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From Russia with love: The resilience of monetary policy transmission channels during Western sanctions and the monetary regime shift

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Abstract

This paper applies a macroeconometric approach to analyze structural shocks and their impact on the key transmission channels of monetary policy in Russia, focusing on the period since the imposition of sanctions and the monetary regime shift beginning in 2014. The approach combines the Lee–Strazicich LM test, used to identify structural breaks, with a Bayesian VAR model that estimates the posterior distribution of shock effects and responses. The model is further extended by dummy variables indicating the periods of imposed sanctions in 2014, the change in the Bank of Russia's monetary policy in 2015, and the Russia–Ukraine conflict in 2022. The findings indicate that the interest rate transmission channel operates in a fully asymmetric manner: the short run is characterized by the monetary policy shift, and the long run — by the conflict in Ukraine, suggesting the implementation of an expansionary and later highly restrictive policy with a temporary dual approach. The credit and exchange rate transmission channels are identified as the two most important stabilization mechanisms for macroeconomic shocks, with the 2015 regime change significantly enhancing the absorption of exogenous shocks. In contrast, the extended price transmission channel exhibits a more moderate capacity for shock absorption, underscoring the Bank of Russia's success in anchoring inflation expectations. Overall, the findings confirm that proactive monetary policy shapes inflation expectations effectively by employing two main tools: managing the key interest rate to control inflationary pressures and managing the ruble exchange rate to stabilize the economy.

Keywords: Russian Federation, monetary regime shift, sanctions, monetary policy, transmission channels, Bayesian VAR.
JEL classification: C11, C50, E40, E42, E52, E58.

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1. Introduction

This paper applies a macroeconometric approach to the analysis of structural macroeconomic shocks transmitted through the various channels of the Russian Federation's monetary policy. The analysis focuses on the period from the imposition of sanctions and the Bank of Russia's monetary regime shift in 2014 onward. The proposed and modified macroeconometric framework evaluates the effects and responses of the Bank of Russia's monetary policy transmission channels to specific macroeconomic shocks and examines their spillovers within a bivariate framework of endogeneity and exogeneity.

Such a framework provides a robust tool for understanding the propagation of macroeconomic shocks through multiple transmission channels — defined here as the interest rate, credit, exchange rate, and extended price channels of monetary policy. The models assume that monetary policy is multipolar, consisting of short-, medium-, and long-run components. The primary approach in constructing the macroeconometric model is the application of the Bayesian vector autoregression (BVAR) model, with the novelty of including and modeling the posterior distribution derived from the BVAR. The BVAR is preceded by the Lee–Strazicich LM (LS–LM) test to detect multiple structural breaks. This modified modeling approach enables the identification of short-, medium-, and long-run structural macroeconomic shocks, as well as the depiction of dynamic relationships and intercorrelations.

The paper follows the approaches of Uhlig (2005) and Giannone et al. (2015) while extending the models proposed by Deryugina and Ponomarenko (2014) and Lomivorotov (2015). It introduces an enhancement primarily based on the BVAR. Compared to Deryugina and Ponomarenko (2014) and Lomivorotov (2015), the overall macroeconomic model incorporates additional variables crucial for the transmission of monetary policy channels in the Russian economy. A key innovation is the inclusion of household inflation expectations as a variable, an extremely relevant indicator for anchoring inflation expectations in the Russian context. Although existing literature often neglects this variable, several studies demonstrate that its impact on monetary policy flexibility and inflation stabilization is significant (see Diegel and Nautz, 2021). Their findings confirm that well-anchored long-run inflation expectations play a crucial role in mitigating the effects of monetary policy: when expectations are well anchored, shocks have a reduced impact on inflation because expectations remain aligned with the central bank's objectives.

Furthermore, Uhlig's (2005) approach is extended by incorporating time dimensions into the analysis of the Bank of Russia's monetary policy responses. In this way, the short-, medium-, and long-run effects of ruble depreciation — resulting from sanctions or persistent inflationary pressures — can be more precisely differentiated. Additional time-horizon restrictions, which were underestimated by Uhlig (2005), are introduced to identify shocks across horizons and to distinguish temporary effects from more persistent ones.

Then, dummy variables are introduced into the overall model structure in place of the sign restrictions used by Uhlig (2005) and by Deryugina and Ponomarenko (2014) — who also employ dummy variables but not for specific economic and geopolitical cycles. This modification allows the marking of distinct monetary policy cycles, such as those introduced by the Western sanctions of 2014,

the monetary regime shift in 2015, and the Russia–Ukraine conflict in 2022. In contrast, Giannone et al. (2015) and Lomivorotov (2015) rely on short-run analyses that do not incorporate specific economic cycles and use a limited sample of macroeconomic variables.

The characteristics of the Russian economy — marked by heavy dependence on energy exports, a restrictive approach to international capital flows, and structural rigidities — further complicate the Bank of Russia's policy responses and deepen the gap in the transmission of shocks to broader macroeconomic indicators. These features justify extending the concept of multipolar monetary policy to include the structure of exogenous shock transmission, thereby providing a more robust insight into the flexibility and responsiveness of the central bank's policy to both endogenous and exogenous challenges.

The remainder of the paper is organized as follows. Section 2 reviews the existing literature on the structural effects on the transmission channels of monetary policy. Section 3 outlines the data and sources used for the quantitative analysis and presents the methodological framework of the macroeconometric model. Section 4 provides a detailed discussion of the empirical findings obtained from the modified model. Section 5 concludes by discussing the findings within a broader macroeconomic context.

2. Literature review

There is a substantial body of empirical research examining macroeconomic shocks and monetary policy using BVAR models. Uhlig (2005) developed a method for identifying structural shocks without relying on restrictive a priori assumptions, allowing a more flexible analysis of shock effects within the endogenous framework of monetary policy. However, this approach does not sufficiently distinguish the effects of shocks across short- and long-run horizons and underestimates the role of nominal rigidities.

Giannone et al. (2015) investigate the optimal selection of a priori assumptions in BVAR models to improve forecasting accuracy and enable more robust modeling of macroeconomic variables. They conclude that conventional priors, such as Minnesota priors, can sometimes be overly restrictive in complex economic systems and propose modifications that enhance flexibility without sacrificing predictive accuracy. Their model mitigates issues associated with small data samples, thereby improving the analysis of monetary policy effects.

Kulikov and Netšunajev (2013) combine a conventional BVAR model with a structural approach, introducing the possibility of regime switching through a Markov-switching SVAR (MS–SVAR) model. Their framework employs heteroskedasticity as a natural instrument for analyzing structural shocks without excessive reliance on strong a priori assumptions. Using this alternative approach, they analyze relationships among macroeconomic variables that vary across business cycles and conclude that shocks in the transmission channels of reference interest rates negatively affect inflationary pressures and economic output.

Deryugina and Ponomarenko (2014) employ a large BVAR model with 14 macroeconomic indicators, applying prior assumptions to stabilize estimates in conditions of limited data availability. They conclude that oil prices are a crucial factor in the Russian economy, though they alone are insufficient to fully

explain its dynamics. Lomivorotov (2015) also applies the BVAR model to analyze the effects of endogenous and exogenous shocks on the Russian economy, distinguishing between endogenous shocks (interest rates and inflation) and exogenous shocks (oil prices and sanctions). He finds that exogenous shocks have significantly shaped the monetary decisions of the Bank of Russia, which has used interest rates and foreign exchange interventions as primary tools to mitigate their effects. However, in certain periods, the effectiveness of these instruments has been limited due to the high level of dollarization in the Russian economy and constrained foreign exchange reserves.

