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Impact of the Russian Stock Market on Economic Growth*

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ABSTRACT

The article considers the impact of the stock market on the economic growth. The **aim** of the study is to determine the degree of impact of the Russian stock market on gross domestic product, as well as to analyze the significance of various financial instruments in this process. The study suggests three hypotheses: 1) the dynamics of changes in the stock market as a whole has an impact on GDP growth; 2) the growth of the stock market has a positive impact on the change in GDP; 3) the stock market affects the GDP growth more, than that of corporate bonds. To test these hypotheses, the work employs **methods** of economic and mathematical modeling and building a vector autoregressive (VAR) model. The authors used the data from the International Monetary Fund (IMF), Moscow Exchange (MOEX) and Finam Investment Holding for the period from January 2000 to July 2019. As a **result,** they proved that not only traditional macroeconomic and production factors affect the country's GDP growth, but also the positive dynamics of the stock market. The paper revealed that the impact of the growth of stock indices and corporate bonds on the change in gross domestic product would be different. At the same time, a different degree of impact of the stock market on gross domestic product over time. The authors **concluded** that ensuring the growth of stock indices is a condition to achieve stable growth in Russia's GDP. Most of all, the GDP growth depends on the growth of the largest liquid companies trading in the Russian stock market.

Keywords: stock market; RTS index; economic growth; real GDP; stocks; bonds

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INTRODUCTION

After 2014, the Russian economy is going through another crisis. The fall in oil prices, the depreciation of the national currency, the anti-Russian sanctions restricting financial flows and access to foreign financing of the largest Russian companies — all this has a very negative impact on the economic situation in the country. Under these conditions, searching for sources of sustainable economic growth, stabilizing macroeconomic indicators, as well as improving the living standards of the population are priority. Traditional economic growth factors are considered factors of domestic production and everything related to it (labor productivity, level of development of technologies and innovations, human capital), as well as general macroeconomic factors that, in the era of globalization, affect the development of each individual economy (currency exchange, resource prices, volumes of foreign economic activity). However, some researchers consider separately or in addition to traditional factors specific indicators that may affect the economic growth of the country as a whole. These include environmental situation, financial market development level, healthcare system, etc. Since the Russian stock market is a developing one, i.e. has the potential for development, the study of the relationship between the state of the stock market and economic growth is of scientific interest.

LITERATURE REVIEW AND SUBSTANTIATION OF THE HYPOTHESIS

We can conveniently classify the studies devoted to economic growth factors into two large groups: the study of traditional macroeconomic factors affecting economic growth, and the study of specific factors.

The first group pays much attention to the production development (level of technological development, labor productivity, etc.).

S. Acikgoz and M. S. Ben Ali identify economic growth factors using the example of the Middle East and North African countries [1]. The authors analyze the sources of economic growth in three main areas: technological progress, human capital and investment capital. The results showed that in most countries technological progress and the overall level of production contribute more to economic growth. In turn, human capital had the least impact on economic growth. The countries not involved in oil production are experiencing a serious shortage of financial resources and must increase their savings and labor productivity to ensure economic growth.

K. Nakamura, S. Kaihatsu and T. Yagi [2] made similar conclusions after they examined the background of recent Japan's low labour productivity growth and issues regarding Japan's sustainable growth. The authors conclude that there are two reasons behind the slowdown in labor productivity: inefficient use of existing technologies and R&D results. They emphasize that to ensure sustainable economic growth, it is necessary to improve labor productivity and efficiency in the labor and capital markets.

As part of a more focused study, L. F. Gabriel and L.C. de Santana Ribeiro established in which sector value added has a greater impact on economic growth in developing coun-

tries: raw materials, manufacturing or services [3]. The authors found that manufacturing is the strategic key sector in terms of driving economic growth for most developing countries.

Modern studies provide the main provisions of the theory of production factors, thus, proving that economic growth directly depends on production level, technological development and labor productivity. O. S. Sukharev and E. N. Voronchikhina noted that considering country specifics, as well as industrial development level, are necessary to identify economic growth factors [4].

The authors in the second group of studies identify diverse approaches to this issue and indicate various specific factors that affect economic growth. R. P. Pradhan, M. B. Arvin and S. Bahmani using the Granger causality test investigate the interactions between innovation, financial development and economic growth [5]. Innovation is measured using a composite index calculated based on the number of patents granted, research and development costs, and the share of high-tech exports in GDP. Financial development is assessed through composite indices of the banking sector, stock market and other financial markets. As a result, the authors found that all the studied indicators mutually influence each other.

P. Procházka, K. Čermáková analyzed the impacts of selected institutional factors on economic growth [6]. The authors consider Open Market category — one of the four groups of indicators included in the Index of Economic Freedom (IEF) presented by the Heritage Foundation. The study employs the correlation analysis to test the connection between GDP and trade openness, measured by the value of customs tariffs; investment freedom, measured by the volume of foreign direct investment; Doing business index; R&D expenditures. The study revealed the closest connection between GDP and R&D expenditures. At the same time, customs tariffs and FDI flows do not significantly affect economic growth.

