enables us to describe any change in the macroprudential policy as either a modification of risk-weight add-ons or an introduction of countercyclical buffer to capital adequacy ratio. The weakness of this method is an impossibility to describe the scale of the change in macroprudential policy over the period.

As the Bank of Russia implements its macroprudential policy through the modification of risk-weight add-ons, it is possible to describe how tough this policy is. In the Bank of Russia's study dated October 2020, the variable describing changes in macroprudential measures is scaled on the median change in risk-weight add-ons across all EIR/DSTI intervals. This approach enables us to have a comprehensive description of the macroprudential policy. However, it has some weaknesses, e.g. it does not cover an individual impact of add-ons on different banks: because of differentiated risk-weights by the EIR and DSTI levels, the add-ons make different effects on credit institutions as they have different distributions of disbursed loans volume by the EIR and DSTI levels.

To cover the individual impact of risk-weight add-ons on banks, the key variable may be calculated as a change in the weighted average add-on for new consumer loans:

$$\Delta MAP_{i,t} = \sum_{EIR,DSTI} nad_{EIR,DSTI,t} * V_{EIR,DSTI,i,t} - \sum_{EIR,DSTI} nad_{EIR,DSTI,t-1} * V_{EIR,DSTI,i,t-1}$$

where: $nad_{EIR,DSTI,t}$ – the value of add-on in the EIR/DSTI interval in the period t ;

$V_{EIR,DSTI,t}^{bank}$ – the amount of consumer loans issued in the EIR/DSTI interval over the period t relative to total amount of unsecured consumer loans issued by the i -th bank over this period.

In this set-up the variable may change either as a result of the add-ons modification or as a result of changes in the bank's disbursement structure by the EIR/DSTI. We can separate these two effects as per the following formula:

$$\Delta MAP_{i,t} = \Delta \left(\sum_{EIR,DSTI} nad_{EIR,DSTI} * V_{EIR,DSTI,i} \right)_t \approx$$

$$\approx \sum_{EIR,DSTI} \Delta nad_{EIR,DSTI,t} * V_{EIR,DSTI,i,t-1} + \sum_{EIR,DSTI} nad_{EIR,DSTI,t-1} * \Delta V_{EIR,DSTI,i,t}$$

Where the first term describes the change in the bank's weighted average add-on directly prompted by the modification of risk-weight add-ons by the Bank of Russia (hereinafter – MAP_{nad} , or the net effect of the add-on modification); and the second term describes the change in the bank's weighted average add-on due to changes in banks' disbursement structure by the EIR/DSTI (hereinafter – MAP_{str} , or the net effect of the change in structure). The net add-on effect is the key explanatory variable used in the said model. Decomposition of ΔMAP in two effects is illustrated in Annex A.3.

Target variables

Target variables are quarterly growth rates of outstanding unsecured consumer loans and quarterly growth rates of new unsecured consumer loans. Furthermore, we examine the impact of the macroprudential add-ons on the lending structure by the EIR and DSTI. To this end, the target variable is the above value MAP_{str} reflecting the change in the banks' weighted average add-on for consumer loans prompted by the change in disbursement structure. MAP_{str} takes on positive values if the bank shifts its disbursements towards the EIR and DSTI area with higher macroprudential add-ons. If a bank starts to disburse more loans in the EIR and DSTI intervals with a lower macroprudential add-on, MAP_{str} takes on negative values. Thus, one variable gives an aggregate description to the changes in the bank's disbursement distribution by the EIR and DSTI.

3.3. Modelling results

The estimates of regression coefficients we received imply that the macroprudential add-ons substantially influence the distribution of new disbursements by the EIR and DSTI levels. However, we did not find any statistically significant influence of the macroprudential add-ons on the growth rate of the outstanding loan amounts or the amount of loan disbursements.

Besides, we identified some differences in the nature of the add-ons' influence on the disbursement structure in the periods 2016–2018 and 2018–2021 which perfectly matches the differences in the nature of the add-ons' modifications in these periods. That is why, we assessed each of the models over three periods: 2016–2018, 2018–2021, and the entire period 2016–2021. Further results of each model are presented below.

