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# Assessment of the Impact of the Money Supply on Russian GDP Growth Rates

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## ABSTRACT

The **subject** of the study is the dynamics of real and nominal GDP in Russia for the period from 1995 to 2024 inclusive. In this study, the impact of the money supply on the economic growth rate and the level of inflation in the Russian Federation is assessed, and a forecast of such an impact is made for 2025. The **purpose** of the study is to determine, using quantitative methods, the degree of influence of the money supply on the dynamics of Russian GDP and inflation in order to identify the direction and limits of monetary management of the economy. The **relevance** of the study is that the results allow obtaining a higher rate of economic growth in Russia. The **result** of the study is the constructed stochastic model of the annual balanced increment of the money supply, as well as the discovered non-linear statistical relationship between the dynamics of the increments of the money supply and GDP. Dynamic modeling of the money supply was used as a **method** of analysis. Dynamic modeling of the money supply was used as a method of analysis.The model constructed by the authors, which includes the Keynesian demand function for the money supply and the neoclassical Cobb-Douglas production function, approximating the dynamics of GDP, helped to calculate the annual volume of money supply growth (M2 aggregate), accelerating the GDP growth rate in modern economic conditions. A non-linear relationship between the dynamics of the money supply and GDP was confirmed in the course of the study, which made it possible to evaluate the most optimal increase in the money supply in the country to accelerate the growth of Russian GDP. The result that was obtained indicates that one should not artificially restrain the growth of the money supply, since the analysis of time series using vector autoregression recorded a positive effect of the growth of the money supply on the dynamics of Russian GDP and the absence of any impact on the dynamics of inflation.

***Keywords:*** monetization of the economy; inflation; inflation targeting; the economic growth; econometric modeling; monetary policy; stochastic model

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## INTRODUCTION

The money supply, gross domestic product, and price levels are considered the three main macroeconomic variables that play an important role in determining the rate of economic growth. The relationship between the money supply and the volume of goods and services produced has recently attracted increasing attention from researchers due to the slowdown in global GDP growth. Most empirical studies on this topic are conducted based on statistical data from foreign countries. A significant number of economists analyzing the impact of monetary policy on economic growth conclude that an increase in the money supply has a direct positive effect on the dynamics of gross domestic product in both developed and developing economies. However, some researchers do not find such an effect or even argue that an increase in the money supply has a negative impact on production volumes in certain countries.

Ambiguous results of empirical studies on the impact of money supply on GDP growth rates seem to reflect the ongoing theoretical debates in this area of economic analysis. If we recall the structure of the main interest rate channel of monetary transmission, an increase in the money supply should lead to a decrease in interest rates in the economy, which in turn would increase borrowing and consumption in the short term and lead to GDP growth. It seems that the result of such monetary impact on the real sector of the economy is obvious, but some economists dispute it.

Evaluating the long-term impact of the money supply on GDP is even more difficult. If, over extended time horizons, it is not the real demand for goods and services that increases, but the nominal demand, then following the increase in the money supply, there is a rise in the prices of capital assets (stocks, real estate, equipment), which in turn stimulates speculative investments in the capital and real estate markets. The cyclical formation of liquidity bubbles in modern developed countries inevitably leads to their collapse, followed by a crisis contraction of the money supply, an economic recession with a significant decrease in business activity and a reduction in GDP volumes.

In the presented paper, the direct impact of the money supply on the gross output of goods and services will be analyzed. The conducted study uses annual, quarterly, and monthly data of the analyzed variables for the period from 1995 to 2024. The **purpose** of the study is to determine, through mathematical modeling, the existence of a relationship between the Russian money supply and GDP in contemporary market conditions. This study addresses two questions:

1. Does an increase in the money supply contribute to economic growth?

2. Does an increase in the money supply lead to an increase in the inflation rate?

The results of such research are relevant for decision-making at the macroeconomic level.

