Questions of Assessing the Level of State Support to Industry and Its Impact on Economic Indicators of Development in Regional Integration Associations

N. G. Kushnarev[a,]*, N. N. Rogozhnik[a], L. V. Tsybulnik[a], I. V. Shamatrin[a], and A. Yu. Pak[a]

[a] Eurasian Economic Commission, Moscow, Russia
*e-mail: ngktrade@yahoo.com

Abstract—In the article, based on the analysis of world theoretical and practical ideas, a methodological approach has been developed to assess the level of state support for industry based on the use of a set of indicators: the amount of state support in GDP, industrial production, and industries. Separately, an approach is proposed to assess the level of state support for exports, taking into account the possibility of determining the volume of industrial subsidies in order to facilitate the promotion of goods to foreign markets. In addition, the article proposes a methodological approach to facilitate the impact of the volume of industrial subsidies on certain economic indicators related to the goals of implementing state support measures based on an analysis of the industrial support policy in regional integration associations.

The practice of providing state support in regional integration associations (RIA) varies significantly. A wide range of support measures can be implemented both at the national and supranational levels. At the same time, the impact of the COVID-19 pandemic has led to a significant increase in the number of government support measures provided by countries in order to offset the adverse effects on the economy in general, and the industrial sector in particular. In view of the increase in budget expenditures of countries, including those that are members of the RIA, the problem of assessing the level of state support provided to industry and its impact on certain economic development indicators in order to measure the scale of possible economic distortions becomes relevant. This implies the formation of adequate methodological approaches to assessing the level of state support for industry within the framework of the RIA.

Literature review. Theoretical and practical ideas about assessing the level of state support for industry and its impact are formed by the international and domestic scientific community, as well as international economic organizations.

The issues of assessing the level of state support are considered to a greater extent as part of the development of approaches to the formation of reviews of budget expenditures. So, in the works of foreign scientists Robinson [1, 2], and Vandierendonck [3], the analysis of the size of budget expenditures is considered in terms of efficiency/inefficiency based on certain criteria. Approaches to assessing the level of state support in regional integration associations are being developed in the European Union (hereinafter EU) as part of the formation by the European Commission (hereinafter EC) of annual Reports on the provision of state assistance.[1] Such reports contain an analysis of the support provided in the EU countries: absolute and relative indicators of the volume of assistance provided, the total number of measures implemented, the target distribution of the allocated amounts of state assistance, the spending of each state on the largest state aid schemes by purpose, etc. [4–7].

The problem of assessing the level of state support in the works of domestic scientists is also presented in the framework of reviews of budget expenditures in domestic literature in the works of Rykova [8], Bogacheva, and Smorodinova [9, 10]. However, more attention in these works is paid to the issues of increasing the efficiency of budget expenditures and the problems associated with their use, based on an analysis of the implementation of state programs for the development of the real sector of the economy.

In terms of the impact of support measures, a number of EU countries regularly conduct an appropriate assessment, but most often it is aimed at monitoring

---

[1]State Aid Scoreboard 2019. https://ec.europa.eu/competition/ state_aid/scoreboard/state_ aid_scoreboard_2019.pdf.

costs, rather than a full assessment of the impact of implemented measures. For example, in Finland[2] TEKES innovation agency is holding comprehensive assessments ranging from individual projects to large scale schemes. Such an assessment shows that, for example, for every euro invested by TEKES, companies increase their R&D spending by two euros, and that supported small and medium-sized enterprises (SMEs) have 20% higher turnover growth and 17% higher employment growth than the control group of SMEs, and the annual turnover growth of young innovative companies is 150%.

The Organization for Economic Cooperation and Development (OECD) is also involved in assessing market distortions due to government support. The OECD has developed an Evaluation System for Support to Producers and Consumers in the Monitoring and Evaluation of Agricultural Policy.[3] The OECD maintains a database on various aspects of public support for agriculture, and publishes an annual Agricultural Policy Monitoring and Evaluation report that reviews ongoing developments and provides updates for the OECD and the European Union as a whole, as well as key emerging market economies. It should be noted that the OECD is actively working to develop approaches to assessing the distortions of the international market of certain industries associated with the provision of state support, for example, extractive industries and subsidies for fossil fuels, fisheries and fishing subsidies, and the aluminum sector [11−15]. For example, in 2019, a report on the assessment of misstatements associated with aluminum subsidies was released—Assessing misstatements in international markets: the aluminum value chain.[4] The results of this report confirm that subsidies are provided in the aluminum sector at all stages of value creation, and that significant support is provided in China and the Gulf countries. The report notes that market distortions in this sector are a problem for global competition and regulation of the provision of state support. Thus, at the international level, there is now a need to create a system for assessing the impact of subsidies to industries on potential market distortion and competition.

