ORIGINAL PAPER

DOI: 10.26794/2587-5671-2023-27-6-17-30
UDC 338.2,338.012(045)
JEL C53, G38, G31

Import Substitution Impact on Growth of Production of Mineral Products and Metallurgy: Short-Term and Long-Term Forecasting of Basic Sectors of the National Economy

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ABSTRACT

The **purpose** of the study is to identify ways of short- and medium-term development of mineral production and metallurgy in the Russian Federation in the context of the policy of sanctions based on economic and mathematical modeling. The impact of sanctions on production in the basic sectors of the Russian economy, as well as the impact of import substitution on production in the short- and long-term is investigated. The research **methodology** includes panel regression with fixed effects and Bayesian vector autoregression (BVAR model). The sanctions index is calculated based on a sentimental analysis of the texts of news publications. This index is based on the results of computer analysis of a set of thematic texts (evaluation of the frequency of words and phrases, correlation analysis, case analysis based on the BERT neural network). The paper demonstrates the importance of an industry-specific approach to the implementation of import substitution policy in view of its time horizon. For example, for the mineral products industry, the current import substitution policy can be considered effective in terms of the production index forecast, and for the metallurgical industry, the import substitution policy needs to be revised, since a sharp decline is expected in the short-term when the baseline scenario is implemented, and in the long-term production stabilizes without showing growth. As a result, the efficiency of the import substitution policy is considered to be completely dependent on the industry in which it is implemented. Fund intensity and other factors affecting industry cycles must be considered in order to forecast policy results. Import substitution also has a long-term positive impact.

Keywords: import substitution; industry development; sanctions; economic system; economic growth; sanctions indexes; text analysis

For citation: **Fedorova E.A., Nevredinov A.R., Melikhov K.S., Yashchenko A.I. Import Substitution impact on growth of production of mineral products and metallurgy: Short-term and long-term forecasting of basic sectors of the national economy. *Finance: Theory and Practice*. 2023;27(6):17-30. (In Russ.) DOI: 10.26794/2587-5671-2023-27-6-17-30**

INTRODUCTION

The Russian Federation's economic policy, as represented in real economic decisions, is significantly impacted by foreign policy and inter-state interactions. Since 2014, such development has taken form in the context of import substitution programs, which have changed into measures of national response to the sanctions policies of a number of Russian partner countries. The state's and the global inter-country system's economic development is based on integrated and sustainable economic growth [1]. This growth is achieved through foreign trade relations, enabling countries to identify the most promising areas of activity, through resource redistribution [2, 3]. The import substitution under consideration in this paper potentially involves reorientation to domestic production features, strengthening of economic autonomy and ultimate state development [4, 5]. The purpose of the study is to identify ways of short- and medium-term development of the economic system of the Russian Federation on the basis of economic and mathematical modeling of the conditions of sanctions.

REVIEW OF LITERATURE AND HYPOTHESES

Since the 1950s, serious thought has been given to the theoretical consequences of sanctions. The main formal theories of sanctions developing at the moment are based on negotiating models [6–9]. The first requires into consideration participant interactions in restricting measures in just a few of response measures. The second, on the other hand, examined interactions in terms of alternating movements (subjective forms of conduct), infinite horizon (decision-making), and completeness (reciprocal) information. With point (address) introduction, global experience shows that sanctions reduce the sanctioned country's GDP growth rate by an average of 0.5–0.9 percentage points over a seven-year period [10]. However, the systematic effectiveness of such restrictions was disputed by a number of authors. For example, some researchers [11, 12] suggested that a reduction in international trade could stimulate the domestic markets of the target country and eliminate the impact of sanctions measures. Another reason for the ineffectiveness of restrictions is the additional costs for countries [12, 13]. In order to compare research views on sanctions restrictions, the authors compiled a scheme of the attitudes of different authors toward them (*Fig. 1*).

The presented scheme allows for the identification of diversified assessment conclusions describing the impact of the sanction. The experience of restrictive measures is different around the world, this is due to the long-term nature of the sanctions imposed against Russia, which did not always harm the economic processes of the country [14]. However, the economic development of the Russian Federation and the system of response to restrictions described by the domestic authors are completely incompatible with global research theories (*Fig. 1*). The authors of the paper are interested in looking into it, presented within the framework of a certain hypothesis, in order to reach an actual determination of the influence of sanctions on the country's economic activity.

Hypothesis 1. Sanctions imposed against the Russian economic system led to a reduction in production in its basic industries.

Import substitution as a measure of a country's response to restrictions on its economic system is seen as one of the main reasons for the ineffectiveness of sanctions. This reaction, coupled with the reorientation of production capabilities, is described in the cost-output model and models of the reorganization of economic activity in the context of market development [15, 16]. Import substitution, according to a number of researchers, contributes to the development of individual sectors of countries and economic growth

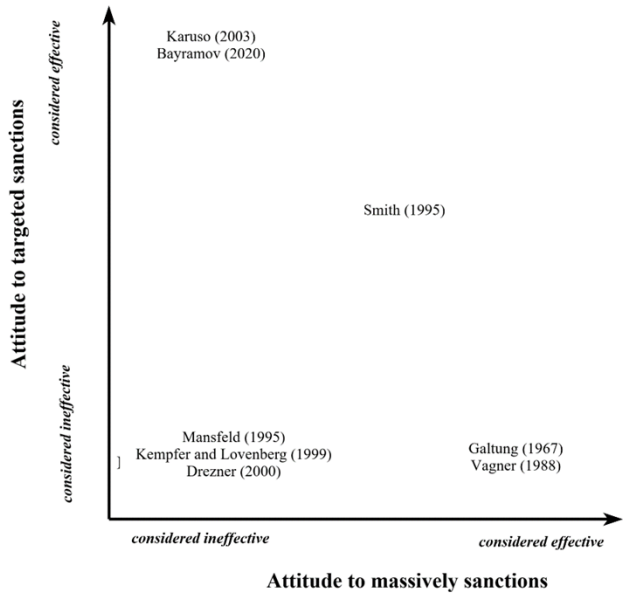

Fig. 1. **Key Theoretical Views on Sanctions Restrictions**

Source: Compiled by the authors.