## LITERATURE REVIEW

In economic journals, one can find a significant number of publications on the impact of the money supply on the economy. For example, M.A. Abramova, S.E. Dubova, and Z. Bayarsaikhan examine the role of money in the reproduction process and propose to revive the Russian economy by ensuring an adequate money supply in our country [1]. About the negative consequences for the Russian economy from the monetary policy conducted by the Central Bank of the Russian Federation, which leads to a contraction of the money supply and a slowdown in economic growth, writes S. Yu. Glazyev [2]. As M.V. Ershov [3, p. 358] notes, the monetary regulator is constantly trying to solve the dilemma of how to stimulate economic growth while simultaneously combating inflation. O.S. Sukharev in the paper [4] asserts that the increase in the money supply was not a determinant of inflation and contributed to sustaining growth.

Usually, the impact of the dynamics of the money supply on GDP is studied through channels of monetary transmission [5], where monetary impulses are transmitted to the real sector of the economy through chains of various macroeconomic variables. There have been increasing instances of assessing the direct impact of the money supply on GDP dynamics [6]. This paper concludes that in many countries, there is a positive long-term effect from an increase in the monetization ratio, which affects economic growth. Moreover, there is a threshold level of monetization, the overcoming of which is fraught with increased inflation and can lead to other negative consequences.

More than fifty years ago, M. Friedman and A. Schwartz [7] provided evidence that changes in the money supply precede equivalent changes in output and cause their fluctuations. R. Lucas discovered a connection between the dynamics of the money supply and GDP using a dynamic stochastic general equilibrium model [8]. M.T. Belongia and P.N. Ireland [9] confirmed the presence of similar correlations in more recent data. Using structural vector autoregression, they showed that identified monetary policy shocks generally have a strong and persistent impact on output and prices. The results of existing studies on this topic allow us to conclude that in developed countries, changes in monetary policy affect real output in the short term, but in the long term, they only impact prices. However, in developing countries, this issue remains open and not fully resolved [10].

In the paper of O. Evans [11], the nonlinear relationship between money supply, inflation,

and output is studied in accordance with the hypotheses of Friedman and Schwartz that monetary policy affects prices in the long term but not in the short term, and output in the short term but not in the long term. The study examines statistical data for Nigeria and South Africa for the period 1970–2016 using the ARDL (autoregressive distributed lags model) approach. The study concluded that Friedman and Schwartz were correct in asserting that the growth of the money supply affects output in the short term, rather than in the long term.

The nature of the relationship between money, inflation, and output is explored in the works of M. Jarociński and M. Lenza [12]; X. Zhang, X. Liu et al. [13]. In recent decades, a significant amount of research has been conducted in this area. Most of these studies have focused on the relationship between the growth of the money supply and output. For example, J. Benchimol [14] identified how money and monetary policy affected output and inflation in Israel. The author of this paper showed that the sensitivity of output to monetary shocks increased during crises. F. Canova and T. Menz [15] used a small structural macroeconomic model for the U.S., the Eurozone, Japan, and the UK and found that monetary aggregates play an important role in business cycles.

The main question of P. Caraiani's paper [16] is whether the money supply affects output in the USA. The paper conducts Granger causality tests between money and output, as well as money and inflation, using simulated data from estimation models. A causal relationship between money and output was found. Another part of the literature is dedicated to the relationship between the growth of the money supply and inflation. For example, M. El-Shagi and S. Giesen [17], using a multidimensional state space framework to analyze the short-term impact of money on prices in the U.S., provided evidence of a significant influence of money on prices.

An important issue in the field of monetary policy for many countries in the post-Soviet space, including Russia, is the search for ways to increase the level of monetization of national economies without causing inflation. The paper by E. M. Sandoyan and L. M. Akopyan [18] is dedicated to identifying the causes of the low level of monetization in the Armenian economy and the impact of this process on economic growth. The paper provides evidence that in countries with a low level of monetization, a high level of inflation is observed, i.e., it draws a conclusion that is directly opposite to what can be found in the pages of textbooks on economic theory.