Over the past decade, the Bank of Russia has largely pursued a restrictive monetary policy to stabilize the exchange rate, curb inflationary pressures, and simultaneously increase foreign exchange reserves to enhance resilience against exogenous shocks. Implementing such a policy has become a key mechanism for mitigating the adverse effects of sanctions and ensuring economic stability.

Mironov (2015) analyzes historical trends and the structural characteristics of the Russian economy, applying the Marshall–Lerner condition to the Russian context. He concludes that the contractionary monetary policy cycle following 2015 increased production costs. Although this cycle somewhat reduced inflationary pressures, household consumption declined significantly and inflation expectations rose. Furthermore, he argues that devaluation, in the absence of adequate structural reforms, can exacerbate Russia's economic problems by triggering a devaluation—inflation spiral in which depreciation and inflationary effects reinforce each other, worsening overall economic conditions. Mironov also concludes that inflation in Russia is not solely the result of monetary and fiscal factors but stems from structural weaknesses in the economy, a high dependence on raw-material exports, and vulnerability to exogenous shocks such as fluctuations in oil prices and sanctions.

Ivanova (2016) expands on these findings, indicating that inflation is significantly driven by cost-push shocks—particularly rising import prices and structural weaknesses in the Russian economy. She notes that changes in the Bank of Russia's monetary regime have had a significant impact on the dynamics of inflation.

Ilyashenko and Kuklina (2017) compare monetarist and Keynesian approaches to explaining inflation, critically analyzing the quantity theory of money and its applicability to the Russian economy. They conclude that economic monopolization and rising energy and raw-material prices are key drivers of cost-push inflation. These factors increase production costs, which are then passed on to consumers through higher prices. Moreover, the authors highlight that ruble depreciation significantly influences inflationary pressures, with periods of high depreciation coinciding with notable increases in the general price level.

Giannone et al. (2015) also examine the application of BVAR models for analyzing macroeconomic shocks and short-run forecasts, emphasizing the flexibility and robustness of this approach. Their findings indicate that BVAR models enable precise identification of macroeconomic shocks and differentiation between exogenous and endogenous effects on other macroeconomic variables within the model. They argue that the transmission mechanisms of shocks largely depend on the observed time horizon and economic cycles.

Borzykh (2016) applies a time-varying parameter factor-augmented VAR (TVP–FAVAR) model to investigate the credit transmission channel in Russia.

Her findings suggest that large private banks are more sensitive to changes in monetary policy than state-owned banks and that credit transmission channels primarily operate through large private banks. She concludes that changes in the MIACR interbank interest rate significantly affect the lending volume of large banks: an increase in the MIACR rate reduces credit demand, whereas a decrease stimulates it.

Wolf (2020) re-evaluates the model by Uhlig (2005), pointing out the sensitivity of its sign restrictions to expansionary supply and demand shocks, which are often misinterpreted as contractionary monetary policy shocks. According to his findings, such shocks appear to stimulate, rather than reduce, economic output. Arias et al. (2019) introduce an alternative approach combining sign restrictions with a zero restriction on the systematic component of monetary policy. Their analysis demonstrates that Uhlig's model, with high posterior probability, fails to satisfy monetary-policy-rule constraints. Cheng and Yang (2020) extend the model by Arias et al. (2019) by incorporating narrative sign restrictions to identify monetary policy shocks more precisely. Their findings indicate that contractionary monetary policy shocks, with high posterior probability, lead to a decline in economic output.

Rudakovski (2023) conducts a comparative analysis of the capabilities of BVAR and standard VAR models in studying the Russian economy. His findings suggest the superiority of BVAR models, which more accurately predict inflation and ruble-exchange-rate dynamics during crisis cycles, whereas standard VAR models tend to underestimate or overestimate the effects of shocks. Devianto et al. (2023) use the BVAR model to analyze the effects of macroeconomic shocks and to forecast selected variables. They emphasize that BVAR models, by applying Bayesian priors to address parameter overfitting, provide more robust estimates than standard VAR models, particularly when time-series data are limited. Their analysis demonstrates that monetary shocks are better explained through BVAR models, as these allow the integration of uncertainty into the estimation process.

Finally, Styrin (2024) investigates the impact of borrowing and import restrictions on monetary-policy transmission in small open economies. He finds that international restrictions lead to an increase in interest rates on external sovereign debt, and higher interest rates further contribute to inflationary pressures as borrowing costs translate into higher prices for final goods. Furthermore, Styrin highlights that, under such inflationary pressures, monetary policy becomes more restrictive because central banks are compelled to raise interest rates to counteract high inflation. This underscores that the presence of financial and trade restrictions significantly alters the transmission dynamics of monetary policy in small open economies.

3. Data and methodology

3.1. Data

The macroeconometric model in this paper is divided into five dependent models, analyzing a monthly time series from 2014 through early 2025. The models are structured around four key transmission channels of monetary policy — namely, the interest rate, credit, exchange rate, and extended price channels. The paper employs seven independent macroeconomic variables, each acting as a separate

vector within a specific transmission channel. This means that not all variables are necessarily included in every channel; instead, they are allocated according to the channel in which they exert the greatest influence.

For example, the independent variable representing Brent oil prices is included exclusively in the exchange rate transmission channel, as it does not significantly affect the other channels. Accordingly, the dependent variables in the models are: the Bank of Russia's key interest rate (Δ*cbr*) in the interest rate transmission channel; the total circulation of loans granted to the household sector (Δ*loans*) in the credit transmission channel; the real effective exchange rate of the ruble (Δ*reer*) in the exchange rate transmission channel; and both core inflation (Δ*ccpi*) and household-perceived inflation (Δ*cpiexp*) in the extended price transmission channel of monetary policy.

Quantitative data on the monetary aggregates M1 and M2 were obtained from the Bank of Russia, where M1 represents the amount of cash in circulation and M2 includes M1 plus savings deposits and short-run securities. Data on the key interest rate were obtained from the Bank of Russia[1] and Rosstat[2] (*cbr*), while data on the key interest rates of the U.S. Federal Reserve (Fed) and the European Central Bank were sourced from FRED[3] (*fed*) and the ECB[4] (*ecb*).

Interest rates are analyzed as key monetary instruments in the economies of Russia, the United States, and the European Union, where they serve as exogenous shocks affecting the endogeneity of Russian monetary policy within the transmission channels. Data on the long-run interest rate, which refers to household-sector loans with maturities of three years or more, were obtained from the Bank of Russia (*lcr*). Data on total loans in the economy, referring to the household sector, were also obtained from the Bank of Russia (*loans*).

Data on the export of oil, natural gas, and coal were obtained from the Bank of Russia, with cross-checks performed against U.S. FRED data (*cmdex*). Data on the real effective exchange rate of the ruble were obtained from the Bank of Russia (*reer*), with the real exchange rate serving as a direct indicator of the strength of the Russian economy in both domestic and international markets. Finally, data on the global price of Brent oil were obtained from FRED (*brent*), while data on core inflation (*ccpi*) and household-perceived inflation (*cpiexp*) were obtained from the Bank of Russia.

3.2. Macroeconometric model

The modification of the macroeconometric model begins with testing for unit-root stationarity using the Lee–Strazicich LM test. Given the likelihood of multiple breaks in the time series, as well as the complexity of the macroeconomic variables, the LS–LM test is a more appropriate choice for unit-root testing. This approach allows for the simultaneous detection of multiple structural breaks in complex time series, where the breaks are visible but cannot be precisely specified (see Lee and Strazicich, 2003).