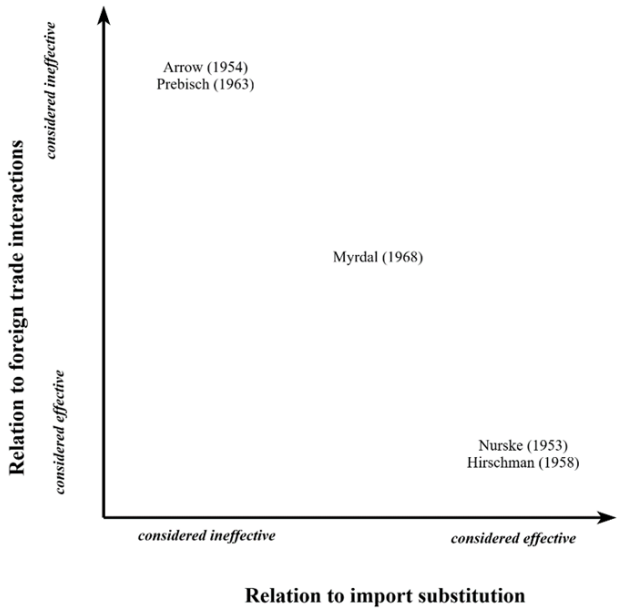

Fig. 2. **Key Theoretical Views on Foreign Economic Policy**

Source: Compiled by the authors.

[17]. At the same time, there was a strong criticism of the idea of import substitution under sanctions [4], taking into account the impossibility of obtaining additional capital from abroad if they are available. The authors' approaches to import substitution research have been analyzed in connection with free trade principles that have been extensively studied since the 1950s. A comparison of the described scientific views is presented in *Fig. 2*.

In the context of non-trade restrictions, a number of researchers noted the substantial reliance of domestic sectors of the economy on foreign equipment (particularly in the manufacturing industry), where the scale of replacement is limited [18]. However, even in the context of the structural transformation of the economic system in 2022–2023, a number of researchers positively assess the possibilities of the development of Russian import substitution [19]. The authors of this paper propose to evaluate primarily the basic sectors of the state, ensuring the systemic and continuous maintenance of the economy of the country.

Hypothesis 2: Import substitution in Russia's basic sectors affects production in those sectors.

In the framework of the system, the key impact on the domestic economic system within the work has been established for: extraction and production of mineral products (including petroleum products; sections 25–27 of the EEU classification); extraction of and processing of metals and products made of them (sections 72–83 of the EU classification). The choice of these industries is due to their high importance in the economic system of the Russian Federation. For the period 2017–2022, they accounted for an average of 37.09% of all federal budget tax revenues (or 27.96% of all budget revenues)[1] and 60.47% of total export (external trade) revenues of organizations.[2]

[1] Calculation of authors, for mining and processing of metals and products made of them included sections 07, 23–25; for the processing and production of mineral products sections: 05–06, 19; data from 2017 to 2021. Source: Analytical portal of the Federal Tax Service of Russia. URL: https://analytic.nalog.gov.ru/ (accessed on 21.12.2022).

[2] Calculation of authors, annual indicators of export to CIS countries and far abroad. Commodity structure of export and

The share of foreign production, competing with domestic production in such industries is at a fairly low level. As existing import substitution programs are planned for a limited period of time: 2021–(2022)–2024 (3 to 4 years), the authors have detailed their development plans with annual criteria. Data on import substitution programs for 2022 was used as retrospective information aimed at improving the accuracy of forecasting in the framework of econometric analysis. Data on export substitution scenarios is presented in *Table 1*.

The information provided in *Table 1* is based on the program of the Ministry of Trade, revised after the beginning of the structural transformation of the economic system of Russia in 2022.[3] Similar to *Table 2*, information submitted by the Ministry before the start of domestic economic restructuring 2021–2023 was developed for the industry of mining and processing of metals and products thereof.[4]

Hypothesis 3a. Import substitution in the basic industries of the Russian economy has a negative effect on the growth of production in the short-term.

Hypothesis 3b. Import substitution in the basic industries of the Russian economy has a positive effect on the growth of production in the long-term.

METHODOLOGY OF RESEARCH

The first two hypotheses will be tested on the basis of fixed-effect panel regression [15], the model specification is presented by formula (1).

$$PI_{i,t} = \alpha + \beta_1 EX_{i,t} + \beta_2 IM_{i,t} + \beta_3 SAN_t + \beta_4 USD_t + \varepsilon_{i,t}, \quad (1)$$

where $PI_{i,t}$ — production index of the i-industry in the t-period, $EX_{i,t}$ — export volume of the i-industry in the t-period, $IM_{i,t}$ — import volume of the i-industry in the t-period, SAN_t — sanction index based on sensitive analysis in the t-period, USD_t — exchange rate of the USD in the t-period, $\varepsilon_{i,t}$ — model error.