G. Dai [19] determined the optimal growth of the money supply for China to be in the range of 14–15% to maintain real economic growth at 10.5%, because such rates of money supply growth, in the author's opinion, are unlikely to lead to high inflation. A. Haug and W. Dewald [20] studied the correlation between fluctuations in money supply growth and fluctuations in real output growth and inflation in 11 industrialized countries from 1880 to 2001. The authors of the paper concluded that fluctuations in the growth of the money supply do not systematically affect the business cycle. However, in the long term, the growth of the money supply leads to inflation but does not affect the growth of real output. Probably, that's why in new Keynesian models, money does not play an explicit role [21].

In the paper by A. A. Hossain [22], the issue of high and unstable inflation in nine Muslim countries is addressed. The results of the study demonstrate the presence of a causal relationship between money and prices. The author of the paper also found that money has a certain stimulating effect on real output in the short term. It is expected that low and stable inflation, all else being equal, will contribute to long-term production growth and increase the demand for Islamic financial products, leading to higher long-term real investments and economic growth.

## RESEARCH METHODOLOGY

Let's recall the well-known exchange equation of I. Fisher between the monetary and commodity masses [23]:

$$MV = PQ, \quad (1)$$

where $M$ — money supply (aggregate M2), $V$ — velocity of money circulation, $P$ — price level in the country, $Q$ — volume of production of goods and services, usually over one year. Periodically, articles appear in scientific journals that provide well-founded criticism of the equality between the right and left sides of this equation in the context of an open modern economy [24]. However, if we assume that all the variables in equation (1) depend on time, and then find the time derivative of the right and left sides of this equality, i.e., transition from the static form of equation (1) to the dynamic form, we can find a sufficiently accurate match between the left and right sides of Fisher's equation [25]. Therefore, when constructing the model of the impact of money supply dynamics on economic growth rates, we will rely on the equation (1).

The first equation of our model will determine the growth rates of real GDP, adjusted for the impact of inflation. We will calculate the annual growth rate q of the production volumes of goods and services Q using the following formula:

$$q = \frac{1}{Q}\frac{d(Q)}{dt} = \frac{P}{MV}\frac{d\left(\frac{MV}{P}\right)}{dt}. \quad (2)$$

After finding the time derivative of the complex function, we will obtain the following result:

$$q = \frac{1}{M}\frac{dM}{dt} + \frac{1}{V}\frac{dV}{dt} - \pi, \quad (3)$$

where $\pi = \frac{1}{P}\frac{dP}{dt}$ — the rate of increase in consumer prices. Thus, according to Fisher's equation, the rate of increase in GDP is positively influenced by the rate of increase in the money supply and the velocity of money circulation. Inflation has a negative impact on GDP dynamics. But this is theory; Russian practice shows that the rise in prices in the modern Russian economy, as will be shown further, is not statistically related to either the money supply or GDP. To increase the money supply, scientifically justified limits need to be found; otherwise, the solution to equation (3) will be an unlimited increase in the money supply in the country, theoretically increasing GDP volumes.

As a constraint, we will choose the demand for money by economic agents. According to J. Keynes's monetary theory, the demand for money depends on the volume of GDP (transactional demand), the level of bank interest rates (speculative demand), and does not depend on inflation [26, p. 88]:

$$M = kY + \xi\frac{1}{r}, \quad (4)$$

where $Y$ — GDP, $r$ — the weighted average bank interest rate on loans to non-financial organizations for a term exceeding three years, $k$ and $\xi$ — are proportionality coefficients. In a somewhat modified form, this relationship is presented in the paper by S. Goldfeld et al. [27]:

$$ln(M_t) = a + b\ln(M_{t-1}) + c\ln(Y_t) + d\ln(r_t). \quad (5)$$

In equation (5), just like in equation (4), it is assumed that the demand for the money supply depends on the levels of GDP and the level of bank interest rates. Moreover, S. Goldfeld suggested that the current level of the money supply depends on its past values, which is quite realistic. The form of equation (5) suggests that the relationship between its variables is nonlinear. The original function before logarithmization has the following form:

$$M_t = g \cdot M_{t-1}^b \cdot Y_t^c \cdot r_t^d, \quad (6)$$

where $a = \ln(g)$. Equation (6) is structurally similar to the well-known Cobb-Douglas function in economics. Differentiating equality (6) with respect to time under the condition $\frac{dY}{dt} > 0$, we obtain constraint (9) on

the growth of the money supply (8). Our model will not include the equation describing the money supply because it is almost entirely controlled by the actions of the Central Bank of the Russian Federation and commercial banks.

