Structural dynamic shifts in the Russian macroeconomics in the period of global challenges

Natalya A. Alekseeva (0000-0003-4220-0193)[1(1)], **Zinaida A. Mironova** (0000-0002-4677-439Kh)[1], **Elena V. Alexandrova** (0000-0002-2732-4481)[1], **Vyacheslav A. Sokolov** (0000-0001-9685-2272)[1], **Marina V. Mironova** (0000-0003-4961-7098)[1]

[1] Izhevsk State Agricultural Academy, Izhevsk, Russia

Abstract. The Russian economy is one of the most influential economies in the world, since it is fully capable of self-sufficiency in basic foodstuffs, exporting food, being a global technological leader in many industries. In recent years, the Russian economy has been facing major external economic and political threats, which makes it necessary to restructure the macroeconomics in order to increase its financial stability and efficiency. The main provisions of the Decree of the President of Russia on the goals of national development until 2030 were considered. The research purpose is to study the transition period in the economy to its more progressive structure in 2016-2019 in terms of the most important components of the gross product: intermediate consumption, value added, exports, imports, trade and transport margins. The research objectives are related to the study of the influencing factors on the dynamics of macroeconomic indicators, forecasting further changes. The scientific novelty of the study lies in the assessment of progressive changes in the dynamics and structure of the Russian macroeconomics. The practical significance of the study lies in the possibility of predicting structural changes based on the identified trends. It is also possible to create a new methodology for assessing the contribution of Russia's real economy to world trade, based on the presence of signs of its more progressive way of life, high financial stability and efficiency.

Keywords: Gross domestic product · Intermediate consumption · Value added · Dynamics · structure · National development goals · Macroeconomics.

1. Introduction

Russia is a country so rich in natural resources, human potential, developed territories, advantageous geopolitical location, diversified economy, prospects for cooperation with China and India that it does not have to make a choice between sovereignty and, for example, food security. According to (Altukhov, 2022), only the production of milk and dairy products in Russia does not reach the threshold set by the Food Security Doctrine (82.4% in 2017 against 90%). There are enough other food products in the country. Russia is a technological leader in many industries.

At present, the most global challenges for the Russian economy are the following problems: low solvent demand of a part of the population for food products; underdeveloped infrastructure of the domestic food market; imbalance in prices for material and technical resources and food; weak

[1] Corresponding author: 497477@mail.ru

national base of animal and plant genetic resources; weak investment and innovation activity in the agro-industrial sector, slowdown in structural and technological modernization, etc. According to (Altukhov, 2022), the average annual growth rate of investments in agriculture in the Russian Federation for the period of 2000-2017 amounted to 100.7%, while the average annual growth rate of agricultural production was 102.4% over the same period. The gap between the growth rates to the level of 1990 of crop production (142.6% – 2017) and livestock production (72.4% – 2017) is aggravated. In 2017, among the 20 leading countries of the world, Russia ranked 90th in terms of living standards and 72nd in terms of GDP per capita, having only 1.7% of the global GDP and 6.6% of the US GDP.

Despite the higher standard of living in developed countries, their economies can be subject to shocks. Thus, (Reif, 2022) noted that the German economy is sensitive to oil shocks, a high export component and high energy intensity of production. (Borumand et al., 2019) noted the influence of oil price, exchange rate and inflation rate factors on the Iranian economy. Macroeconomic studies of dependence of the inflation and unemployment rates on various types of shocks are relevant (Geiger and Scharler, 2021). (Banerjee and Basu, 2019) studied the specifics of the impact on the young market economy of India of such factors as productivity, investment in technology, fiscal spending, interest rate. (Zhang et al., 2022) studied structural transformations in the Chinese economy depending on the elasticity of production factor substitution. (Bondarev and Greiner, 2022) studied how structural innovations lead to economic growth and slow climate change.

(Soummane et al., 2019) noted that Saudi Arabia is on the path of energy reforms, reducing activity in energy-intensive sectors of the economy, reducing energy costs, investing income in other sectors of the economy. (Ryazantsev et al., 2021) studied the topic of macroeconomic measurements in terms of methodological assessment tools on the example of the countries of the Eurasian Economic Union. (Soufi et al., 2022) developed macroeconomic sustainability indicators. (Terzi, 2020) pointed out the need to adjust the entire architecture of the Eurozone, aimed at increasing the independence of the monetary policy of European countries. (Boateng et al., 2020) focused on the construction industry, which can make a significant contribution to the country's gross domestic product.

