

# Import substitution trends in agriculture of the Russian regions

I Schepina<sup>1</sup>, T Gogleva<sup>1</sup> and O Charykova<sup>2\*</sup>

<sup>1</sup> Voronezh State University, 1 Universitetskaya square, Voronezh 394018 Russia

<sup>2</sup> Research Institute of Economics and Organization of the Agro-Industrial Complex of the Central Black Earth Region of the Russian Federation, 26a Serafimovich str., Voronezh 394042 Russia

E-mail: chog@yandex.ru

**Abstract.** The relevance of the research topic is determined by the importance of the agricultural industry for the development of the Russian economy and the need to determine the results of state support for modernization and competitiveness of the agro-industrial complex. Since at the present stage government regulation includes protectionist policy instruments leading to import substitution in the industry, it is also relevant to study its influence in the context of the overall strategy for the development of agriculture. The problem solved in this research is in determining the trends of import substitution in agriculture in various regions of Russia. In determining sectoral peculiarities, priority is not given to the climatic or socio-economic conditions of the regions (as opposed to traditional, existing approaches) but to changes in the volume and structure of agricultural production, the ratio of export and import of industry products, changes in the volume of investment, etc., which is interpreted as the results of the state policy aimed at the development of the agro-industrial complex. When solving the tasks, we used the import load coefficients and import priority for the country as a whole, the analyzed regions' clustering, which allowed us to identify typological groups depending on the degree and direction of development of the agricultural industry and the impact of government regulation on it. Such an analysis is based on the conclusions that the agro-industrial complex in Russia is a complex industry characterized by external economies of scale with a dynamically increasing profitability, and its sub-sectors are developing according to the "catch-up growth" scenario, the success of which is largely determined by an adequate strategy and instruments of government regulation. The proposed toolkit in the study can be used as part of monitoring the assessment of the effectiveness of the state strategy for the development of the agro-industrial complex.

## 1. Introduction

The development of the Russian economy in the context of globalization of the economy and new challenges requires the identification of priority breakthrough directions, the concentration of resources on those measures that could cause a multiplier effect in relation to others. The main goal of the research is to identify import substitution trends in the agriculture of Russian regions.

It seems that analyzing the development trends of the Russian economy, primarily in the field of agriculture and the agro-industrial sector, should not be limited to the problems of import substitution, but it should be considered in the context of a wider range of issues about the diversity of government



regulation in the context of globalization based on the characteristics of the organization of industry-specific market structures of the world market and a tool to increase the international competitiveness of domestic agricultural products.

Among modern domestic economists, the issues of increasing competitiveness in the agro-industrial sector and import substitution are considered in the works written by the following authors: A. I. Altukhov, N. D. Avarsky, V. G. Bepakhotnykh, I. N. Burobkin, V. A. Klyukach, E. N. Krylatykh, V. V. Miloserdov, S. B. Ognitsev, A. G. Paptsov, E. I. Semenova, A. F. Serkov, I. G. Ushachev, A. A. Shutkov, and others, including the regional aspects of this problem are reflected in the works of I. B. Zagaytov, I. F. Khitskov, O. G. Charykova, and others.

Note that a purposeful strategy to accelerate the development and modernization of agriculture and the entire agro-industrial complex intensified in Russia with the adoption of the Federal Law on the Development of Agriculture [1] and the priority national project Development of the Agro-Industrial Complex [2] in 2006. The specification of the goals was carried out in the Doctrine of Food Security of the Russian Federation [3], and others.

The initial hypothesis of this study was the assumption that import substitution, carried out in modern Russian agriculture, cannot be considered from the standpoint of the traditional theory of foreign trade only as a result of the use of restrictive measures against the import of food and agricultural raw materials. It is part of the developed state strategy for the development of the agro-industrial complex aimed at increasing the international competitiveness of this complex of industries.

To confirm this hypothesis in the course of the study, the following tasks were solved: (a) a critical analysis of theoretical approaches to “import-placing” and the development of the author's; (b) highlighting the possibilities of analyzing the agricultural market from the point of view of the new Krugman trading theory; (c) justification of indicators for monitoring and evaluating the effectiveness of import substitution; (d) typology of regions of the Russian Federation with a high share of agriculture in GDP; (e) determining the peculiarities of the impact of import restrictions on agricultural and food imports, applied since 2014, on the development of agriculture in the regions of Russia.

## 2. Methods

In the process of research, general scientific methods of cognition were used, primarily dialectical, deduction, decomposition, methods of economic analysis and synthesis, as well as economic statistical and cluster analysis, grouping and comparison methods.