Special mention should go to the works analyzing the dependence of GDP on the financial sector. K. K. Makun considers the regression dependence of GDP on three factors — imports, remittances and foreign direct investment — in the Fiji economy [7]. All factors turned out to be significant, however, imports have a negative impact on economic growth in the long term, and remittances and foreign direct investment positively influence economic growth both in the long run and the short run. The authors of works [8–9] come to similar conclusions about the impact of foreign direct investment, as well as the development level of the financial sector on economic growth. Among the parameters of the financial sector development, they most often analyze inflation level, volume of bank loans and market capitalization.

Many works examine the dependence of stock market development and economic growth on the example of various countries, including Belgium [10], Portugal [11], African countries [12], OPEC countries [13], China [14]. The results of these studies are contradictory. However, most of them prove a direct correlation between stock market development and economic growth, since companies that operate efficiently within the country are attractive both for internal and external investors. The negative impact of the stock market on economic growth is noted in the presence of factors characterizing the inefficient functioning of the market, in particular corruption and financial bubbles.

Therefore, economic growth depends on two sets of variables — traditional macroeconomic (general factors) and specific factors. We focus on the impact of specific factors such as the state of the stock market, characterized through the main stock indices. Thus, we will analyse the following hypotheses:

Hypothesis 1: **changes in the state of the stock market as a whole affects GDP growth.**

Since the Russian stock market is developing and less prone to financial bubbles [14],

the development of the stock market (positive dynamics of the RTS index) will stimulate economic growth [10, 12].

Hypothesis 2: **stock market growth has a positive effect on the change in GDP.**

Stock market development can be estimated by the MOEX index — a vector of sustainable development, whose calculation base includes shares of companies showing the best dynamics of sustainable development and corporate social responsibility, i.e. the most investment attractive. The increase in investment attractiveness, expressed through the growth of the index, will contribute to economic growth [11].

Hypothesis 3: **GDP growth is affected more by the stock market than by the corporate bond market.**

The stock market in Russia is more developed than the corporate bond market; thus, stock trading has a greater impact on economic growth.

METHODOLOGY AND EMPIRICAL BASE

We tested these hypotheses with a vector autoregression (VAR) model, widely used to make forecasts of macroeconomic indicators. For modeling, we selected traditional macroeconomic variables (a similar set of variables as in [15–17]) and specific factors reflecting the state of the stock market.

The macroeconomic variables include:

- consumer price index;
- industrial production index;
- oil price in the world market;
- USD to RUB exchange rate;
- unemployment rate;
- monetary aggregate M2.

The specific variables include:

- RTS index;
- MOEX index of the ten most liquid companies;
- corporate bond index.

We used the monthly benchmarks from the official databases of the International Monetary Fund (IMF), Moscow Exchange (MOEX), and Finam Investment Holding for the period from January 2000 to July 2019.

Table 1 provides the description of variables used for modeling with the index and the notes to the calculation method.

RESULTS

Initially, we analyzed the dynamics of changes (*Fig. 1*) in the analyzed indicators to test the hypotheses.

Some benchmark macroeconomic variables shows seasonality at visual analysis. Therefore, to eliminate its influence, we made an adjustment using the generally accepted X-13ARIMA-SEATS methodology. Seasonality was removed for the following variables: real GDP, industrial production index, unemployment rate, monetary aggregate M2, consumer price index. *Fig. 2* shows the dynamics of the adjusted time series of the analyzed variables.

Hypothesis test results:

Hypothesis 1

We check whether the RTS index affects GDP and add only EX_RTS to the control variables. Data sampling for the period from December 2002 to September 2018 (190 observations).

Fig. 3 shows GDP impulse response function to one-unit shock of variables (one dispersion amplitude) indicated in the heading of the graphs, with a 95% confidence interval and a period of 12 months in advance.

Table 2 and *Fig. 3* show the positive shock of the RTS index leads to a stable and statistically significant growth (response) of real GDP at a 5% level over the next 12 months. At the same time, the contribution to the dispersion of GDP in 1 month is 2.1%, and in 6 months is already 9.3%. The maximum contribution takes place in 9 months after the shock and amounts to 11.1%, followed by a decline in influence. Thus, the positive dynamics of the Russian stock market stimulates economic growth and leads to an increase in real GDP (hypothesis 1 was substantiated). The RTS index reflects the state of the stock market as a whole, while the index growth reflects an increase in the total

Table 1

Variables used for modeling

Index	Name	Notes to the calculation method
GDPR	Real GDP, trillion roubles	Nominal GDP in 2010 prices (converted by the GDP deflator) and seasonally adjusted
ER	USD to RUB exchange rate	Monthly average
IPI	Industrial production index	2010 seasonally adjusted index
UR	Unemployment rate,%	Seasonally adjusted unemployment rate
M2	Monetary aggregate M2, trillion roubles	"Broad Money" seasonally adjusted
CPI	Consumer price index	2010 seasonally adjusted index
OIL	Oil price (Brent), RUB/barrel	USD to RUB converted at the corresponding average monthly exchange rate
EX_RTS	RTS index	
EX_LIQ	MOEX index of the ten most liquid companies	
EX_CBI	Corporate bond index	

Source: compiled by the authors.

