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Sanctions Pressure on the Russian Economy: Ways to Overcome the Costs and Benefits of Confrontation within the Framework of Import Substitution

M.R. Safiullin, L.A. Elshin
Center for Advanced Economic Research of the Academy of Sciences of the Republic of Tatarstan, Kazan, Russia;
(Volga Region) Federal University, Kazan, Russia

ABSTRACT

The sustainable development of the national economy, taking into account the creation of mechanisms for ensuring economic security, technological sovereignty and preventing threats to the localization of import supplies of final and intermediate consumption goods, is one of the priority directions of economic policy in the conditions of systemic restrictions formed under the pressure of sanctions. In this regard, the study of the key externalities generated within the framework of the sanctions confrontation is an extremely popular task, both for science and practice. In this paper, the authors pay attention to both the actualization of the problem posed and an overview of some of the costs and benefits that can be extracted in the new reality for the national economic system of the Russian Federation. The main purpose of the study is to systematize and analyze the key parameters of economic growth in the Russian Federation under the sanctions pressure of the 2022 model and substantiate the policy of intensification of import substitution as a key mechanism for ensuring sustainable development in the medium and long term in the new reality. The subject of the study is the restrictions imposed by a number of Western countries in relation to the Russian economy, the costs they generate and the opportunities for building a new model of economic growth. As the main results of the study, it is necessary to highlight the systematization of sanctions and restrictions imposed on Russia in 2022; identified trends in the formation of key macroeconomic parameters of the Russian economy, revealing the features of labor market development, GDP formation, investment and business activity, etc.; systematization of risks and prospects of economic growth, including the projection of theoretical models of economic dynamics (IS-LM, AD-AS) on the received estimates; identification of the dependence of the national economy of the Russian Federation on the import of technologies and intermediate/final consumption goods, followed by justification and development of a model to stimulate the policy of import substitution within the framework of the activation of NTR.

Keywords: sanctions pressure; sustainable economic development; risks; opportunities; import substitution; scientific and technological development; modeling; crisis

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INTRODUCTION

Increasing sanctions pressure on the Russian economy predetermines significant risks of sustainable development and the need to adapt reproduction processes to the new reality. Restrictions are forming in foreign trade and cooperative activities and manifesting in the localization of access to imports of raw materials, technologies, services, goods of final and intermediate consumption, using to degrees by different sectors of the economy in the organization of economic relations [1, 2].

"Sanctions, in general terms — are a break-up of integration and cooperative ties, which is essentially a blow to the theory and practice of the international division of labour, which ultimately reduces the costs of production according to production in the most favorable conditions" [3]. Sanctions against the Russian economy by some Western countries made it impossible to maintain imports at the same level. Logistic and cooperative ties are being transformed, in connection with which the question of finding models of eliminating risks and reaching the path of sustainable development of the most "suffering" sectors of the national economy arises acutely.

Considering the increased demand for research aimed at finding and justifying mechanisms of technological sovereignty and the implementation of import substitution policy at both the macro- and mesolevels, research devoted to this issue, began to appear more often in domestic scientific literature.

One of the first issues in the domestic scientific literature of sustainable economic development under external pressure on the economic system, which generates a high level of restrictions on imports of technologies and goods, raised the academic L. I. Abalkin. In accordance with the views of the scientist "the State, especially in the force majeure crisis situation, is forced even in its own loss to produce what it can not do without" [4]. Thus, the priority of economic security of the country and the focus on the need to stimulate the policy of import substitution especially in the «acute» phases of cyclical development of the economy are actualized.

This position is echoed by I. I. Pichurin and D. V. Blinov [5]. In their paper, the researchers point out that "the increase of imports has never brought benefits to the Russian economy, and now it has reached such a scale that the very existence of Russia is "threatened" [5].

V. S. Osipov is substantiating own position in his research, according to which, as a result of the adoption of prescription of the Washington Consensus, the "third world" countries lost their industry, as world markets opened too quickly. The flow of imported goods into the national market primarily devastated the industry, which led to a decline in the income of the population (after all, the increasing returns were lost, and the diminishing returns is remained)" [6].

The problem of substantial dependence on imports in the manufacturing sector of production is also substantiated in researches by A. P. Tsypin [7], N. A. Nevskaya [8] and other Russian scientists.

It is also important to note that the issues of theoretical and applied understanding and research of import substitution policies and the formation of sustainable cooperative ties, which are not sufficiently exposed to the global environment, has also received considerable attention among foreign researchers in recent years. The most notable of these are: researches by S. Stone, D. Flaig and F. Van Tongeren,[1] L. Feng, Z. Li, D. Swenson [9], K. Malik, V. Wickramasinghe [10], G. Hufbauer, J. Schott, K. Elliott, B. Oegg [11] etc.