## 3. Research Methodology

To assess the effectiveness of import substitution in Russian agriculture, import load factors and import priority were calculated, according to the approach proposed in the methodological tool for assessing the effectiveness of implementing rational import substitution policies in the industry Matveeva, L. G., Chernova, O. A., and Klimuk, V. V. [4]. This approach was also used by the Research Financial Institute of the Ministry of Finance of Russia in developing indicators characterizing the decrease in dependence of the Russian economy on agri-food imports.

These figures are calculated as follows:

$$R_{ij} = I/GDP \quad (1)$$

where  $R_{ij}$  is the ratio of import load,  $I$  is the volume of imports of a particular product,  $GDP$  is the value of GDP. This indicator reflects the share of imports in GDP, and its decline can be interpreted as a decrease in the economy's dependence on imports.

$$F_{ip} = \frac{\Delta i}{\Delta e} \quad (2)$$

where  $F_{ip}$  is the import priority factor,  $\Delta i$  is the growth rate of imports of this type of agricultural product,  $\Delta e$  is the growth rate of exports of this type of agricultural product.

The value of the import priority ratio being less than 1 reflects the excess of the growth rate of export volumes over the growth rate of import volumes, which to some extent, indicates an increase in the level of competitiveness of national products.

Not less important indicator characterizing the degree of competitiveness of Russian goods on the foreign market is the imbalance ratio of trade turnover or the competitiveness factor  $F_{comp}$ . The imbalance of trade turnover (competitiveness ratio) is calculated as the ratio of trade balance to foreign trade turnover:

$$F_{comp} = \left[ \frac{(E - I)}{(E + I)} \right] * 100, \quad (3)$$

where  $E$  is export,  $I$  is import.

The competitiveness factor may be in the following range:

$$-100 < F < 100.$$

The increase in the value of  $F$  indicates an increase in the degree of competitiveness, a decrease indicates its decrease.

To analyze the impact of import substitution policies using cluster analysis methods, typological groups of agricultural regions were identified, taking into account their differentiation in living standards, foreign trade and the development of the agro-industrial complex. This study was conducted in two stages: at the first, based on the results of hierarchical cluster analysis, assumptions were made about the most appropriate number of clusters, and at the second stage, it relies on k-means.

For clustering, the following indicators were chosen that characterize the economic development of the region, its foreign trade activity, level of development, and investment attractiveness of agriculture, as well as the standard of living:

1. Gross regional product (GRP) per capita, mln. rub.;
2. Foreign trade turnover, mln. US dollars;
3. Export, mln. US dollars;
4. Export of foodstuffs and agricultural raw materials, mln. US dollars;
5. Import, mln. US dollars;
6. Imports of food products and agricultural raw materials, mln. US dollars;
7. The share of agricultural products in the region in the total volume of agricultural production in Russia, %;
8. Consumer spending on average per capita in months, rubles;
9. Investments in agriculture, mln rub.

For clustering, the normalized indicators were used. The k-means clustering was carried out in the STATISTICA package. The data on the development of the Russian economy, both at the level of the whole country and at the level of individual regions, came from the Federal State Statistics Service.

#### 4. Results

Russia's agriculture, dynamically developing over the past decade, has a complex external environment making a significant impact on the processes taking place in the industry. The external environment is shaped largely by the state regulation, which is emerging in the context of

globalization and foreign policy challenges: the country's accession to the WTO and the resulting restrictions on subsidizing the industry; development of the concept of national food security; implementation of various state support programs for agricultural producers; the imposition of an embargo on the supply of agricultural and food products from the EU in response to the economic sanctions of the latter. Ultimately, all of this resulted in the formulation of the idea of import substitution and target programs regarding the products of the industry, which raises the scientific [5, 6] and practical [7] issues of the feasibility and effectiveness of the actions taken to reduce agricultural and food imports.

### 5. Theoretical Approaches to “Import Substitution”

In science, there are several approaches to the solution of the question of the expediency of import substitution. Traditional neoclassical studies address this issue from the standpoint of state protectionism [8] and from the consequences of economic growth. Neoclassical studies of economic growth, from the standpoint of export orientation and import substitution in general, also indicate the shortcomings of import-substituting growth [9]. Import substitution reduces the degree of specialization of the country, leads to a reduction in foreign trade, which ultimately reduces its well-being.

In practice, there have been attempts to show the advantages of import-substituting growth, based on the state protectionist policy (the Zinger-Prebisch hypothesis [10] and the state foreign economic policy of Latin America in the 1950s–60s of the 20th century). State regulation in this situation as a target function focused on the promotion of national production, competing with imports as a means of achieving rapid industrialization and economic growth. The main tool in the implementation of this function was the effective tariff. Practical experience of such regulation showed its negative results, especially in developing countries [11, 12]. On the other hand, import substitution was focused on the lower, compared to the world, quality of national resources and the low size of effective demand of the national market. Thus, this approach in the historical retrospect showed the inconsistency of the import-substituting orientation of economic development.