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[1] Bank of Russia. *Monetary and financial statistics*. https://www.cbr.ru/eng/statistics/macro_itm/dkfs/

[2] Rosstat (Federal State Statistics Service). *Official statistics database*. https://eng.rosstat.gov.ru/folder/11335

[3] Federal Reserve Bank of St. Louis (FRED). *Economic data series*. https://fred.stlouisfed.org

[4] European Central Bank (ECB). *Statistical data warehouse*. https://data.ecb.europa.eu/main-figures/ecb-interest-rates-and-exchange-rates/key-ecb-interest-rates

The LS–LM test comprises two main models, depending on how the structural breaks occur. *Model A* estimates a break only in the level, whereas *Model C* estimates breaks in both the level and the trend. For a time series y_t with structural breaks, the modified model according to Lee and Strazicich (2003) is expressed as follows:

$$\Delta y_t = \delta' \Delta Z_t + \Phi S_{t-1} + \sum_{j=1}^{k} \delta_j \Delta S_{t-j} + \varepsilon_t, \tag{1}$$

where $\Delta y_t = y_t - y_{t-1}$ denotes the first difference of the time series y_t; δ' denotes the regression parameters; Z_t denotes the vector of exogenous variables capturing breaks in levels and/or in both levels and trends; S_{t-1} denotes the modified residual accounting for structural breaks, k denotes the number of lags included to correct for autocorrelation; ε_t denotes the white-noise error term.

Lee and Strazicich (2004) extend the test to allow for a single endogenous break, which is useful when only one significant break is detected. In Model A, the structure of the vector $Z_t = [1, t, D_{1t}, D_{2t}]$ allows for up to two breaks in the level. In Model C, which incorporates at least two endogenous breaks in both level and trend, the structure of the vector Z_t is expanded by including additional variables DT_{1t}, DT_{2t}, corresponding to the second break. The vector then becomes $Z_t = [1, t, D_{1t}, D_{2t}, DT_{1t}, DT_{2t}]$, where $D_{1,2t}$ and $DT_{1,2t}$ are dummy variables for the first and second breaks, respectively.

These dummy variables are defined as follows:

$$D_{1,2t} = \begin{cases} 1, \text{ if } t > TB_{1,2} \\ D_{1,2t}, \text{ otherwise } 0, \end{cases}$$

$$DT_{1,2t} = \begin{cases} t - TB_{1,2}, \text{ if } t > TB_{1,2} \\ DT_{1,2t}, \text{ otherwise } 0, \end{cases} \tag{2}$$

where $TB_{1,2}$ represent the breakpoints of the first and second breaks, noted separately as TB_1 and TB_2.

Preliminary results of the Lee–Strazicich LM test are presented in Table 1. The characteristics of the macroeconomic variables used in the LS–LM test required the application of both Model A and Model C, estimating breaks in the level and in both the level and the trend. The results indicate that only the exogenous variable representing the key interest rate of the European Central Bank required the use of Model A, whereas all other variables necessitated the use of Model C. Stationarity was established for five variables — namely, the monetary aggregates M1 and M2, total household-sector loans, the key interest rate of the ECB, and the real effective exchange rate of the ruble. All other variables exhibited non-stationarity in their levels, which consequently leads to the rejection of the null hypothesis.

The BVAR model is now constructed, incorporating dummy variables and selected Minnesota/Litterman priors. Given the objective of examining structural macroeconomic shocks on the transmission channels of monetary policy within a relatively limited time series (132 observations), the BVAR model applies an approach that integrates prior assumptions in accordance with Bayes' theorem — unlike the standard VAR model, which is not used in this paper.

The introduced dummy variables represent key structural macroeconomic shocks in the short, medium, and long run, while the posterior distribution derived

Table 1
Results of Lee–Strazicich LM test.

Variable	Model A — Level Model C — Level and trend							
	t-statistic	Critical value			Model	Break 1	Break 2	Decision
		1%	5%	10%				
*m1***	–5.88	–6.16	–5.49	–5.14	C	06/2020	01/2023	+
*m2**	–5.38	–4.64	–4.08	–3.80	C	07/2022		+
*loans**	–6.69	–5.83	–5.32	–5.05	C	09/2015	03/2018	+
cbr	–4.19	–6.03	–5.52	–5.22	C	05/2015	05/2020	–
lcr	–4.47	–6.16	–5.49	–5.14	C	10/2020	11/2023	–
*ecb**	–4.48	–4.00	–3.40	–3.09	A	10/2022		+
fed	–4.94	–6.03	–5.52	–5.22	C	01/2020	03/2023	–
cmdex	–4.36	–6.11	–5.55	–5.30	C	09/2018	08/2021	–
ccpi	–4.67	–6.07	–5.49	–5.21	C	10/2016	02/2022	–
cpiexp	–4.26	–6.07	–5.49	–5.21	C	01/2017	07/2021	–
*reer**	–6.51	–5.83	–5.32	–5.05	C	02/2022	02/2023	+
brent	–4.56	–6.11	–5.42	–5.16	C	12/2019	05/2021	–

Note: Decision on the stationarity of each variable: *stationarity at the 1% level, **at the 5% level.
Source: Author's calculations based on Lee–Strazicich LM test.

from the BVAR model is employed to stabilize parameter estimates by incorporating information from both the likelihood function and the prior distributions. Sims and Zha (1998) emphasize that the use of posterior distributions allows for a more robust assessment of structural breaks in limited data series and recommend employing Minnesota priors along with an extended model that includes dummy variables to capture key shocks. In this way, the posterior distribution reflects the historical information contained in the prior distributions.

Canova (2007) states that the posterior distribution plays a crucial role in the decomposition of structural shocks and in quantifying their impact on macroeconomic variables. Franta (2012) argues that the main advantage of Bayesian estimation lies in the fact that imposing prior assumptions introduces additional information into the macroeconometric model, thereby making the analysis more accurate and precise. Giannone et al. (2015) likewise assert that the posterior distribution enables the model to account for complex economic processes — including the influence of exogenous variables on endogenous ones and the effects of structural macroeconomic shocks.

Accordingly, the modified model for the short, medium, and long run — incorporating dummy variables and employing the posterior distribution derived from Minnesota/Litterman priors in this paper — is specified as follows:

$$\Delta y_t^{(l)} = \alpha_l + \sum_{i=1}^{q} \Phi_{k,i}^{(l)} + \sum_{j=1}^{q} X_j \Lambda_{t-j} + \sum_{n=1}^{q} \Gamma_{n,m} \delta_t^{(n)} + \varepsilon_t^{(l)}, \tag{3}$$

where l denotes the chronological number related to each model separately; m denotes the chronological number of the variable; k denotes the chronological number of the dependent variable; q denotes the total number of separate variables (dependent, dummy, independent); $\Delta y_t^{(l)}$ denotes the dependent variable in the five models (Δcbr, $\Delta loans$, $\Delta reer$, $\Delta ccpi$, $\Delta cpiexp$); α_l denotes the constant in the model; $\sum_{i=1}^{q}$ denotes the lag of the dependent variable within its own model; $\Phi_{k,i}^{(l)}$ denotes the parameter for the lagged dependent variables; $\sum_{j=1}^{q}$ denotes

the total number of dummy variables in the model; X_j denotes the parameter for the dummy variables; Λ_{t-j} denotes the dummy variables representing structural shocks, defined as follows: $\Lambda_{1,t}$ — Western sanctions (2014), $\Lambda_{2,t}$ — monetary policy change (2015), $\Lambda_{3,t}$ — the Russia–Ukraine conflict (2022); $\sum_{n=1}^{q}$ denotes the total number of independent variables; $\Gamma_{n,m}$ denotes the parameters of the independent variables; $\delta_t^{(n)}$ denotes the independent variables; and $\varepsilon_t^{(l)}$ corresponds to the random errors in the models.