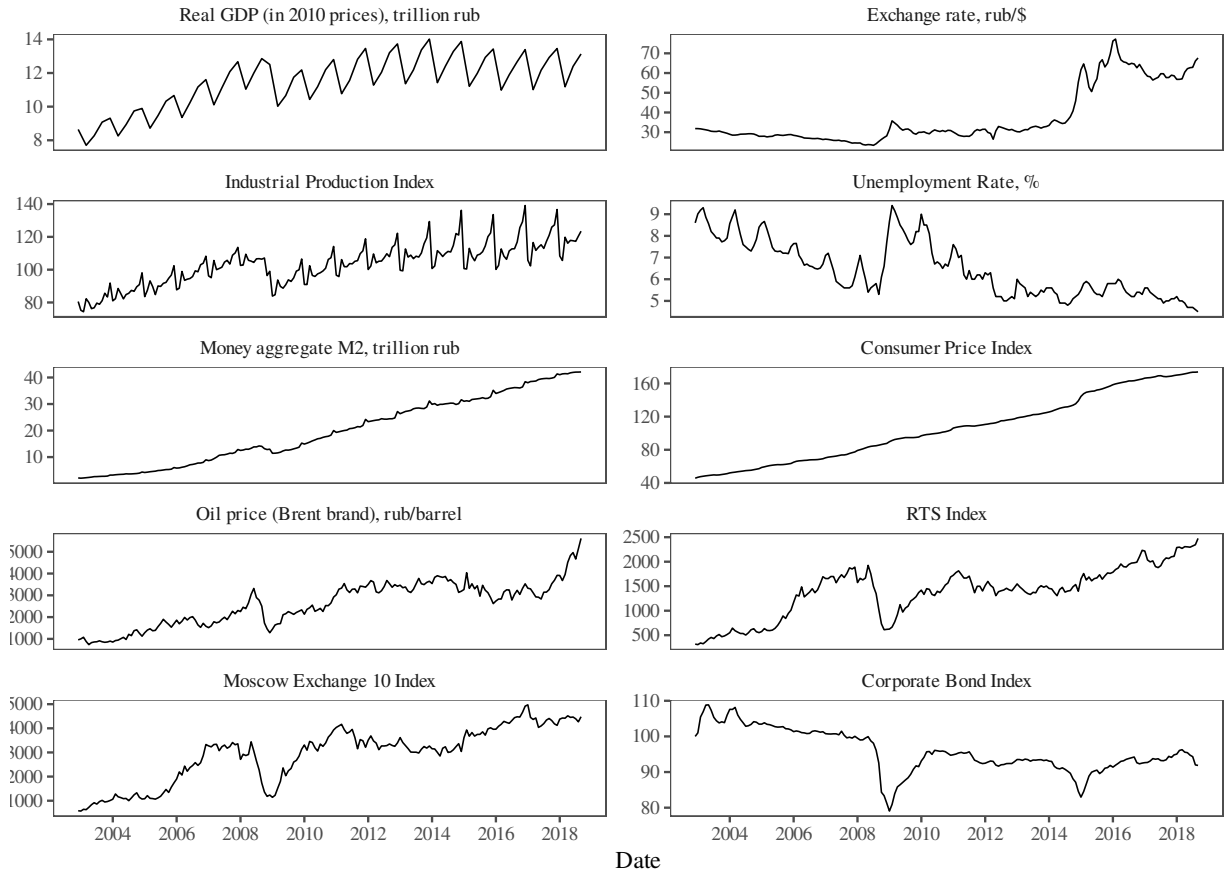

Fig. 1. **Dynamics of changes in the analyzed variables**

Source: compiled by the authors.