Bayesian vector autoregression (BVAR) will be the methodology for verifying the third hypothesis. The model used in the study is a five-dimensional vector auto-regression with lag 7 and using the associated normal Wishart inverse distribution, it can be represented by the formula (2).

$$\begin{bmatrix} PI_t \\ EX_t \\ IM_t \\ SAN_t \\ USD_t \end{bmatrix} = c + \sum_{j=1}^{7} \Phi_j \begin{bmatrix} PI_{t-j} \\ EX_{t-j} \\ IM_{t-j} \\ SAN_{t-j} \\ USD_{t-j} \end{bmatrix} + \varepsilon_{i,t}, \quad (2)$$

where PI_t — production index in the t-period, EX_t — export volume in the t-period, IM_t — import volume in the t-period, SAN_t — sanction index based on sensitive analysis in the t-period, USD_t — exchange rate of the USD in the t-period, c — vector constant, Φ_j — matrix of autoregression coefficients, $\varepsilon_{i,t}$ — model error vector.

The sanction index will be calculated on the basis of sentiment analysis. We used articles from the news portal lenta.ru. Between January 2014 and March 2023, more than 16 200 publications were uploaded under "economics" and "science and technology". Only those that contained the word "sanction" or "ban" were selected, with a total of 1 960 publications (of which approximately 1 700 belong to the "economics" section). We cleared the texts of stop-words and unnecessary characters and lemmatized. Our methodology for developing a sanction index included several stages of content analysis of the empirical data collected, including: evaluation of the frequency of words and phrases;

import. Federal Customs Service of the Russian Federation. URL: https://customs.gov.ru/folder/502 (accessed on 05.01.2023).

[3] On approval of the Plan of Measures for Import Substitution in the Chemical Industry of the Russian Federation and on Invalidation of Some Orders of the Ministry of Industry and Trade of the Russian Federation. Order of the Ministry of Industry and Trade of the Russian Federation from 15 November 2022 No. 4743. Consultant Plus: Moscow. 2023.

[4] Could be submitted on request by the authors of the article, limitation of volume of article did not allow to insert the table.

Table 1

Import Substitution Scenarios in the Mining and Production of Mineral Products

Time period (year)	Type of scenario forecast		
	Basic (realistic)	Optimistic*	Pessimistic**
2022	Decrease in import volume by 11% (under the conditions of restriction of export-import operations for Russia)	Reduction of imports by 4%	Growth of imports by 6%
2023	Growth of imports by 6% (with reorientation of industrial and economic activity and growth of economic activity)	Reduction of imports by 5%	Growth of imports by 8%
2024	Reduction of the volume of imports by 5% (in the context of the transition to the implementation of the program plans of the Ministry of Trade of previous years)	Reduction of imports by 7%	Growth of imports by 5%

Source: Compiled by the authors.

Note: * Planned annual indicators of the Ministry of Industry and Trade (forecast changes y/y) [Order of the Ministry of Industry and Trade];

** Forecast data on indicators of the level of the period before the introduction of import substitution programs (forecast changes y/y).

correlation analysis, in which we focus on the relationship between words and the term "sanction" in order to find the most important words for the index case analysis based on the BERT neural network [20] in order to assess the context of sanctions-related issues and to develop keywords. The first stage is the frequency analysis presented in *Table 2*.

In the second phase of text analysis, we analyzed the correlation factors, the results are presented in *Table 3*.

First and foremost, the media discussed the source, direction and nature of the sanctions (*Table 3*). They allow the development of the dictionary index along with the frequency list, but we have also chosen to perform a case analysis with the support of the neural network BERT. The resulting SAN sanctions index dictionary consists of the following words and phrases: sanction, economic sanctions, restriction, ban, blockade, block, barrier, import ban, export ban, hard sanctions, penalties, restrictive, embargo, retaliation, anti-Russian, west sanctity, sanction introduction, sanctions EU, Washington reaction, western sanction package, sanctions list, new sanction ban, supply ban, sanctuary pressure, import bans.

The result of the evaluation of the sanction index is displayed on *Fig. 3*. The data by year is averaged for visibility.

From *Fig. 3* it can be seen that the main peaks of the imposition of sanctions fall at the beginning of the period in 2014, which is still the weakest, as well as 2018 and the end of 2021.

STUDY RESULTS

The author's study is based on available macroeconomic data on the ten basic industries of the Russian economy from 2014 to 2021 monthly — a total of 960 observations for five indicators: production index (Rosstat[5]), volume of exports and imports (FCS of Russia[6]), sanctions index, exchange rate of the US dollar (CB of

[5] Rosstat. [Industrial statistics]. URL: https://rosstat.gov.ru/enterprise_industrial (accessed on 05.03.2023).

[6] Commodity structure of exports and imports. Federal Customs Service of the Russian Federation. URL: https://customs.gov.ru/folder/502 (accessed on 05.03.2023).

Table 2

Frequency of Words and Phrases

Word	Frequency	Word	Frequency
Ban	795	Package of sanction	76
Restriction	749	Ban on import	68
Embargo	292	Delivery ban	64
Anti-russian	172	Economic sanction	61
Impose sanction	169	Export ban	42
Anti-russian sanction	153	European union sanction	41
Restrictive	142	Ruble depreciation	40
New sanction	137	Sanctions pressure	35
Restrictive measure	108	Import ban	35
Imposition of a sanction	102	Retaliation	29
Sanctions list	97	Strong sanction	28
Western sanction	90	Penalty charge	24
Bloc	84	Barrier	22
American sanction	76	Washington sanction	13
Package of sanction	76	Blockade	8

Source: Author's calculations.