[1] OECD, Trade and Agriculture Directorate. URL: https://www.gtap.agecon.purdue.edu/resources/download/7203.pdf (accessed on 07.03.2021).

In general, it should be noted that, despite separate works devoted to the problems of technological and product sovereignty of national economic systems, issues of empirical substantiation of models of import substitution and formation of stable cooperative ties in the conditions of system limitations are invulnerable world conjuncture, and have not received proper development at both national and regional levels. This causes and actualizes the need to increase research in this area. These issues are particularly important in the current agenda in the Russian Federation, faced with external barriers to imports and the need to find directions and mechanisms for modelling new cooperation chains under the conditions of sanctions restrictions, which raised the problem of stimulating import substitution policies and ensuring technological sovereignty. The present article is devoted to understanding and some solution of the issues raised and the main purpose of which is systematization of threats and opportunities for growth for the national economy under external pressure.

MATERIALS AND METHODS

It is advisable to use methods of system analysis of data, their aggregation and processing, methods of logical and descriptive analysis, as a methodical tool of research issues raised about the impact of sanctions pressure, the most important consequence of which is to restrict imports and disrupt logistics and value chains. In this regard, the most important methodological basis of the study is the search for patterns of economic development in the new reality, determining on this basis prospects for emerging new trends in economic dynamics and potential consequences as positive, and negative.

Key and methodical tools, forming the basis for finding solutions to the tasks, are the systematization of the sanctions imposed on the national economy. As of October 2022, 8 packages of sanctions were adopted against Russia, which made it "leader" in the world on this indicator. In total, more than 10 000 sanctions were imposed on the country (*Table 1, Fig. 1*).

Sanctions pressure on the national economy of the Russian Federation and subsequent adjustments of key macroeconomic indicators demonstrate two stages of adaptation to systemic transformations. The first of them is characterized by increased volatility and reaction to foreign policy "shock" (large-scale sanctions in February–March of 2022). The second is characterized by systemic adaptation to the perturbations that occurred. The most obvious dichotomous basis of adaptation processes to the sanctions pressure on the Russian economy was visible on the financial markets.

The Central Bank of Russia raised the key interest rate by 2.5 times in the Q1 of 2022 in order to combat the turbulence that led to the rapid rise in credit prices [from 8.5% (February of 2022) to 20% (March of 2022)]. Later, the rate declined to 7.5% (October of 2022).

The most important consequence of the rise in the interest rate was a reduction in GDP and investment activity, which is completely organic fits into the IS–LM model (*Fig. 2*).

The depreciation of the ruble (Q2 of 2022) led to higher import prices Substantial inflation in 2022, according to the Keynesian models of economic growth, could not but reflect on GDP (*Fig. 3*). The result of these patterns was a significant decline in GDP in 2022.

The most important feature of this crisis is diametrically opposed adjustments of base assets relative to other crisis phases of the Russian economy. While in the framework of the 2008 cyclical global crisis and the 2014 sanctions year, energy prices

Table 1

Eight Packages of Sanctions Against the Russian Federation, 2022

Economic sector	Key sanctions
Oil production	– freezing of existing contracts with individual companies and imposition of restrictions on new contracts; – restriction on the export of technologies related to oil and other energies production and refining; – restrictions on oil transportation; – oil embargo; – implementation of the G7 agreement on marginal oil prices, etc.
Gas industry	– sanctions against selected companies in the industry to freeze existing contracts and refuse to enter into new projects; – embargo by the European Union for the supply of LNG; – ban on insurance of ships with fuel
Oil and gas chemical complex (OGCC)	– embargo on the supply of OGCC products; – implementation of the G7 agreement on marginal oil prices; – ban on new investments in the Russian energy sector; – ban on insurance and reinsurance of maritime transport of oil in third countries; – ban on the export of certain goods and technologies, including those related to the energy sector, as well as the prospecting, exploration and production of oil, gas and minerals; – imposed "block" sanctions against large companies (Rosneft, Transneft, Gazprom Neft and others) etc.
Financial and banking industry	– limit access of Russia to EU capital markets and financial services; – the European Union disconnect major Russian banks from SWIFT; – a complete ban on any transactions with four "key Russian banks", including Sberbank, VTB; – ban on providing audit, accounting services, consulting services on business strategy and GR services; – ban on buying, importing or transferring (directly or indirectly) gold of Russian origin; – extension of the ban to take deposits etc.
Real sector of economy	– restrictions on the supply of dual-use goods (goods with both civilian and military applications); – ban on the Russian air carriers to land, take off or fly over EU territory; — "block" sanctions against large companies (Rosneft, Transneft, Gazprom Neft, Kamaz, Rosteh, Uralvagonzavod, Sovkomflot and others); – ban on the provision of tourism services, etc.
Industry	– ban on import of steel and iron products; – ban on new investments in the Russian energy sector, except for civil nuclear energy and transportation of certain products to the EU; – ban on the export, sale, transfer of equipment and technology; – ban on the import of all types of Russian coal, etc.
Trade	– ban on transactions with the Russian Maritime Register of Shipping; – ban on the import from Russia and Belarus of wood, cement, as well as seafood and alcohol; – ban of Russian ships and ships operated by Russia to enter EU ports; – export ban on quantum computers, semiconductors and transport equipment; – restrictions on trade and investment associated with certain economic sectors and infrastructure projects; – ban on imports from Russia of processed and semi-processed steel products, machines and equipment, plastics, vehicles, textiles, shoes, leather, ceramics, some chemical products and jewelry not made of gold, etc.

