Factors of regional heterogeneity of monetary impulse transmission

The paper proposes to test the hypothesis about the difference in the performance of the interest rate channel of monetary transmission in the regions of Russia depending on several macroeconomic indicators.

A review of the literature shows that the performance of the monetary transmission channel in the regions of the country may differ because of such factors as population aging and differences in the state of household balances.

According to [1], the young population is characterized by a higher debt burden and higher elasticity of consumption to shocks of the central bank interest rate. If the share of the adult population increases, then the aggregate reaction of consumption to the shock of the central bank interest rate decreases. Similar conclusions were obtained in [2]: in an older society, consumption decreases less in response to the shock of an interest rate increase, that is, the efficiency of the interest rate channel of the monetary transmission channel is less than in a younger society. In [3], the difference in the performance of the monetary transmission channel is associated with the state of household balances. Households with initially limited liquidity increase spending and consumption in response to the shock of a stimulating monetary policy (although incomes are growing for all categories of households). The effect is explained by a higher propensity to consume and a stronger reaction of this category of households' expenditures to unexpected "profits". As a result, it is the behavior of households with more limited liquidity that determines the result of the monetary policy shock on aggregate demand. In [4] and [5] it is shown that less wealthy households are less sensitive to monetary policy shock. This may be because their labor income is dominated by budget transfers, which are less sensitive to the central bank interest rate, because of which the possibilities of the monetary policy channels are reduced.

Based on the analysis of the theoretical literature, the empirical part of the work tests three hypotheses:

1) Inflation in regions with different levels of demographic burden changes differently in response to changes in the interest rate. An increase in the share of the elderly population leads to a decrease in the sensitivity of consumption and, consequently, inflation to changes in the Central Bank rate.

2) Inflation in regions with different volumes of lending/debt changes differently in response to changes in the Central Bank interest rate. The higher the share of loans as a percentage of GRP, the higher the sensitivity of inflation to changes in the Central Bank rate.

3) Inflation in regions with different consumption and social transfers reacts differently to changes in the interest rate. This may be because the interest rate has a smaller impact on the decisions of households whose consumption is dominated by transfers.

For empirical testing of the hypotheses put forward, official statistics data for the regions of Russia for the period 2010-2022 were used[1]. Average volume of debt of individuals and legal entities for the period as a percentage of GRP; average volume of expenditures and social transfers for the period as a percentage of GRP; average indicators of the demographic burden of those younger and older than working age for the period. The results of dividing the regions into clusters are presented in Figure 1.

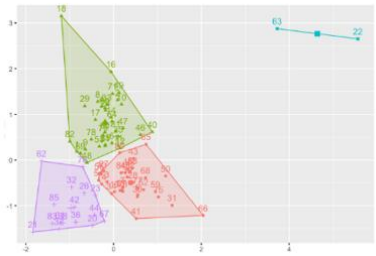
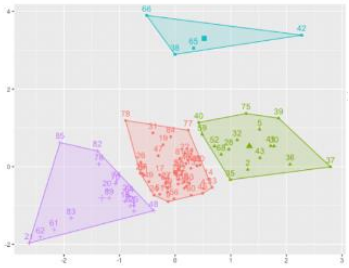
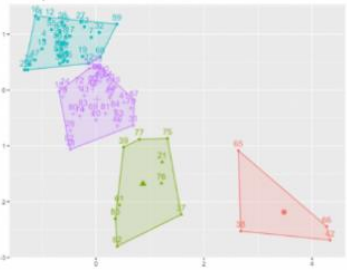
Clustering (1)	Clustering (2)	Clustering (3)
Division of regions into clusters based on average debt levels on loans as a percentage of GRP	Division of regions into clusters based on the share of expenditures and social transfers in GRP	Division of regions into clusters based on demographic load factors
		

Figure 1 – Clustering of regions by pairs of selected criteria

For each group of regions, the transmission mechanism operation was assessed. For these purposes, data on the following indicators were collected: Ruonia interest rate; index of physical volume of GRP; price growth rate; share of lending to individuals and entrepreneurs as a percentage of GRP; nominal effective exchange rate growth.

During the empirical study, panel data models were estimated. The most interpretable results were obtained when estimating models using the Blundell-Bond method. This method considers the problem of potential endogeneity by using a matrix of instrumental variables. Lagged differences of variables are used as tools for the equation in levels.

Using the Blundell-Bond method allowed us to obtain the results presented in Table 1.