When the variables are incorporated into the BVAR models, they are expressed in reduced form as follows.

For the interest rate transmission channel:

$$\begin{aligned}\Delta cbr_t = {} & \alpha_1 + \sum_{i=1}^{1} \Phi_{1,1}\, cbr_{t-i} + \sum_{j=1}^{3} X_{1,1}\Lambda_{sanctions\ 2014} + \\ & + X_{1,2}\Lambda_{monetary\ policy\ changes\ 2015} + X_{1,3}\Lambda_{conflict\ 2022} + \\ & + \sum_{n=1}^{8} \Gamma_{1,1}\, M1_t + \Gamma_{1,2}\, M2_t + \Gamma_{1,3}\, lcr_t + \Gamma_{1,4}\, fed_t + \\ & + \Gamma_{1,5}\, ecb_t + \Gamma_{1,6}\, spread_t + \Gamma_{1,7}\, ccpi_t + \Gamma_{1,8}\, cpiexp_t + \varepsilon_{1,t}.\end{aligned}$$

For the credit transmission channel:

$$\begin{aligned}\Delta loans_t = {} & \alpha_2 + \sum_{i=1}^{1} \Phi_{2,1}\, loans_{t-i} + \sum_{j=1}^{3} X_{2,1}\Lambda_{sanctions\ 2014} + \\ & + X_{2,2}\Lambda_{monetary\ policy\ changes\ 2015} + X_{2,3}\Lambda_{conflict\ 2022} + \\ & + \sum_{n=1}^{8} \Gamma_{2,1}\, M1_t + \Gamma_{2,2}\, M2_t + \Gamma_{2,3}\, cbr_t + \Gamma_{2,4}\, lcr_t + \\ & + \Gamma_{2,5}\, fed_t + \Gamma_{2,6}\, ecb_t + \Gamma_{2,7}\, ccpi_t + \Gamma_{2,8}\, cpiexp_t + \varepsilon_{2,t}.\end{aligned}$$

For the exchange rate transmission channel:

$$\begin{aligned}\Delta reer_t = {} & \alpha_3 + \sum_{i=1}^{1} \Phi_{3,1}\, reer_{t-i} + \sum_{j=1}^{3} X_{3,1}\Lambda_{sanctions\ 2014} + \\ & + X_{3,2}\Lambda_{monetary\ policy\ changes\ 2015} + X_{3,3}\Lambda_{conflict\ 2022} + \\ & + \sum_{n=1}^{6} \Gamma_{3,1}\, cbr_t + \Gamma_{3,2}\, brent_t + \Gamma_{3,3}\, fed_t + \Gamma_{3,4}\, ecb_t + \\ & + \Gamma_{3,5}\, cmdex_t + \Gamma_{3,6}\, ccpi_t + \varepsilon_{3,t}.\end{aligned}$$

For the extended price transmission channel:

$$\begin{aligned}\Delta cppi_t = {} & \alpha_4 + \sum_{i=1}^{1} \Phi_{4,1}\, cppi_{t-i} + \sum_{j=1}^{3} X_{4,1}\Lambda_{sanctions\ 2014} + \\ & + X_{4,2}\Lambda_{monetary\ policy\ changes\ 2015} + X_{4,3}\Lambda_{conflict\ 2022} + \\ & + \sum_{n=1}^{6} \Gamma_{4,1}\, M1_t + \Gamma_{4,2}\, M2_t + \Gamma_{4,3}\, cbr_t + \Gamma_{4,4}\, lcr_t + \\ & + \Gamma_{4,5}\, cpiexp_t + \Gamma_{4,6}\, reer_t + \varepsilon_{4,t}.\end{aligned}$$

$$\begin{aligned}\Delta cpiexp_t = {} & \alpha_5 + \sum_{i=1}^{1} \Phi_{5,1}\, cpiexp_{t-i} + \sum_{j=1}^{3} X_{5,1}\Lambda_{sanctions\ 2014} + \\ & + X_{5,2}\Lambda_{monetary\ policy\ changes\ 2015} + X_{5,3}\Lambda_{conflict\ 2022} + \\ & + \sum_{n=1}^{6} \Gamma_{5,1}\, M1_t + \Gamma_{5,2}\, M2_t + \Gamma_{5,3}\, cbr_t + \Gamma_{5,4}\, lcr_t + \\ & + \Gamma_{5,5}\, cppi_t + \Gamma_{5,6}\, reer_t + \varepsilon_{5,t}.\end{aligned}$$

All dummy variables (Λ_{t-j}) are included in each model but their parameters (X_j) differ across models.

The structural breaks defined by dummy variables are specified as follows: $\Lambda_{2014} = 1$ from March 2014 onward (Western sanctions), $\Lambda_{2015} = 1$ from January 2015 onward (monetary policy changes), and $\Lambda_{2022} = 1$ from February 2022 onward (the Russia–Ukraine conflict).

Given the selected Minnesota/Litterman priors with incorporated dummy variables in this paper, the general hyperparameterized prior specification is expressed as follows. The prior distribution is $\beta \sim \mathcal{N}(\beta_0, V_0)$ with a diagonal prior variance matrix V_0. For the l-th lag of variable i in equation j, the prior variance can be written as:

$$Var(\beta_{j,i,l}) = \begin{cases} \lambda_1^2 \left(\frac{\sigma_j^2}{\sigma_i^2}\right) l^{-2\lambda_3}, & i = j \text{ (own lags)} \\ \lambda_1^2 \lambda_2^2 \left(\frac{\sigma_j^2}{\sigma_i^2}\right) l^{-2\lambda_3}, & i \neq j \text{ (cross-lags)}, \end{cases} \tag{4}$$

where β_0 denotes the prior mean; σ_j^2 and σ_i^2 are residual variances from univariate AR estimations used for scaling; the hyperparameter λ_1 controls the overall tightness of the prior, λ_2 imposes additional shrinkage on cross-variable lags, and λ_3 governs the rate of lag decay (i.e., the power-law decay of higher-order lags). Note that hyperparameters λ_1 and λ_2 appear squared in the variance expression because the Minnesota prior is specified in terms of standard deviations.

After specifying the prior distribution, information from the data is combined with the prior to obtain the posterior distribution, which can be written as:

$$p(\beta \mid Y, X) \propto p(Y \mid X, \beta) p(\beta), \tag{5}$$

where $p(Y|X, \beta)$ denotes the likelihood function; $p(\beta)$ denotes the prior distribution. Under the assumption of a Gaussian likelihood and a normal prior, the posterior distribution is also Gaussian. The posterior mean is given by:

$$\mathbb{E}(\beta \mid Y, X) = (V^{-1} + X'X)^{-1}(V^{-1}\beta_0 + X'Y), \tag{6}$$

where V^{-1} denotes the inverse prior covariance matrix; X denotes the matrix of regressors; Y denotes the vector of dependent variables; β_0 denotes the prior mean, which implies that the posterior covariance matrix is $\bar{V} = (V^{-1} + X'X)^{-1}$.