Source: Developed by the authors according to the VEGASLEX portal. URL: https://www.vegaslex.ru/upload/medialibrary/9da/VEGAS_LEX_Alert_Sanctions_Feb_2022_RUS_ver3.pdf?ysclid=la9jg8sv7w731664266 (accessed on 10.11.2022).

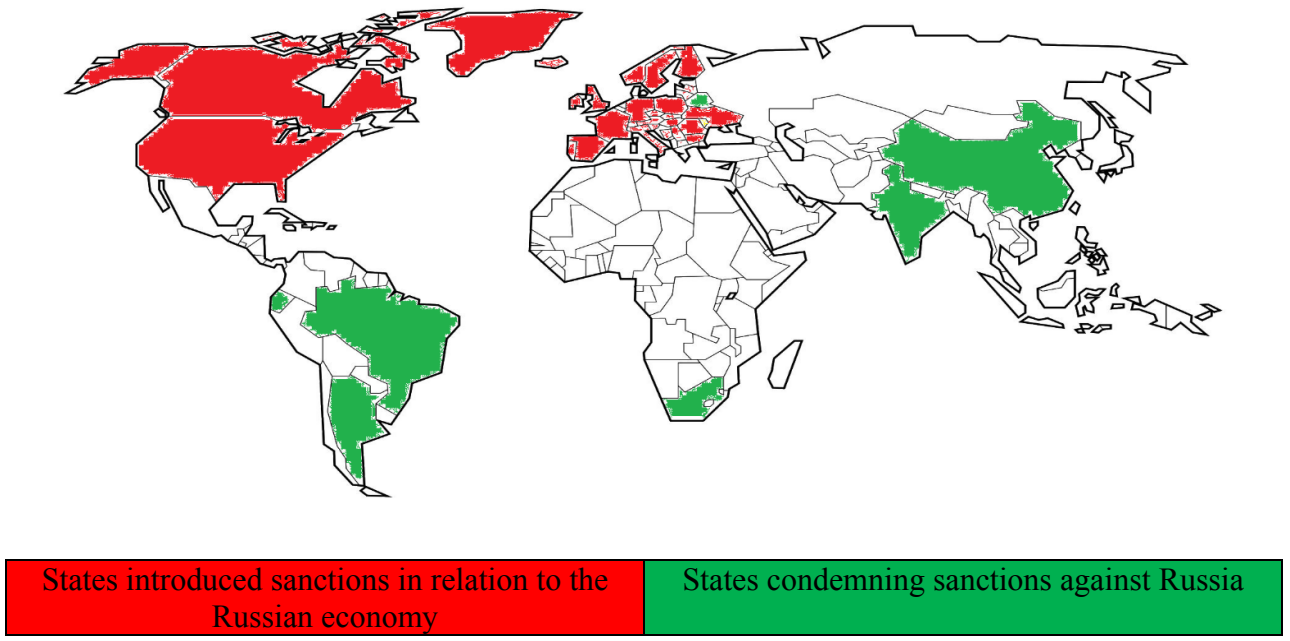


Fig. 1. **The Attitude of the Countries of the World to the Sanctions Pressure on the Russian Economy**

Source: Developed by the authors according to: URL: https://www.gd.ru/articles/12177-sanktsii-dlya-biznesa?ysclid=la9jj5fqle388143546 (accessed on 05.11.2022); https://delprof.ru/press-center/open-analytics/izmeneniya-v-eksporte-i-importe-rf-v-2022-godu-vliyanie-sanktsiy-na-mezhdunarodnuyu-torgovlyu/?ysclid=lab0lhemj5811160288 (accessed on 05.11.2022).

and the ruble fell by more than half, in 2022 there were diametrically opposite trends (*Table 2*).