Thus, structural changes in the macroeconomics of many countries are aimed at improving financial stability and economic efficiency. But the dynamics of structural relationships of industries, the level of its progress, which determine financial stability and efficiency, has not been sufficiently studied. The conducted research is largely based on public opinion polls, predictive assessments of experts, and not on official statistics (Bondarev and Greiner, 2022; Geiger and Scharler, 2021). This article explores the structural and dynamic changes in the Russian economy aimed at the goals of breakthrough development (population growth, health preservation, well-being, living standards, digital transformation) through the growth of investments, including in the field of information technology by four times, the development of non-commodity and non-energy exports, entrepreneurship and science (Decree of the President of the Russian Federation …, 2020).

2. Materials and Methods

The scientific novelty of the study lies in the assessment of changes in the Russian macroeconomic policy in order to ensure its compliance with the main global challenges. The main research hypothesis is that the financial stability and economic efficiency of the national economy depend on the resource use directions, the correlation between production industries and the service sector, the structure of intermediate consumption and value added.

The research purpose is to substantiate a transition to a more progressive structure of Russia's macroeconomics. The research objectives are to study the dynamics and structure of the gross product in Russia, the main factors affecting its value, assess the degree of achievement of national development goals and develop a forecast for the gross product.

The main research method was the structural-dynamic analysis of macroeconomic indicators recalculated according to new statistical classifiers (Alekseeva, 2020). The analyzed period is interesting in that it covers sanctions bans on Russia and a retaliatory import substitution policy. Since

the latest actual data on gross domestic product do not cover the fundamental post-pandemic macroeconomic changes, the accuracy of the forecast may be reduced.

3. Results

The value of the gross product is the sum of the value of intermediate consumption of industries and value added. In terms of the share of intermediate consumption, the sphere of material production (42.5% in 2019) was ahead of the service sector (40.5% in 2019).

The value of the gross product is the sum of the value of intermediate consumption of industries and value added. In terms of the share of intermediate consumption, the sphere of material production (42.5% in 2019) was ahead of the service sector (40.5% in 2019).

The most material-intensive of all sectors of the economy was the production of electricity, gas, steam, air conditioning – 80.6% in 2019 (Table 1), which is explained by the reliability of power supply to industries and the population. The second place was given to agriculture: the material component increased from 54.4% in 2016 to 56.8% in 2019 (Table 1). The share of own production for domestic consumption decreased from 32.3% to 30.8%. This was due to the increasing degree of integration of agriculture with other sectors of the economy.

The service sector also strengthened its material and technical component (39.3% in 2016 and 40.5% in 2019) (Table 1). The production of software products and information technologies (hereinafter referred to as "IT technologies") stood out with a particularly high material intensity – 72.3% in 2019, it means its development has just begun. The share of IT technologies in value added is still small – 27.7% in 2019 (Table 1). In IT technologies, 95.7% of the main products were created in the information technology industry. The industry is not sufficiently integrated into the economy.

Out of the service industries, agriculture (80.0% in 2019) and electricity production (95.6% in 2019) produced most of the products for the end consumer (Table 1).

Table 1. Dynamics and structure of intermediate consumption and final consumption in gross output in Russia. *Source*: Compiled by the authors.

Industry	Share of intermediate consumption, %				Percentage of final consumption, %			
	2016	2017	2018	2019	2016	2017	2018	2019
Agriculture	54.4	53.8	53.7	56.8	80.0	81.7	79.3	80.0
Extractive industries	45.2	46.6	42.9	42.6	0.2	0.3	0.2	0.2
Manufacturing industries	40.7	40.8	41.4	40.6	58.5	57.3	55.1	56.3
Power generation	80.6	80.7	80.7	81.4	96.6	97.1	96.2	95.6
Construction	21.5	20.5	21.2	21.8	0.2	0.2	0.2	0.1
Total real sector	42.9	43.1	42.9	42.5	44.8	43.7	40.7	42.1
IT technologies	68.5	70.5	69.0	72.3	19.4	17.7	16.8	20.0
Transport	76.5	77.1	76.8	76.3	76.8	77.0	76.2	78.1
Air and space transport	24.8	21.0	20.3	22.6	54.3	58.8	56.5	63.5
Research and development	6.3	4.4	4.7	4.7	0.0	0.1	1.9	0.0
Total service sector	39.3	40.0	40.0	40.5	84.2	85.1	84.7	85.3

In the real sector, the upward trend in exports increased from 30.0% in 2016 to 32.9% in 2019 (Table 2). The export component of value added in IT technologies also increased – from 39.3% in 2016 to 44.7% in 2019, which indicated a high demand for products and services of Russian programmers abroad (Table 2). The largest contribution to the accumulation was made by the construction industry (96.6% in 2019), the research and development industry (98.6% in 2019).