At the same time, since the countries that are part of the RIA differ in terms of the size of their economies and budget possibilities, it becomes necessary to assess the level of state support for industry and its impact, taking into account these features within the framework of the functioning of regional integration associations.

Methodology for assessing the level of state support for industry in regional integration associations. The

primary information for assessing the level of state support is data on:

— The total volume of state support in the RIA countries.

— The volume of state support for the development of exports of the RIA countries.

— Provision of support at the state and (if available) regional levels.

— Volumes of GDP of the RIA countries.

— Volumes of industrial production, including in the sectoral context of the RIA countries.

— Volumes of foreign and mutual trade of the RIA countries.

The assessment of the level of state support for industry is carried out on the basis of the algorithm presented in Fig. 1.

In accordance with Fig. 1, assessment of the level of state support includes:

— Assessment of the level of state support for the entire industry of each RIA country and the integration association as a whole.

— Sectoral assessment of the level of state support for each country of the RIA and the integration association as a whole.

Assessing the level of state support for the entire industry, the following calculations are made:

1. Estimation of the volume of state support provided to industry:

1.1. Calculation of the volumes of state support provided to industrial enterprises in absolute terms for each RIA country.

1.2. Determination of the dynamics of the provision of state support in the countries of RIA and in general for RIA.

2. Calculation of the level of state support to the volume of GDP:

2.1. Calculation of the level of state support to the volume of GDP in the context of each RIA country according to the following formula:

$$k_i = \frac{S_i}{G_i} \times 100\%,$$

where k_i is the level of state support to the GDP in the country i; S_i is the volume of industrial subsidies provided in the country i; G_i is the volume of the country's gross domestic product i.

2.2. Calculation of the level of state support to the total volume of GDP as a whole in RIA according to the following formula:

$$k_g = \sum \frac{S_{i=1}^n}{G_{i=1}^n} \times 100\%,$$

where k_g is the level of state support to GDP in RIA as a whole; n is the total number of RIA countries.

ASSESSMENT OF THE LEVEL OF STATE SUPPORT FOR INDUSTRY

Assessment of the level of state support for the entire industry	Assessment of the level of state support by industry

1. Assessment of the volume of state support provided

Dynamics in absolute values in each state and in general in the regional integration association	Ranking of states by the volume of state support provided

2. Calculation of the level of state support to the volume of GDP

Dynamics of the level in each state and in general in the regional integration association	Ranking by the level to GDP

3. Calculation of the level of state support to the volume of industrial production

Dynamics of the level in each state and in general in the regional integration association	Ranking by the level to industrial production

4. Calculation of the level of state support for exports

Calculation of the volume of state support for exports	Dynamics of state support volumes	Dynamics of the level of state support for exports to total exports of manufactured goods	Share of state support for exports in the total volume of state support