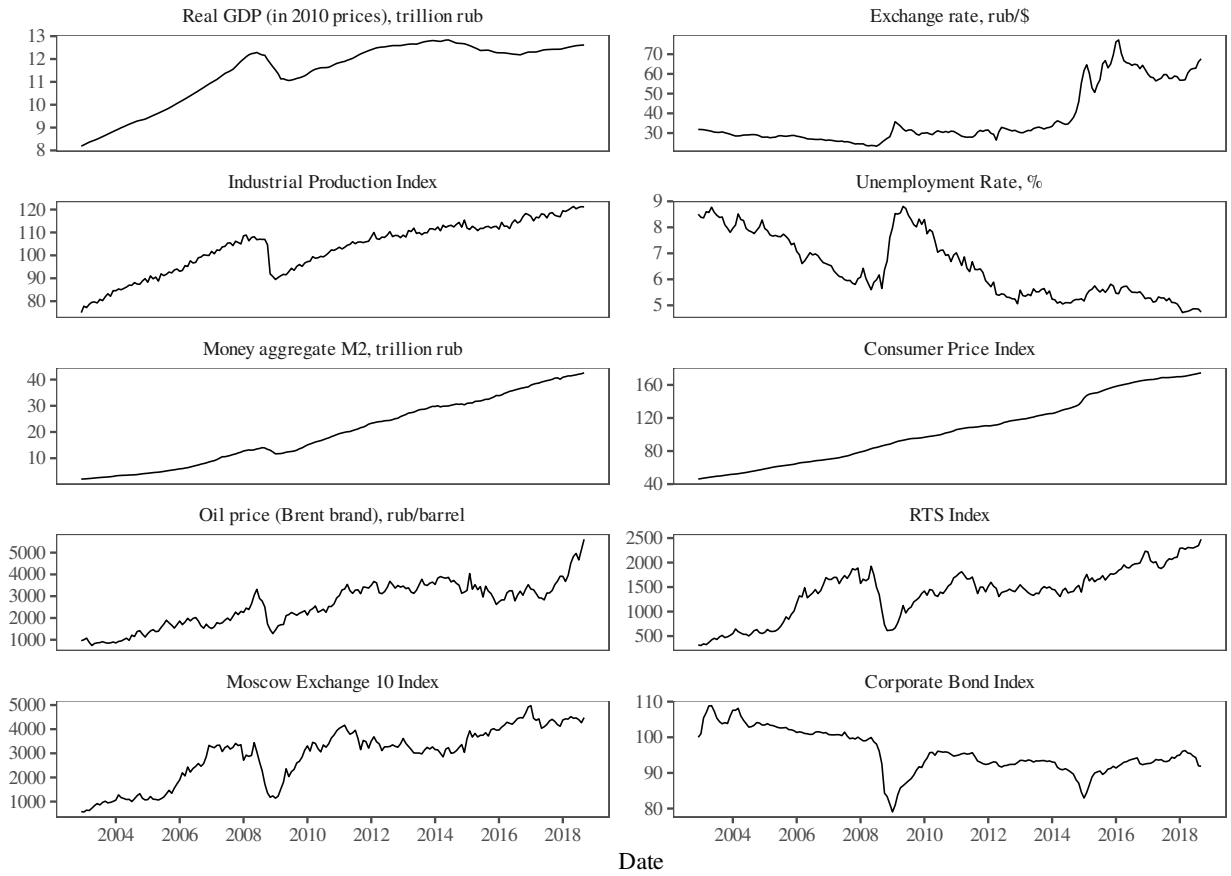

Fig. 2. **Dynamics of changes adjusted for the seasonality of the analyzed variables**

Source: compiled by the authors.

Table 2

Variance decomposition for 12 months in advance, % (hypothesis 1)

Month	GDPR	ER	IPI	UR	M2	CPI	OIL	EX_RTS
1	91.4	0.2	1.3	0.3	4.6	0.0	0.0	2.1
2	86.9	0.2	2.3	0.5	7.5	0.1	0.0	2.5
3	79.7	0.2	2.7	0.9	12.9	0.2	0.2	3.1
4	72.4	0.2	4.4	1.0	16.2	0.3	0.3	5.2
5	66.0	0.6	4.1	1.4	20.3	0.2	0.5	7.0
6	57.5	1.1	3.5	1.4	26.4	0.2	0.7	9.3
7	50.7	1.5	3.1	1.8	30.7	0.3	1.4	10.5
8	43.0	1.4	2.6	2.9	36.0	0.4	3.0	10.6
9	35.3	1.5	2.1	4.1	40.6	0.7	4.6	11.1
10	28.4	1.6	1.6	5.0	45.0	1.5	6.2	10.6
11	22.5	1.7	1.3	5.4	47.6	2.2	9.1	10.2
12	18.1	1.8	1.1	5.3	47.8	2.7	13.2	9.9

Source: calculated by the authors.