Table 2. Dynamics and structure of accumulation and exports in gross output in Russia. *Source*: Compiled by the authors.

Industry	Percentage of accumulation, %				Percentage of exports, %			
	2016	2017	2018	2019	2016	2017	2018	2019
Agriculture	1.3	1.8	-1.8	1.3	18.8	16.5	22.5	18.8
Extractive industries	7.7	6.8	4.8	7.2	92.0	92.9	95.0	92.7
Manufacturing industries	16.9	18.4	17.3	18.0	24.6	24.3	27.6	25.7
Power generation	0.0	0.0	0.0	0.0	3.4	2.9	3.8	4.4
Construction	96.8	96.7	96.1	96.6	3.0	3.2	3.7	3.3
Total real sector	25.5	26.3	24.0	25.0	29.6	30.0	35.4	32.9
IT technologies	41.3	37.0	33.6	35.3	39.3	45.3	49.6	44.7
Transport	0.0	0.0	0.0	0.0	23.2	23.0	23.8	21.9
Air and space transport	0.0	0.0	0.0	0.0	45.7	41.2	43.5	36.5
Research and development	98.6	98.6	96.7	98.6	1.4	1.3	1.4	1.4
Total service sector	9.8	9.2	9.1	9.2	5.9	5.7	6.2	5.5

The share of trade and transport margins in output decreased, which indicated an improvement in logistics links in the economy and cheaper products (Table 3). A large share of imported components remained in the manufacturing industry – 69.9% in 2019, the dependence of the real sector on imports did not decrease (Table 3).

Table 3. Dynamics and structure of the use of imports and trade and transport margins in gross output in Russia. *Source*: Compiled by the authors.

Industry	Import use structure, %				Share of trade and transport margins, %			
	2016	2017	2018	2019	2016	2017	2018	2019
Agriculture	3.9	3.5	3.4	3.2	5.0	4.5	4.1	4.1
Extractive industries	1.6	1.5	1.6	1.6	13.2	12.7	14.6	12.2
Manufacturing industries	69.5	70.6	70.2	69.9	82.8	81.3	74.4	75.4
Power generation	0.0	0.0	0.0	0.0	x	x	x	x
Construction	1.7	0.0	1.6	1.8	x	x	x	x
Total real sector	76.7	75.5	76.8	76.6	100	98.5	93.1	91.7

If one correlates the value of the gross product created during the year in Russia to the amount of accumulated capital in the economy, the growth of capital productivity in macroeconomics will be determined from 6.86 rubles in 2016 to 7.3 rubles in 2018.

4. Discussion

The results obtained and their comparison with previously obtained results (Strizhkova, 2021; Alekseeva et al., 2022) showed noticeable progressive shifts in the ratios and directions of economic development: the growth of added value, especially in the real sector, the export potential of agriculture, manufacturing industries, IT technologies; growing integration of industries; improved logistics links, reduced cost of final products due to a more balanced distribution of trade and transport margins; reduction in the share of imported products in agriculture, the liberation of domestic markets for domestic producers; strengthening of logistical capacity of IT technologies, high export potential of the industry; increase in capital productivity.

The forecast for a decrease in Russia's gross product in 2022 is a controversial issue. The International Monetary Fund expects Russia's GDP to fall by 8.5% (The IMF expects Russia's GDP

…, 2022), the Chairman of the Accounts Chamber of the Russian Federation A. Kudrin – more than 10% (The IMF expects Russia's GDP …, 2022). According to the authors' estimates, this can happen due to a decrease in mining, manufacturing, reduction in the activities of air and space, land and pipeline transport.

In a fairly short period of time, due to a reduction in the share of imported products, the liberation of the domestic market from some foreign participants, the strengthening of the ruble exchange rate and the growth of confidence of various investors in the effectiveness of capital investments in the real economy, as well as due to the targeted economic policy of the state, domestic production, especially processing, agriculture, science and IT technologies should be more developed, which will be reflected in an increase in the share of output in basic producer prices, in an increase in the share of capital accumulation, intermediate consumption and then gross value added.