Analyzing trends in the development of agriculture and the agro-industrial sector, the problems of import substitution should be considered on the basis of the variety of methods of state regulation in the context of globalization and the characteristics of industry-specific market structures of the world market. In this regard, an exemplary is P. Krugman's new trade theory, which substantiates the need for certain forms of protectionism while there is a positive return on scale in world markets with oligopolistic structures and differentiated goods. P. Krugman [13, 14] argues that it is necessary to formulate a state strategic trade policy, which assumes that a country can promote its economy towards achieving international competitiveness only by consolidating its position as a “dominant firm” in the global market environment. This policy involves the identification of such industries and industries that, thanks to government support, are capable of reaching the required production volumes and world-class returns to scale using new technologies in the future, to become competitive on the world market.

The theory of foreign trade, however, has many critics. Methods of state regulation based on strategic trade policy negatively affect competition. As a result, measures implemented by the state can be applied in the interests of some firms and to the detriment of others [15, 16].

The traditional understanding of agriculture as an industry of a large number of small producers in modern conditions is changing. These trends suggest that inter-industry complexes of the agro-industrial complex can be viewed from the standpoint of the strategic new trade theory developed by P. Krugman. For the interbranch complexes of the agro-industrial complex, one of the most important sources of external economies of scale is the accumulation of experience and knowledge. Dissemination of the accumulated knowledge leads to increased productivity and efficiency throughout the industry.

## 6. Analysis of Import Substitution in Agriculture of Russia

Import substitution became particularly important after Russia in 2014, in response to a number of trade and economic sanctions from European countries, the USA, Canada, Australia, and Japan, banned the import of a number of products (meat, milk and dairy products, vegetables, fruits, and nuts). The embargo on these products has opened up opportunities for filling the niche in this segment for the Russian companies. So, Table 1 shows dynamics in the production of the main types of import-substituting products in the period from 2013 to 2016.

**Table 1.** Production of agricultural products in the Russian Federation (all categories of farms; thousand tons).

Types of products	Years				2016 in % by 2015
	2013	2014	2015	2016	
Cattle and poultry (live weight) <i>including:</i>	12223	12912	13475	13970	103.7
Cattle	2909	2911	2876	2827	98.3
Pigs	3611	3824	3975	4351	109.5
Bird	5141	5580	6033	6189	102.6
Milk	30529	30791	30797	30759	99.9
Potatoes	30199	31501	33646	31108	92.5
Vegetables	14689	15458	16111	16283	101.1
Fruits and berries	2942	2996	2903	3311	114.0

Source: Federal State Statistics Service (<http://www.gks.ru>).

The results of agricultural production indicate a steady growth in meat production since 2013. The most impressive rise is in pork production. Russia was very dependent on imports of pork five years ago. Only Japan imported more pork than Russia [17].

In the dairy sector, there was a slight increase, and even a decrease in production was observed in 2016. But there is a feature. The main foreign supplier of milk to Russia is Belarus. The food embargo does not apply to it, so the conditions in the dairy market have almost not changed. Nevertheless, Russian dairy exporters show success. They increased sales to other countries and expand the list of counterparties [17].

In crop production, the most significant success has been made in growing crops, mainly wheat. Over the last 5 years, grain production has been growing by an average of a quarter per year. Now Russia is actively increasing the supply of grain abroad. In 2016, it became the world leader in wheat exports. Moreover, it “conquers” the market of the United States. Russia is increasing its exports to Mexico and Brazil, and this is a traditional market for America.

In other areas of crop production, there are also tangible changes. Compared to 2010, it was possible to significantly increase the production of vegetables and potatoes, as well as fruits and berries [21, 22].

It is important to note that Russia began the implementation of the process of creating a package of regulatory acts aimed at supporting domestic producers by the state in 2015. The goal of minimizing imports in the agricultural sector was set back in 2010. But the introduction of sanctions lists has enabled domestic producers to fill the gap existing in the market with legislative and financial support coming from the state.

Analyzing the data on imports of agricultural products for certain types of products, we can conclude that there is a steady decline in imports of all types of food, which indicates the decreasing import dependence of the Russian Federation on these types of products (Table 2).

To assess the effectiveness of import substitution in the field of agriculture, an analysis was carried out on the import load factors and import priority for 2013-2016. In our calculations, we used the previously mentioned formulas (1) and (2), as well as the competitiveness factor (3) (Table 3).

For Russia, the coefficient of competitiveness of agricultural products has been steadily increasing since 2013. This characterizes the growing degree of competitiveness of agricultural goods made in Russia on the foreign market, although this coefficient is still negative (Table. 3)

**Table 2.** Import of food products to Russia (thousand tons).

Years	Types of products				
	Meat and meat products	Milk and cream	Potatoes	Vegetables	Fruits and nuts
2013	2306	272	450	3000	6412
2014	1664	303	691	3380	5688
2015	1146	256	553	2607	5105
2016	950	196	276	1724	4764

Source: Compiled by the authors according to official statistics / Federal State Statistics Service (<http://www.gks.ru>).