Add-ons' influence on the loan portfolio growth rates

The estimates of regression coefficients in this model do not demonstrate any influence of the macroprudential risk-weight add-ons on the growth rate of the outstanding unsecured consumer

loans. The regression coefficients with the key variables over all three observed periods are positive and statistically insignificant (Table 2), except one coefficient in 2018–2021.

REGRESSION COEFFICIENTS IN THE MODEL OF MACROPRUDENTIAL ADD-ONS' INFLUENCE ON THE UNSECURED CONSUMER LOAN PORTFOLIO GROWTH RATES. TARGET VARIABLE – A CHANGE IN THE PORTFOLIO AMOUNT LOGARITHM. THE VARIABLES LEGEND IS PRESENTED IN SECTION 3.2. ASTERISKS SHOW THE STATISTICAL SIGNIFICANCE OF THE COEFFICIENTS: * - P-VALUE<0.05, ** - P-VALUE<0.01, *** - P-VALUE<0.001 Table 2

Variable / Period	2016 – 2018	2018 – 2021	2016 – 2021
ΔMAP_{nad}	0.02	0.10	0.02
$\Delta\text{MAP}_{nad(-1)}$	0.002	0.15*	0.0003
$\Delta\text{MAP}_{nad(-2)}$	0.02	0.04	0.01
$\Delta\text{MAP}_{nad(-3)}$	0.02	0.06	0.004
SIZE(-1)	-0.02	-0.03	-0.01
LIQ(-1)	0.21	-0.04	0.04
DEP(-1)	-0.18	-0.07	-0.16*
CtA(-1)	-0.12	-0.04	0.01
N1_min(-1)	0.23	0.35*	0.16
Bank fixed effects	+	+	+
Time fixed effects	+	+	+

Positive sign indicates that growth rates of the outstanding amount were rising along with the increase in add-ons over the observed periods. However, these values of coefficients do not mean that the increasing add-ons boost elevated growth of the portfolio because the coefficients are not statistically significant. The poor statistical significance of coefficients implies that it is impossible to state conclusively that these coefficients differ from zero. The verification of hypothesis about the joint significance of the coefficients with key variables did not produce any positive results.

Add-ons' influence on the growth rates of loan disbursement volume

In the model of the macroprudential add-ons' influence on the growth rates of loan disbursement volume the sign of some key variables points to a slower disbursement of new loans amid higher capital requirements. Nevertheless, the poor statistical significance implies that it is impossible to state conclusively that the received estimates differ from zero and, as a result, that the macroprudential add-ons significantly influence the growth rates of new consumer loan disbursements (Table 3). The verification of hypothesis about the joint significance of the key coefficients again did not produce any positive results.

REGRESSION COEFFICIENTS IN THE MODEL OF MACROPRUDENTIAL ADD-ONS' INFLUENCE ON THE GROWTH RATES OF NEW DISBURSEMENTS. TARGET VARIABLE – A CHANGE IN THE LOGARITHM OF CONSUMER LOAN VOLUME DISBURSED OVER THE PERIOD. THE VARIABLES LEGEND IS PRESENTED IN SECTION 3.2. ASTERISKS SHOW THE STATISTICAL SIGNIFICANCE OF THE COEFFICIENTS: * - P-VALUE<0.05, ** - P-VALUE<0.01, *** - P-VALUE<0.001 Table 3

Variable / Period	2016 – 2018	2018 – 2021	2016 – 2021
ΔMAP_{nad}	0.11	-0.99	-0.04
$\Delta\text{MAP}_{nad(-1)}$	-0.13	1.08	0.05
$\Delta\text{MAP}_{nad(-2)}$	0.06	0.50	0.17
$\Delta\text{MAP}_{nad(-3)}$	-0.20	-2.04*	-0.37
SIZE(-1)	0.07	-0.007	-0.16
LIQ(-1)	0.33	-0.19	0.01
DEP(-1)	0.57	0.43	0.04
CtA(-1)	-1.51	-1.88	-1.23
N1_min(-1)	0.54	1.80	0.93
Bank fixed effects	+	+	+
Time fixed effects	+	+	+

Add-ons' impact on disbursements distribution by the EIR and DSTI

The results of modelling the macroprudential add-ons' impact on the disbursement structure indicate a significant influence of the add-ons (Table 4).

