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Money Supply, Inflation and Budget Deficit in Russia Compared to the United States

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ABSTRACT

The author examines the causes and sources of the depreciation of money in Russia compared with that in the United States. The **subject** is causal connections between the budget deficit, money supply, and the depreciation of money. The **relevance** of the research for Russia is determined by concerns about macroeconomic stability and high inflation. In the case of the United States, an increase in the money supply and an inflation spike occurred because of the debt financing of the federal budget deficit. The **scientific novelty** of the paper lies in considering the two main options for monetary policy to support the liquidity of public debt: hard and soft, and the analytical methods and results of the research. One of the important scientific results is that the burden of public debt should be measured not as the ratio of public debt to gross domestic product (GDP) but as the share of public debt in a bond market. The second scientific result is very important for the practice: during 2011–2022, in the eight biennial periods, the GDP deflator was approximately equal to the growth of the money supply M2 minus GDP growth. Thus, the depreciation of money was directly caused by monetary policy. In the other three biennial periods, a substantial difference was observed, probably because of external shocks. As the **method** of the study, the author estimated the effect of interest rates caused by crowding out corporate debt by public debt. It was substantiated that to obtain the effects of soft monetary policy and thus the increase of M2 to GDP deflator, it is essential to use biennial periods. Based on the **results** of the analysis, it was revealed that, particularly in 2021–2022, the growth of the GDP deflator amounted to 139.8% and was due to the growth of the money supply M2 by 140.5%. At the same time, the effect on GDP growth was insignificant, at 3.4%. **The key conclusion** is that for the implementation of macroeconomic stability policies, it is necessary to manage the expansion of the M2 money supply, the exchange rate, and to use the GDP deflator as an important indicator in addition to the inflation index – consumer price index. A good way to achieve this is to adopt a special law for controlling inflation, similar to the USA Inflation Reduction Act.

Keywords: budget deficit; public debt; money supply; monetary aggregate M2; inflation; inflation tax; GDP deflator

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Денежная масса, инфляция и дефицит бюджета в России в сравнении с США

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АННОТАЦИЯ

Автор рассматривает причины и источники обесценивания денег в России, по сравнению с США. **Предметом** исследования являются причинно-следственные связи между бюджетным дефицитом, денежной массой и обесцениванием денег. **Актуальность** исследования для России определяется опасениями по поводу макроэкономической стабильности и высокой инфляции. В случае с США увеличение денежной массы и всплеск инфляции произошли в результате долгового финансирования дефицита федерального бюджета. **Научная новизна** исследования заключается в рассмотрении двух основных вариантов денежно-кредитной политики с целью поддержания ликвидности государственного долга: жесткого и мягкого;

а также аналитических методах и результатах исследования. Один из важных научных результатов состоит в том, что бремя государственного долга должно измеряться не как отношение государственного долга к ВВП, а как доля государственного долга на рынке облигаций. Второй научный результат очень важен для практики – в течение 2011–2022 гг. в восьми двухгодичных периодах дефлятор ВВП был примерно равен росту денежной массы М2 минус рост ВВП. Таким образом, обесценивание денег было напрямую вызвано денежно-кредитной политикой. В остальных трех двухлетних периодах наблюдается существенная разница, вероятно, из-за внешних шоков. В качестве **метода** исследования автор оценил эффект для процентных ставок, вызванный вытеснением корпоративного долга государственным долгом. Обосновано, что для получения эффектов мягкой денежно-кредитной политики и, следовательно, увеличения дефлятора М2 к ВВП необходимо использовать двухгодичные периоды. По **результатам** анализа выявлено, что, в частности, в 2021–2022 гг. рост дефлятора ВВП составил 139,8% и был обусловлен ростом денежной массы М2 на 140,5%. При этом влияние на рост ВВП оказалось незначительным – 3,4%. **Главные выводы:** для реализации политики макроэкономической стабильности необходимо контролировать расширение денежной массы М2 и обменного курса, а также использовать дефлятор ВВП в качестве важного индикатора в дополнение к индексу инфляции – индекс потребительских цен. Хороший способ сделать это – принять специальный закон о контроле над инфляцией, аналогичный закону о снижении инфляции в США.

Ключевые слова: дефицит бюджета; государственный долг; денежная масса; денежный агрегат М2; инфляция; инфляционный налог; дефлятор ВВП

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Introduction

The first subject of this research is the impact of an increase in the money supply on inflation in Russia from 2011 to 2022. The second subject is the relationship between high levels of budget deficit financed by the issue of public debt and the possible expansion of the money supply. The relevance of the topic is due to the high importance of the above-mentioned fundamental ties for the Russian economy at the present stage. Ensuring stable economic conditions through compliance with the long-term principles of stability and balance of the budget system is one of the main goals of the state program “Public Finance Management and Financial Market Regulation” of the Ministry of Finance of the Russian Federation.¹ In particular, the President of Russia Vladimir Putin drew attention to high inflation risks in Russia in July 2023.² With the right policy of the Central Bank of the Russian Federation (Central Bank), inflation can be reduced to an acceptable level, and the risks of excessively high inflation can be completely eliminated. In fact, some of such measures are already being taken in Russia at the end of 2023. However, a proper analysis of this problem is required.