5. Calculation of the share of state support in budget expenditures

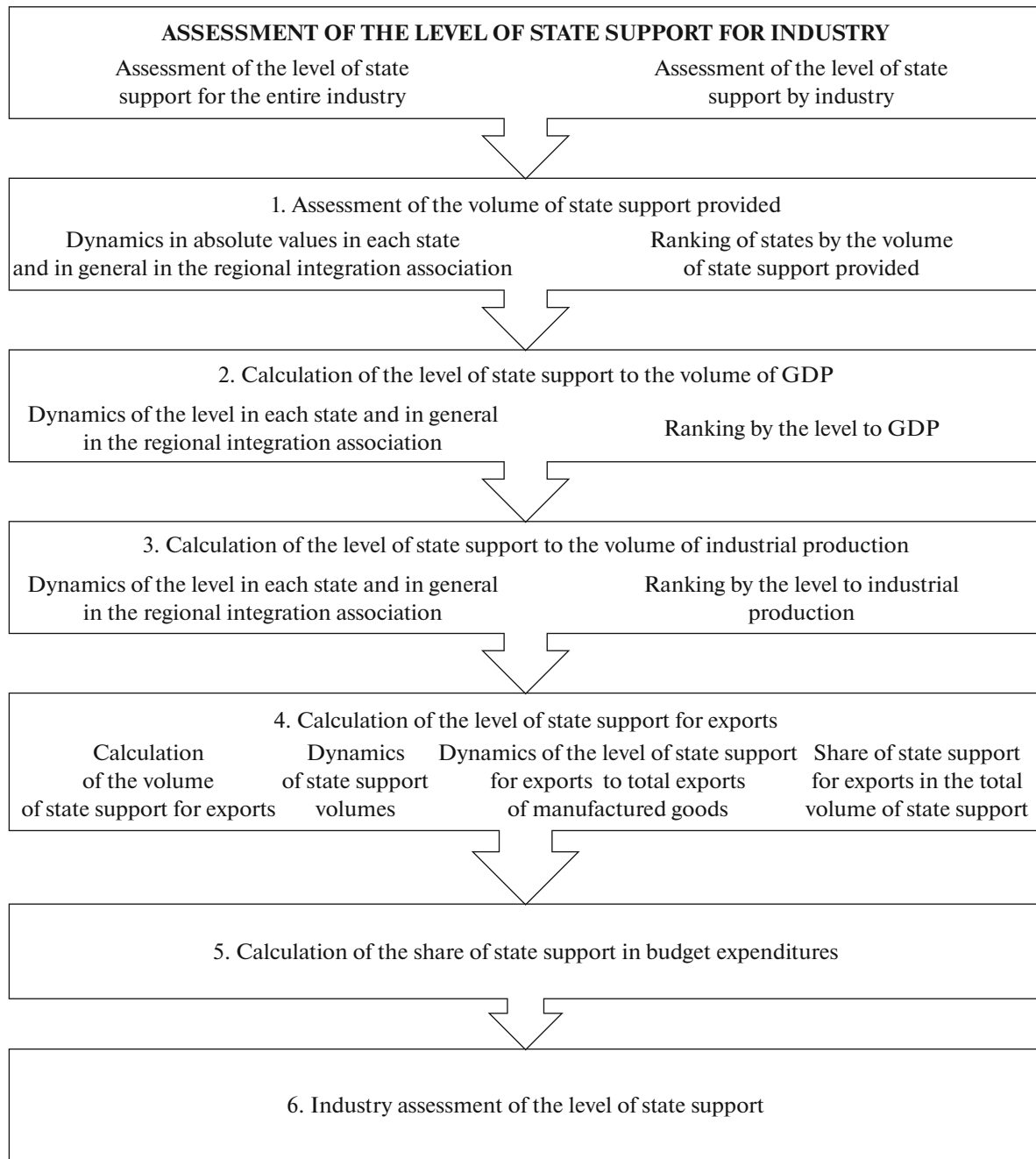6. Industry assessment of the level of state support

Fig. 1. Algorithm for assessing the level of state support for industry regional integration association.

2.3. Ranking of RIA member states that provide state support to industrial enterprises, according to the level of state support to the total GDP.

3. Calculation of the level of state support for industry in relation to the volume of industrial production:

3.1. Calculation of the level of state support for industry in relation to the volume of industrial production in the context of each RIA country according to the following formula:

$$h_i = \frac{S_i}{I_i} \times 100\%,$$

where h_i is the level of state support in industrial production in the country i; I_i is the volume of industrial production in value terms in the country i.

3.2. Calculation of the level of state support for industry to the total volume of industrial production in the whole RIA according to the following formula:

$$h_g = \sum \frac{S_{i=1}^n}{I_{i=1}^n} \times 100\%,$$

where h_g is the level of state support for industrial production in the RIA as a whole.

3.3. Ranking of each RIA country that provides state support to industrial enterprises by the share of state support in total industrial production.

4. Calculation of the level of state support for exports to the total volume of exports of industrial goods:

4.1. Calculation of the volume of state support for exports based on statistical data/acts on the execution of the budgets of the RIA countries, adjusted for the share of industrial goods in the volume of total exports (intraregional and external).

4.2. Calculation of the level of state support for exports to the total exports of manufactured goods of each RIA country using the following formula:

$$l_i = \frac{D_i}{E_i} \times 100\%,$$

where l_i is the level of state support for exports to the total volume of exports of the country i; D_i is the amount of allocated budget funds to support exports in the country i; E_i is the total volume of exports of manufactured goods of the country i.

4.3. Calculation of the level of state support for exports to the total exports of industrial goods of RIA according to the following formula:

$$l_g = \sum \frac{D_{i=1}^n}{E_{i=1}^n} \times 100\%,$$

where l_g is the level of state support for RIA exports.