Based on the confidence intervals presented in Table 2, the following conclusions can be drawn. Within the first clustering, in the first cluster containing regions with the largest share of

[1] The sampling period is determined by the availability of statistical data.

retail loans in GRP, the rate increase leads to a greater reduction in the CPI growth rate. Within the second clustering, the impact of the Central Bank rate on the change in the CPI growth rate is statistically indistinguishable across clusters. Within the third clustering, in regions with the largest share of the population under working age relative to the working-age population, the change in the Ruonia rate leads to a greater reduction in the CPI growth rate than in other regions.

Table 2 – Confidence intervals for the coefficient of Ruonia for different clusterings

Clustering (1)	Cluster 1	Cluster 2	Cluster 4
Ruonia lag	(-0.302; -0.133)	(-0.203; -0.029)	(-0.422; 0.006)
Clustering (2)	Cluster 1	Cluster 2	Cluster 4
Ruonia lag	(-0.173; -0.017)	(-0.530; -0.224)	(-0.416; -0.210)
Clustering (3)	Cluster 2	Cluster 3	Cluster 4
Ruonia lag	(-0.525; -0.189)	(-0.2203; -0.081)	(-0.291; -0.092)

Source: authors' calculations.

Table 1 – Results of constructing models within clusterings (1)-(3) (dependent variable: CPI growth rate)

	Clustering (1)			Clustering (2)			Clustering (3)		
	Cluster 1	Cluster 2	Cluster 4	Cluster 1	Cluster 2	Cluster 4	Cluster 2	Cluster 3	Cluster 4
CPI growth rate lag	0.562 ***	0.602 ***	0.506 ***	0.589 ***	0.484 ***	0.658 ***	0.544 ***	0.54 ***	0.603 ***
	(0.023)	(0.019)	(0.091)	(0.019)	(0.075)	(0.037)	(0.055)	(0.045)	(0.026)
GRP growth rate lag	0.123 ***	0.192 ***	0.118 **	0.174 ***	0.125 **	0.06	0.115 **	0.183 ***	0.093 **
	(0.034)	(0.034)	(0.051)	(0.029)	(0.06)	(0.037)	(0.045)	(0.03)	(0.037)
Personal lending indicator lag	0.443 ***	0.589 ***	0.711 ***	0.567 ***	0.404 ***	0.593 ***	0.39 ***	0.563 ***	0.522 ***
	(0.034)	(0.034)	(0.107)	(0.033)	(0.031)	(0.059)	(0.104)	(0.034)	(0.042)
Entrepreneurs lending indicator lag	0.024	0.057 ***	-0.054	0.048 ***	-0.051	0.012	-0.08	0.053 ***	0.03 *
	(0.015)	(0.011)	(0.055)	(0.011)	(0.046)	(0.015)	(0.071)	(0.012)	(0.017)
NEER rate	-0.056 ***	-0.039 ***	-0.059 ***	-0.043 ***	-0.081 ***	-0.035 ***	-0.084 ***	-0.049 ***	-0.041 ***
	(0.006)	(0.009)	(0.023)	(0.006)	(0.019)	(0.013)	(0.024)	(0.007)	(0.008)
Ruonia lag	-0.217 ***	-0.116 ***	-0.208 *	-0.095 **	-0.377 ***	-0.313 ***	-0.357 ***	-0.151 ***	-0.191 ***
	(0.043)	(0.045)	(0.109)	(0.039)	(0.078)	(0.053)	(0.086)	(0.036)	(0.051)
Constant	-0.049 ***	-0.086 ***	-0.012	-0.082 ***	-0.004	-0.019	0.02	-0.075 ***	-0.055 ***
	(0.009)	(0.009)	(0.017)	(0.008)	(0.018)	(0.014)	(0.019)	(0.009)	(0.011)
Number of observations	396	408	182	555	182	207	108	413	423

Thus, the conducted empirical study allows us to draw the following conclusions:

– Some evidence was found in favor of a greater CPI response to a change in the interest rate in regions with a higher share of the population under working age relative to the working-age population.

– Some evidence was found in favor of a greater CPI response to a change in the interest rate in regions with a higher share of lending to individuals in GRP.

– No statistically significant differences were found in the response of the CPI growth rates to a change in the Central Bank rate in regions with different shares of consumption and transfers in GRP.

Construction of dynamic models on panel data using the Blundell-Bond method made it possible to identify some differences in the CPI response to a change in the interest rate in different groups of regions. The identified differences draw attention to the importance of considering the reaction of regions with a high share of the population under working age relative to the working-age population to a change in the interest rate. Similar conclusions can be formulated for regions with a higher share of individual loans in GRP. Taking these differences into account may be relevant when implementing monetary policy.

References

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