Literature review: budget deficit, money supply and inflation

As a rule, the problem of financing the primary deficit of the state budget and interest on debt is solved by new government borrowing. Theoretically, in the past, it was believed that this meant the transfer of expenditures to future periods; therefore, with a budget deficit, the debt should increase, and with a surplus, it should decrease [1]. To stimulate the development of the economy (or curb overheating), the classical theory of finance [2] usually proposes to apply primarily the methods of monetary easing (tightening) combined with reducing (increasing) the refinancing rate of the Central Bank. However, after 2000 (and especially after the 2008 crisis), constant monetary easing led to the situation where nominal interest rates in the US and the European Union (EU) became close to zero, and real interest rates became negative. Monetary methods of stimulating the economy have become ineffective, and the center of gravity of state policy has shifted to fiscal methods [3]. As a result, public debt in most developed countries is only growing, and interest payments are made at the expense of new borrowing. These changes in financial policy have been analyzed in some studies after 2008, including from the perspective of fiscal policy’s effectiveness in stimulating the economy at zero interest rates [4].

¹ URL: <https://minfin.gov.ru/ru/performance/budget/govprog/gosfin/>

² URL: https://lenta.ru/news/2023/07/25/riski_infl/

For example, in the United States, the last year with a surplus was 2001, when the national debt was only \$5.8 trillion. Today it is comparable to the annual expenditures of the US federal budget. Between 2000 and 2012, it seemed that the possibilities of government borrowing for the United States were almost limitless [5], and the use of these opportunities for fiscal stimulation of the economy seemed completely justified. However, after 2022, the situation does not look so clear. The rapid growth of the US national debt after 2001 (about five times in 21 years) was caused by the financial expansion of the state — the desire to increase fiscal incentives for the economy. With such a rapid increase in US debt, questions arise about the acceptability of such growth and its limits [6]. A sharp increase in the growth rate of the US national debt occurred in 2020–2022, due to the COVID-19 pandemic. The budget deficit for three years amounted to \$6 trillion, which is higher than the budget revenues of 2022 (US federal budget expenditures in 2022 were \$6.27 trillion, 25% of GDP, and the deficit was \$1.4 trillion).³

A budget deficit within acceptable limits usually does not have an inflationary effect [7], since emission financing of the budget deficit is prohibited in most countries. Despite this, a large budget deficit often causes inflation to accelerate [6]. The fact is that only direct lending to the government or the purchase of public debt upon placement by the central bank is prohibited. The purchase of government debt by the central bank in the open market is a standard tool (open market operations), and if the increase in public debt is too large, then to ensure debt liquidity, central banks are forced to buy government securities in the open market on a large scale. Such open market operations increase the monetary base, which in turn tends to affect inflation. However, the expansion of the money supply alone does not necessarily lead to inflation. Under certain conditions (specifically, the presence of a GDP gap is required) [1, 2], it can lead to a greater increase in consumption or to an increase in investments, including, as a result, a fall in the interest rate.

After all, monetary stimulation (after the negative experience of the Great Depression) is the generally accepted paradigm of modern economic

theory (often referred to as “monetarism”), the foundation of which was laid by Milton Friedman [1]. However, if the expansion of the money supply leads to an increase in demand that cannot be met with new goods or services, then (with some time lag) that will lead to an increase in inflation [1, 2]. Inflationary expectations, the propensity to save and invest, as well as psychological factors, play a significant role. If the population and firms perceive the increase in income as temporary and non-inflationary in nature, then new funds will be invested in financial instruments (increase in the money supply monetary aggregate M2). This usually entails an increase in investment in the real sector, as the funds will eventually be invested in business expansion. However, if the increase in the money supply is perceived as carrying a signal for inflation, there will be an increase in prices for consumer and capital goods, as well as an increase in the demand for money (monetary aggregates M1 and M0).

The US and EU countries faced the effect of abnormally high inflation caused by a high budget deficit in mid-2022, with inflation reaching 10% in the US (June 2022) and 10–11% in Europe (October 2022) on an annualized basis in some months⁴ [6]. In August 2022, the United States passed a law aimed at reducing inflation (“Inflation Reduction Act”),⁵ which drew criticism in the EU due to its protectionist orientation. In the United States, the problem of a surge in inflation was solved [6], first of all, by raising the Fed rate to 4.5%, but an increase in interest rates may inhibit the development of the economy.