REGRESSION COEFFICIENTS IN THE MODEL OF MACROPRUDENTIAL ADD-ONS' INFLUENCE ON THE DISBURSEMENT STRUCTURE OF THE UNSECURED CONSUMER LOAN PORTFOLIO. TARGET VARIABLE – THE NET EFFECT OF THE CHANGE IN THE DISBURSEMENT STRUCTURE (MAP_{str}). THE VARIABLES LEGEND IS PRESENTED IN SECTION 3.2. ASTERISKS SHOW THE STATISTICAL SIGNIFICANCE OF THE COEFFICIENTS: * - P-VALUE<0.05, ** - P-VALUE<0.01, *** - P-VALUE<0.001

Table 4

Variable/Period	2016 – 2018	2018 – 2021	2016 – 2021
MAP_nad	-0.02	0.15	-0.01
MAP_nad(-1)	-0.40***	-0.11*	-0.37***
MAP_nad(-2)	-0.09***	-0.01	-0.09**
MAP_nad(-3)	-0.04	0.002	-0.04
SIZE(-1)	-0.03	-0.12	-0.03
LIQ(-1)	0.06	-0.01	-0.02
DEP(-1)	-0.05	-0.25	-0.06
CtA(-1)	0.21	0.06	0.01
N1_min(-1)	0.09	0.03	-0.02
Bank fixed effects	+	+	+
Time fixed effects	+	+	+

The regression coefficients with certain key variables are negative and statistically significant over all observed periods. Besides, there is a great difference between the value of the coefficients and their significance in the periods 2016–2018 and 2018–2021 due to the different nature of changes in the risk-weight add-ons in these periods.

Before 2018, the regulator introduced the macroprudential add-ons based only on the EIR levels. The changes in them were considerable and they were applicable only to loans with high EIR (e.g. add-ons for loans with the EIR above 30% were increased by 130–460 pp). Given such changes in the add-ons, the bank capital adequacy was heavily dependent on the distribution of disbursements by the EIR. This greatly prompted banks to shift their disbursements to the EIR intervals with no add-ons. As a result, there are substantially negative and statistically significant regression coefficients with the key variables in the period 2016–2018.

From September 2018, risk-weight add-ons were introduced with more smooth changes (+ 20–70 pp) across all EIR intervals. From 2019 Q4, following the introduction of add-ons based on DSTI, the add-ons have been changing smoothly across all EIR and DSTI ranges. Obviously, such smooth changes in the add-ons are less stimulating for banks to change their lending structure because the dependence of capital adequacy on the distribution of disbursement volumes by the EIR and DSTI becomes less pronounced. As a result, the regression coefficients with the key variables over the period 2018–2021 have smaller absolute value and statistical significance.