Table 3

Analysis of Word Correlations with the Word "Sanction"

Word	Corr. coeff.	Word	Corr. coeff.
Against	0.887	Introduce	0.627
Relation	0.832	American	0.625
Enter	0.812	European Union	0.623
Restriction	0.807	Embargo	0.597
Intro	0.746	Threat	0.580
Anti-Russian	0.709	Ban	0.564
Party	0.702	State	0.530
New	0.696	Package	0.522
Measure	0.684	Penalty	0.495
Restrictive	0.661	Return	0.489
Response	0.650	European	0.446
Washington	0.644	Economic	0.418

Source: Author's calculations.

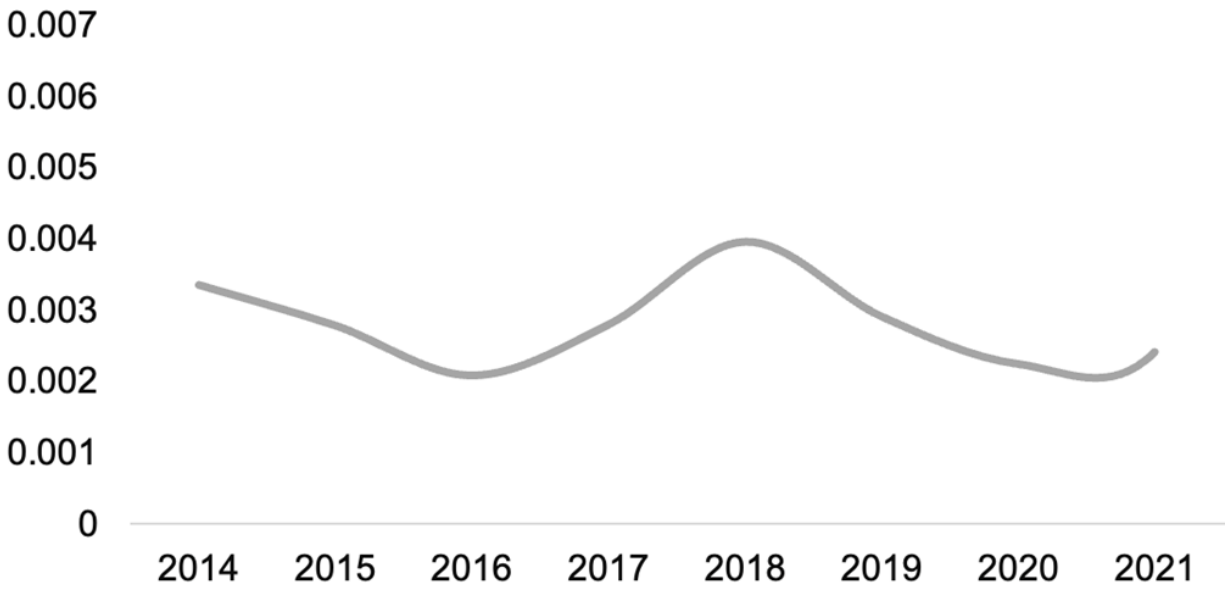

Fig. 3. **Dynamics of the Sanctions Index SAN News Portal lenta.ru for 2014–2021**

Source: Author's calculations.

Table 4

Results of the Impact Assessment of Sanctions on Production

Model variables	Economy in general	Mineral products	Metallurgy
Export volume	0.001	0.007*	–0.035
	(0.001)	(0.003)	(0.034)
Import volume	0.019***	–0.424**	0.208*
	(0.003)	(0.206)	(0.122)
Sanctions index	0.08***	0.02***	–0.01**
	(0.012)	(0.003)	(0.006)
Rate of USD	–0.003**	–0.011***	0.009**
	(0.001)	(0.000)	(0.004)
Constant	1.01***	1.513***	0.616**
	(0.056)	(0.208)	(0.289)
Adjusted R-squared	0.27	0.33	0.21

Source: Author's calculations,

Note: p-value: * < 0,1; ** < 0,05; *** < 0,01.