Traditionally, the ratio of public debt to GDP is considered a limit on the amount of debt [7–10]. In the United States, by July 2023, this volume had already exceeded 141% of GDP (\$32 trillion as of June 15, 2023), and even 261% of GDP in Japan (according to 2022 data). The traditional approach is used, for example, in a paper by experts from the World Bank [10], whereby analyzing data from 79 developed countries for 2001–2008, it is empirically shown that the critical level when the debt-to-GDP ratio begins to adversely affect economic growth is 77.1%. However, this approach seems

³ URL: <https://fiscaldata.treasury.gov/americas-finance-guide/national-deficit/>

⁴ URL: <https://www.vedomosti.ru/economics/articles/2022/12/08/954239-kogda-inflyatsiya-v-ssha-i-evrope-vernetsya-k-tseli>

⁵ URL: <https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/>

overly simplistic, as it does not consider the fundamental differences between different countries. This approach is usually not used in studies using dynamic and stochastic models, such as dynamic stochastic general equilibrium (DSGE) models [6, 11–13]. The government can borrow new funds in the debt market either while maintaining the existing share of public debt or increasing this share. An increase in public debt usually leads to the crowding out of private investment by public investment. Cases of direct displacement — when public debt increases substantially due to an equal reduction in the volume of corporate debt — are relatively rare, since in this case the corporate debt shrinks and thus the interest rate rises. This has a negative impact on the economy and on the increase in the cost of debt. If total debt increases but public debt grows faster and corporate debt grows slowly, this does not lead to crowding out. However, in this case, the overall increase in the debt market is directly or indirectly financed by the Central Bank, which means an increase in the money supply and possibly inflation.

The amount of the inflation tax (*IT*) on the monetary savings of the population is usually calculated according to the following formula:

$$IT = C \times \text{inf} + D (\text{inf} - \text{dep}), \quad (1)$$

where: *C* is cash in circulation; *inf* is the inflation rate; *D* — cash on deposits; *dep* is the nominal interest rate on deposits.

This calculation does not take into account the fact that the real depreciation of money is not fully reflected in inflation based only on the Consumer Price Index (CPI) and requires the use of a GDP deflator. Next, we will apply an alternative to the (1) assessment of the losses of economic entities from the depreciation of money, which can be obtained if the costs of increasing it are subtracted from the increase in the money supply (like “seigniorage”). The difference is equal to the potential benefits of the monetary authorities and, accordingly, the losses of the population. Thus, GDP growth should be subtracted, because if the increase in the money supply corresponds to the growth of GDP, then the depreciation of money does not occur, and such an increase has a positive effect on economic growth, preventing deflation (provided that the velocity of money circulation is stable). Let us consider the classical identity of exchange [1, 2]:

$$M = PY / V. \quad (2)$$

This fundamental identity can be traced back to Walras’s law, which is the basis of the Arrow-Debreu theory of equilibrium [1] (sometimes erroneously referred to as the Fisher equation, which is used to determine the velocity of money). Identity (2) in itself says nothing about the nature of inflation, unless one makes the additional assumption that all inflation is purely monetary (the growth of *P* with *V* and *Y* constant). In the works of *M. Friedman* [1, 2], it was proven that a moderate growth of the money supply in a situation of economic stagnation (provided that GDP is lower than potential) creates a stimulus for GDP growth, but also leads to a certain increase in inflation [1, 2]. Modern economic theory [1, 2] assumes that insignificant inflation (2–3% or even higher) in certain periods of economic growth is inevitable and even contributes to economic development [1, 2]. However, if the growth of the money supply exceeds the economy’s ability to grow due to additional demand, then it only leads to a proportional increase in inflation, which, as world experience shows, may become high (30% and higher) and, with an uncontrolled growth in the money supply, turn into hyperinflation (50% per month and even higher).

Research method

The research method is data analysis and analytical assessments. First, an analysis of a possible increase in public debt in Russia and its impact on the interest rate is carried out. Then, an analysis of the impact of Russia’s money supply expansion policy on inflation and the GDP deflator is conducted. The depreciation of cash and savings is assessed not only by the inflation index (CPI), but also by a broader indicator — the GDP deflator, which takes into account not only the growth of prices for consumer goods but also for capital assets and, accordingly, more comprehensively assesses the effect of the depreciation of cash and savings. Money supply growth is measured by the M2 money supply, which is a widely accepted measurement indicator [14] for the money supply and includes (in the national definition) M0 cash, demand accounts, and term deposits in the banking system.

To assess the losses of economic entities from the depreciation of money, the growth indicator M2 minus GDP growth is used. It is assumed that

to the extent that the increase in the money supply corresponds to the growth of GDP, the depreciation of money does not occur, and such an increase has a positive effect on economic growth, preventing deflation (provided that the velocity of money circulation is maintained).

To assess the possible future impact of fiscal policy on monetary expansion and inflation, internal sources of financing Russia's budget deficit for 2023–2025 are considered. A comparison of the volume of public debt with the volumes of domestic and foreign financial markets for Russia and the United States is carried out, and a possible increase in interest rates in the variant of the hard monetary policy of the Bank of Russia is calculated.

Next, the growth of the money supply in Russia from 2011 to 2023 is analyzed. Two-year periods are used to identify the relationship between the growth of the money supply and the GDP deflator. It is substantiated that, as a rule, the growth of the GDP deflator is approximately (or almost exactly) equal to the growth of the M2 money supply. This pattern is somewhat disrupted only in two periods of the study, when external shock happens, such as COVID-19 or sanctions. Particularly, in 2021–2022 there was unjustifiably rapid growth in the M2 money supply (140.5%), which is not related to the state fiscal policy and significantly exceeds GDP growth (3.4%), which led to an increase in the GDP deflator (139.8%).