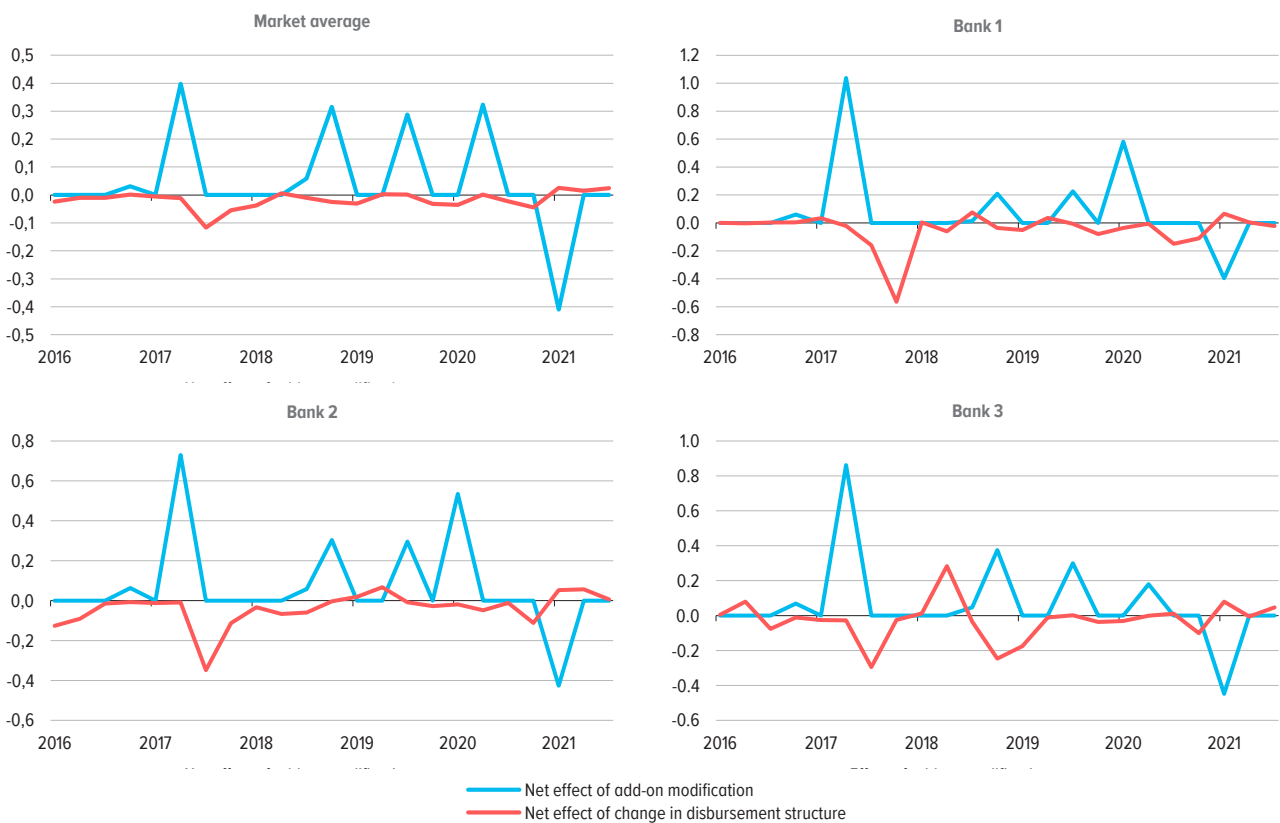
The influence of risk-weight add-ons on the change in disbursement distribution by the EIR and DSTI as described above may be shown on charts of match between variables MAP_{nad} and MAP_{str} for different banks and the entire market. Figure 5 shows the dynamics MAP_{nad} and MAP_{str} as the market average and for three banks with the most illustrative dependence of these variables. It is obvious that after changes in the average weighted add-on prompted by the modification of the risk-weight add-ons related to the EIR and DSTI by the Bank of Russia (red line – MAP_{nad}) banks seek to reduce the impact on capital through changing the disbursement structure (blue line – MAP_{str}). In 2017, this effect was most pronounced.

It is worth noting that during the period of the most active changes in the disbursement distribution by the EIR (2016–2018), the Bank of Russia decreased its key rate by 3.75 pp which had a direct impact on the movements in the EIR of the issued loans. The monetary policy easing

should not lead to any bias in the estimates of coefficient with key variables or impact future conclusions, as the key rate influence on the EIR is fully covered by the time fixed effects reflecting the macroeconomic background, which include the Bank of Russia key rate. To ensure better accuracy of the results we built one more regression with an explicit inclusion of the Bank of Russia key rate as a control variable (Annex A.4). This regression produces the results of similar quality. In addition, it is worth noting that in the period 2018–2020, the Bank of Russia key rate decreased by 3 pp which is comparable with its decline in the period 2016–2018. Nevertheless, we observe a great difference between the coefficients with the key variables in these periods which additionally proves the resilience of our conclusions to the changes in the Bank of Russia key rate.

DYNAMICS OF THE WEIGHTED AVERAGE ADD-ON COMPONENTS: THE NET EFFECT OF THE ADD-ON MODIFICATION (ΔMAP_{nad}) AND THE NET EFFECT OF THE CHANGE IN THE DISBURSEMENT STRUCTURE (ΔMAP_{str})

Fig. 5



4. CONCLUSIONS

The macroprudential policy to mitigate the risk of escalating household debt burden pursued by the Bank of Russia in 2018–2020 made it possible to accumulate a sufficient macroprudential capital buffer, which was partially utilised during the pandemic. The EIR/DSTI-based differentiated size of macroprudential capital requirements for consumer loans made banks to change their lending structures and focus on those loans that require less equity, i.e. the loans with a lower EIR and DSTI. The lower cost of lending was instrumental in slowing down the growth of the household debt burden.