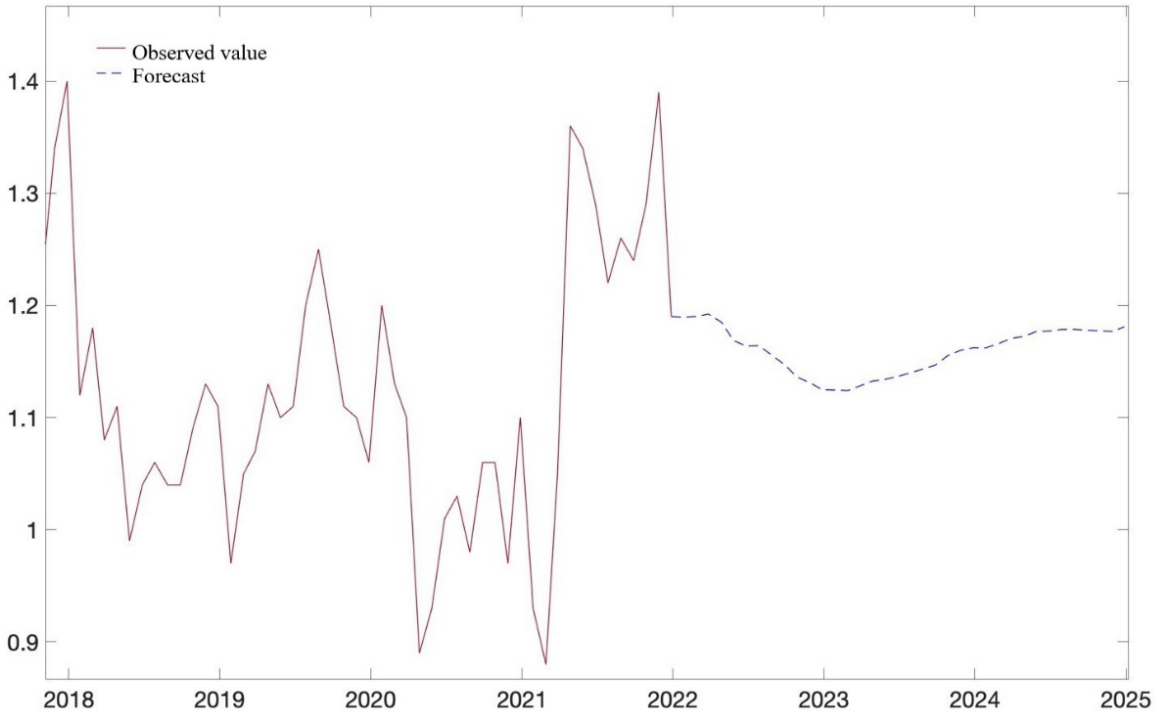

Fig. 4. **Forecast of the Production Index in the Mineral Products Industry for 2022–2024**

Source: Author's calculations.

Russia[7]). The results of the evaluation of the common model for all industries are presented in *Table 4*.

It may be assumed that the estimates of coefficients at the variable sanction index are significant both for the economy as a whole and for the industries of mineral products and metallurgical products at a level of significance of not less than 5%. At the same time, the sanctions have a positive impact on production in the economy as a whole and in the industry of mineral product production. For the metallurgical industry, the effect of sanctions is negative. The first hypothesis is confirmed for the metallurgical industry and disproved for the economy as a whole and for the mineral products industry. The second hypothesis is confirmed for the economy as a whole and for the metallurgical industry, and disproved for the mineral products industry.

To verify hypothesis 3, the authors used Bayesian vector autoregression. The forecasts obtained by applying this model to the authors' data were adjusted to the indicators provided by the import substitution scenarios in the basic sectors of the economy of the Russian Federation to verify the hypothesis of the impact of import substitutes on the growth of production in these sectors. Based on the evaluation of the BVAR model, estimates of the value of the production index for 2022–2024 for the mineral products production (*Fig. 4*) and metallurgy industries (*Fig. 5*) have been obtained.

According to the model forecast (*Fig. 4*) production in the mineral products industry will grow, and the growth rate will increase after 2023.

According to the model forecast (*Fig. 5*) the change in the production index in the metallurgy industry will be negative: in the first half of 2022, the index moves in a downward trend, then stabilizes, and by 2025, it will be approximately 1.12. Improved forecasts are adjusted to the import substitution scenario

[7] CBR. Large Bayesian Vector Autoregression Model for Russian Economy. URL: https://cbr.ru/Content/Document/File/16740/wps_1.pdf. (accessed on 05.03.2023).

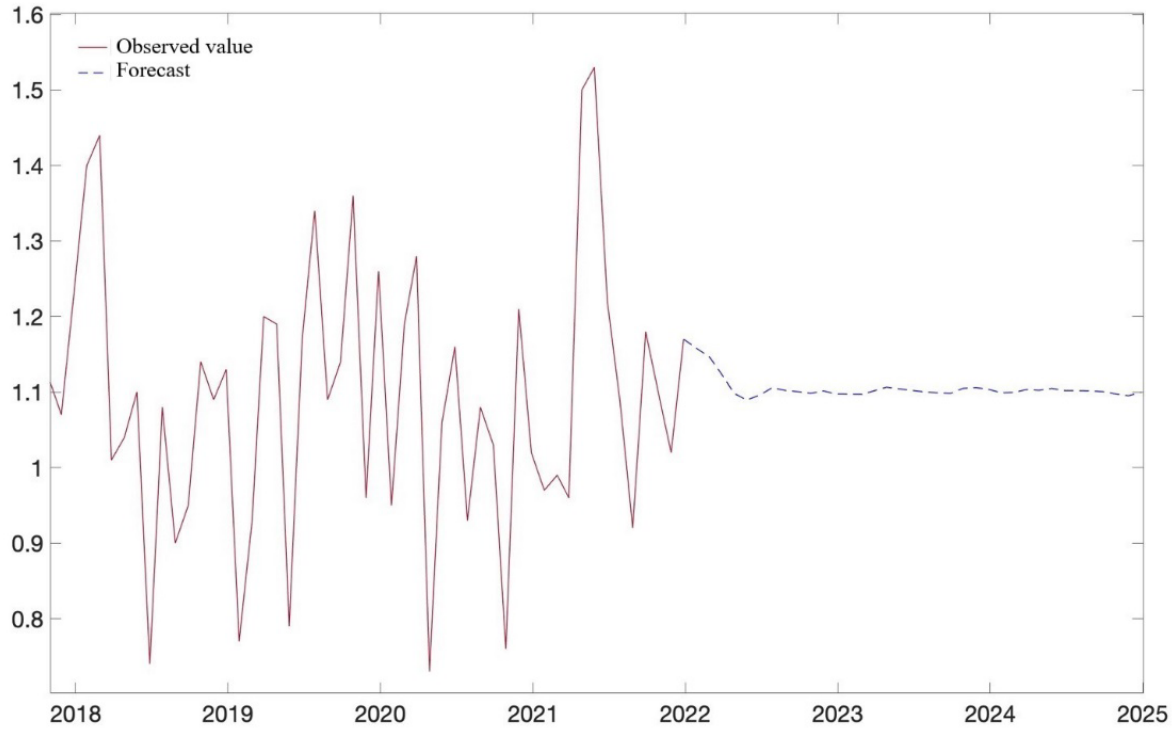

Fig. 5. **Forecast of the Production Index in the Metallurgy Industry for 2022–2024**

Source: Author's calculations.