Analyzing the sources of financing the federal budget deficit in Russia

For Russia, the problem of a real budget deficit has actually arisen since 2023. Prior to this, the federal budget deficit in Russia was artificial — part of the funds from exceeding oil and gas revenues to the established limits (for 2022 it was a limit of 8 trillion rubles) was transferred to the NWF (National Welfare Fund) in order to smooth out the effects of oil price fluctuations. The document of the Ministry of Finance of Russia “The Main Directions of the Budget, Tax and Tariff and Customs Policy for 2023–2025”⁶ proposes three sources of financing the deficit (see *Table 1*): government securities (excess of the OFZ⁷ issue over the redemption of OFZs), ad-

ditional oil and gas revenues and the NWF (National Welfare Fund).

The balance of budget revenues and expenditures in 2023 is significantly worse than in 2022, when there were significant additional oil and gas revenues and a budget surplus. In the future, this situation is likely to only worsen due to international sanctions. According to the “Main Directions of Budget, Tax and Tariff and Customs Policy for 2023–2025,”⁸ financing the primary federal budget deficit at the expense of government securities (excess the issue over the redemption of government securities minus interest on the debt) in 2023–2025 will be only 231.1, 334.2 and 142.7 bln. rb., respectively. At the same time, the primary federal budget deficit in the first three months of 2023 exceeded 3000 bln. rb. Additional oil and gas revenues in the amount of 1,961 bln. rb. in 2023 are in question under the current conditions of sanctions.

Thus, the increase in government debt in 2023–2025 is not considered a significant source for financing the primary deficit. As sources of financing the deficit in 2023 (see Appendix 40 to the Federal Law on the Federal Budget for 2023 and 2024–2025⁹ (hereinafter referred to as 466-FZ), additional oil and gas revenues of 939 billion rubles are indicated (which is quite unlikely) and the funds of the NWF in the amount of 2,903 billion rubles. To assess the possibility of financing a significant budget deficit by issuing new debt, see *Table 2*.

At the beginning of 2023, the value of government bonds amounted to 19.6 trillion. (51% of the bond market).¹⁰ In the current version of 466-FZ, there is an increase in the share of public debt in the bond market with its growth of 10% from 50.66% to 53.17%. However, if we assume an annual additional primary deficit of 5000 bln. rb., in a hard version of monetary policy, provided that the entire deficit is financed by government bonds, public debt will take up 88.16% of the entire bond market, which means that corporate bonds are almost completely replaced by government bonds and is almost impossible. If we assume an extremely soft version of monetary policy, the option is the purchase of bonds by the

⁶ URL: https://minfin.gov.ru/ru/document?id_4=300570

⁷ OFZ — abbreviation for Russian: Облигации Федерального Займа, romanized: Obligatsyi Federal'novo Zaima, literally “Federal Loan Obligations”.

⁸ URL: https://minfin.gov.ru/ru/document?id_4=300570

⁹ URL: https://minfin.gov.ru/ru/document/?DOCUMENT_NUMER_4=466-%D0%A4%D0%97&P_DATE_from_4=&P_DATE_to_4=&M_DATE_from_4=&M_DATE_to_4=&t_4=-8992603966332692413&order_4=M_DATE&dir_4=desc&by_doc_number_4=1&INF_BLOCK_ID_4=0

¹⁰ URL: https://minfin.gov.ru/ru/document?id_4=300570http://www.cbr.ru/hd_base

Table 1

Sources of financing the federal budget deficit in 2022–2025, billion rubles (bln. rb.)

Year	2022	2023	2024	2025
All sources	1,313.1	2,925.3	2,192.6	1,264.3
Additional oil and gas revenues	3,193.6	1,961.0	643.7	–488.5
NWF (National Welfare Fund)	–1,880.5	964.2	1,549.0	1,752.8
Government securities (excess of the OFZ issue over the redemption of OFZs)	–953.6	1,747.4	1,937.6	2,000.5

Source: Compiled by the author with the data of the Ministry of Finance. URL: https://minfin.gov.ru/ru/document?id_4=300570

Central Bank of the Russian Federation annually in the amount of 5000 bln. rb. The private bond market will not be absorbed by the state, but the money supply will increase. For comparison, the US bond market in 2023 accounted for 51% of the global bond market capitalization, or \$51 trillion (including \$31 trillion of government bonds), and the US stock market accounted for 42% of the global stock market capitalization, or \$52.2 trillion. In the United States, during 2020–2022, the combined federal budget deficit amounted to approximately \$6 trillion.¹¹ In relation to the volume of the US debt market, \$6 trillion accounts for 11.76%. The main variant of monetary policy was a soft option: the US Federal Reserve bought securities on the open market for about 3/5 of the volume of new debt [6].

