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Impact of Anti-Russian Sanctions on Some Macroeconomic Indicators of Russia's Development

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Abstract

Measures, imposed on the Russian Federation in 2014 to isolate Russia from the world community, were called sanctions. Their immediate goal is to deprive Russia of resources (financial, economic, technical and technological, information, scientific, cultural) that are needed for its development. The sanctioning countries suppose that the damage caused by their sanctions will weaken the socio-economic, military-political, scientific and technological potential of Russia. Some results of the author's analysis of the impact of sanctions on the macroeconomic indicators of the Russian Federation I presented in this paper. The following indicators were studied: the volume of financial resources provided to Russian organizations, individuals and credit organizations; the volume and dynamics of capital investments and fixed assets; gross domestic product and industrial output; labour and capital productivity, and some other indicators. The years in which anti-Russian sanctions caused the most considerable damage have been identified. The author also shows that the negative impact of sanctions on the economic development of the country is, in many ways, similar to the damage, caused by the global financial and economic crises. The similarity of their impact is because both crises and sanctions deprive the country of resources for economic development. First of all, we are talking about financial resources.
Keywords: anti-Russian sanctions; economic development; gross domestic product; foreign investments; fixed capital
JEL Classification: F49, F51, H56

Financial Restrictions and Fixed Capital

Sanctions imposed on Russia in 2014, which their initiators are consistently expanded and tightened, isolate the Russian economic entities of the world's financial markets. This goal is clearly stated, for example, in the document "Imposition of Additional Sanctions on Russia under the Chemical and Biological Weapons Control and Warfare Elimination Act of 1991":

"The United States Government shall oppose, following Section 701 of the International Financial Institutions Act (22 U.S.C. 262d), the extension of any loan or financial or technical assistance to Russia by international financial institutions. The United States Government shall prohibit any United States bank from making any loan or providing any credit to the government of Russia, except for loans or credits to purchase food or other agricultural commodities or products" [Bureau, 2019].

Difficulties in obtaining cheaper foreign loans than in the country (a refusal to grant them, prohibitions, and restrictions), blocking and freezing of accounts in foreign banks forced Russian individuals and legal entities to turn to the Russian financial and credit institutions. Measured in Russian roubles, the volume of loans, deposits, and other placed funds in the foreign currency provided to organizations, individuals and credit organizations in the Russian Federation sharply increased immediately after the introduction of anti-Russian sanctions (Fig. 1).

Statistical analysis showed significant (with a two-way level of significance $\alpha = 0{,}01$) in 2007–2018, the negative linear correlation between