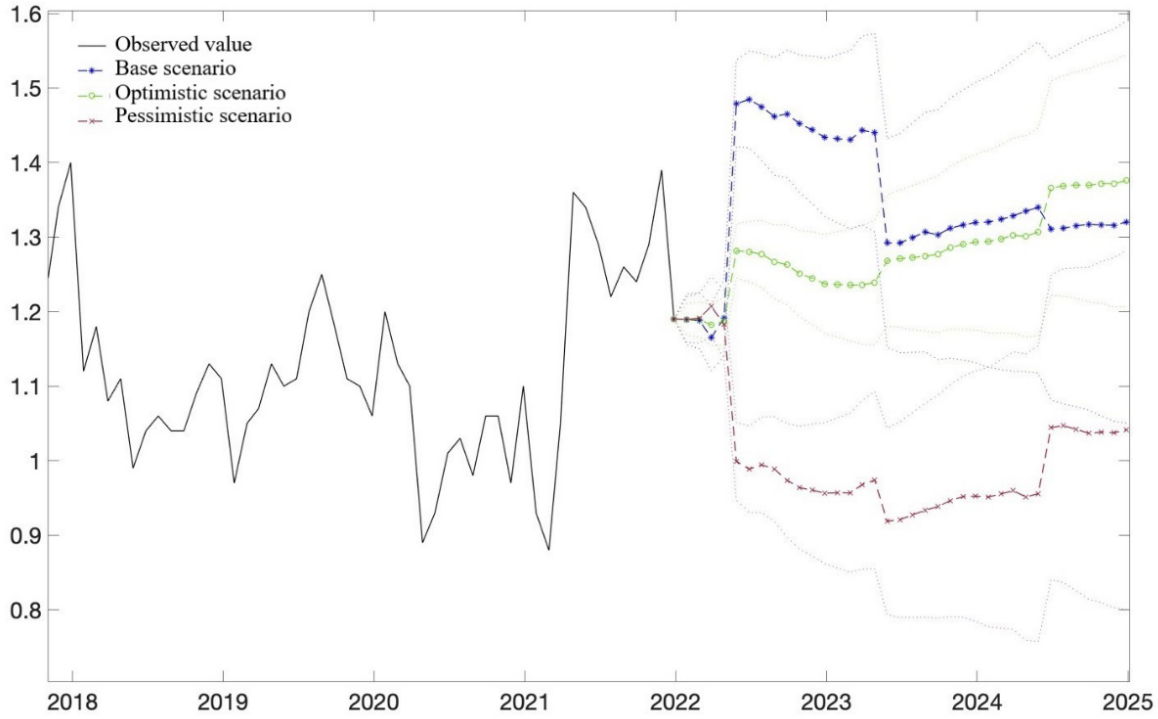

Fig. 6. **Forecast of the Production Index in the Mineral Products Industry for 2022–2024**

Source: Author's calculations.

Table 5

Results of Scenario Forecasting of the Production Index in the Mineral Products Industry and Verification of Hypotheses

Production index	Import substitution scenario		
	Basic	Optimistic	Pessimistic
In the short-term (as of early 2023)	1.42	1.25	0.97
Hypothesis 3a	Disproved	Disproved	Confirmed
In the long-term (at the end of 2024)	1.31	1.37	1.04
Hypothesis 3b	Confirmed	Confirmed	Confirmed

Source: Compiled by the authors.

(basic, optimistic, pessimistic — according to the programs of the Ministry of Trade, *Table 2, 3*) and are again aimed at modeling. The results of the evaluation of the model are based on scenario data production forecasts for the mineral products industry (*Fig. 6*) and the metallurgical industry (*Fig. 7*), based on the implementation of scenarios by the Ministry of Trade.

According to the forecast (*Fig. 6*) the mineral products industry will develop within the framework of a growing trend. After the implementation of the basic scenario of the Ministry of Trade (unstable, shock reduction of imports), *Table 2*, in the short term there will be a "boom" of production in the industry; in the long-term, the index of production still remains high, but before this adjusted almost to stagnation in the period from mid-2023 to the Q2 of 2024. With the implementation of the optimistic scenario (progressive steady decline in imports) in *Table 2*, a stable positive dynamic of the production index is forecast up to 2025. In the context of the pessimistic scenario (increase in imports, depletion of import substitution), as shown in *Table 2*, a sharp decline in the production index is forecast by the middle of 2022, and subsequent stagnation means a slight recovery in production growth will occur only by 2025. *Table 5* presents the results of the forecast of the production index and the verification of hypotheses 3a and 3b for the mineral products industry.

According to the forecast (*Fig. 7*), the metallurgical industry will be less secure, and while production will increase (on average) during the next three years, the trends in some scenarios will be disappointing.

With the implementation of the base scenario of the Ministry of Trade (unstable, shock reduction of imports), *Table 3*, in the short term there will be a sharp decline of production — the index will be in the reduction zone of production; in the long-term, the index of production will still remain at levels characteristic of reduction but will go into the zone of recovery in the middle of 2023 — early 2024, by 2025 it will stabilize in the area of unit growth (its absence). With the realization of the optimistic scenario (progressive steady decline in imports), *Table 3*, a stable negative dynamic of the production index is forecast until 2025, which is explained by the positive impact of imports on the index of production, *Table 6* (results of the assessment of the impact of sanctions on production), that is, the need for imports; by the end of 2024, the index, with this scenario, will be in the zone of reduction of production.