It is important to note that adaptation of the national economy of the Russian Federation in 2022 was more sustainable and effective relative to the previous crises of 2014 and 2020. This highlights, in many ways, the development of a kind of immunity from business, population, public authorities to overcome the crisis processes formed both within the sanctions pressure and pandemic. These mechanisms of adjustment to the new reality were noticeable in the initial phase of the crisis in 2022, when the sanctions were most clearly manifested in the pressure on the monetary and financial system (freezing of gold-currency reserves) of the Russian economy, as well as to limit the mechanisms for the development of the real sector in the framework of perturbation of cooperation, logistics, production linkages and value chains.

Meanwhile, a number of macroeconomic indicators in the first three quarters 2022 showed noticeable signs of emerging crisis manifestations and risks of sustainable development. Among the most important can be:

- reduction of technological sovereignty by banning the import of certain technologies and goods of final/intermediate consumption;
- a decline in the volume of exports in the trade balance (as a result of the introduction in 2023 of marginal prices for Russian energy resources and systematic rejection of some of them), which predetermines a reduction in budget revenues and forms the risks of creating a budget deficit;
- a decline in net exports as a result of lower export revenues determines a decline in GDP;
- G7 decisions on marginal Russian oil prices in November determine the risks of a decline in export revenues, sequestering of net exports and, consequently, an increase in the ruble exchange rate adjustment, including within the budget balancing;
- disruption of the financial sustainability of the banking sector as a result of the

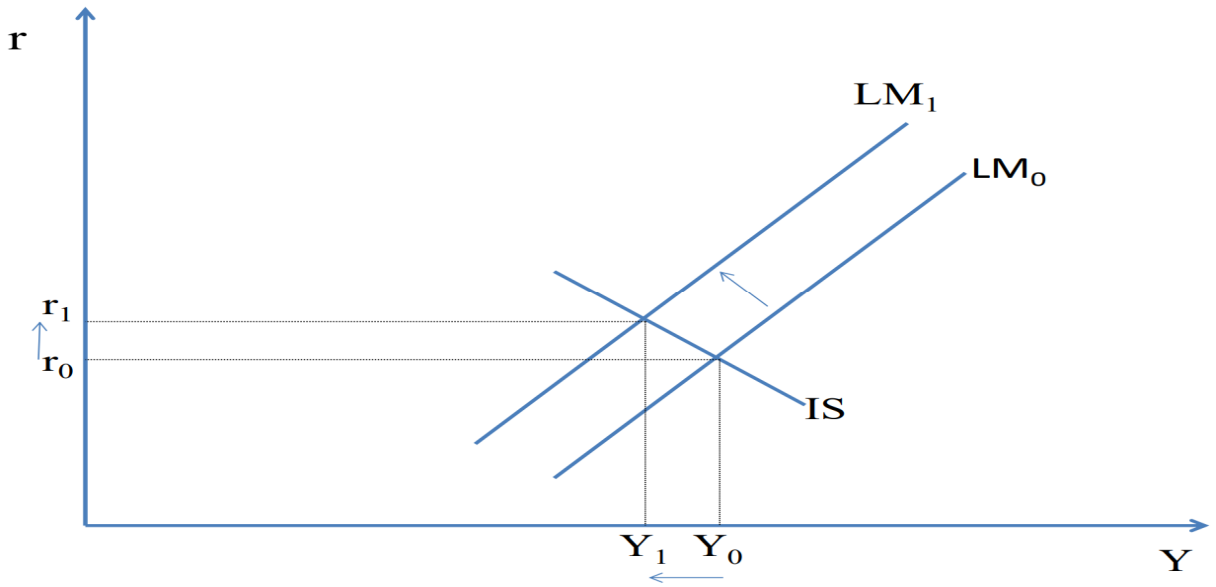
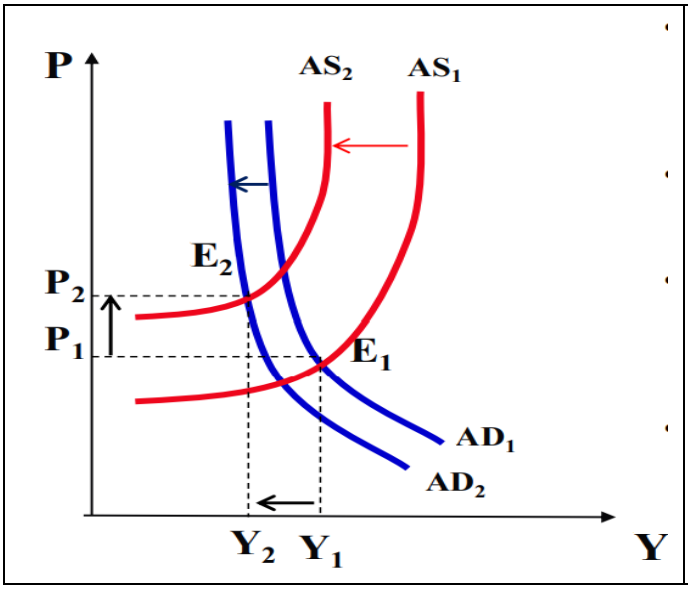