4. Findings

Based on preliminary testing, the optimal number of lags was determined to be one, given the relatively demanding set of macroeconomic and dummy variables used in this paper. All five models with the dependent variables were implemented with different optimal lambda hyperparameters, with λ_1 generally ranging from 0.2 to 0.3, λ_2 from 0.8 to 1, and λ_3 from 0.2 to 0.3. In the overall analysis, the posterior variance is used to obtain findings for the short, medium, and long run. In the graphical presentation, the short run refers to a period of

12–18 months, the medium run to 18–60 months, and the long run to periods beyond 60 months.

In all transmission-channel models, Cholesky-adjusted orthogonalization is employed as the sole decomposition method, enabling the depiction of contemporaneous structural shocks — provided that the order of the exogenous and endogenous variables is correctly specified within the BVAR model. In this paper, this means that exogenous geopolitical shocks are placed first in all models, immediately following the primary dependent variables. Next come the exogenous variables that may influence the endogenous transmission channels, followed by the endogenous variables that react to exogenous structural changes but cannot affect them contemporaneously.

4.1. Interest-rate transmission channel

Fig. 1 illustrates the shock response of the Bank of Russia's key interest rate (Δcbr) to the structural-shock effects of other independent exogenous and endogenous variables. The model required the application of lambda hyperparameters $\lambda_1 = 0.3$, $\lambda_2 = 0.8$, and $\lambda_3 = 0.3$. Fig. 1 shows that a contemporaneous and isolated shock of 1 basis point (bp) in the Bank of Russia's key interest rate results in an effective shock change of 1.5–1.7 bps. In the short run, the key interest rate exerts a pronounced effect, whereas in the medium and long run it primarily exhibits a cyclical pattern.

The findings indicate that an increase in the monetary aggregate negatively affects the key interest rate in the short run, while in the medium and long run — despite cyclical movement — the effect remains predominantly positive within the interest-rate channel. Under a restrictive monetary policy, the central bank raises interest rates and limits money-supply growth.

The effects of the key interest rates of the U.S. Federal Reserve and the European Central Bank are asymmetric and heterogeneous. In the short run, they manifest simultaneously, whereas in the medium and long run they become entirely asymmetric. This pattern reflects the closer economic and financial integration between Russia and the European Union compared to the United States. An increase in the ECB's rate enhances the real value of Russian export

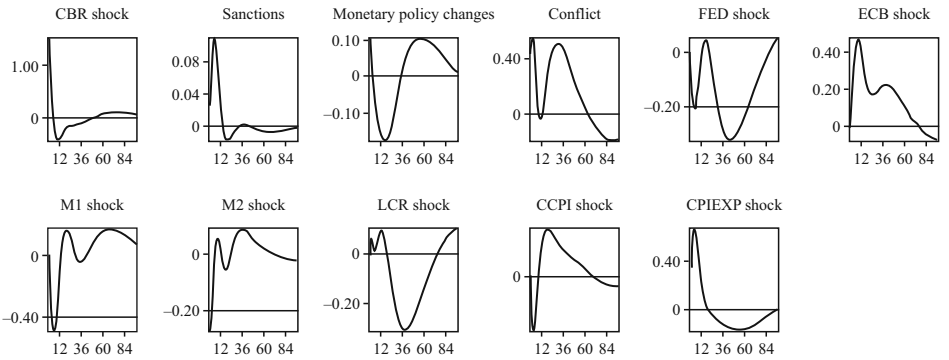

Fig. 1. Posterior effects of structural shocks through the interest-rate transmission channel.

Source: Author's calculations.

revenues denominated in euros, contributing to ruble stabilization, whereas a Fed rate increase has a deflationary effect that worsens Russia's trade balance and influences its monetary decisions negatively.

The asymmetric behavior of core and perceived inflation is consistent with economic-theory postulates asserting that the central bank seeks to prevent excessive reactions of the domestic economy under conditions of instability and in the absence of large real shocks. In the short run, a rise in inflation expectations may stimulate higher consumption and reduce the need for a strongly restrictive monetary policy. However, in the medium and long run, if rising inflation expectations are not matched by higher core inflation, monetary policy may remain expansionary.

4.2. Credit-transmission channel

Fig. 2 illustrates the shock response of total long-run household loans (Δ*loans*) to the structural-shock effects of other variables. The model required $\lambda_1 = 0.3$, $\lambda_2 = 1$, and $\lambda_3 = 0.2$. A contemporaneous and isolated shock of 1 bp in total household loans produces an effective change of 1.2–1.3 bps.

Two key conclusions emerge from the credit channel. First, both the credit channel and monetary decisions demonstrate resilience to the effects of sanctions, attributable to the transformation of Russian monetary policy since 2015 and the introduction of stronger stabilization mechanisms. Second, there is a significant transmission of shock effects from exogenous structures to endogenous variables, with these shocks being more pronounced in the credit channel than in the interest-rate channel.

The effects of the Russia–Ukraine conflict, interest-rate changes (*cbr* and *lcr*), and inflation variables (*ccpi* and *cpiexp*) can be interpreted as a coherent set of factors uniformly influencing household credit demand. Exogenous geopolitical events, such as invasions or wars, increase uncertainty and household costs, thereby raising both core inflation and inflation expectations. In response, the Bank of Russia adopts a restrictive monetary policy to curb inflation, leading to higher interest rates. Hence, in the short and medium run, all shock effects on credit demand are negative, as restrictive policy discourages borrowing while encouraging savings.

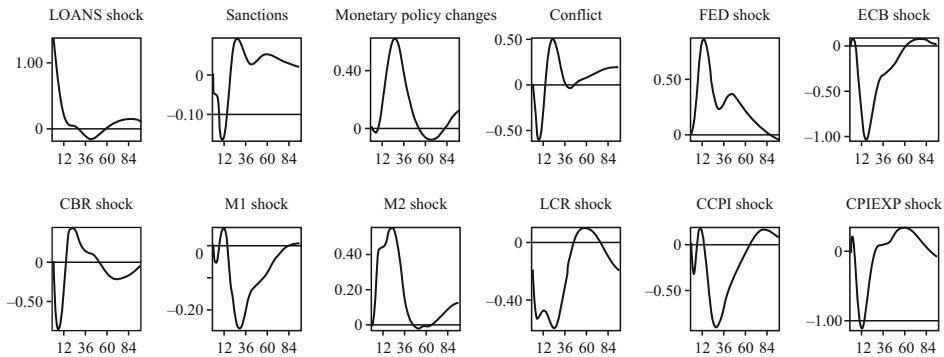

Fig. 2. Posterior effects of structural shocks through the credit-transmission channel.

Source: Author's calculations.

The asymmetry between foreign-policy shocks also persists: a Fed rate hike tends to increase Russian credit demand in the short run, while an ECB rate hike reduces it. The difference reflects the deeper financial and trade links between Russia and the European Union. The imposed European sanctions further amplify financing costs and limit access to EU capital markets. Meanwhile, Fed policy changes may, through the dollar market and Russia's energy exports, temporarily strengthen the ruble and improve domestic liquidity, thereby stimulating credit. Nevertheless, Russia's connection with the EU remains more important, as European banks play a key role in trade financing.

4.3. Exchange-rate transmission channel

Fig. 3 shows the shock response of the real effective exchange rate of the ruble ($\Delta reer$) to structural shocks in other variables. The model required $\lambda_1 = 0.3$, $\lambda_2 = 1$, and $\lambda_3 = 0.3$. A contemporaneous and isolated 1 bp shock in the real effective exchange rate results in a significant effective change of 8–8.3 bps.