4.4. Calculation of the share of state support for exports in the total amount of state support in each RIA country using the following formula:

$$z_i = \frac{D_i}{S_i} \times 100\%,$$

where z_i is the share of state support for exports in the total volume of state support of the country i.

5. Calculation of the amount of subsidies provided in the total amount of budget expenditures:

5.1. Calculation of the amount of subsidies provided in the amount of budget expenditures of each RIA country according to the following formula:

$$J_i = \frac{S_i}{B_i} \times 100\%,$$

where J_i is the share of state support in the expenditure part of the country's budget i; B_i is the volume of expenditures of the state budget of the country i.

5.2. Calculation of the amount of subsidies provided in the total amount of expenditures of the RIA budget as a whole according to the following formula:

$$J_g = \sum \frac{S_{i=1}^n}{B_{i=1}^n} \times 100\%,$$

where J_g is the share of state support in the expenditure side of the RIA budget.

6. An industry assessment of the level of state support in a regional integration association is made on the basis of the following calculations:

6.1. Calculation of the level of state support in the total volume of industrial production of a single industry in each RIA country using the following formula:

$$f_i = \frac{W_i}{T_i} \times 100\%,$$

where f_i is the level of state support for a particular industry in the country i; W_i is the amount of subsidies provided to support a particular industry of the country i; T_i is the volume of industrial production of a single industry in the country i.

6.2. Calculation of the level of state support in the total volume of industrial production of a single industry in the whole RIA according to the following formula:

$$f_g = \sum \frac{W_{i=1}^n}{T_{i=1}^n} \times 100\%,$$

where f_g is the level of state support in the total volume of industrial production of a single industry in the RIA.

6.3. Ranking of industries of countries by the level of state support provided in each country and in general by regional integration association.

Methodology for assessing the impact of state support on individual economic development indicators. The main task of assessing the impact of state support is to determine whether and to what extent the goals originally set by it were achieved, as well as whether it affected the overall RIA market. Figure 2 shows a diagram of the stages of assessing the impact of support.

In accordance with the first stage, the authors analyzed the world experience in providing state support to industry in the RIA, which revealed that the main goals of providing support are most often:

— Development of domestic production.

— Export promotion.

— Attraction of foreign investments.

— Stimulating the creation of innovative industries.

— Creation of jobs.

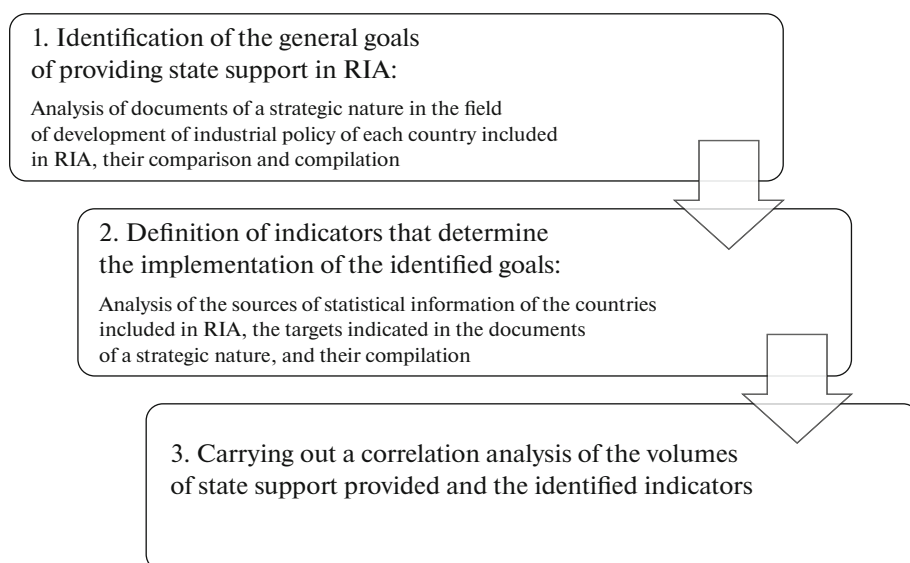— Support for small and medium enterprises.

```
1. Identification of the general goals
of providing state support in RIA:

Analysis of documents of a strategic nature in the field
of development of industrial policy of each country included
in RIA, their comparison and compilation
```

```
2. Definition of indicators that determine
the implementation of the identified goals:

Analysis of the sources of statistical information of the countries
included in RIA, the targets indicated in the documents
of a strategic nature, and their compilation
```

```
3. Carrying out a correlation analysis of the volumes
of state support provided and the identified indicators
```