Fig. 2. **Graphical Interpretation of Interest Rate Growth in 2022 (IS-LM Model)**

Source: Developed by the authors according to URL: https://www.rea.ru/ru/org/cathedries/Kafedra-otraslevojj-i-biznes-statistiki/Documents/ Нуреев%20P.M._MP-2017.pdf (accessed on 05.11.2022).



a) Higher prices reduced aggregate demand (AD curve shift from position 1 to position 2).
b) Lower demand reduced aggregate supply (AS curve shift from position 1 to position 2).
c) Macroeconomic equilibrium shifted from E_1 to E_2, indicating that the rise in prices has led a decline in GDP (shift the equilibrium point that determines the volume of GDP at fixed price level from Y_1 to Y_2)

Fig. 3. **The AD-AS Model as a Tool for Substantiating the Changes that have Occurred in the Russian Economy (Sample II–III Quarters of 2022)**

Source: Developed by the authors according to EMISS data: URL: https://www.rea.ru/ru/org/cathedries/Kafedra-otraslevojj-i-biznes-statistiki/Documents/Нуреев%20P.M._MP-2017.pdf (accessed on 05.11.2022).

decline in real incomes of the population and the reduction in the solvency of economic agents;

- reduction of the overall level of competition in the economy as a result of exit of foreign companies from the national market predetermines deterioration of the competitive environment and decrease in the quality of organizational and managerial decisions, etc.

RESULTS AND DISCUSSION

A brief excursion into the system of externalities caused by sanctions pressure

Table 2

Comparative Analysis of the Fall in Oil Prices and the Growth of the Dollar in 2008 and 2022

Price	2008		2014		2022	
	$	%	$	%	$	%
Futures for Brent oil	from 139 to 45	–68% ⇓	from 112 to 53	–53% ⇓	from 80 to 104	+30% ⇑
US $	from 23.4 to35.9	+53% ⇓	from 34 to 64.3	+89% ⇓	from 76 to 60	–21% ⇑

Source: Developed by the authors according to: URL: http://ru.investing.com/ (accessed on 11.11.2022).