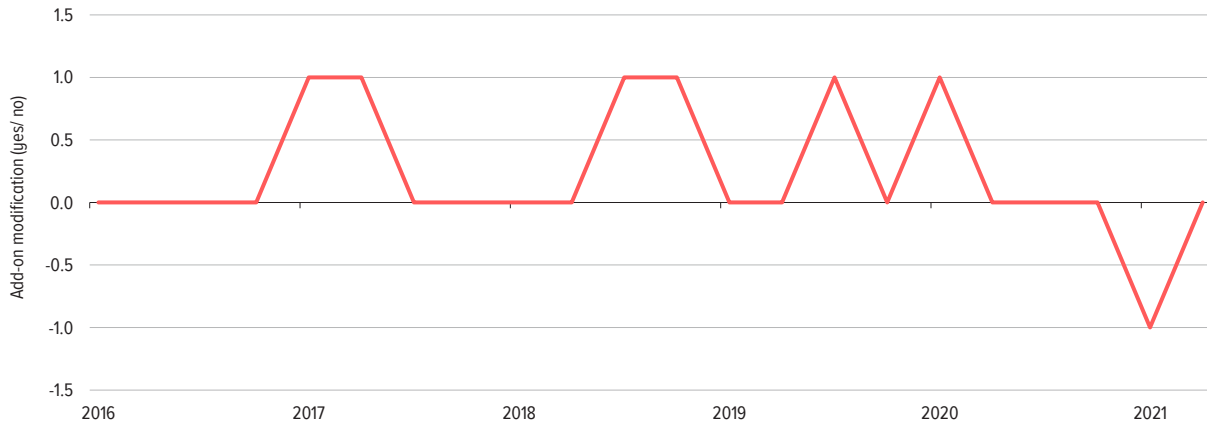
The results of our quantitative research show that the lending structure may change only as a result of very considerable toughening of capital requirements, which works as a ban on the issue of such loans. If the macroprudential policy toughens moderately, the lending structure and faster increase in the outstanding consumer loans remain.

Hence, risk-weight add-ons may be used as a macroprudential instrument to accumulate the capital buffer or, in case of their considerable increase, to ban completely the issue of some loans with certain characteristics. To limit the share of risky loan disbursements and to maintain the accessibility of loans to people rather than to prohibit their issue, it is necessary to apply a new instrument of the macroprudential policy. For this purpose, the global practice relies on macroprudential limits. The Bank of Russia obtained authority to use this instrument. The macroprudential limits will be predominantly used to curb growth of risky lending with the risk-weight add-ons to be instrumental in accumulating the capital buffers in good times with their utilisation during periods of crisis.

A.2 – Comparison of the methods to set key explanatory variable describing changes in the Bank of Russia’s macroprudential policy