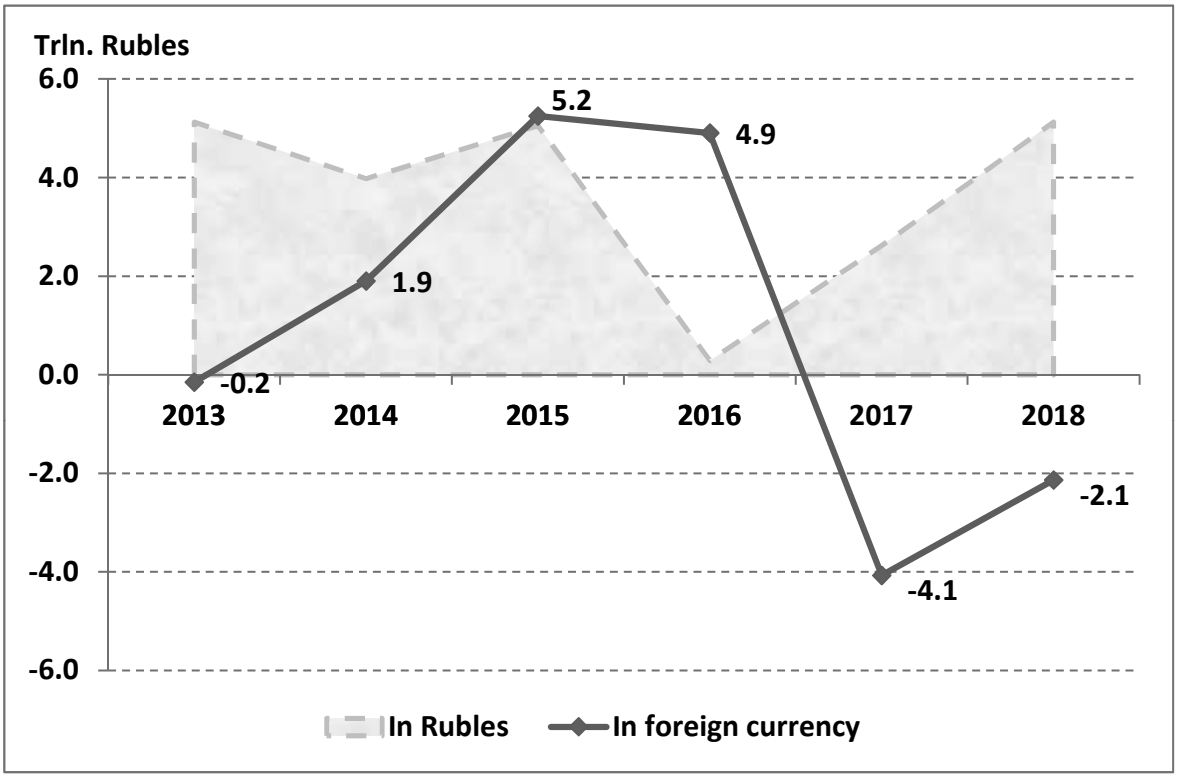

Figure 1. Increment of credits, deposits and other allocated funds made available to organizations, private persons and credit institutions, 2013–2018 (beginning of year, Trn. Rubles)

Source: Compiled by the author based on Rosstat's data: https://www.gks.ru/ (Accessed December 29, 2019).

Table 1

Linear (R^2) and rank correlation coefficients of credits, deposits and other allocated funds made available to organizations, private persons and credit institutions, with the volume of inward foreign direct investment in Russia, 2007–2018

Units of measurement for the rows of variables	Incoming in Russia foreign direct investment		
	Total	From sanctioning countries	
	R^2	R^2	Spearman's rank correlation coefficient
Roubles	-0.7374	-07.1165	-0.692
The U.S. dollars	-0.7521	-0.6893	-0.715

Source: Compiled by the author based on Central Bank of Russia's data: https://www.cbr.ru (Accessed November 15, 2019).

credits, deposits and other allocated funds made available to organizations, private persons and credit institutions and the volume of inward foreign direct investment in Russia, 2013–2017 (Table 1).

However, banks operating in Russia also faced sanctions restrictions and had difficulties obtaining foreign currency from foreign banks as well. It, in particular, contributed to the growth of the exchange rate of the rouble against the U.S. dollar.

So, if the dynamics of changes in credits, deposits and other allocated funds made available to organizations, private persons and credit institutions, expressed in roubles (see Fig. 1), convert to U.S. dollars, we will get a fall in 2015, not an increase (Fig. 2).

The decrease in external and internal financing hurts the size and dynamics of production investments, their specific and geographical structure. Therefore, in the Russian economy, the volumes of investment in fixed capital naturally decreased after the introduction of anti-Russian sanctions (Fig. 3).

During the global financial and economic crisis of 2008–2010, their decline was less, but the