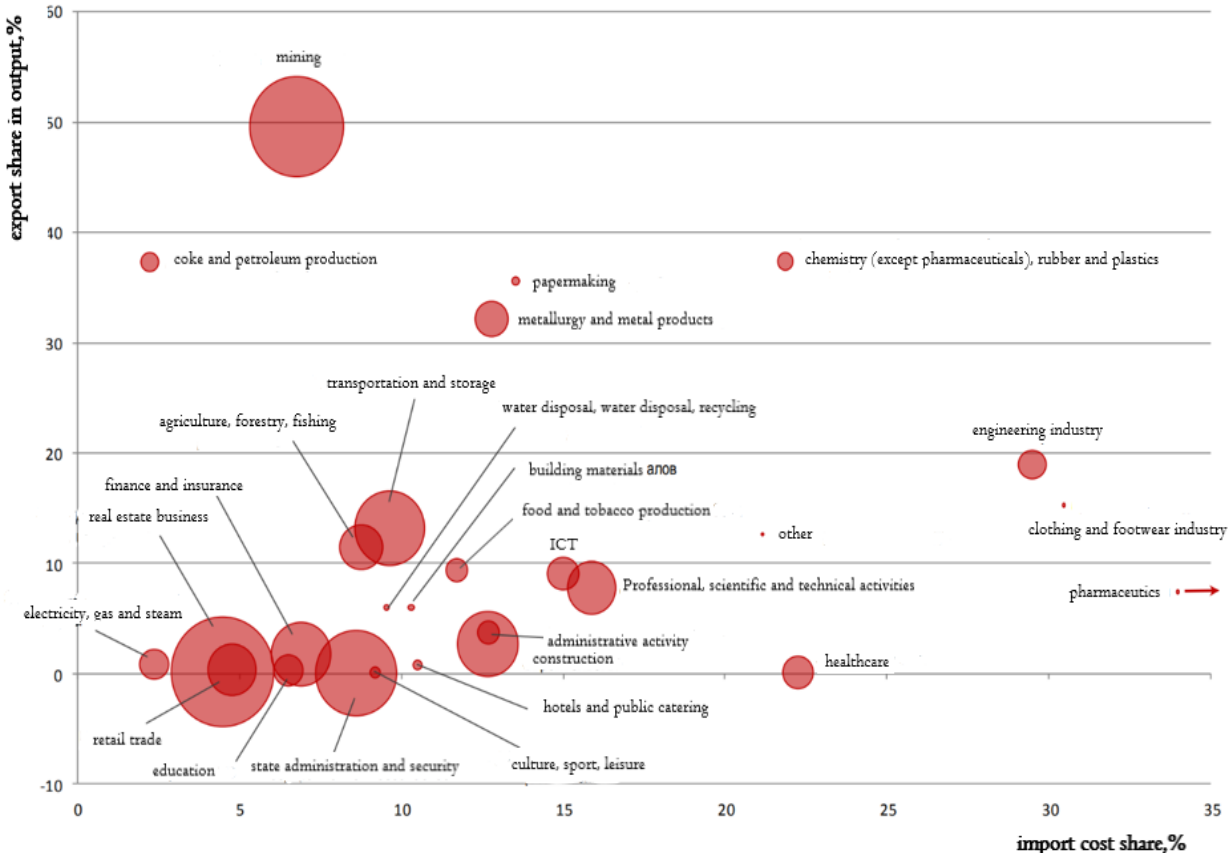


Fig. 4. **Export-Import Dependence of the Russian Economy, 2021. The Size of the District Means the Segment's Share in the Economy**

Source: Developed by the authors according to: URL: www.forecast.ru/_ARCHIVE/Presentations/DBelousov/2022–07–15Kolomna.pdf (accessed on 10.11.2022).

on the Russian economy predetermines and largely confirms the earlier theses on the need to develop measures of State mechanisms for stimulating economic dynamics, where import substitution is most important [12–14]. This is due not only to the fact that the share of imports in the structure of the Russian economy is significant and, in some sectors, very high (*Fig. 4*), but also to the fact that the niches released form the potential for development of the so-called endogenous model of economic growth, based on an autonomous development policy that is largely based on

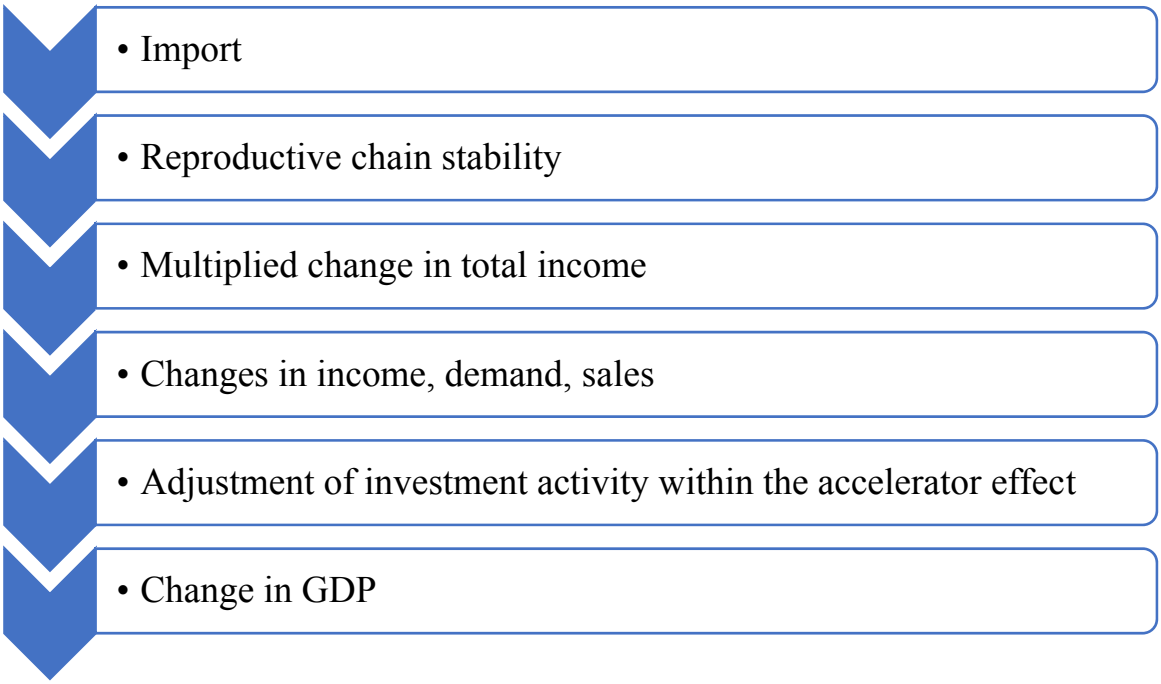


Fig. 5. **The Process of Import Influence on GDP Dynamics within the Framework of the Accelerator Effect Application**

Source: Developed by the authors.

the need to intensify the process of import substitution [15–17].