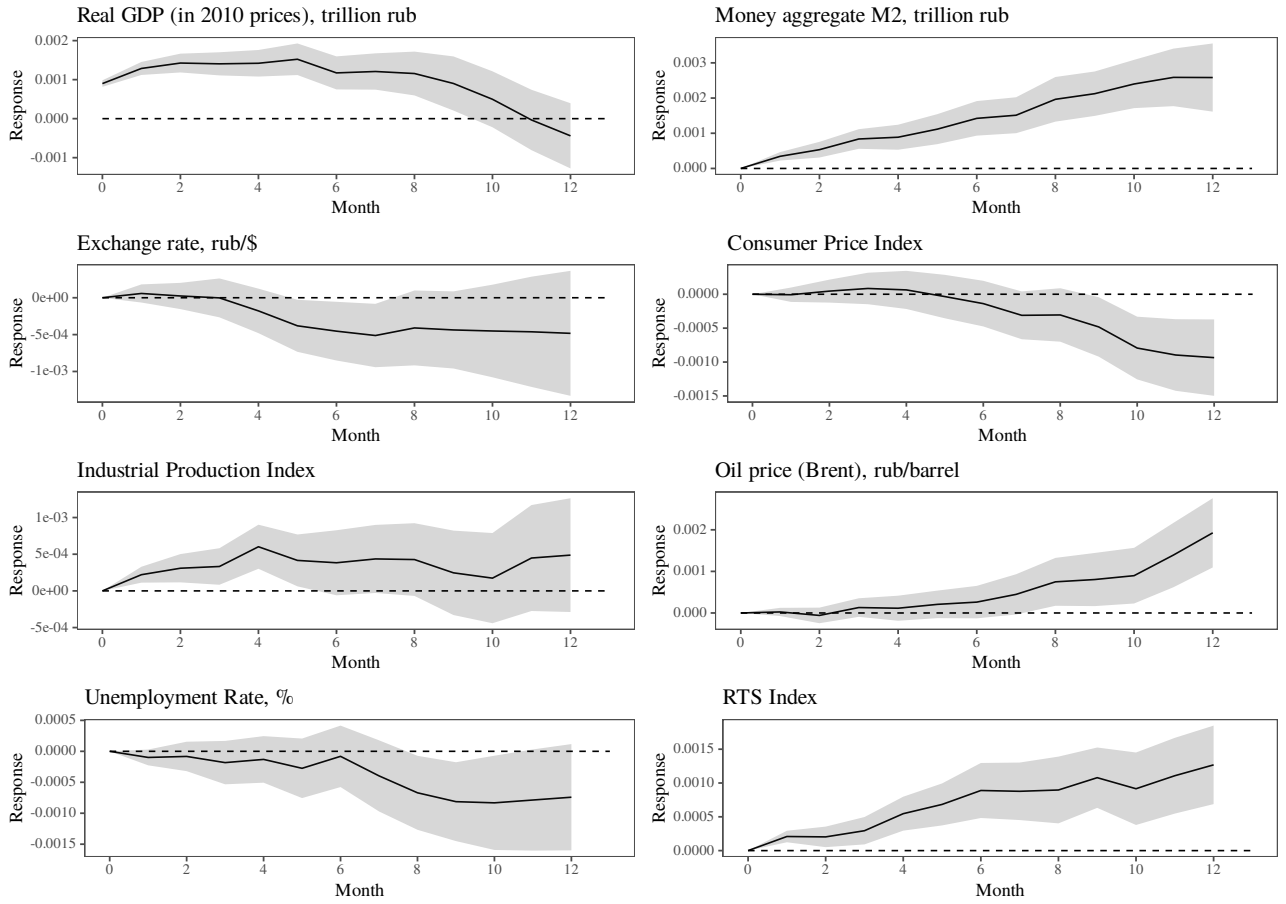

Fig. 3. **GDP impulse response function to one-unit shock of variables (hypothesis 1)**

Source: compiled by the authors.

Table 3

Variance decomposition for 12 months in advance,% (hypothesis 2)

Month	GDPR	ER	IPI	UR	M2	CPI	OIL	EX_LIQ
1	92.3	0.2	1.4	0.5	3.9	0.0	0.1	1.7
2	88.0	0.1	2.4	0.6	6.7	0.1	0.0	2.0
3	81.3	0.1	2.9	1.1	11.4	0.1	0.4	2.6
4	73.9	0.2	4.7	1.3	14.1	0.1	0.6	5.1
5	67.3	0.7	4.3	1.7	17.2	0.1	1.0	7.6
6	59.2	1.3	3.8	1.5	21.8	0.2	1.6	10.6
7	52.5	1.8	3.3	1.7	24.7	0.6	2.7	12.6
8	45.3	1.8	2.7	2.4	28.4	1.0	5.2	13.2
9	38.0	1.9	2.1	3.2	31.3	1.6	7.4	14.4
10	31.3	2.3	1.8	3.9	33.7	2.8	9.7	14.6
11	25.0	2.6	1.4	4.0	34.6	3.9	13.5	15.0
12	20.1	2.9	1.1	3.7	33.4	4.7	18.6	15.5

Source: calculated by the authors.