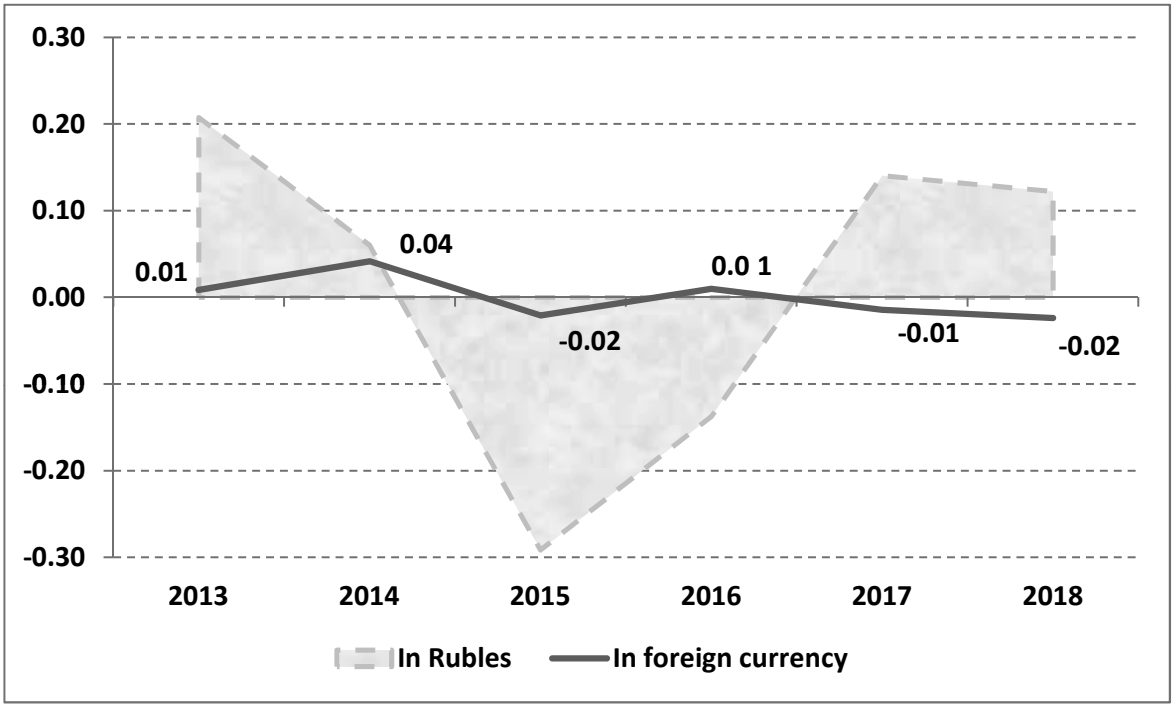

Figure 2. Increment of credits, deposits and other allocated funds made available to organizations, private persons and credit institutions, 2013–2018 (beginning of the year, Trn. US dollars)

Source: Compiled by the author based on Rosstat's data: https://www.gks.ru/ (Accessed December 29, 2019).