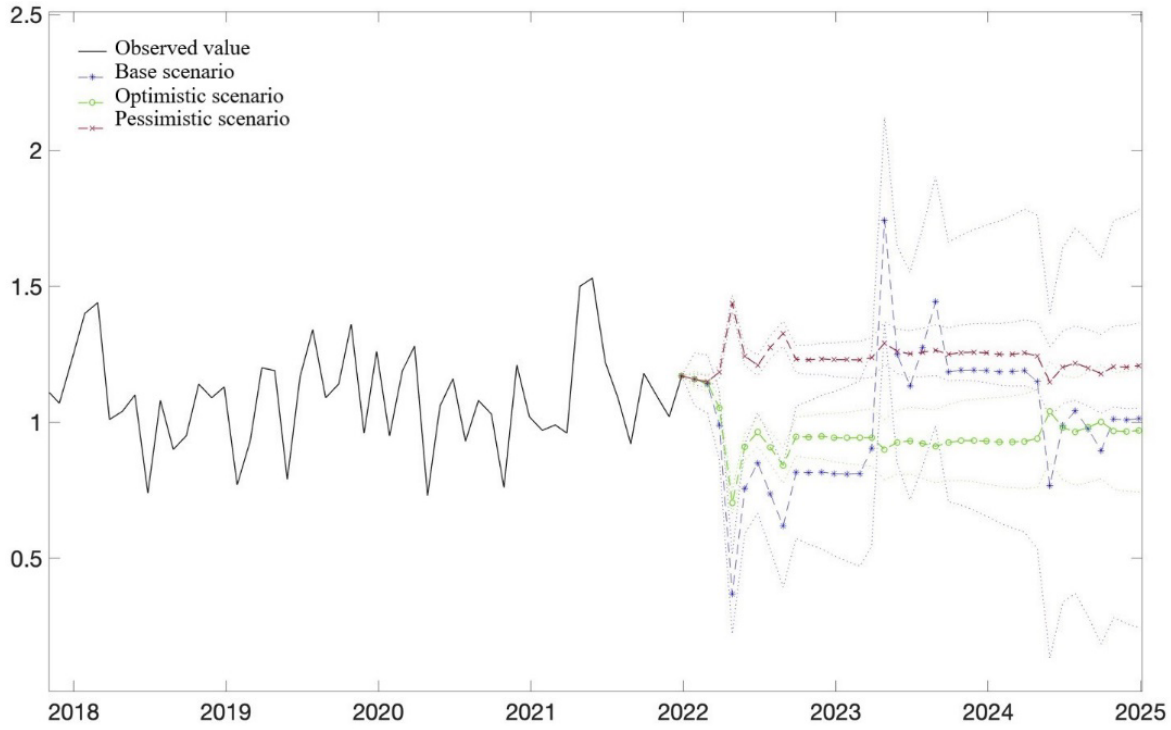

Fig. 7. **Forecast of the Production Index in the Metallurgical Industry for 2022–2024**

Source: Author's calculations.

Table 6

Results of Scenario Forecasting of the Production Index in the Mineral Products Industry and Verification of Hypotheses

Production index	Import substitution scenario		
	Basic	Optimistic	Pessimistic
In the short-term (as of early 2023)	0.84	0.96	1.21
Hypothesis 3a	Confirmed	Confirmed	Disproved
In the long-term (at the end of 2024)	1.01	0.99	1.14
Hypothesis 3b	Confirmed	Disproved	Confirmed

Source: Compiled by the authors.

In the pessimistic scenario (increased imports, no import substitution), *Table 3*, a stable high production index is forecast until 2025. *Table 6* presents the results of the forecast of the production index and the verification of hypotheses 3a and 3b for the metallurgical industry.

As a result of the assessment of the impact of sanctions on the production index in the economy as a whole and in some basic

industries, the results for different industries have been demonstrated to be ambiguous, so in the industry of mineral products, sanctions have a positive effect on the metallurgical industry — a negative. The paper demonstrates the relevance of a sector-specific approach to the implementation of the import substitution policy in view of its time horizon. For example, for the mineral products industry, the current import substitution policy can be considered effective in terms of the forecast of the production index, while for the metallurgical industry, the import replacement policy needs to be revised.

Due to the decrease in the volume of imports in 2022 by 13% in the base scenario of the Ministry of Trade, the production index will fall from 1.18 at the beginning to 0.84 at the end of 2022. As a result, in contrast to the mineral products industry, hypothesis 3a of the negative impact of import substitution on the short-term production index in metallurgy is confirmed for all scenarios, preserving the pessimistic one. In turn, hypothesis 3b of the long-term positive impact of import substitution on the output index is confirmed for the underlying and pessimistic scenarios in the mineral products industry and rejected for an optimistic scenario in the metallurgy industry.

CONCLUSION

The study's authors determine that the extent to which industries require imported components or equipment influences the effects of import substitution policy on production in these industries. With required import substitution, the industries affected must undergo structural transformations, which will be accompanied by output compression over a three-year horizon; the impact of import replacement policy on output in the underlying industries is one-way, as they often involve two interconnected phenomena. Import substitution policy parameters should be defined primarily on the basis of the industry-specific need to pursue such a policy: where the import substitute elements are structurally significant in the industry's production chain, their import substitution would involve the risk of compression of output.

Further research could include adapting stochastic models to the needs of forecasting the results of import substitution programs in order to account for the probability of describing the degree of success of the policy in specific sectors and determining the significance of changes in relevant economic indicators.

ACKNOWLEDGEMENTS

The work was carried out under the Russian Science Foundation grant No. 23–28–01427 "Assessing the impact of sanctions on the financial market of the Russian Federation". Financial University, Moscow, Russia.