Thus, the main constraint on the growth of state debt in both Russia and the United States (as well as, probably, other countries) is not the ratio of debt to GDP, as is usually believed [7–10], but the ratio of debt to the capacity of financial markets. In the case of Russia, the main problem is blocking access to world capital markets because of foreign sanctions. For the United States, the main problem is that the US stock market occupies a very large part of the world stock market [6] (taking into account debt and equity instruments of more than 56%). Metaphorically speaking, the American state financial elephant is too big for the china shop of financial markets. To assess the impact of the crowding effect on the interest rate in a tight version of monetary policy, we denote V — the total volume of the corporate bond market. As a result of the direct displacement effect, their cost will decrease by X of the budget deficit. The relative decline in the value of corporate bonds due to their displacement by government debt is equal to:

$$x \% = X / V \%$$

Denoting D as the average duration of corporate bonds, and $R\%$ as the change in bond yield with a decrease in their value by $x\%$ (this is equal to a change in the interest rate in the debt bond market, and hence in the economy as a whole), using the common equation for the tie between interest and value of a bond, we obtain the following expression:

$$R \% = -x \% / D. \quad (3)$$

Thus, if the amount of public debt increases by the amount of deficit X without increasing the total size of the debt market, due to the direct displacement of corporate bonds, the interest rate may increase by the value of $R\%$.

Using expression (3), we get that with an increase in public debt by $X = 5000$ bln. rb. and with an average duration of corporate bonds of 3 years, a potential increase in the interest rate:

$$R \% = (5/19) * 100 \% / 3 = 8,7 \%$$

The conclusion is that under the tight version of monetary policy in Russia, at the present it is impossible to significantly increase the financing of the primary budget deficit by increasing the public debt by about 5000 bln. rb. per year. In the soft version of monetary policy, the Bank of Russia should buy a similar amount of 5000 bln. rb. on the open market. In this case, there will be no increase in the rate of interest, but there will be an increase in the money supply $M2$.

Impact of money supply growth n the GDP deflator index and inflation

Fig. 1 shows monthly increases in $M2$ since January 1, 2011. Usually, after a peak in January, the

¹¹ URI: <https://www.whitehouse.gov/omb/budget/historical-tables/>

Table 2

The growth of public debt with financing of the primary deficit of the federal 5000 bln. rb. (in addition to 466-FZ), bln.rb.

	2023	2024	2025
Government securities (excess of the OFZ issue over the redemption of OFZs)	1,750.4	2,625.5	2,946.5
Interest on the OFZ debt	1,519.3	2,291.3	2,803.8
Financing of the primary deficit due to the growth of public debt, provided for by 466-FZ	231.1	334.2	142.7
Financing an additional primary deficit of 5000 bln. rb., increase in public debt	5,000.0	5,000.0	5,000.0
Additional expenses for interest on the debt with a yield of new placements of 10%)	250.0	750.0	1,250.0
Additional excess of the OFZ issue over the redemption of OFZs	5,250.0	5,750.0	6,250.0
Increase in public debt under 466-FZ from the level of 2022	1,750.4	4,375.9	7,322.4
Increase in public debt from the level of 2022 in the case of financing an additional annual primary deficit of 5000 bln. rb.	7,000.4	15,375.9	24,572.4
Public debt by 466-FZ	20,640.7	23,266.2	26,212.7
Public debt in the case of financing an additional annual primary deficit of 5000 bln. rb.	25,890.7	34,266.2	43,462.7

Source: Calculated by the author with the data from the Ministry of Finance. URL: https://minfin.gov.ru/ru/document?id_4=300570

seasonal growth was further mitigated by a significant decrease in M2 in February–March, but this did not happen in 2023. The decrease in M2 in February 2023 was insignificant, however, a high increase in M2 (over 1 trillion rubles) was observed in March and April 2022 and 2023, August–September 2022, and in June–August 2023.

When analyzing the relative growth of M2 over a period of 12 months as a percentage (see Fig. 2) since 2013, one can see that normally this growth was less than 15% (except for two peaks in mid-2013 and early 2020), but since the second half of 2022, there has been an abnormal increase exceeding 25% at the end of 2022. Particularly, from August 2022 to September 2023, there was an abnormally high peak in the M2 money supply — over 20,000 bln.rb. from August 1, 2022, to October 1, 2023 (of which 13,000 bln.rb. for 9 months of 2023).

This may be a good approximation of the inflation tax burden, which is almost equal to the annual revenues of the federal budget. Unlike in the U.S., this excess cannot be explained by an increase in national debt. Such M2 growth rates as in 2022 and 2023 are obviously several times higher than

the federal budget deficit and cannot be explained either by an increase in the Bank of Russia's reserves (which decreased from \$630 billion to \$563 billion in 2022–2023) nor the need to prevent a financial crisis in the banking sector (as in 2012) or other extraordinary events (such as the COVID-19 pandemic in 2020) that required a significant expansion of lending to the banking sector by the Central Bank.

Table 3 compares the growth of the M2 money supply, the GDP deflator index, and the GDP deflator index plus GDP growth from 2012 to 2022, as well as inflation (although this indicator is less significant).