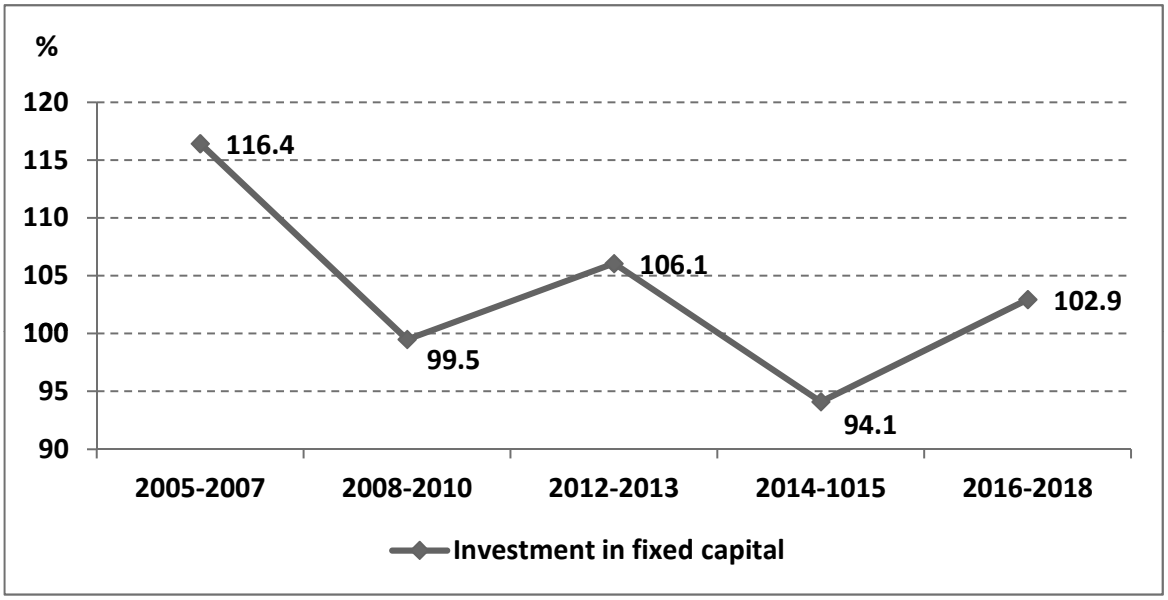

Figure 3. Average annual growth rates of investment in fixed capital in Russia, 2005–2018, %

Source: Compiled by the author based on Rosstat's data: https://www.gks.ru/ (Accessed December 29, 2019).

reasons are the same — a lack of resources for investment.

It is known that investments in fixed assets (I) replace the disposal of fixed assets (R), a fixed capital gain (ΔF), they also increase an uncompleted capital investment (ε) (Kazantsev, 1980, pp. 101–103):

$$I = R + \Delta F + \varepsilon \quad (1)$$

Therefore, the drop in investment in fixed capital (fixed assets) in 2014–2015 could not but lead to a decrease in the size of fixed capital (Fig. 4).

Gross Output

A decrease in fixed assets (F) causes, other things being equal, reduction in the capital-labour ratio: k =F/L. Here: k — is a capital-la-

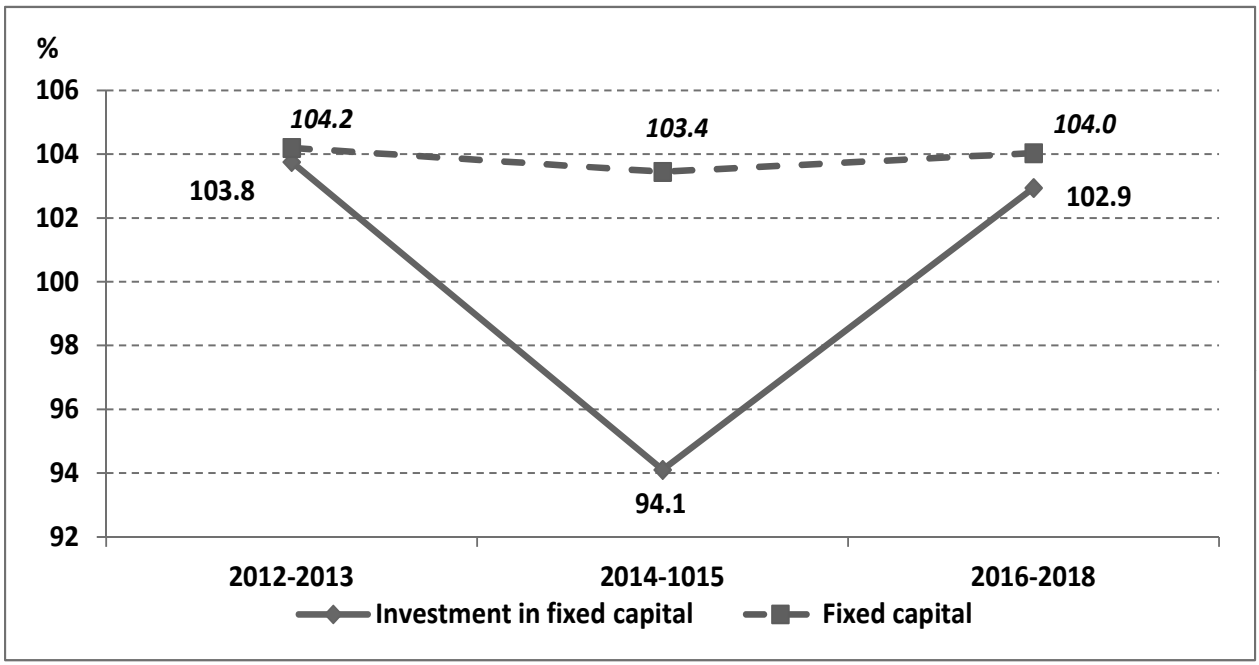

Figure 4. Average annual growth rates of the volumes of fixed capital and investments in fixed assets in RF in 2012–2018, %