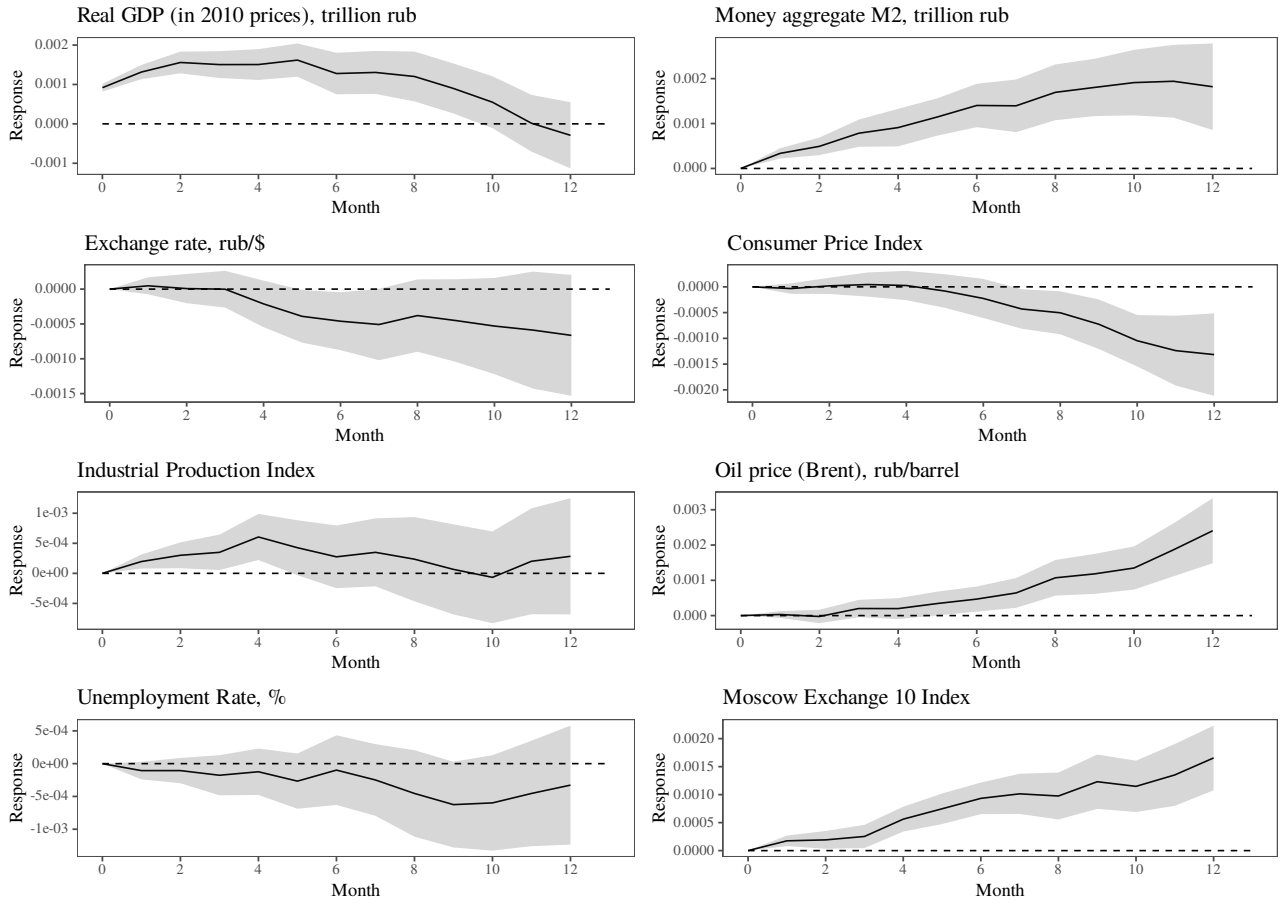

Fig. 4. **GDP impulse response function to one-unit shock of variables (hypothesis 2)**

Source: compiled by the authors.

capitalization of domestic issuers and investor interest in the Russian market.

Based on the impact of the stock market dynamics on real GDP established and confirmed by empirical analysis, we can conclude that ensuring economic growth requires measures on stimulating stock market development, however, the maximum contribution of this impact will only be observed in 9 months.

Hypothesis 2

We check whether the MOEX index of the ten most liquid companies affects GDP and add only EX_LIQ to the control variables. Data sampling for the period from December 2002 to September 2018 (190 observations).

Fig. 4 shows GDP impulse response function to one-unit shock of variables (one dispersion amplitude) indicated in the heading of the graphs, with a 95% confidence interval and a period of 12 months in advance.

Table 3 and *Fig. 4* show that the positive shock of the MOEX index of the ten most liquid companies leads to a steady and statistically significant 5% increase in real GDP over the next 12 months. The contribution to the dispersion of GDP in 1 month is 1.7%, and in 6 months -is already 10.6%. The maximum contribution takes place in 12 months after the shock and amounts to 15.5%. Thus, the growth of quotations of the ten most liquid companies has a positive effect on GDP growth.