The findings indicate that both endogenous and exogenous shocks have stronger effects on the exchange-rate channel than on the interest-rate or credit channels. The ruble exchange rate is highly sensitive to exogenous indicators — such as global oil prices and policy-rate changes by the Fed and the ECB — as well as to geopolitical indicators like regime shifts and the Russia–Ukraine conflict in 2022.

In the short run, higher Brent oil prices exert a positive effect, increasing foreign-exchange inflows and supporting ruble appreciation. Conversely, increases in foreign key interest rates produce asymmetric effects: ECB rate hikes appreciate the ruble due to trade integration, while Fed rate hikes depreciate it through deflationary and financial-market channels. Despite sanctions that weaken Russia's direct ties to dollar-denominated capital flows, Fed policy still affects the ruble indirectly via the oil and commodity markets.

Increases in oil, gas, and coal exports are expected to support ruble appreciation, as they generate additional foreign-exchange inflows. Starting from the Russia–Ukraine conflict in 2022, Russia redirected much of its export capacity to Southeast Asia — mainly China and India — and this reorientation proved crucial for maintaining ruble stability despite Western sanctions.

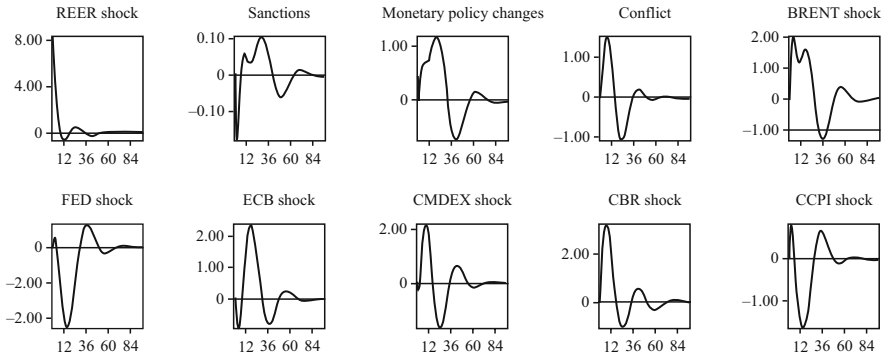

Fig. 3. Posterior effects of structural shocks through the exchange-rate transmission channel.

Source: Author's calculations.

4.4. Extended-price transmission channel

Fig. 4 presents the shock effects on core inflation (Δ*ccpi*), and Fig. 5 shows the effects on household inflation expectations (Δ*cpiexp*). Although both belong to the price channel of monetary policy, they are displayed separately to comply with the Cholesky-decomposition ordering for contemporaneous shocks. Both models use $\lambda_1 = 0.3$, $\lambda_2 = 1$, and $\lambda_3 = 0.2$. A contemporaneous and isolated 1 bp shock in core inflation results in an effective change of 1.2–1.4 bps.

The 2015 policy shift — marked by the introduction of a floating exchange rate and a 4% inflation target — initially exerted a negative short-run effect on inflation, but in the medium and long run it activated a stabilization mechanism. During 2015–2016, contractionary policy reduced aggregate demand, and in the following years sustained restrictiveness stabilized both the ruble and prices.

The inverse effects of monetary-aggregate shocks (M1, M2) on inflation are consistent with modern monetary theory and the New Keynesian framework, implying that increases in liquidity can generate opposing short-term dynamics depending on supply elasticity. Under contractionary policy, additional liquidity in M2 may trigger structural adjustments in the Russian financial system due to capital controls and institutional changes.

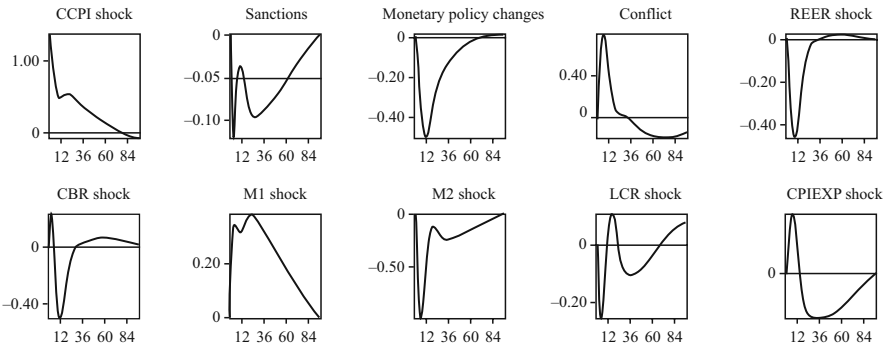

Fig. 4. Posterior effects of structural shocks through the core-inflation price channel.

Source: Author's calculations.

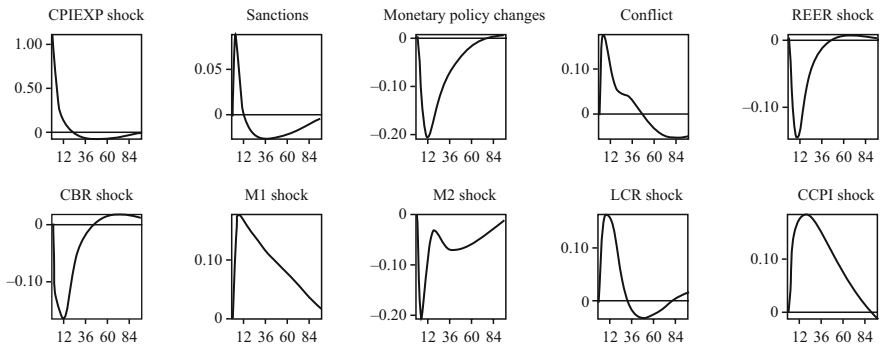

Fig. 5. Posterior effects of structural shocks through the household-inflation-expectations price channel.

Source: Author's calculations.

Core inflation and inflation expectations are symmetrically related: shocks to expectations follow the pattern of shocks to core inflation with a strong cyclical component. The limited feedback from expectations to core inflation suggests that the Bank of Russia is successfully anchoring inflation expectations through restrictive policy, thereby confirming its credibility.

A contemporaneous and isolated 1 bp shock in household inflation expectations produces an effective change of 1.0–1.1 bps. Unlike the interest-rate, credit, and exchange-rate channels, exogenous and endogenous shocks have a relatively minor impact on the price channel. This implies that the Bank of Russia's stabilization mechanisms effectively anchor inflation expectations and limit their transmission to prices. The findings also highlight that monetary-policy stabilization primarily operates through the credit and exchange-rate channels, where exogenous effects are stronger than within the price channel. These findings underscore the importance of Russia's export revenues and foreign-exchange inflows, as well as the role of state intervention, since credit policies appear to function largely independently of interest-rate movements.

4.5. Robustness check

To assess the robustness of the overall BVAR model, Table 2 presents the posterior variance decomposition of macroeconomic shocks, applying a modified ordering of variables and a Monte Carlo error correction. This approach is intended to identify whether any significant anomalies occur in the variation of shocks relative to the baseline dependent models. The variations shown in Table 2 reflect the maximum contributions of individual shocks at the short-run (up to 18 months, labeled SR), medium-run (18–60 months, labeled MR), and long-run (beyond 60 months, labeled LR) horizons.