Thus, the system of equations, the solution of which will allow determining the increase in the money supply that accelerates the growth rate of Russia's GDP, can be written as follows:

$$q_t = \frac{1}{M_t}\frac{dM_t}{dt} + \frac{1}{V_t}\frac{dV_t}{dt} - \pi_t \to \max, \quad (7)$$

$$M_t = g \cdot M_{(t-1)}^{b} \cdot Y_t^{c} \cdot r_t^{d}, \quad (8)$$

$$\frac{dM_t}{dt} \le gb \cdot M_{t-1}^{b-1} \cdot Y_t^{c} \cdot r_t^{d} \cdot \frac{dM_{t-1}}{dt} + gc \cdot M_{t-1}^{b} \cdot Y_t^{c-1} \cdot r_t^{d} \cdot \frac{dY_t}{dt} + gd \cdot M_{t-1}^{b} \cdot Y_t^{c} \cdot r_t^{d-1} \cdot \frac{dr_t}{dt}, \quad (9)$$

$$Y_t = a \cdot K_t^{\alpha} \cdot L_t^{\beta}, \quad (10)$$

$$V_t = \frac{Y_t}{M_t}, \quad (11)$$

$$\frac{dV_t}{dt} = a\left[\alpha \cdot \frac{K_t^{\alpha-1} L_t^{\beta}}{M_t} \cdot \frac{dK_t}{dt} + \beta \cdot \frac{K_t^{\alpha} L_t^{\beta-1}}{M_t} \cdot \frac{dL_t}{dt} - \frac{K_t^{\alpha} L_t^{\beta}}{M_t^2} \cdot \frac{dM_t}{dt}\right], \quad (12)$$

$$dY_t = a_1 + \beta_1 \cdot dY_{t-1} + \beta_2 \cdot dY_{t-2} + \beta_3 \cdot t, \quad (13)$$

$$dr_{t+1} = \mu \cdot dt + \sigma \times \varepsilon \cdot \sqrt{dt}, \quad (14)$$

$$\frac{dK_{t+1}}{dt} = (\nu^e - \mu^e) \cdot K_t. \quad (15)$$

As a function that most adequately describes GDP dynamics, we will also choose the Cobb-Douglas production function (10), where $K$ — is the value of fixed assets in the country, $L$ — is the number of employed people in the economy. When conducting calculations to account for inflationary processes, a time series of real GDP values was used. The increment in the velocity of money circulation (12) was found by differentiating the equation used to find the velocity of money $V$ over time, equality (11). To find the annual GDP increments (13) included in inequality (9), we will use vector autoregression. Considering the high volatility of the increments of bank interest rates on loans to non-financial organizations, we will use the Wiener model (14) for their approximation, which has shown the most adequate results in the analysis of this variable, where μ — is the expected value of the interest rate increment, σ — is the standard deviation of these increments, ε — is a random variable with a standardized normal distribution, $dt$ — interval time. The expected annual increase in the value of fixed capital is determined by formula (15), where $\nu^e$ — the expected value of the fixed asset renewal rate, $\mu^e$ — the expected value of the fixed asset disposal rate (a brief description of the calculations for these values is provided in *Table 1*).