Fig. 2. Scheme for assessing the impact of state support.

| Development of domestic production | • Volume of industrial production, thousand US dollars |

| Export promotion | • Volume of exports of industrial goods in the framework of mutual trade, thousand US dollars
• Volume of exports of industrial goods in the framework of trade with third countries, thousand US dollars |

| Attraction of foreign investment | • Volume of foreign direct investment in the manufacturing industry of the country, thousand US dollars |

| Promotion of the creation of innovative industries | • Volume of production of innovative goods and services, thousand US dollars |

| Job creation | • Employed population, thousand people |

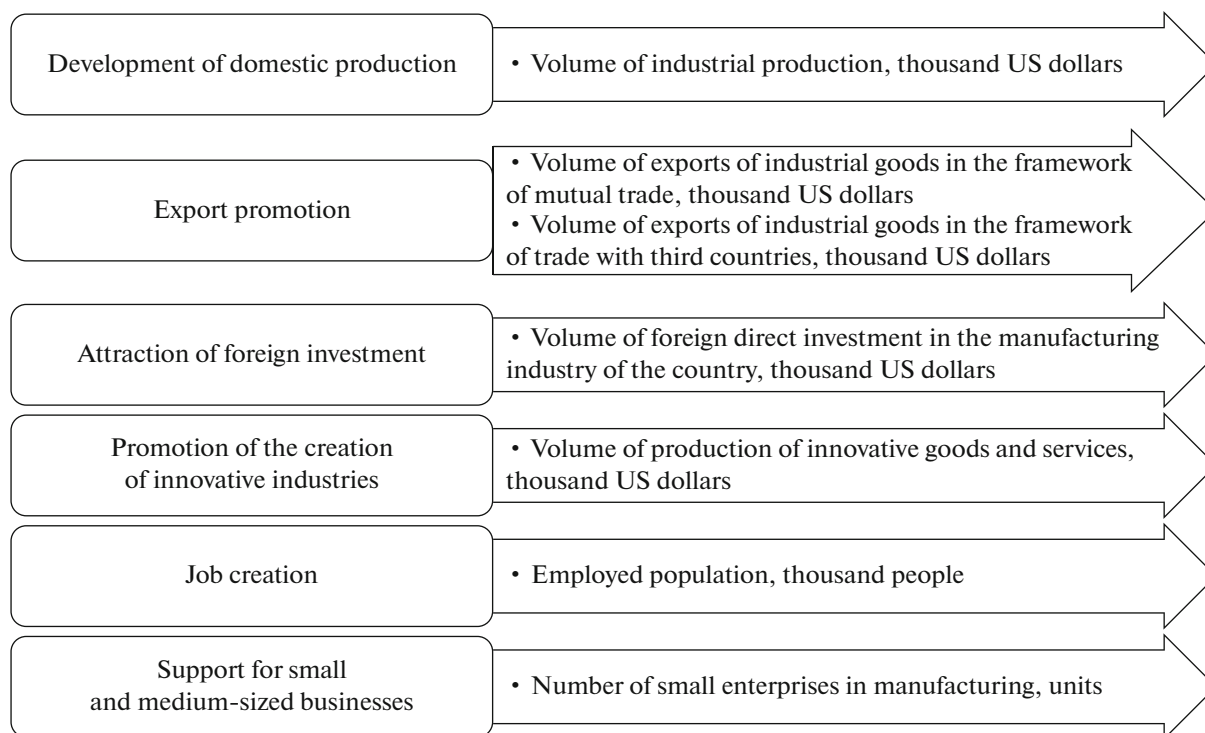| Support for small and medium-sized businesses | • Number of small enterprises in manufacturing, units |

Fig. 3. Indicators for assessing the achievement of the goals of providing state support.

In this regard, at the second stage, a generalized assessment of the achievement of these goals can be carried out on the basis of the following indicators presented in Fig. 3.

Thus, at the third stage, using the method of correlation analysis, the presence and tightness of the relationship between the volume of state support (the volume of state support for exports) and the identified variables are revealed, and the values of the corresponding linear coefficients of pair correlation are calculated. However, it should be noted that the provision of industrial subsidies may have a delayed effect. Thus, the provision of subsidies in the current year may have a greater effect in subsequent years, and in

Table 1.