The findings indicate minimal and statistically insignificant deviations from the baseline models and their shock variations, confirming the model's robustness in the first stage of analysis. As expected, the largest reallocations of shocks occur through the three dominant transmission channels: the interest-rate, credit, and exchange-rate channels. Within the extended price channel, particular emphasis falls on the influence of the monetary aggregate M2 and on the effects of the Russia–Ukraine conflict in 2022 on core inflation and inflation expectations.

In the short run, the variance of the shock to M2 accounts for 26.43% of the total change in the level of core inflation. In the medium and long run, this share gradually declines to 21.04% and 17.56%, respectively. These findings point to pronounced symmetry in the dynamics of money-supply flows, credit conditions, and inflationary pressures. They also confirm that, in the short run, the Bank of Russia pursued an expansionary monetary and credit policy, whereas in the medium and long run it gradually shifted to a restrictive stance — demonstrating a temporary duality of monetary policy across the phases of the conflict in Ukraine.

Accordingly, the strong short-run impact of M2 implies that abrupt changes in money supply exert significant inflationary effects on the economy. In contrast, the medium-run and long-run impacts of M2 gradually diminish as the transmission mechanisms of monetary policy are reallocated through other channels — particularly the credit and exchange-rate channels, which largely shape the dynamics of inflationary pressures.

Table 2
Model robustness check: macroeconomic shocks in transmission channels.

Variable	Posterior variance of macroeconomic shocks in transmission channels														
	Δ*cbr*			Δ*loans*			Δ*reer*			Δ*ccpi*			Δ*cpiexp*		
	SR	MR	LR	SR	MR	LR	SR	MR	LR	SR	MR	LR	SR	MR	LR
cbr	–	–	–	20.51	10.14	6.40	22.60	19.09	15.97	6.08	6.45	4.81	5.09	5.47	4.71
loans				–	–	–									
reer							–	–	–	6.34	6.30	4.35	3.36	3.45	2.92
ccpi	10.15	15.68	15.45	3.20	12.82	12.71	4.40	5.50	5.45	–	–	–	5.65	13.50	13.58
cpiexp	8.16	7.72	8.33	22.11	22.07	11.90				3.38	7.47	8.10	–	–	–
m1	18.16	14.85	10.20	1.24	16.69	17.00				5.30	12.07	12.30	6.19	10.70	11.13
m2	1.28	1.41	1.25	5.28	6.64	5.35				26.43	21.04	17.56	4.97	5.16	5.53
lcr	1.65	5.03	5.11	8.55	8.50	7.61				1.68	1.26	1.37	5.11	5.27	4.57
fed	2.46	6.89	7.43	14.93	15.14	10.21	8.51	10.90	10.36						
ecb	9.04	8.80	7.95	10.84	16.74	13.25	6.11	10.61	10.59						
spread[a)]	18.93	13.05	8.46												
cmdex							8.14	10.26	10.24						
brent							8.82	10.88	10.90						
$A_{1,t}$	0.45	0.37	0.23	0.51	0.46	0.31	0.04	0.05	0.05	0.43	0.76	0.79	0.67	0.65	0.70
$A_{2,t}$	3.12	3.75	3.10	1.15	5.92	5.48	2.26	4.53	4.55	8.21	9.07	7.76	7.16	9.11	8.70
$A_{3,t}$	8.88	16.38	16.63	7.96	5.49	4.50	4.06	4.26	4.00	17.74	15.71	12.87	4.27	4.19	4.47

Note: SR—the maximum contributions of individual shocks at the short-run horizons (up to 18 months), MR—the maximum contributions of individual shocks at the medium-run (18–60 months) horizons, LR—long-run (beyond 60 months) horizons. [a)] Added variable to extend the robustness of the model.
Source: Author's calculations.

In the second and final stage, White tests for heteroskedasticity were conducted and indicate homoskedasticity of the models, implying that the variability of residuals is not systematically related to changes in fitted values. Likewise, CUSUM and CUSUMQ tests show that the parameters of all models remain stable throughout the observed period, with their values staying within acceptable bounds. These robustness tests confirm that the models are correctly specified and that no structural breaks occurred in the parameters over the study period, thereby reinforcing the reliability of the research findings. Consequently, the interpretations of the models can be regarded as robust, allowing for concrete and relevant macroeconomic conclusions.

5. Discussion and conclusion

The findings clearly demonstrate that the Bank of Russia's monetary policy transmission channels react asymmetrically to structural shocks in the short, medium, and long run, with the credit and exchange-rate channels playing dominant roles as primary stabilization mechanisms. However, the results also highlight the complexity of the dynamics within these channels, as exogenous shocks — such as changes in the monetary policies of the Federal Reserve and the European Central Bank — exert significant asymmetric and heterogeneous effects on the endogenous aspects of Russia's monetary policy.

An analysis of the short-run period, marked by the monetary-policy regime shift in 2015, and the long-run period, characterized by the effects of the Russia–Ukraine conflict in 2022, reveals completely asymmetric behavior of the interest-rate channel. This reflects the implementation of an expansionary monetary policy that was subsequently followed by a restrictive stance, combined with a temporary dual approach by the Bank of Russia. The increase in interest rates, which appears as a positive shock within the dominant cycle of restrictive monetary policy, represents a long-run measure for stabilizing domestic inflation and the ruble exchange rate. Consequently, it is confirmed that since 2022 Russia's monetary policy has been highly restrictive, with the primary objective of mitigating the effects of shocks on the endogenous transmission channels.

The implementation of capital controls, together with the Bank of Russia monetary measures, has isolated Russia's financial system from exogenous influences, thereby preventing further ruble depreciation. This isolation from Western capital flows has enabled the country to mitigate the direct effects of restrictions and sanctions imposed by the Federal Reserve and the ECB.

The introduction of the inflation-expectations variable into the extended price channel, alongside core inflation, leads to several key conclusions. Although the price channel does not absorb shocks as strongly as the other transmission channels, this confirms the effectiveness and autonomy of the Bank of Russia's monetary policy, which prevents the spillover of shocks to final-goods prices through stabilization mechanisms. This finding supports the conclusion that proactive monetary policy successfully shapes inflation expectations by employing two main tools: managing the key interest rate to control inflationary pressures and managing the ruble exchange rate to stabilize the economy.

Although the Bank of Russia has officially shifted to a floating exchange rate and inflation targeting since 2015, in practice it has often undertaken selective and

limited foreign-exchange interventions within the broader framework of monetary policy. The purpose of these interventions was to guide the exchange rate during periods of pronounced instability and to mitigate exchange-rate shocks to the Russian economy. The adoption of a floating exchange rate and the introduction of inflation targeting have both contributed to enhancing the resilience of the Russian economy to exogenous shocks in both the short and long run.

The Bank of Russia's primary focus remains on core inflation, inflation expectations, and money-supply control. Changes in monetary aggregates suggest that inflationary pressures are largely driven by endogenous factors within the transmission channels rather than by exogenous forces. This finding confirms the ability of the Bank of Russia to maintain economic stability and effectively manage inflationary pressures despite shocks from external sources.

The posterior effects of shocks on the exchange-rate channel indicate a rapid recovery of the exchange-rate mechanism, reflecting the successful combination of primary and secondary policy measures. The ongoing implementation of contractionary monetary policy — characterized by reduced liquidity and rising interest rates — represents primary measures, while capital controls and high energy-export revenues (reflecting a positive trade balance) function as secondary measures.