Meanwhile, based on the presented data (*Fig. 4*), it is important to note the need for differentiation and prioritization of approaches to the implementation of mechanisms of import substitution, based on five important factors:

- vulnerability and dependence of economic sectors on imports of technology and goods for final/intermediate consumption (share of imports from unfriendly countries);
- speed of readjustment of new logistics channels of supply of imported raw materials and intermediate goods;
- possibility and prospects of import substitution within the framework of intensification of scientific-technological development and formation of new cooperation value chains;
- research capacity in selected fields of activity as a tool of operational and strategic import substitution;
- industry orientation to external and internal markets.

These factors should largely determine the stages of implementation of import substitution policy.

It is important to emphasize that restriction of carrying a imports are two key threats: the first is, as already noted, to ensure the sustainable development of reproduction processes, and the second (in accordance with the neo-Keynesian concept of accelerator effect) — is to limit the dynamics of gross income and subsequent decline in investment [16, 18].

Based on the basic postulates of economic theory, formally, the import effect on GDP can be described as follows (*Fig. 5*).

The direct proof of this algorithm of relationships is the analysis and evaluation of the impact of the change in import volumes on the dynamics of the gross domestic product of the Russian Federation. As part of the construction of the simplest econometric models, it can be found (according to data for the last 10 years) that a decrease in the volume of imports by 1 mln USD leads to a decrease in the GDP of

Fig. 6. **Three-Stage Model of Stimulating Import Substitution Policy**

Source: Developed by the authors.

the Russian Federation to 417 mln rubles (*Table 4*). At the same time, the statistical significance of the obtained estimates is not much doubt about the analysis of the values of determination coefficients and other parameters characterizing the verification of calculated data (R-squared = 0.92).

The presented assessments sufficiently clearly demonstrate the acute of the current question on the search for the most effective and adaptive solutions aimed at ensuring the technological and product sovereignty of the national economy of the Russian Federation at the current stage of its development. In general, it should be noted that the current situation, characterized by the need to stimulate economic dynamics under sanctions pressure and the need to replace foreign technologies and goods, focuses on the implementation of the key directions and mechanisms of import substitution, that presented on *Fig. 6*.

CONCLUSION

Based on the results of the research, it should be noted that in the Russian Federation the issues of import substitution are pays close attention. Actively implemented programs and mechanisms at the federal and regional levels contribute significantly to the fact that business demonstrates very effective methods of adaptation to emerging perturbations. Moreover, as demonstrated above when considering the positive externalities for the national economy associated with the sanctions pressure, new and unique «windows of opportunities» are opening for Russian entrepreneurs within emerging market niches when exiting foreign companies.

In addition, it should be emphasized that the implementation of the presented model of stimulation of the import substitution policy should largely rely on the research of the structural components that form the scientific and technological sovereignty. These should include: education, science, innovation, financial provision of scientific-research work and scientific-educational infrastructure [19, 20]. Their assessment and analysis will not only reveal "bottlenecks" of import substitution in the framework of creation of domestic analogues of used foreign technologies, but also to ensure the identification of directions and opportunities for realizing

the potential of innovative development in accordance with the principles and adaptive mechanisms for integrating the national socio-economic system into a new paradigm of economic growth, consistent, inter alia, not only import substitution policy, but also the organic integration into the fairway of the sixth technological order.