As can be seen from Table 3, there is no obvious direct relationship between any two of the three factors: inflation, the growth of the M2 money supply, and the GDP deflator index. At the same time, in some years (periods) of high M2 growth (2012–2015, 2018, 2021–2022), there is an increase in the GDP and inflation deflator index, with some lags (about 1 year). GDP monetization was highest in 2020 and 2022 (54%), slightly declining in 2019 (47%) and 2021 (49%), and almost constant in 2016–2018 (45–46%).

Noteworthy is the sharp acceleration of the M2 growth rate in 2022 (124%) and unusually high

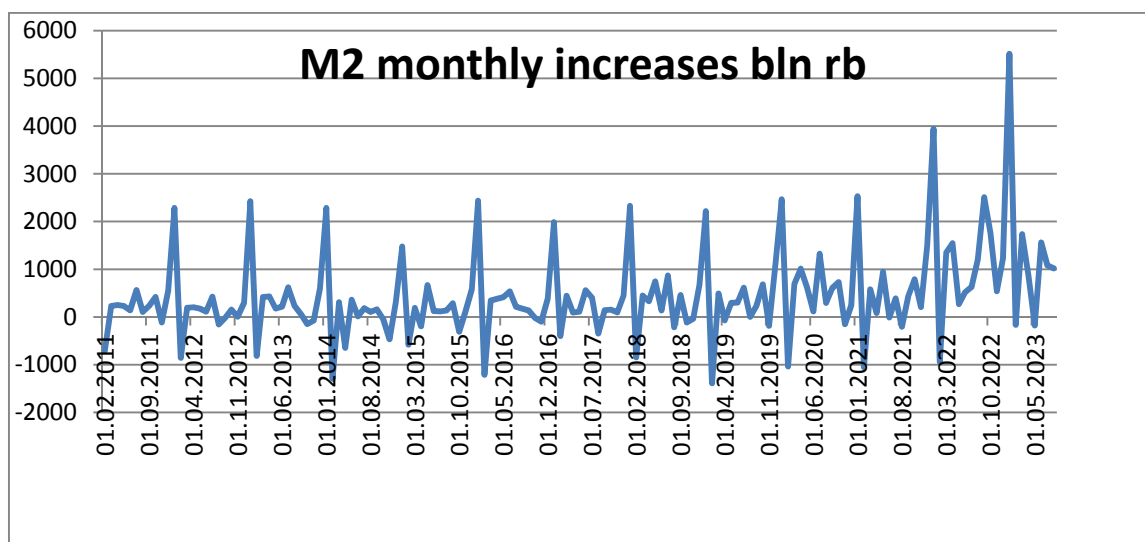


Fig. 1. Monthly increases in M2 since January 1, 2011

Source: Compiled by the author. URL: http://www.cbr.ru/hd_base

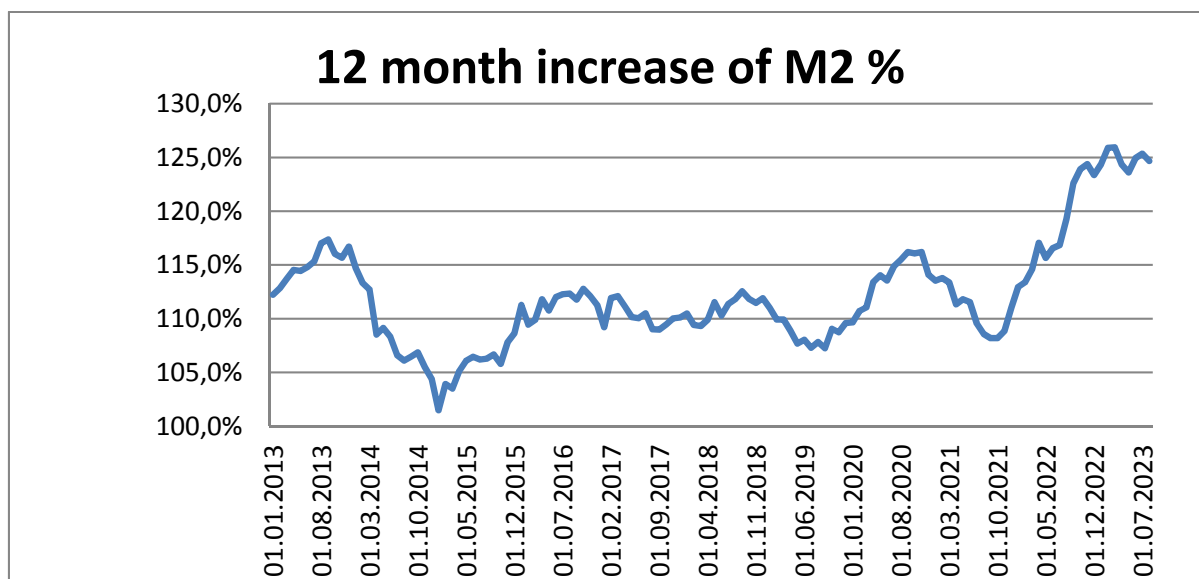


Fig. 2. Growth of M2 over a 12-months period

Source: Compiled by the author. URL: https://www.cbr.ru/statistics/macro_itm/svs/key-ind/

growth rates in 2020 (114%), 2021 (113%) and 2015 (115%). The GDP deflator index has extremely high values in 2021 (119%) and 2022 (114.3%). In 2015–2019, the M2 growth rate was relatively moderate (109–111%), and the GDP deflator index was also at a moderately high level in 2012 (113%), 2013 (107%) and 2014 (108%). At the same time, in 2012 and 2013, there were unusually high growth rates of M2 (115% and 112%), and in 2014, the growth of M2 cooled down, but there was a shock devaluation of the ruble by two times.