Indicator	USMCA	EU
Amount of state support, billion dollars		
2016	83	101
2017	84	131
2018	90	142
2019	101	154
Volume of GDP, billion dollars		
2016	21 351	13 885
2017	22 351	14 734
2018	23 556	15 971
2019	24 444	15 689
Volume of industrial production, billion dollars		
2016	4061	3164
2017	4314	3262
2018	4600	3331
2019	4683	3357
Volume of budget expenditures, billion dollars		
2016	7584	5942
2017	7848	6105
2018	8235	6295
2019	8633	6520

Source. Calculated by the authors based on data from the World Bank, International Monetary Fund and Eurostat.

no way affect the economic performance of the current year.

Approbation of the proposed methodology for assessing the level of state support for industry in regional integration associations. Using the proposed methodology, the level of state support in two regional integration associations, the Free Trade Area between the United States, Mexico and Canada (USMCA) and the EU. At the same time, due to the lack of information in open sources on the volume of subsidies aimed at supporting exports, the level of state support will be calculated without calculating the level of export support. The table provides the necessary statistics for the evaluation.

In the period from 2016 to 2019 in the USMCA countries, the volume of government subsidies provided[5] increased by almost 21% (the largest volume is provided in the United States). As for the level of state

support to GDP, it barely changed in the countries of the USMCA during the study period and did not exceed 0.41% (Fig. 4). The level of state support for industrial production is also quite stable and amounted to no more than 2.16% in 2019. The share of state subsidies in budget expenditures in the study period was approximately the same and amounted to no more than 1.17%.

It should be noted that in the USMCA countries the provision of state support is regulated at the national level. In accordance with the Agreement on the Establishment of a Free Trade Zone USMCA, the Parties, when providing state support, are guided by the provisions Agreements on Subsidies and Countervailing Measures of the World Trade Organization (hereinafter SSCM WTO), as well as consult on the possibility of developing more effective rules and regulations regarding the use of public subsidies. At the national level, the United States, Canada, and Mexico have developed systems of state support.

The United States has the most developed and comprehensive industry support system. The main feature of state support is to increase the competitiveness of the national industry and stimulate the rapid development of the latest industries and industries (nuclear energy, electronics, biotechnology, advanced materials, renewable energy resources and energy saving, technical means of communication, etc.). Various forms of support are used: grants, state guarantees, preferential loans, etc. It is common to provide government support at both the federal and state levels. In accordance with the US notification sent to the WTO,[6] at the state level, tax incentives, grants, blended financing, soft loans, etc. are provided.

In Canada, government support comes in a variety of forms. A significant amount of support is realized at the regional level. Measures to support SMEs in the form of [7] grants, concessional loans, financing of superclusters, state guarantees, etc. In accordance with Canada's notification to the WTO,[8] there is a program to support the entrepreneurship of native Canadians in order to develop competitive enterprises, in accordance with which grants and loans are provided on preferential terms. In addition, there is a business development program for enterprises to increase their number and increase their competitiveness (subsidies are provided in the form of repayable, conditionally repayable and nonrepayable loans). The practice of support through development institutions is widespread. For example, innovation activities are subsidized through the Atlantic Innovation Fund (ACOA).

[5] Calculated based on data from the International Monetary Fund. According to the IMF Government Finance Statistics Manual, subsidies include current grants that governments provide to businesses based on their level of productive activity, or the quantity or value of the goods or services they produce, sell, export, or import.

[6] https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/G/SCM/N315USA.pdf&Open=True.

[7] https://www.canada.ca/en/services/business/grants.html.