Source: Compiled by the author based on Rosstat's data: https://www.gks.ru/ (Accessed December 29, 2019).

bour rate, L — is a number of employed in the economy. Usually, the smaller the funds (F), the lower the number of employees employed by them (L). However, in the Russian Federation in 2001–2017, the volume of fixed assets was steadily increasing (in comparable prices), and the average annual number of people employed in the economy decreased in the crisis of 2009 and 2013–2017[1]; as a result, the stock of labour increased in all years of the period under review.

Further, the reduction in the volume of investment in fixed assets leads to the moral and physical obsolescence of the latter. It may reduce their volume as a result of non (or partial reimbursement) retired due to physical depreciation of capital assets. In any case, the share of new funds in the total volume of funds will decrease (see Fig. 4 and equation (1)). Since the output-capital ratio (fixed assets output coefficient) of old funds (BS) is generally lower than that of new funds (bn), the average return on fixed assets (b) will decrease. I showed (Kazantsev, 1980, pp. 123–127) that the formula expresses this relation:

$$b = b_c*[1-q] + b_н*q, \quad (2)$$

where q — is a share of new (more productive) funds in their total volume.

The quality of business management also has a direct impact on the return on funds. It may get worse with the departure of foreign direct investment.

From the formal notion of the concepts "capital productivity" (output-capital rate) (b) and "capital-labour rate" (k) follows that labour productivity (p) (the rate of output (X) to the number of employed in the economy (L)), appears as a product of capital productivity and capital-labour rate:

$$p = X/L = X/F* F/L = b*k. \quad (3)$$

Expression (3) in other notations introduced Grigorij Aleksandrovich Feldman (1884–1958) in 1928 (Feldman, 1928)). He also formalized the relationship between the volume of output (according to G.A. Feldman, this is the national income) and labor productivity, and between the number of employed, the volume of fixed assets and their productivity:

$$X = p*L = b*F. \quad (4)$$

Later, these rates used Roy Harrod (1900–1978) and Evsey Domar (1914–1997), and the

[1] The reasons for the decline in the average annual number of people employed in the economy require a particular analysis that goes beyond the scope of this study.

relationship of investment to entrepreneur's income was presented by John Maynard Keynes (1883–1946) in his investment multiplier (for more information, see: Kazantsev, 1980). In Russian literature, we find the analysis and modeling of the considered connections in the works A. Anchishkin, E. Ivanov, E. Kapustin, Ya. Kvasha, V. Trapeznikov, A. Frenkel, A. Xodzhaev, Yu. Yaryomenko and other authors.

The quality and structure of fixed assets largely determine the level of material consumption of products produced on them. The cost of raw materials and the volume of products depends on it. This relationship is explicitly represented in the input-output balance equation:

$$X = AX + Y, \quad (5)$$

where:

X — is a column vector of gross output

A — is an input-output matrix

Y — is a column vector of the final product.

All other things being equal, the final product (Y) increases with an increase in the volume of fixed assets (F) and an increase in capital productivity (b).

But the increase in the share of material costs, inventories and reserves change (without the increase in unfinished capital investments) in a gross product, i.e. materials-output ratio (m), acts in the direction of reducing the volume of the final product:

$$Y = b*F*[1 — m] — s + \Delta M. \quad (6)$$

Where ΔM — is an increase in material costs, inventories and reserves (without the rise in unfinished capital investments), $\Delta M \geqslant 0$; s — is foreign trade balance and losses; $0 < m \leqslant 1$.