REFERENCES

1. Schumpeter J.A. Theoretical problems: Theoretical problems of economic growth. *The Journal of Economic History*. 1947;7:1–9. DOI: 10.1017/S 0022050700065189
2. Marx K. Das Kapital. Kritik der politischen Ökonomie. Bd. 1. Buch 1: Der Produktionsprocess des Kapitals. Hamburg: Verlag von Otto Weissner; 1867. 784 p. (Russ. ed.: Marx K. Kapital. Kritika politicheskoi ekonomii. Vol. 1. Bk. 1: Process proizvodstva kapitala. Kharkov: Proletarii; 1923. 610 p.).
3. Kaldor N. A model of economic growth. *The Economic Journal*. 1957;67(268): 591–624. DOI: 10.2307/2227704
4. Problems of Capital Formation in Underdeveloped Countries (1953). In R. Kattel, J. Kregel, & E. Reinert (Eds.), Ragnar Nurkse: Trade and Development (pp. 99–212). Anthem Press; 2009. DOI: 10.7135/UPO9781843318187.010
5. Goodman B. The strategy of economic development, Albert O. Hirschman. (Yale Studies in Economics: 10). New Haven: Yale University Press, 1958. Pp. xiii, 217. $ 4.50. *American Journal of Agricultural Economics*. 1959;41(2):468–469. DOI: 10.2307/1235188

6. Smith A. The success and use of economic sanctions. *International Interactions*. 1995;21(3):229–245. DOI: 10.1080/03050629508434867
7. Morgan T.C., Miers A.C. When threats succeed: A formal model of the threat and use of economic sanctions. In: Proc. Annu. meet. American Political Science Association (Atlanta, GA, September 2–5, 1999). Washington, DC: APSA; 1999:643–659.
8. Lacy D., Niou E.M.S. A theory of economic sanctions and issue linkage: The roles of preferences, information, and threats. *The Journal of Politics*. 2004;66(1):25–42. DOI: 10.1046/j.1468–2508.2004.00140.x
9. Eaton J., Engers M. Sanctions. *Journal of Political Economy*. 1992;100(5):899–928. DOI: 10.1086/261845
10. Caruso R. The impact of international economic sanctions on trade: An empirical analysis. *Peace Economics, Peace Science and Public Policy*. 2003;9(2):1–19. DOI: 10.2202/1554–8597.1061
11. Galtung J. On the effects of international economic sanctions: With examples from the case of Rhodesia. *World Politics*. 1967;19(3):378–416. DOI: 10.2307/2009785
12. Kaempfer W., Lowenberg A.D. The political economy of economic sanctions. In: Sandler T., Hartley K., eds. Handbook of defense economics. Vol. 2: Defense in a globalized world. Amsterdam: North-Holland Publishing Co.; 2007:867–911. DOI: 10.1016/S 1574–0013(06)02027–8
13. Drezner D.W. Bargaining, enforcement, and multilateral sanctions: When is cooperation counterproductive? *International Organization*. 2000;54(1):73–102. DOI: 10.1162/002081800551127
14. Bayramov V., Rustamli N., Abbas N. Collateral damage: The Western sanctions on Russia and the evaluation of implications for Russia's post-communist neighbourhood. *International Economics*. 2020;162:92–109. DOI: 10.1016/j.inteco.2020.01.002
15. Bodrunov S.D. Resource advantages of Russia — basis of high-tech economic growth. *Nauchnye trudy Vol'nogo ekonomicheskogo obshchestva Rossii = Scientific Works of the Free Economic Society of Russia*. 2015;190(1):134–154. (In Russ.).
16. Glaz'ev S. Yu. Problems and prospects of the Russian financial market in the context of structural changes in the world economy. *Finance: Theory and Practice*. 2020;24(3):6–29. DOI: 10.26794/2587–5671–2020–24–3–6–29
17. Arrow K.J. Import substitution in Leontief models. *Econometrica*. 1954;22(4):481–492. DOI: 10.2307/1907438
18. Golikova V.V., Kuznetsov B.V. Strategies of Russian industrial enterprises' importing behavior under economic sanctions. *Voprosy ekonomiki*. 2021;(7):89–106. (In Russ.). DOI: 10.32609/0042–8736–2021–7–89–106
19. Felbermayr G., Mahlkow H., Sandkamp A. Cutting through the value chain: The long-run effects of decoupling the East from the West. *Empirica*. 2023;50(1):75–108. DOI: 10.1007/s10663–022–09561-w
20. Atagün E., Hartoka B., Albayrak A. Topic modeling using LDA and BERT techniques: Teknofest example. In: Proc. 6th Int. conf. on computer science and engineering (UBMK). (Ankara, September 15–17, 2021). Piscataway, NJ: IEEE; 2021:660–664. DOI: 10.1109/UBMK52708.2021.9558988

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E.A. Fedorova — general management of the research, formulation of the problem, development of the concept of the article, formation of research methodology, formulation of hypotheses, construction of model specifications and calculations.
A.R. Nevredinov — compilation of the sanctions index, construction of model specifications and calculations.
K.S. Melikhov — determination of the degree of development of the problem, data collection, formation of research methodology, formulation of hypotheses, construction of model specifications and calculations.
A.I. Yaschenko — determination of the degree of development of the problem, formulation of hypotheses, search and formulation of import substitution scenarios.

Conflicts of Interest Statement: The authors have no conflicts of interest to declare.

The article was submitted on 28.05.2023; revised on 19.07.2023 and accepted for publication on 27.08.2023.
The authors read and approved the final version of the manuscript.