5. Conclusion

Undoubtedly, the Russian economy is expecting some decline this year, but, according to the authors' estimates, it will not be a protracted recession, since there are progressive shifts in the structure of macroeconomics, and Russia has enough resources of all kinds to withstand economic challenges, while preserving its sovereignty. The practical significance of the study lies in the possibility of forecasting the gross domestic product in Russia. Due to the high financial stability and efficiency of the restructuring of the Russian economy, it is possible to revise the methods for assessing the contribution of the real economies of countries, including the Russian economy, to world trade.

References

1. N.A. Alekseeva, O.G. Dolgovykh, E.V. Aleksandrova, L.A. Istomina, Z.A. Mironova, *New Economic Realia of the State Agricultural Policy*, in P.V. Trifonov, M.V. Charaeva (eds.) Strategies and Trends in Organizational and Project Management. Lecture Notes in Networks and Systems **380**, 256-260 (Springer, Cham, 2022). https://doi.org/10.1007/978-3-030-94245-8_35
2. A.I. Altukhov, Sovremennye vyzovy i ugrozy obespecheniya prodovolstvennoi bezopasnosti Rossii [Modern Challenges and Threats to Ensuring Food Security in Russia] (2022). Accessed on: October 30, 2022. [Online]. Available: http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_agroprom/actions/Documents/%D0%90%D0%BB%D1%82%D1%83%D1%85%D0%BE%D0%B2.pdf
3. S. Banerjee, P. Basu, Macroecon. Dynam. **23(5)**, 1721-1756 (2019). https://doi.org/10.1017/S1365100517000438
4. A. Boateng, C. Ameyaw, S. Mensah, Int. J. Const. Manag. (18 Nov, 2020). https://doi.org/10.1080/15623599.2020.1842962
5. A. Bondarev, A. Greiner, Port Econ J **21**, 125-160 (2022). https://doi.org/10.1007/s10258-021-00196-6
6. S. Boroumand, T. Mohammadi, J. Pajooyan, A. Memarnejad, Iran. Econ. Rev. **23(4)**, 1057-1083 (2019). https://doi.org/10.22059/ier.2019.73003
7. Ukaz Prezidenta Rossiiskoi Federatsii ot 21.07.2020 № 474 "O natsionalnykh tselyakh razvitiya Rossiiskoi Federatsii na period do 2030 goda" [Decree of the President of the Russian Federation No. 474 dated 21.07.2020 "On Natalia development Goals of the Russian Federation for the period up to 2030"] (2020). Accessed on: October 30, 2022. [Online]. Available: http://publication.pravo.gov.ru/Document/View/0001202007210012
8. M. Geiger, J. Scharler, J. Money, Credit Bank. **53(4)**, 813-843 (2021). https://doi.org/10.1111/jmcb.12747
9. M. Reif, Oxford Bul. Econ. Stat. **84(1)**, 80-102 (2022). https://doi.org/10.1111/obes.1246
10. S.V. Ryazantsev, T.K. Rostovskaya, O.A. Zolotareva, Econ. Reg. **17(3)**, 971-986 (2021). https://doi.org/10.17059/EKON.REG.2021-3-18
11. S. Soummane, F. Ghersi, J. Lefèvre, Energy Pol. **130**, 263-282 (2019). https://doi.org/10.1016/j.enpol.2019.03.062

12. H.R. Soufi, A.E. Mohsen, A.A. Shirazi, Soc.-Econ. Plan. Sci. **79**, 101101 (2022). https://doi.org/10.1016/j.seps.2021.101101
13. MVF ozhidaet padeniya VVP Rossii v 2022 godu na 8,5% [The IMF expects Russia's GDP to fall by 8.5% in 2022%] (2022). Accessed on: October 30, 2022. [Online]. Available: https://www.interfax.ru/business/835734
14. A. Terzi, Europ. Econ. Rev. **128**, 103516 (2020). https://doi.org/10.1016/j.euroecorev.2020.103516
15. L.A. Strizhkova, L.I. Tishina, M.V. Selivanova, Stat. Iss. **28(5)**, 5-27 (2021)
16. S. Zhang, C. Zhu, X. Li, X. Yu, Q. Fang, Techn. Forecast. Soc. Change **176**, 121509 (2022). https://doi.org/10.1016/j.techfore.2022.121509