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REFERENCES

1. Safiullin M.R., El'shin L.A., Prygunova M.I. Volatility and competitiveness of regions in the conditions of foreign-political and market changes (illustrated by regions of the Privolzhskiy Federal District). *Vestnik Rossiiskogo ekonomicheskogo universiteta imeni G.V. Plekhanova = Vestnik of the Plekhanov Russian University of Economics*. 2014;(12):115–127. (In Russ.).
2. Elshin L.A. Comparative analysis of cyclical fluctuations of regional economic systems: Modeling, identification, forecasting. *Vestnik Instituta ekonomiki Rossiiskoi akademii nauk = Bulletin of the Institute of Economics of the Russian Academy of Sciences*. 2017;(4):138–156. (In Russ.).
3. Osipov V.S., Zel'dner A.G., Pankova S.V. et al. Import substitution economy: Impact assessment of structure of foreign trade commodity flows on development of economic potential and import substitution in the Russian Federation. *Intellekt. Innovatsii. Investitsii = Intellect. Innovation. Investments*. 2017;(7):31–44. (In Russ.).
4. Abalkin L.I. Selected works (in 4 vols.). Vol. IV: In search of a new strategy. Moscow: Ekonomika; 2000. 799 p. (In Russ.).
5. Pichurin I.I., Blinov D.V. Ensuring import substitution after Russia's accession to the WTO. Yekaterinburg: UPI Educational and Methodological Center; 2014. 144 p. (In Russ.).
6. Osipov V.S. Industry and operational competitive advantage in the international labor division: The matrix of structuring industrial policy. *Ekonomika i predprinimatel'stvo = Journal of Economy and Entrepreneurship*. 2014;(6):26–33. (In Russ.).
7. Tsypin A.P. Effect of the state of industry on the region food security. *Azimut nauchnykh issledovanii: ekonomika i upravlenie = ASR: Economics and Management (Azimuth of Scientific Research)*. 2016;5(3):209–211. (In Russ.).
8. Nevskaya N.A. Features of industrial policy in Russia. *Nauchnoe obozrenie*. 2015;(13):257–260. (In Russ.).
9. Feng L., Li Z., Swenson D.L. The connection between imported intermediate inputs and exports: Evidence from Chinese firms. NBER Working Paper. 2012;(18260). URL: https://www.nber.org/system/files/working_papers/w18260/w18260.pdf
10. Malik K., Wickramasinghe V. International technology transfer and its impact on innovation enhancement for firms based in Sri Lanka. *International Journal of Technology Transfer and Commercialisation*. 2013;12(1–3):8–21. DOI: 10.1504/IJTTC.2013.064130
11. Hufbauer G.C., Schott J.J., Elliott K.A., Oegg B. Economic sanctions reconsidered. 3rd ed. Washington, DC: Peterson Institute for International Economics; 2007. 248 p.
12. Shavtikova L.M., Geriev M.M., Seitov A.B. et al. Import substitution and its role in the Russian economy, import substitution of software. *Finansovaya ekonomika = Financial Economy*. 2022;(9):134–136. (In Russ.).
13. Manshilin S.A., Leshchinskaya A.F. Model of financial incentives for innovation activity in industrial sector: Development and forecasting of efficiency. *Finance: Theory and Practice*. 2022;26(2):74–87. DOI: 10.26794/2587–5671–2022–26–2–74–87

14. Angel J.L.I., Linnikov A.S., Sereda A.V., Minakov A.S. Current ways to protect the rights and ensure the economic security of Russian individuals and legal entities in the context of international economic sanctions. *Finance: Theory and Practice*. 2022;26(1):198–214. DOI: 10.26794/2587–5671–2022–26–1–198–214
15. Dudnikova E.B., Sukhanova I.F., Lyavina M. Yu. et al. Features and consequences of food import substitution in Russia. *Amazonia Investiga*. 2019;8(21):656–666. URL: https://amazoniainvestiga.info/index.php/amazonia/article/view/154/130
16. Zvonova E.A., Pishchik V. Ya., Alekseev P.V. Optimization of the activities of institutions promoting investment in the sustainable economic growth of Russia. *Finance: Theory and Practice*. 2021;25(4):110–120. DOI: 10.26794/2587–5671–2021–25–4–110–120
17. Bragina Z.V., Denisov A.R., Masyuk N.N., Steblyanskii N.V. Trends in Russia's GDP growth under environmental constraints. *Finance: Theory and Practice*. 2021;25(5):24–44. DOI: 10.26794/2587–5671–2020–25–5–24–44
18. Naumov I.V., Trynov A.V., Safonov A.O. Scenario modelling for reproducing investment potential of institutional sectors in the regions of the Siberian Federal District. *Finance: Theory and Practice*. 2020;24(6):19–37. DOI: 10.26794/2587–5671–2020–24–6–19–37
19. Safiullin M.R., Derzayeva G.G., Elshin L.A. About assessment of budgetary policy efficiency of municipalities. *World Applied Sciences Journal*. 2013;27(13A):299–304. DOI: 10.5829/idosi.wasj.2013.27.elelc.62
20. Ryzhaya A.A., Shpak A.S., Belyakov S.A. State support for the development of scientific research in universities and their participation in scientific and technological development. *Ekonomicheskie nauki = Economic Sciences*. 2021;(205):180–190. (In Russ.). DOI: 10.14451/1.205.180

ABOUT THE AUTHORS

Marat R. Safiullin — Dr. Sci. (Econ.), Prof., Vice-Rector for Economic and Strategic Development, Kazan (Volga Region) Federal University, Kazan, Russia; Director, Center for Advanced Economic Research of the Academy of Sciences of the Republic of Tatarstan, Kazan, Russia
https://orcid.org/0000-0003-3708-8184
C.p@tatar.ru

Leonid A. Yelshin — Dr. Sci. (Econ.), Deputy Director for Science, Center for Advanced Economic Research of the Academy of Sciences of the Republic of Tatarstan, Kazan, Russia; Head of the Department of Territorial Economics of the Kazan (Volga Region) Federal University, Kazan, Russia
https://orcid.org/0000-0002-0763-6453
Corresponding author:
Leonid.Elshin@tatar.ru

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