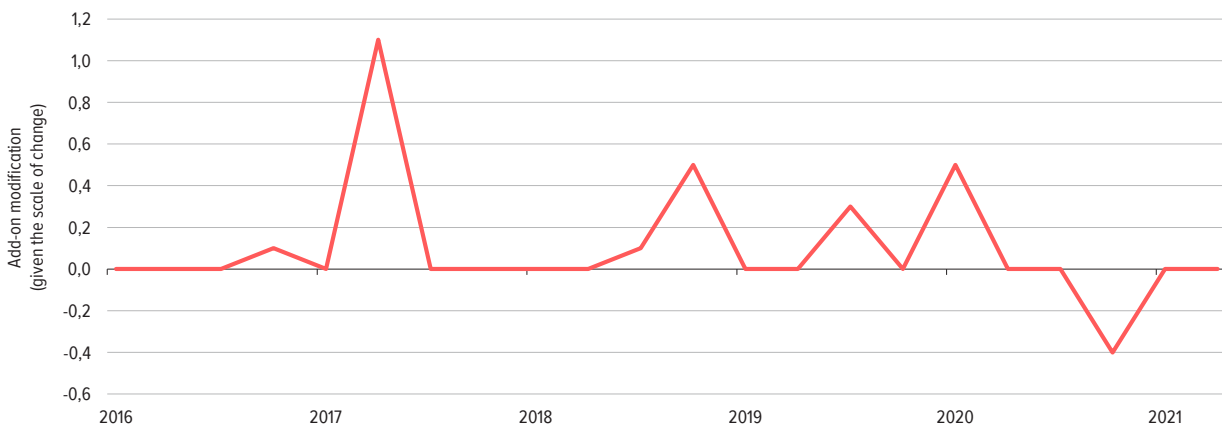
BANK FOR INTERNATIONAL SETTLEMENTS APPLIES A DISCRETE APPROACH

Fig. 1



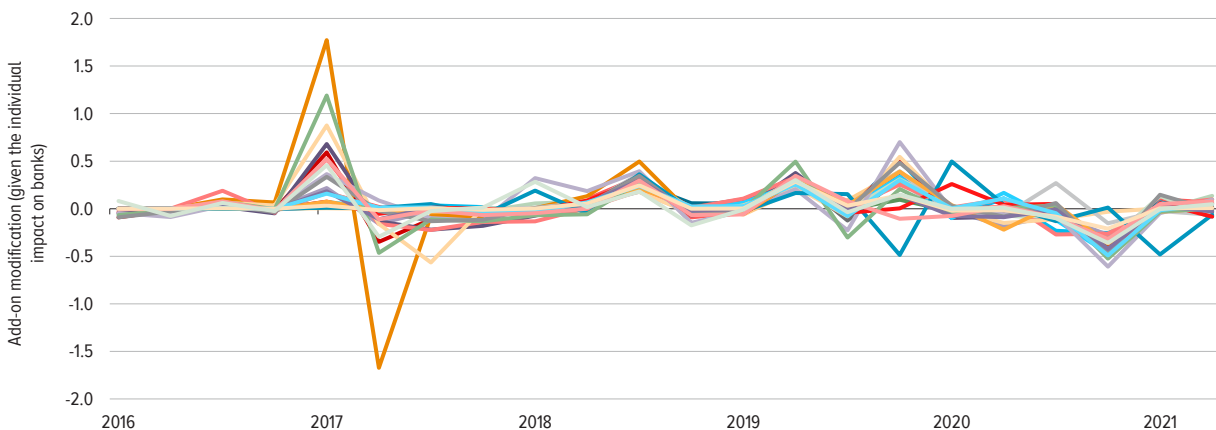
BANK OF RUSSIA APPROACH (RESEARCH DATED OCTOBER 2020) IS SCALING ON MEDIAN CHANGE IN ADD-ONS

Fig. 2



THE APPROACH USED IN THIS STUDY IS A CHANGE IN THE WEIGHTED AVERAGE ADD-ON FOR CONSUMER LOANS OF A BANK. EACH LINE REPRESENTS AN INDIVIDUAL BANK

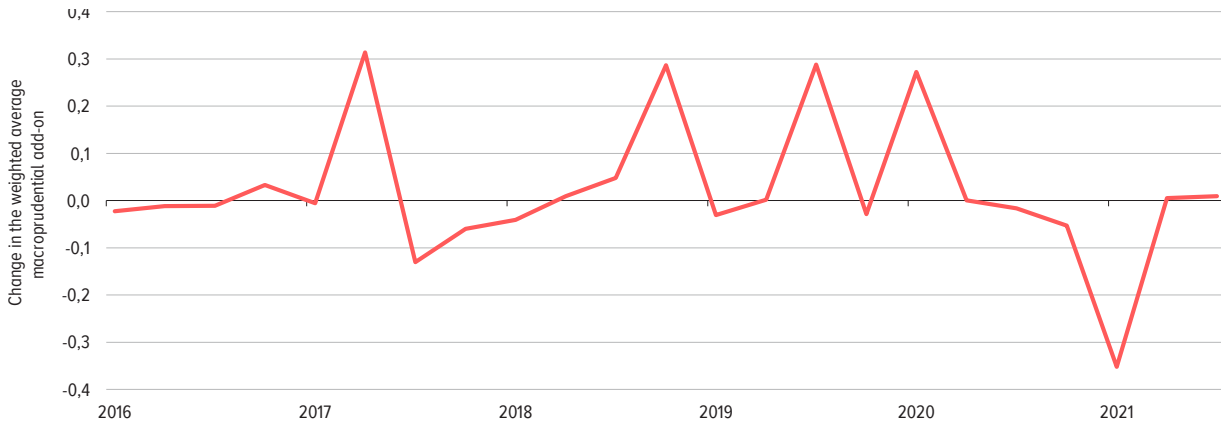
Fig. 3



A.3 – Illustration of the change in the weighted average risk-weight add-on for consumer loans broken down by the change directly prompted by the modification of add-ons by the Bank of Russia and the change in the loan disbursement structure by the EIR and DSTI.