Within the most influential transmission channel — the exchange-rate channel, which contributes most significantly to overall stabilization — two questions arise. First, can the management of monetary policy during the sanctions period (2014 onward) be viewed through the lens of the Keynesian problem of monetary-policy limitations under the interest-rate paradox? Although Russia is not in a liquidity trap, the volatility of the exchange-rate channel suggests that adjustments to the policy rate may have limited effects during cycles of strong exogenous shocks. This would imply that an increase in the policy rate during a contractionary cycle strengthens the ruble but simultaneously constrains domestic economic activity.

Second, can the implementation of aggressive monetary policy since the Russia–Ukraine conflict in 2022 — combined with a higher effective exchange rate and persistently elevated inflation — signal macroeconomic distortions arising from excessive control over capital flows? From the perspective of the exchange-rate transmission channel, this may suggest that the nominal appreciation of the ruble is not fully aligned with the real economic fundamentals of Russia's economy. While aggressive capital controls may temporarily stabilize the real exchange rate by limiting exogenous shocks, they also create the risk of long-run macroeconomic distortions, including the potential emergence of Dutch disease.

Given that the energy sector accounts for approximately 60% of Russia's total budget revenues and about 20–25% of its GDP, strong dependence on the ruble exchange rate reveals a structural vulnerability. In cycles of high energy-export revenues, excessive ruble appreciation may undermine the competitiveness of non-energy sectors.

However, solutions to the Dutch-disease problem and other structural distortions can be modeled on similar economies that have implemented successful monetary and fiscal measures to mitigate such vulnerabilities. In Russia's case, this requires an effective monetary policy supported by stabilization mechanisms operating through the key transmission channels. These mechanisms primarily stem from active interventions in the interest-rate, credit, and exchange-rate

channels, which absorb the effects of exogenous shocks and enable real-time policy adjustments.

Furthermore, establishing a countercyclical fiscal framework — through the creation or strengthening of stabilization funds — combined with a fiscal policy oriented toward subsidies and incentives for non-energy sectors, can complement monetary measures in diversifying structural risks within the economy. In the short run, surpluses from oil and gas exports should be directed toward stabilization funds rather than current public expenditures. For these funds to function effectively, they must be transparent and protected from political interference.

Ultimately, short-run stabilization measures should aim to achieve long-run diversification of the economy. Although Russia could implement some of these measures in the short run through continued effective monetary policy and targeted fiscal incentives, long-run diversification remains challenging for several reasons. First, unlike similar export-oriented economies such as Australia and Canada, which have avoided Dutch disease through fiscal discipline, independent monetary policy, and transparent stabilization funds, Russia lacks these institutional safeguards. Second, political-economic barriers remain entrenched in monopolized sectors, where state-owned corporations often maintain the status quo. Third, rather than pursuing broad diversification, Russian policy should prioritize sectors with a comparative advantage and lower exposure to Western sanctions.

Examples from comparable economies demonstrate that long-run diversification is achievable even in highly resource-dependent systems, but only with strong and independent institutions, effective monetary policy supported by credible transmission mechanisms, and strict fiscal discipline.

References

Arias, J. E., Caldara, D., & Rubio-Ramírez, J. F. (2019). The systematic component of monetary policy in SVARs: An agnostic identification procedure. *Journal of Monetary Economics, 101*(C), 1–13. https://doi.org/10.1016/j.jmoneco.2018.07.011

Borzykh, O. (2016). Bank lending channel in Russia: A TVP–FAVAR approach. *Applied Econometrics, 43*, 96–117 (in Russian).

Canova, F. (2007). Bayesian time series and DSGE models. In *Methods for applied macroeconomic research* (pp. 418–461). Princeton: Princeton University Press. https://doi.org/10.1515/9781400841028-012

Cheng, K., & Yang, Y. (2020). Revisiting the effects of monetary policy shocks: Evidence from SVAR with narrative sign restrictions. *Economics Letters, 196*, 109598. https://doi.org/10.1016/j.econlet.2020.109598

Deryugina, E., & Ponomarenko, A. (2014). A large Bayesian vector autoregression model for Russia. *BOFIT Discussion Papers*, No. 22/2014. Bank of Finland, Institute for Economies in Transition.

Devianto, D., Yollanda, M., Maryati, S., Maiyastri, Asdi, Y., & Wahyuni, E. (2023). The Bayesian vector autoregressive model as an analysis of the government expenditure shocks while the COVID-19 pandemic to macroeconomic factors. *Journal of Open Innovation: Technology, Market, and Complexity, 9*(4), 100156. https://doi.org/10.1016/j.joitmc.2023.100156

Diegel, M., & Nautz, D. (2021). Long-term inflation expectations and the transmission of monetary policy shocks: Evidence from a SVAR analysis. *Journal of Economic Dynamics and Control, 130*, 104192. https://doi.org/10.1016/j.jedc.2021.104192

Franta, M. (2012). Macroeconomic effects of fiscal policy in the Czech Republic: Evidence based on various identification approaches in a VAR framework. *Czech National Bank Working Paper Series*, No. 3/2012.

Giannone, D., Lenza, M., & Primiceri, E. G. (2015). Prior selection for vector autoregressions. *Review of Economics and Statistics, 97*(2), 436–451. https://doi.org/10.1162/REST_a_00483

Ilyashenko, V., & Kuklina, L. (2017). Inflation in modern Russia: Theoretical foundations, specific features of manifestation and regional dimension. *Economy of Region, 1*(2), 434–445 (in Russian). https://doi.org/10.17059/2017-2-9

Ivanova, M. A. (2016). Analysis of the nature of cause-and-effect relationship between inflation and wage in Russia. *Studies on Russian Economic Development, 27*(5), 575–584. https://doi.org/10.1134/S1075700716050051

Kulikov, D., & Netšunajev, A. (2013). Identifying monetary policy shocks via heteroskedasticity: A Bayesian approach. *Eesti Pank Working Paper Series*, No. 9/2013.

Lee, J., & Strazicich, M. C. (2003). Minimum Lagrange multiplier unit root test with two structural breaks. *Review of Economics and Statistics, 85*(4), 1082–1089. https://doi.org/10.1162/003465303772815961

Lee, J., & Strazicich, M. C. (2004). *Minimum LM unit root test with one structural break* (Working Paper No. 04-17). Department of Economics, Appalachian State University, Boone.

Lomivorotov, R. (2015). Bayesian estimation of monetary policy in Russia. *Applied Econometrics, 38*(2), 41–63 (in Russian).

Mironov, V. (2015). Russian devaluation in 2014–2015: Falling into the abyss or a window of opportunity? *Russian Journal of Economics, 1*(3), 217–239. https://doi.org/10.1016/j.ruje.2015.12.005

Rudakovski, Y. (2023). Comparing forecasting accuracy between BVAR and VAR models for the Russian economy. *HSE Economic Journal, 27*(4), 506–526 (in Russian). http://doi.org/10.17323/1813-8691-2023-27-4-506-526

Sims, C. A., & Zha, T. (1998). Bayesian methods for dynamic multivariate models. *International Economic Review, 39*(4), 949–968. https://doi.org/10.2307/2527347

Styrin, K. (2024). Monetary policy transmission in a small open economy under financial and trade restrictions. *Bank of Russia Working Paper Series*, No. 141.

Uhlig, H. (2005). What are the effects of monetary policy on output? Results from an agnostic identification procedure. *Journal of Monetary Economics, 52*, 381–419. https://doi.org/10.1016/j.jmoneco.2004.05.007

Wolf, C. (2020). SVAR (mis)identification and the real effects of monetary policy shocks. *American Economic Journal: Macroeconomics, 12*(4), 1–32. https://doi.org/10.1257/mac.20180328