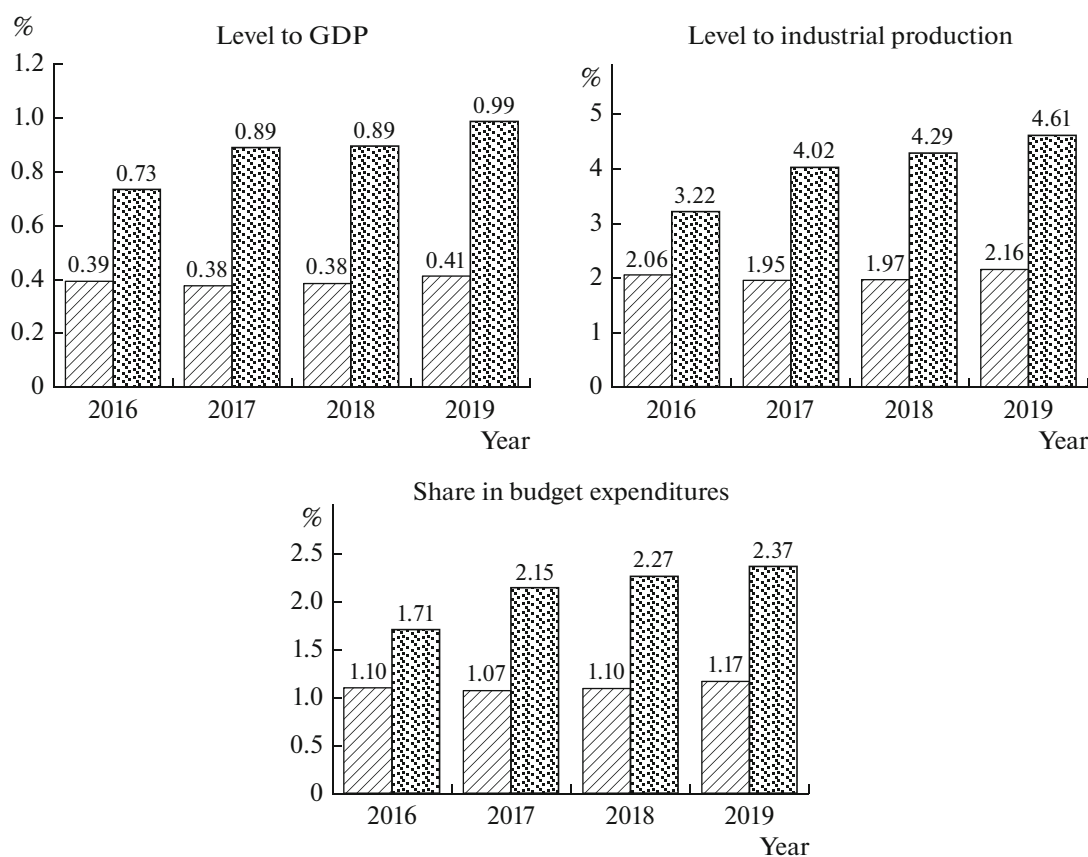[8] https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/G/SCM/N343CAN.pdf&Open=True.

Fig. 4. The level of state support to the volume of GDP, the volume of industrial production and share of state support in budget expenditures, %: ▨ USMCA; ▨ EU.

In Mexico, special programs are being implemented to support promising industries, for example, there is a program for the development of the aerospace industry. In addition, much attention is paid to stimulating innovative sectors of the economy and the development of research and development work. The practice of supporting small and medium-sized businesses is widespread: the state provides concessional loans and grants for training, some assistance programs for small and medium-sized enterprises are aimed at stimulating the expansion of their activities in the foreign market.

In the period from 2016 to 2019 in the EU countries, the volume of state aid[9] increased by 52.4% and the level of state support to GDP increased significantly from 0.73% in 2016 to 0.99% in 2019 (see Fig. 4). The level of state support to the volume of industrial production increased from 3.22% in 2016 to 4.61% in 2019, and the share of state support in budget expenditures is steadily growing and in 2019 amounted to

2.37%, which indicates a significant role states in support of industrial development.

Describing the system of state support in the EU, it should be noted that it has its own general rules for the provision of state support. The basis for the legal regulation of the provision of such support is laid down in the Treaty on the Functioning of the European Union of 1957 (Articles 107−109). The central condition for the provision of state aid in the EU countries is compliance with common European interests (environmental protection and energy conservation, research, development and innovation, regional development, sectoral development). However, they can complement each other and coincide with national subsidizing interests. For example, national state aid schemes may provide support exclusively for SMEs located in the state. Among the EU member states, the share of spending on environmental protection and energy conservation is high, the leaders of such assistance are Germany, Denmark and the Czech Republic. Research, development and innovation are most supported in Finland, Hungary, Belgium, the Czech Republic and Poland [4].