**Empirical analysis.** The system of equations (7) — (15) includes one equation (7) for the extremum, one inequality, and seven equations that constrain the feasible region of the objective function. Such systems of equations are solved using the method of Lagrange multipliers, i.e., it is necessary to find the derivative of the GDP growth rate with respect to the money supply, taking into account the constraint relationships (the Solver menu in Excel). But first of all, it is necessary to calculate the coefficients of these equations. The coefficients $g$, $b$, $c$ and $d$ can be found from equation (8) by first taking its logarithm. The time interval of the data on which the regression is based spans from 1997 to 2024. The GDP value for the fourth quarter of 2024 is obtained through forecasting. In the calculations, we will use the values of real GDP, which can be obtained by dividing the nominal GDP of any year by the GDP deflator of that same year. The use of real GDP values in the calculations is aimed at eliminating the impact of inflation on the assessment of gross domestic product.

Before constructing the regression equation, it is necessary to perform a stationarity test on the time series dynamics that will be used in the calculations. The analysis for stationarity was conducted using the augmented Dickey-Fuller test, implemented in the Gretl software. The calculations showed that the logarithmically transformed time series *M, Y* and *r*, which are involved in the regression analysis (equation 8), are stationary when tested with a constant and trend for ln(*M*) and with a constant for ln(*Y*) and ln(*r*). The coefficients of equation (8) turned out to be the following:

$$M_t = M_{t-1}^{0.75} \cdot Y_t^{0.25} \cdot r_t^{-0.09}. \quad (16)$$

The coefficients of equation (8) are as follows: $g$ = 1, since $a$ = 0 (the constant of equation 8 turned out to be statistically insignificant); $b$ = 0.75; $c$ = 0.25; $d$ = –0.09. The statistical characteristics of this model are as follows: $R^2$ = 0.96, Student's $t$-statistic for its coefficients $b$ is 20; $c$ is 6; $d$ is minus 2.04; the Durbin-Watson statistic is 1.8. The White test at a significance level of 0.05: $\chi^2_{test}$ = 9.7; $\chi^2_{critical}$ = 16.1. The equation turned out with good predictive characteristics. The negative exponent over the variable $r$ (long-term loan rates) draws attention, i.e., with an increase in bank interest rates, the money supply begins to decrease. Conversely, with an increase in GDP, the demand for the money supply starts to grow, i.e., all the signs of the beta coefficients in equation (8) correspond to the economic theory of J. Keynes (equation 4).

Let's calculate the regression coefficients of equation (10). To do this, we will collect data on the dynamics of fixed asset values in the country, the number of employed individuals aged 15 to 72 in the Russian Federation, and GDP volumes from 2000 to 2023 inclusive. The series turned out to be stationary $\ln(L_t)$ and $\ln(K_t)$. As a result, the following values for the equation coefficients were obtained (10):

$$Y_t = 1.4504 \cdot 10^{-51} \cdot K_t^{0.58} \cdot L_t^{10.508}. \quad (17)$$

tatistical characteristics of this model: $R^2$ = 0.91, the $t$-statistics of its coefficients are –10; 14.2; 9.5; and the Durbin-Watson statistic is 1.38.The White test at the 0.05 significance level: $\chi^2_{test}$ = 2.34; $\chi^2_{critical}$ = 16.9. The equation turned out with decent predictive characteristics. Let's check the accuracy of GDP approximation, for example, for the year 2020 using the model:

$$Y_t = 1.4504 \cdot 10^{-51} \cdot 362\,191\,650^{0.572594} \cdot \cdot 70\,976.9^{10.5079} = 108\,977.3, \quad (18)$$

which is quite close to the size of Russia's GDP this year (107 658.2 billion rubles).

The mathematical expectation of inflation in 2024, when analyzing the annual values of this variable from the crisis year of 2008 to 2024, is 7.4%. However, the actual inflation rate for the first 11 months of 2024 has already reached 8.1%. The Bank of Russia expects inflation in 2025 to be at 4%,[1] so for calculations, we will take the average value, i.e., 7.4% per annum.

As the bank interest rate, we will choose the weighted average interest rate on loans to non-financial organizations for a term of over 3 years at the end of the year. The choice of this particular rate is due to the fact that investments in the fixed assets of enterprises, which are financed through long-term loans, have an impact on GDP dynamics. To approximate the value of ε in equation (14), we will use the random number generator built into Excel by calling two functions in a cell: =NORM.S.INV(RAND()).