Compared to the test results of the previous hypothesis, we revealed a stronger impact, i.e. GDP depends on the most liquid, rapidly developing and efficiently functioning domestic companies more, than on the general state of the stock market as a whole.

Table 4

Variance decomposition for 12 months in advance,% (hypothesis 3)

Month	GDPR	ER	IPI	UR	M2	CPI	OIL	EX_RTS	EX_CBI
1	90.6	0.0	2.1	0.0	4.6	0.1	0.3	2.3	0.1
2	87.5	0.3	2.8	0.1	5.8	0.1	0.3	3.0	0.1
3	81.4	0.8	2.8	0.1	9.5	0.0	0.8	4.4	0.2
4	72.1	2.7	4.3	0.3	10.7	0.0	1.0	7.7	1.2
5	60.4	6.2	4.4	0.4	12.3	0.1	1.4	10.2	4.7
6	47.6	10.1	4.0	1.0	15.9	0.6	2.5	12.8	5.5
7	37.9	14.3	4.3	0.9	17.7	1.9	3.9	14.4	4.8
8	29.7	15.5	4.1	0.8	21.2	3.2	6.7	14.9	3.9
9	23.6	16.2	3.4	0.8	23.3	4.8	8.9	15.8	3.2
10	20.2	16.5	2.8	0.7	24.7	7.0	11.0	14.6	2.6
11	18.7	15.7	2.5	0.6	24.3	8.9	14.0	13.3	2.0
12	18.7	15.0	2.5	0.4	22.6	9.8	16.8	12.4	1.7

Source: calculated by the authors.