The forms of state aid applied in the EU are quite diverse: grants, tax incentives (exemptions, deferrals,

---

[9] Calculated based on data from the European Commission. State assistance includes all types of assistance falling under Art. 107 (1) of the Treaty on the Functioning of the European Union (all existing state aid measures for industries and services (including agriculture and fisheries).

reduced rates), preferential loans, advances, guarantees, contributions to authorized capital. At the same time, it should be noted that the arsenal of tools used in the EU countries varies. For example, in Croatia, about 45% of expenditures are accounted for by state guarantees, in Denmark, about 65% are accounted for by tax incentives. The EU also actively subsidizes so-called cofinanced projects (financing from national governments and European structural and investment funds). It should be noted that the EC is actively improving the rules for granting state aid. For example, in connection with the COVID-19 pandemic, the EC has temporarily adjusted certain rules for granting state support. In view of the fact that the coronavirus is considered as an unusual event that is beyond the control of governments, the EC has adopted temporary exemptions from the rules for granting state support.

The developed methodology for assessing the level of state support for industry makes it possible to determine the level of support for the industrial sector by the countries included in the RIA, the level of assistance to countries in promoting exports, as well as the level of support for industries. The calculation of these indicators will make it possible to assess the policy of countries and the RIA as a whole in relation to industry, as well as to develop common approaches to the directions of convergence of measures of state support for industry in general and individual industries in particular.

The methodology for assessing the impact of the state support provided to industry on individual economic indicators makes it possible to determine the positive and negative effects of the provided support measures and provides conditions for the use of reasonable decisions at the supranational and national levels in terms of developing a set of tools and the amount of state support, as well as indirectly assessing whether the provided support measures market support.

The methodology proposed in the article is applicable within the framework of any integration associations if the necessary information is available, access to which may be limited by the powers of the RIA bodies. In addition, the methodology is universal and, depending on the initial data, can be used to assess any form of state support.

REFERENCES

1. M. Robinson, "Spending reviews," OECD J. Budgeting, No. **2**, 81−122 (2013). https://doi.org/10.1787/budget-13-5jz14bz8p2hd

2. M. Robinson, "The role of evaluation in spending review," Can. J. Progr. Eval., No. 3, 305−315 (2018). https://doi.org/10.3138/cjpe.43177

3. C. Vandierendonck, Public Spending Reviews: design, conduct, implementation, European Commission, Economic Papers, No. 525, July 2014. http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp525_ en.pdf.

4. State Aid Scoreboard 2019. https://ec.europa.eu/competition/state_aid/scoreboard/state_aid_scoreboard_2019.pdf.

5. State Aid Scoreboard 2020. https://ec.europa.eu/competition-policy/state-aid/scoreboard_en.

6. The Green Book. Central Government Guidance and Evaluation. London, HM Treasury, 2018. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_-Book.pdf.

7. The Positive Effect of Public Investment on Potential Growth, Economics Department Working Papers, No. 1347, 2016. https://www.oecd.org/economy/public-finance/The-positive-effect-of-public-investment-on-potential-growth.pdf.

8. I. N. Rykova and G. K. Rykov, "Review of budget expenditures as a tool to improve efficiency," Kreativn. Ekon. **15** (4), 1275−1294 (2021). doi https://doi.org/10.18334/ce.15.4.111971

9. O. V. Bogacheva and O. V. Smorodinov, "Budget expenditure reviews: experience from OECD countries and perspectives for Russia," Mir. Ekon. Mezhdunarod. Otnosh., No. 3, 59−67 (2019). https://doi.org/10.20542/0131-2227-2019-63-3-59-67

10. O. V. Bogacheva and O. V. Smorodinov, "Establishing conditions for spending reviews in Russia," Nauch. Issled. Fin. Inst. Fin. Zh., No. 1(47), 21−33 (2019). https://doi.org/10.31107/2075-1990-2019-1-21-33

11. D. Bloch and J. Fournier, The Deterioration of the Public Spending Mix During the Global Financial Crisis: Insights from New Indicators, OECD Economics Department Working Papers, No. 1465 (OECD Publishing, Paris, 2018). https://doi.org/10.1787/2f6d2e8f-en

12. E. Lau, Proposal for Analysis of Spending Reviews, 7th Annual meeting of SBO Network on Performance & Results, Organisation for Economic Cooperation and Development, 2011. http://www.oecd.org/gov/budgeting/49041813.pdf.

13. Measuring distortions in international markets: the aluminium value chain, OECD Trade Policy Papers, No. 218 (OECD, Paris, 2019). https://doi.org/10.1787/c82911ab-en

14. "Quality of public expenditures: Budgeting for performance, results and value-for-money," in *Budgeting and Public Expenditures in OECD Countries* (OECD, Paris, 2019). https://doi.org/10.1787/7e7e0624-en

15. *Government at a Glance 2021* (OECD, Paris, 2021). https://doi.org/10.1787/1c258f55-en