The coefficients calculated in December 2024 for the system of equations (7)—(15) are presented in *Table 1*.

When solving the system of equations (7–15), the results presented in *Table 2* were obtained.

Calculations show that if the increase in the money supply in 2025 is above the arithmetic

[1] Medium-term forecast of the Bank of Russia following the Board of Directors meeting on the key rate on February 16, 2024. URL: https://www.cbr.ru/Collection/Collection/File/48891/forecast_240216.pdf (accessed on12.01.2025).

*Table 1*

**Numerical Values of the Coefficients of the System of Equations (7)–(15)**

| Name of the constant | Numeric value of a constant | Name of the constant | Numeric value of a constant |
|---|---|---|---|
| $\nu^e$ = M(ν) – the expected value of the fixed asset renewal rate over the period from 2009 to 2023 (in %) | 4.23 | g | 1<br>(5.3) |
| $\mu^e$ = M(μ) – the expected value of the fixed asset depreciation rate over the period from 2009 to 2023 (in %) | 0.78 | b | 0.75<br>(20) |
| $K_{2023}$ – the value of fixed assets in the Russian Federation in 2023 (in million rubles) at full accounting value | 460 370 094 | c | 0.25<br>(6) |
| $K_{2024}$ – forecast of the value of fixed assets in the Russian Federation at the end of 2024 (in million rubles) at full accounting value<br>$K_{2025}$ – forecast of fixed asset value in the Russian Federation in 2025 (in million rubles) at full accounting value | 498 718 922<br>540 262 209 | d | –0.09<br>(–2.04) |
| $M_t$ forecast – M2 money supply as of 01.01.2025 (billion rubles) | 113 001.1 | a1 | 0 |
| $E\left(\frac{dL_t}{dt}\right)$ – the expected increase in the number of employed individuals aged 15–72 in the Russian Federation (in thousands) in 2025 | 308.7 | $\beta_1$ | 0 |
| $\pi_t = E(\pi)$ – the expected value of the consumer price index in the Russian Federation (evaluation period – from 2008 to 2024), in %. | 7.4 | $\beta_2$ | 0 |
| *a* | $1.4504 \cdot 10^{-51}$<br>(–10) | $\beta_3$ | 440<br>(7.5) |
| α | 0.58<br>(14.2) | μ | 0.462 |
| β | 10.508<br>(9.5) | σ | 1.89 |

*Source:* Compiled by the authors.

*Note:* in parentheses is the Student's t-statistic for the regression coefficients.

*Table 2*

**Results of Solving the System of Equations (7)–(15) for 2025**

| $M_t$ on 01.01.2026 (in billion rubles) | $dM_t$ (in billion rubles) | $V_t$ (turnovers per year) | $\frac{dV_t}{dt}$ (increase in turnover per year) | ɒ expected inflation rate (in %) | $q_t$ estimated values of real GDP growth rates (in %) |
|---|---|---|---|---|---|
| 129 501.23 (optimistic version) | 17 453.47 | 1.55 | 0.0029 | 7.4 | 6.1 |
| 122 000.00 (pessimistic version) | 9 000.00 | 1.55 | 0.0029 | 7.4 | 0.2 |

*Source:* Compiled by the authors.

mean of this value over the past three years (15 582.73 billion rubles) and amounts to 17 453 billion rubles (the maximum allowable according to inequality 9), then the growth rate of Russian GDP could be 6.1% per year. If the increase in the money supply is chosen at the lower limit of the allowable range (9 000 billion rubles), then the economic growth in the country will be almost zero.