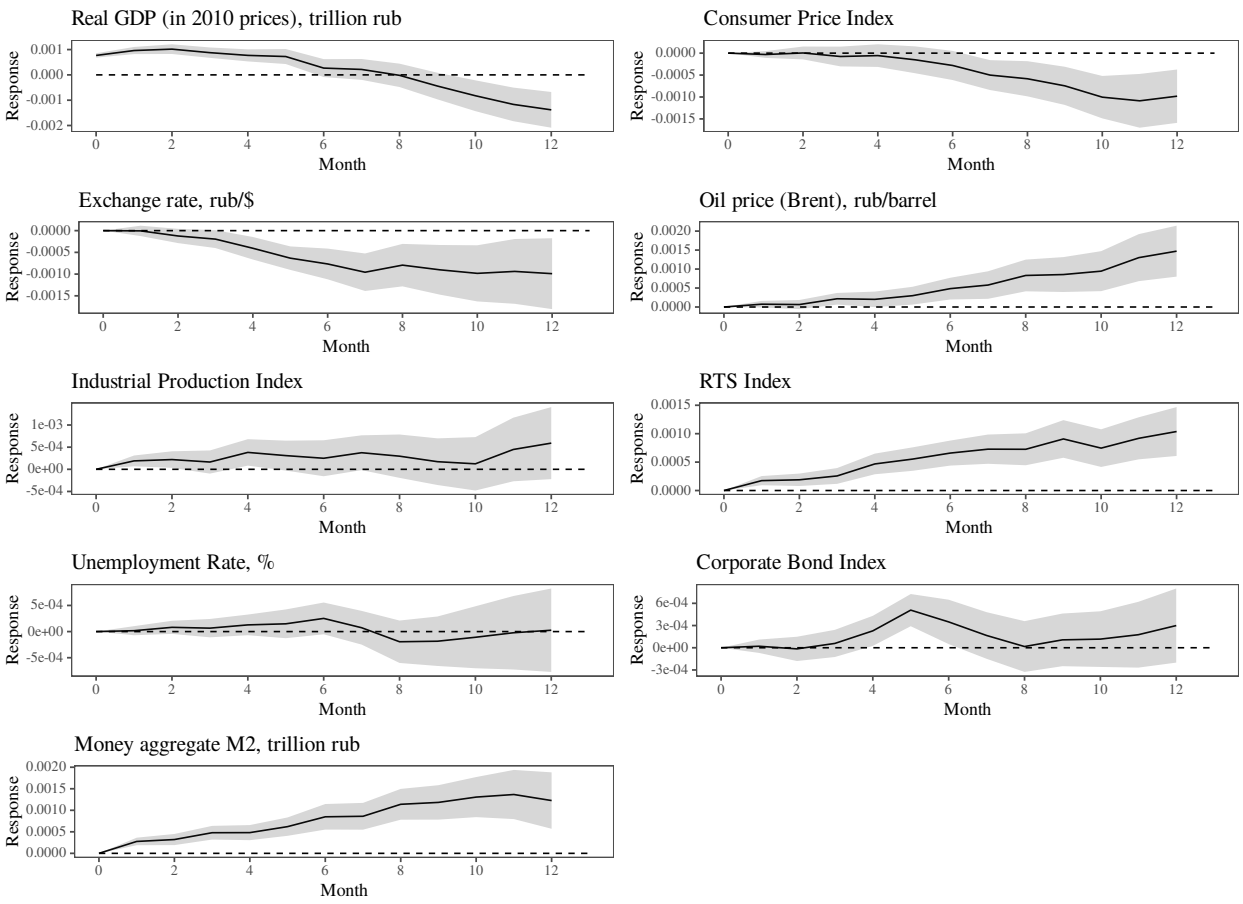

Fig. 5. **GDP impulse response function to one-unit shock of variables (hypothesis 3)**

Source: compiled by the authors.

Besides, the impact of the MOEX index of the ten most liquid companies is constantly increasing over the entire period of 12 months. It follows that the growth of capitalization of the most liquid issuers has a positive effect on GDP and leads to sustainable economic growth. Hypothesis 2 is substantiated.

Hypothesis 3

We check what affects GDP more: the RTS index or the corporate bond index. We add two corresponding variables EX_RTS and EX_CBI to the control variables. Data sampling for the period from December 2002 to September 2018 (190 observations).

Fig. 5 shows GDP impulse response function to one-unit shock of variables (one dispersion amplitude) indicated in the heading of the graphs, with a 95% confidence interval and a period of 12 months in advance.

Table 4 and *Fig. 5* show that the positive shock of the RTS index leads to a steady and statistically significant 5% increase in real GDP over the next 12 months. The contribution to the dispersion of GDP in 1 month is 2.3%, and in 6 months — is already 12.8%. The maximum contribution takes place in 9 months after the shock of the RTS index and amounts to 15.8%, followed by a decline. First, the response of real GDP to the shock of the corporate bond index occurs with a significant delay (the first statistically significant value of the response is observed in 4 months). Second, it is only seen in 3 months (from the 7th month the response is not significant at 5% level). In the indicated months, the contribution of the RTS index to the dispersion of real GDP systematically exceeds the contribution of the corporate bonds index (7.7% vs. 1.2% in 4 months, 10.2% vs. 4.7% in 5 months, and 12.8% vs. 5.5% in 6

months). Thus, we can conclude that real GDP is more affected by the stock market than by the corporate bond market. Hypothesis 3 is substantiated. In Russia, the corporate bond market is less developed than the stock market (significantly less capitalization and fewer companies of issuers). Given that the empirical analysis showed an insignificant contribution (maximum value of 5.5%) of corporate bond dynamics to the change in real GDP, as well as an extremely short period when this contribution is observed (3 months out of 12), it follows that today the corporate bond market is not a tool to stimulate economic growth. Investors prefer to invest in equity rather than debt securities, which may be associated with a high country risk due to the sanctions and the economic situation of Russia. Therefore, in terms of stimulating sustainable economic growth, it is necessary to increase the investment attractiveness of domestic issuers, with an emphasis on the stock market (to stimulate an IPO, etc.).

CONCLUSIONS

Based on testing three hypotheses, we revealed that the state of the stock market, reflected in the dynamics of changes in various stock indices, has a significant impact on economic growth. Since the capitalization growth of Russian companies reflects their efficiency, as well as investment attractiveness and trust of external investors, stock market development ensures the attraction of additional investments into the country's economy, which, in turn, is a factor for achieving economic growth. These conclusions are similar to those in studies [10–12], which, together with the results of economic and mathematical modeling, helps us conclude that ensuring the growth of stock indices is a condition for achieving stable growth in Russia's GDP.

Based on the analysis results, we found out that the greatest increase in GDP depends on the growth of the largest liquid companies trading on the Russian stock market. Unlike the general RTS index, the MOEX index of the ten most liquid companies shows a constant increase in the impact on GDP over a period of 12 months. Therefore, trade dynamism characterizes the positive mood of investors and encourages them to invest in Russian companies, which, in turn, has a positive effect on economic growth. The most liquid companies are characterized by high management efficiency, and that is why they are strategically important objects that allow for economic growth.

Moreover, we managed to reveal a possible unrealized potential of the Russian corporate bond market. Currently, the corporate bond market in Russia is less developed than the stock market, which is the least conducive to economic growth. However, a significant impact of this indicator was noted in a limited period of time that indicates the possibility of a positive effect for the economy through the development of this financial instrument.

In the era of globalization and the development of the international financial market, countries receive additional opportunities to stimulate economic growth through stock market mechanisms. Ensuring conditions for investment attractiveness and stable development of domestic issuers is one of the most important tasks of foreign and domestic policy aimed at achieving sustainable economic growth.

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Musienko S. O. — literature review, substantiation of hypotheses.
Afanas'ev D.O. — introduction, research results, conclusions.

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