When considered in continuous time (with the differentiability of equation (6)), that a change in the parameter m has a stronger effect on the size of the final product than a change in the volume of funds and their returns, if the inequality is true:

$$\left| dm/(1-m) \right| > \left| dF/F + db/b \right|. \quad (7)$$

Otherwise, the impact of changes in m on the final product does not exceed the combined impact of the growth of funds and changes in the return on funds is shown (Kazantsev, 1980, pp. 105–106).

An increase in the materials-output ratio leads, other things being equal, to a decrease in the volumes of output of industries that consume raw materials, materials, and semi-finished products. At the same time, the demand for raw materials, materials, and semi-finished products stimulate the expansion of production in the spheres of economic activity that create them.

Bans on the supply of advanced technologies, modern materials, new equipment, scientific and technical information to the country also cause an increase in the capital-output, material-output, and labour-output rates. Different types of these bans are included in the number of anti-Russian sanctions.

The considered chain of connections is shown in Fig. 5. The negative impact of anti-Russian sanctions on the dynamics of investment in fixed assets and fixed assets in the Russian Federation was shown above. As shown in Fig. 5 in the chain of links just discussed, we will trace the impact of anti-Russian sanctions on labour productivity and products produced in the Russian Federation. The dynamics of changes in these indicators is shown in Table 2.

From the data provided in Table 2, it can be seen that the sanctions (anti-Russian and counter-sanctions in response to them) had a negative impact on the dynamics of GDP and industrial output. L. Kudrin drew attention to the decrease in their growth rates due to the sanctions while increasing the volume of output in some areas of economic activity: "Some branches of domestic industry and agriculture have benefited, but the economy as a whole has not. We are losing growth rates, and several industries are losing the opportunity to make investments and acquire modern technologies. The psychological atmosphere caused by restrictions also matters. As a result of such measures, many foreign companies are now working with companies in Russia with caution; it hinders development. Therefore, the overall balance of sanctions is negative" (Danilevich, 2020).

Our study showed that the most significant negative impact of sanctions is presented in table 2, as in the case arrived in Russia and domestic investment, had on 2014–2015. Data of this table