A comparison of the data for the years from 2012 to 2022 (Table 3) suggests that there is a lag relationship (with a lag of about 1 year) between

the growth of the M2 money supply, the growth of the GDP deflator index, and even the growth of real GDP (although the latter is expressed very slightly). At the same time, the dependence of the GDP deflator index on M2 growth is obvious, but it is not possible to establish exact patterns for annual changes. Obviously, the patterns also depend on non-monetary factors (including external shocks, such as the COVID-19, sanctions, devaluation of the ruble, etc.).

An almost clear and evident relationship is provided by a comparison over biennial periods (see Table 4). It is quite obvious that over the most biennial periods, the growth of the M2 money supply and

Table 3

M2, growth of the M2 money supply, the GDP deflator index, real GDP growth, inflation index and monetization of GDP from 2012 to 2022

Year	M2 bln. rb.	M2 growth, %	GDP deflator index, %	Real GDP growth, %	Inflation index, %	Monetization of the GDP
2022	82,388	124	114.30	97.9	111.9	54%
2021	66,253	113	119.00	105.6	108.4	49%
2020	58,652	114	100.90	97.3	104.9	54%
2019	51,660	110	103.30	102.2	103.1	47%
2018	47,109	111	110.00	102.8	104.3	45%
2017	42,442	110	105.30	101.8	102.5	46%
2016	38,418	109	102.80	100.2	105.4	45%
2015	35,180	111	107.20	98	112.9	42%
2014	31,616	101	107.50	100.7	111.4	40%
2013	31,156	115	105.30	101.8	106.5	43%
2012	27,165	112	108.90	104	106.6	40%

Source: compiled by author. URL: https://www.cbr.ru/statistics/macro_itm/svs/key-ind/

the GDP deflator index are almost the same for the 8 periods (from total of 11) 2021–2022, 2020–2021, 2018–2019, 2017–2018, 2014–2015, 2013–2014, 2012–2013, 2011–2012.

Significant discrepancies are observed only in the 3 periods: 2019–2020 (probably, it is the effect of COVID-19), 2015–2016 and 2016–2017 (probably, that is the effect of the sanctions and counter-sanctions in 2014–2016).

Particularly high growth in the M2 money supply took place in 2021–2022 (by 40.5%), which stimulated some GDP growth (by about 3.4%) and increased the GDP deflator (by 39.8%). Thus, in 2021–2022, we can see two effects of M2 growth: GDP growth and the depreciation of money. However, at the same time, the increase in the GDP deflator exceeds GDP growth by more than 10 times. It is not obvious why a 40.5% increase in the monetary supply was required to achieve quite low biennial growth of GDP of 3.4%.

An analysis of the change in the M2 money supply in the United States for 2020–2022 shows that it increased by about the same amount as the aggregate budget deficit for 3 years. The aggregate budget deficit for 3 years was \$6 trillion, and the growth of M2 amounted to \$6.88 trillion

from June 30, 2019 to June 30, 2022.¹² The greatest concern in the United States was the sharp increase in the share of M1 in M2 (to 80% from the level of 10–20%). This increase indicates an increase in inflation expectations. Not only the United States but also EU countries faced the effect of abnormally high inflation caused by high budget deficits in mid-2022, with inflation in some months reaching 10% in the United States (June 2022) and 10–11% in Europe (October 2022) on an annualized basis.

At the same time, unlike in the United States, the high growth rates of the money supply in Russia cannot be explained by the budget deficit and the need to maintain the liquidity of public debt. A possible explanation is that the increase in the Central Bank's reserves also disappeared since the reserves did not increase during this period. Such high increases in M2 have not been seen in the past since 2012. In 2013–2021, annual M2 growth usually did not exceed 10–15% (at the level of the GDP deflator or slightly more). Due to the seasonality of payments to employees and companies, December and January usually demonstrated an increase in

¹² URL: <https://www.whitehouse.gov/omb/budget/historical-tables/>

Table 4

Growth of the M2 money supply, GDP deflator index and real GDP growth from 2011 to 2022 over 2-year periods

Period	M2 cumulative growth%	GDP deflator index%	Real GDP growth%
2021–2022	140.5	139.8	103.4
2020–2021	128.2	122.4	102.7
2019–2020	124.5	103.6	99.4
2018–2019	121.7	119.0	105.1
2017–2018	122.6	120.8	104.7
2016–2017	120.6	110.3	102.0
2015–2016	121.5	108.4	98.2
2014–2015	112.9	113.8	98.7
2013–2014	116.4	115.9	102.5
2012–2013	128.7	120.9	105.9
2011–2012	135.7	135.7	108.5

Source: Compiled by the author. URL: https://www.cbr.ru/statistics/macro_itm/svs/key-ind/

M2, but the peaks of 2022 and 2023 were abnormally large (see *Table 5*).