CHANGE IN THE AVERAGE WEIGHTED ADD-ON BEFORE BREAKDOWN

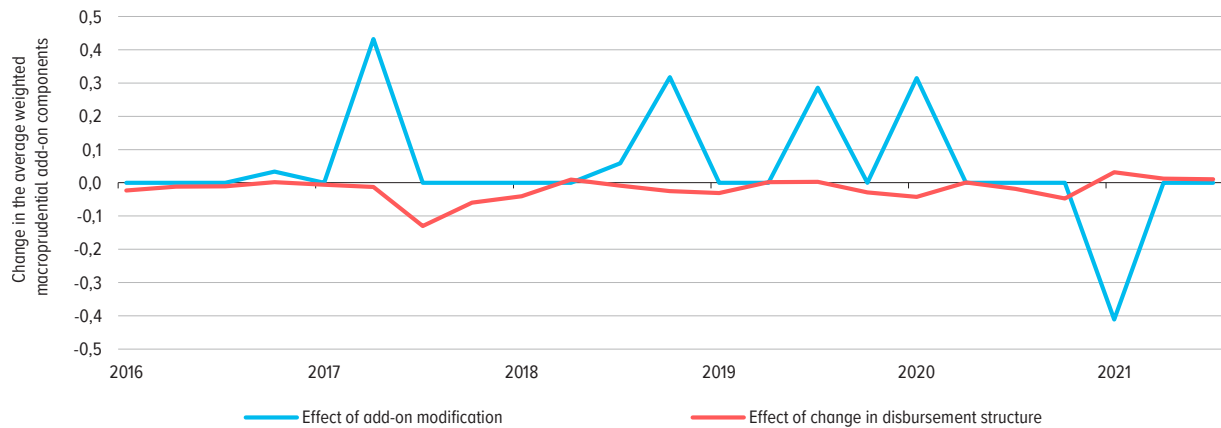
Fig. 1



CHANGE IN THE AVERAGE WEIGHTED ADD-ON BROKEN DOWN BY THE EFFECT OF THE ADD-ON MODIFICATION BY THE BANK OF RUSSIA AND THE EFFECT OF THE CHANGE IN LENDING STRUCTURE MADE BY A BANK

Fig. 2

$$\Delta MAP = \Delta(ADD-ONS * STRUCTURE) = \Delta ADD-ON * STRUCTURE + ADD-ON * \Delta STRUCTURE$$



A.4 – Estimate of regression coefficients in the model of macroprudential add-ons' influence on the loan disbursement distribution by the EIR and DSTI with explicit inclusion of the Bank of Russia key rate as a control variable. Target variable – the net effect of the change in the loan disbursement structure (MAP_str). The variables legend is presented in section 3.2. Asterisks show the statistical significance of the coefficients: * - p-value<0.05, ** - p-value<0.01, *** - p-value<0.001

Variable / Period	2016 – 2018	2018 – 2021	2016 – 2021
ΔMAP_nad	-0.001	-0.05	-0.03
ΔMAP_nad(-1)	-0.36***	-0.06	-0.21***
ΔMAP_nad(-2)	-0.11***	-0.01	-0.06**
ΔMAP_nad(-3)	-0.06*	0.04	-0.02
ΔKeyRate	0.03	0.02	0.01
SIZE(-1)	-0.02	-0.09	-0.01
LIQ(-1)	-0.07	0.01	-0.001
DEP(-1)	-0.04	-0.20	0.02
CtA(-1)	0.18	0.08	0.05
N1_min(-1)	0.10	0.07	0.05
Bank fixed effects	+	+	+
Time fixed effects	-	-	-