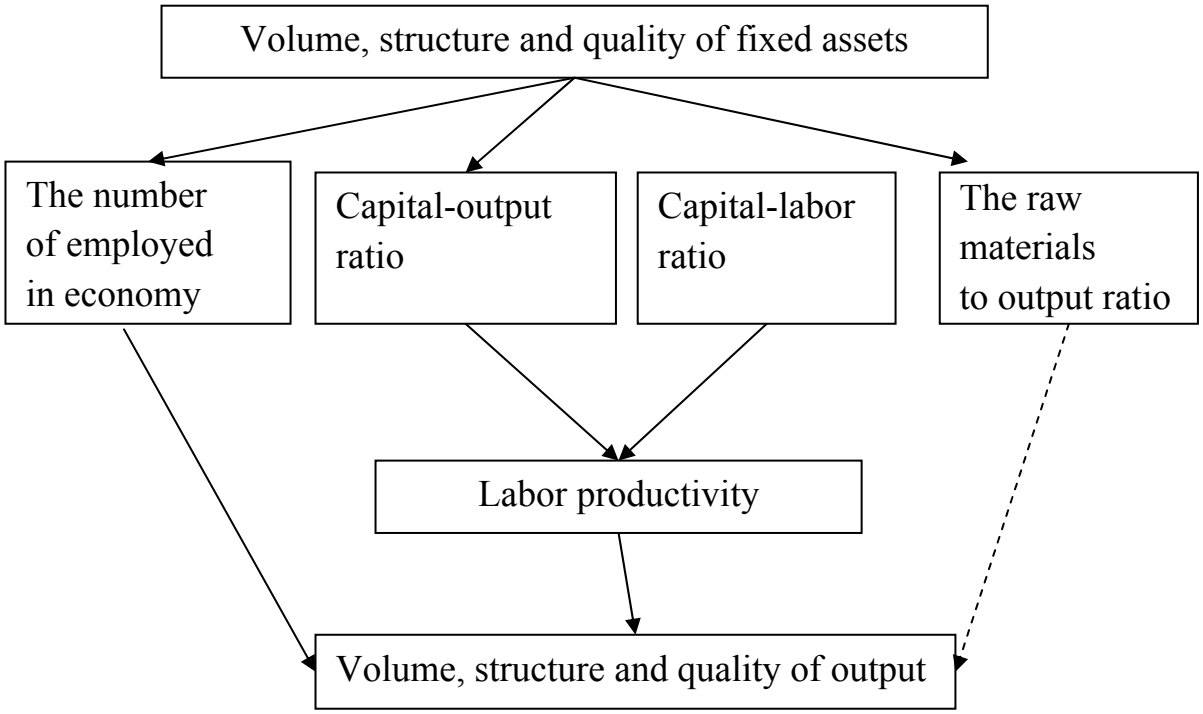

Figure 5. Connection of fixed capital with labour productivity and the volume of output

Source: Compiled by the author.
Note: an unbroken line arrow indicates a positive influence, while the dotted line indicates a negative impact of the factor at the beginning of the arrow on the value of the indicator at the end of this arrow.

Table 2
Rates of increment of Russia's macroeconomic indicators, 2001–2018 (%)

IndicatorПоказатель	**2001–2008**	**2009–2010**	**2011–2013**	**2014–2015**	**2016–2018**
Annual average number of employed (L)	0.7	–0.7	0.2	–0.3	–0.4
Capital-labor ratio (k)	1.3	3.8	3.9	2.8	4.4
Output-capital ratio (b)	7.8	–4.8	–0.8	–4.2	–2.5
Labor productivity (p)	9.2	–1.1	3.1	–0.6	1.8
Gross domestic product (X)	9.9	–1.8	3.3	–0.9	1.4
Volume of industrial production	5.2	–1.3	2.9	0.4	2.4

Source: Compiled by the author based on Rosstat's data: https://www.gks.ru/ (Accessed December 29, 2019).
Note: labour productivity was calculated according to mathematical expression (3).

also give reason to believe that occurred as a result of imposed against Russia sanctions, the worsening of the considered parameters, as they fall due to the global financial and economic crisis severely affected the Russian economy in 2009–2010. Since global economic crises deprive a country not only of external resources necessary for development but also of foreign markets for goods and services, their negative impact on the country's development is in many ways similar to the consequences of restrictive measures and sanctions.

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Влияние антироссийских санкций на некоторые макроэкономические показатели развития России

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Аннотация. Действующие с марта 2014 г., последовательно расширяемые и ужесточаемые меры изоляции Российской Федерации от мирового сообщества назвали санкциями. Их непосредственной целью выступает лишение России ресурсов развития — финансовых, экономических, технико-технологических, информационных, научных, культурных. Страны-санкционеры полагают, что наносимый санкциями ущерб ослабит социально-экономический, военно-политический, научно-технологический потенциал России. В данной работе представлены некоторые результаты авторского анализа влияние санкций на макроэкономические показатели Российской Федерации. В их число входят следующие показатели. Объем финансовых ресурсов, предоставленных российским организациям, физическим лицам и кредитным организациям; объем и динамика производственных инвестиций и основных фондов, валовой внутренний продукт и объем промышленного производства, производительность труда и фондоотдача и некоторые другие индикаторы. Определены годы, в которые антироссийские санкции нанесли наибольший ущерб. Показано также, что негативное влияние санкций на экономическое развитие страны во многом сходно с ущербом, наносимым мировыми финансово-экономическими кризисами. Их одинаковое воздействие обусловлено тем, что и кризисы, и санкции лишают страну необходимых ей ресурсов экономического развития. В первую очередь — финансовых ресурсов.

Ключевые слова: антироссийские санкции; экономическое развитие; валовой внутренний продукт; иностранные инвестиции; основной капитал

Статья подготовлена по результатам исследований, выполненных за счет бюджетных средств по государственному заданию Финансовому университету.