If such high rates of money supply growth continue in 2023, it will create extremely high inflation risks, which have not been fully realized now but may materialize in the future if they cause high inflation expectations.

Discussion and conclusions

The first three conclusions concern financing the budget deficit through new borrowing [15]. First, a hard version of monetary policy leads to a noticeable increase in the interest rate (3). Second, the possibilities for additional financing of the primary budget deficit depend not so much on the ratio of debt to GDP but on the ratio of new borrowings to the volume of the debt market, especially the short-term market. Third, in the case of Russia, these opportunities do not allow new borrowing to finance the primary budget deficit of approximately 5000 bln. rb. per year without significant monetary easing by the Central Bank (for the United States, the limits of permissible borrowing are proportional to the size of debt the market).

A discussion is required regarding the ties between the money supply, GDP deflator index, and inflation in Russia. The paper by B. Plyshevsky [16] compares the growth of inflation and the GDP deflator index in Russia for 2000–2012 with developed and developing countries and concludes that these

indicators in Russia were significantly higher than those in the countries compared. At the same time, there is no indication of the growth of the money supply, but it is obvious that without this growth, the inflationary effect would not be possible.

Some authors (e.g., M. Golovnin) make categorical statements that inflation in Russia is allegedly “obviously” not of a monetary nature [17]. Such assertions are not only unfounded but directly contradict economic theory [1, 2, 14] and empirical data, including those cited in this paper. It can be said with absolute certainty that the deflator index in Russia (and in many other countries as well) is “obviously” directly related to the growth of the money supply. In Russia in 2021–2023, this dependence has become even more direct and “obvious” due to the unusually high growth rate of M2, which is not related to government spending and is not explained by the growth of the Bank of Russia’s reserves.

In the paper [18], the authors analyze the causes of inflation and propose to measure “inflation” (more precisely, the depreciation of money) by the difference between the growth rate of M2 and the growth rate of real GDP. This proposal was not proved by the authors using empirical data. In theory, its essence follows from Say’s Law, which is the general theory of economic equilibrium. However, it requires empirical confirmation, so it is substantiated and confirmed in this paper (see *Table 4*). The data on current growth rates of M2 in Russia

minus GDP growth obviously mean a fairly high inflationary “tax” on deposits in rubles as well as cash in accounts and in cash (at a rate of about 40% for 2 years). However, official “inflation” may not be a good basis to assess this “inflation tax”.

Particularly, from August 2022 to September 2023, there was an abnormally high growth in the M2 money supply — over 20,000 bln.rb. from August 1, 2022 to October 1, 2023, and this amount may be a good approximation of the inflation tax burden, fined by the monetary authorities above usual taxes, and about the same size. What is evident is that this means a fairly high inflationary “tax” on deposits in rubles as well as cash in accounts and in cash (at a rate of about 40% for 2 years), and it is obvious that such a high inflation “tax” (as any other change in monetary and fiscal policy) should have losers and beneficiaries.

The losers are quite evident — deposit holders, pensioners, as well as employees (including public sector employees), whose wages grew at a slower pace. At the same time, the answer to the question of the ultimate beneficiaries of the inflationary “tax” is not evident. There is no doubt that this “tax” has led to an increase in the revenues of the budget system (and so may help to mitigate some of the budget problems), but the beneficiaries of the “tax” are not only the budget system (and not so much) but also many other economic entities. Who are the “winners” — exporters, some major banks (with access to Central Bank loans), or maybe owners of real estate — that is not “obvious” and perhaps deserves special research and investigations.

A good way to reduce inflation is to introduce a law similar to the Inflation Reduction Act that was adopted in the United States in August 2022,¹⁵ after which the M2 money supply decreased significantly (after July 31, 2022, by about \$0.8 trillion per year and is declining further). In Russia, there was just a remark by the President of the Russian Federation V. Putin about the danger of high inflation. It is very likely that the President of the Russian Federation issued an order on this remark, but so far this has not led to changes in the legislation, and there is no information on how this issue is being considered by the Government or the Central Bank.

In any case, the effectiveness of the method of monetary stimulation for economic growth (large-scale growth of M2) is very questionable, to say the least, and the benefits for the economy from the growth of M2 are not obvious, unlike negative outcomes. In this regard, in order to implement the inflation targeting policy, it may be considered introducing internal (Bank of Russia) and external (the Government of Russia and the State Duma) control over the expansion of the M2 money supply, exchange rate and GDP deflator.

In particular, the State Duma can play a significant role as a legislative body that oversees the work of the Bank of Russia (and appoints members of the Board of Directors) [19]. To control these indicators, it is also necessary to adopt a special anti-inflation law similar to that in the United States.

¹⁵ URL: <https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/>

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