Let's calculate the volume of the increase in the money supply in equation (7) without considering the constraint (9), which will most effectively impact the increase in GDP without triggering an inflationary spiral. To do this, we will assess the direct impact of annual increases in the money supply on the increase in Russian GDP. The Dickey-Fuller test with a constant and trend showed the stationarity of these series. The best equation in terms of statistical characteristics turned out to be the following:

$$\underset{(2.9)}{dY_t = 2.81 \cdot dM_{t-1}} \underset{(-2.14)}{- 0.00012 \cdot dM^2_{(t-1)}}. \quad (19)$$

The coefficient of determination of this equation is 0.83, the Durbin-Watson statistic was 2.6. The White test at the significance level of 0.05: $\chi^2_{test} = 7{,}83$; $\chi^2_{critical} = 9.48$. Taking the derivative in equation (19) with respect to $dM_t$ and setting the right side of the equation to zero, we get:

$$2 \cdot 0.00012 \cdot dM_t = 2.81$$

or $dM_t = 11\,708.33$ billion rubles.

Therefore, the optimal M2 growth in 2025 is 11 708.33 billion rubles, with GDP growth at 2.2%. With such an increase in the money supply, there will be no accumulation of excess monetary surplus in the economy. In 2022, the money supply growth was a record 16 135.1 billion rubles, and in 2023, it was 15 997.4 billion rubles. The average actual annual growth of the money supply from 2010 to 2023 inclusive is 5 936.98 billion rubles. However, in 2024 and 2025, the growth of the money supply will likely be significantly lower than in 2022 due to the increase in the key rate values.

The authors of the paper do not claim high accuracy in their calculations, as the dynamics of GDP volumes are influenced not only by the money supply but also by a vast array of economic, political, and social variables and factors. In this case, the discovered trend is important: it is necessary to increase the money supply in the country to sustain economic growth.

In conclusion of our study, we will analyze how strongly Russian inflation is related to the growth rate of the money supply. Will

an acceleration in the growth of the money supply in the country lead to an increase in the inflation rate? A vector regression model was constructed, in which inflation (monthly values of the consumer price index from January 1995 to November 2024) was the dependent variable, and the money supply with time lags from one to twelve was taken as regressors. The model turned out to be statistically insignificant based on the coefficient of determination (around 0.18) and the Student's t-statistic for all regression coefficients (less than one). From this, it can be concluded that the dynamics of consumer prices are not related to the growth of the money supply in the country, i.e., Russian inflation at the current stage of economic development has a non-monetary origin. O.S. Sukharev came to similar conclusions in article [4]. In Russia, which has a low level of the economy's monetization coefficient, there is no need to fear a surge in inflation with an increase in money issuance and growth in money multiplication, at least in the coming years.

## CONCLUSION

Summarizing the conducted research, we will formulate the main conclusions regarding the activation of the emission process as one of the most powerful levers for the growth of the Russian economy.

Firstly, using the constructed dynamic stochastic model, the value of the annual increase in the money supply, balanced with changes in the velocity of money circulation, as well as with the projected GDP, employment, and long-term loan interest rate increases for 2025, was obtained. An increase in the money supply of this magnitude, constrained by the equation of exchange of I. Fisher, will not lead to inflation growth, but it will also not allow the Russian economy to enter a trajectory of sustainable economic growth. To accelerate economic growth, it is necessary to switch to a monetary policy that allows for a more extensive money emission.

Secondly, the conducted statistical analysis of the relationship between the dynamics of the money supply and GDP revealed its non-linearity, which allowed for the calculation of annual increments in the money supply that would lead to growth in Russian GDP without accumulating excess money supply in the economy. Accelerated monetary emission within the limits established in this work will not lead to inflation growth, as at this stage of development of the Russian economy, there is no statistical correlation between the dynamics of the money supply and inflation.

Thirdly, the following methods of money issuance with reduced inflation risk can be proposed:

a) financing state infrastructure and investment projects by acquiring the corresponding bonds;

b) increasing the share of gold in the structure of Russia's international reserves to 80% as in developed countries, which will support the gold mining and related industries, protect this part of the gold and foreign exchange reserves from confiscation, and create a barrier against the penetration of foreign inflation into the country during the formation of gold and foreign exchange reserves.

Thus, the Russian monetary authorities possess a very powerful and effective lever of influence on the real sector of the economy, so it would be logical to expand the list of main monetary policy instruments by adding not only the key rate but also the money supply.

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