**Table 3.** Indicators for assessing the effectiveness of the policy aimed at import substitution in the Russian Federation, 2013-2016.

Indicators	Years			
	2013	2014	2015	2016
Import, agricultural products, mln. USD.	43075.9	39905.0	26583.8	25031.1
Export, agricultural production, mln. USD.	16196.2	18981.0	16209.3	17069.7
GDP, million rubles	54013599.2	58900652.2	64997039.3	85880600
Dollar to rub.	31.8	38	61	66.83
Import load factor, $F_{il}$	0.0253	0.0257	0.0249	0,0194
Import growth rate, $\Delta I$	1.0666	0.9263	0.6661	0.9415
Export growth rate, $\Delta E$ ,	0.9719	1.1719	0.8539	1.0530
Import priority factor, $F_{ip}$	1.0974	0.7904	0.7800	0.8941
Competitiveness factor, $F_{comp}$	-45.3496	-35.5330	-24.2433	-18.9103

Source: Compiled by the authors according to official statistics / Federal State Statistics Service (<http://www.gks.ru>).

The analysis of import-export policy shows a gradual steady decline in imports and slight fluctuations in exports of agricultural products. Changes in the import load coefficient show a steady decline in this indicator in recent years, which indicates a gradual reduction in the dependence of the national agricultural market on foreign suppliers, i.e. there is a tendency to reduce import dependence of the Russian economy in the field of agriculture.

The analysis of the import priority ratio does not show so obvious conclusions compared to the previous indicator, but its value is less than 1, and this indicates that export growth rates outpace import growth rates. This means a decrease in the import dependence of the Russian economy in agriculture. In general, there are positive trends in import substitution.



## 7. Typology of Russian Regions with a High Share of Agriculture in GDP

The study was conducted according to the data came from the Rosstat agency for 2014 and 2016. The years selected are due to the fact that the Government of the Russian Federation has embarked on import substitution that since 2014. Therefore, the data on all selected indicators are available only up to 2016.

At the first stage of the study, 24 regions of the Russian Federation were selected with the largest share of agriculture in GDP in 2014 (Table 4).

**Table 4.** Regions of the Russian Federation with the largest share of agriculture in GDP in 2014.

Region	Agricultural products, mln. rub.	The share of agriculture in the Russian Federation, %	Place in the Russian Federation
Krasnodar Region	286 518	6.6	1
Rostov Region	191 316	4.4	2
Belgorod Region	188 217	4.4	3
Republic of Tatarstan	185 974	4.3	4
Voronezh Region	158 945	3.7	5
Stavropol Region	149 001	3.4	6
Republic of Bashkortostan	136 920	3.2	7
Altai Region	113 938	2.6	8
Saratov Region	109 571	2.5	9
Volgograd Region	107 804	2.5	10
Kursk Region	98 311	2.3	11
Tambov Region	93 528	2.2	12
The Republic of Dagestan	87 915	2.0	13
Lipetsk Region	81 964	1.9	14
Bryansk Region	56 323	1.3	15
Orel Region	52 317	1.2	16
Republic of Crimea	47 096	1.1	17
Mari El Republic	38 514	0.9	18
Kabardino-Balkaria	34 330	0.8	19
Republic of North Ossetia-Alania	25 719	0.6	20
Karachay-Cherkess Republic	23 837	0.6	21
Republic of Kalmykia	20 023	0.5	22
Republic of Adygea	16 335	0.4	23
Altai Republic	9 582	0.2	24
GDP	4 319 050		

On the basis of hierarchical clustering, a preliminary analysis was carried out, which made it possible to estimate the required number of clusters for clustering using the *k*-means method. It turned out that the total of three clusters were identified.

In the obtained clustering, according to the *k*-average method using the data of 2014 and 2016, all indicators are statistically significant at the level of 5%, as evidenced by the results of analysis of variance. It turned out that these regions are the most distinguishable in terms of imports, but the least differing was in imports of agricultural products. Graphs of average values for clustering in 2014 and 2016 are presented in Figure 1 and 2.

The results of clustering for 2014 and 2016 show similar graphs of average values. By all indicators, the leader is cluster 1, cluster 2 represents the “middle” regions and cluster 3 has the smallest values of all indicators. It is important to note that regions 1 and 2 of the cluster are quite close in terms of the “investment in agriculture” indicator, and cluster 2 and 3 of the indicators are “import of food products and agricultural raw materials” and “export of food products and agricultural raw materials”, which indicates a slight difference between them according to indicators.

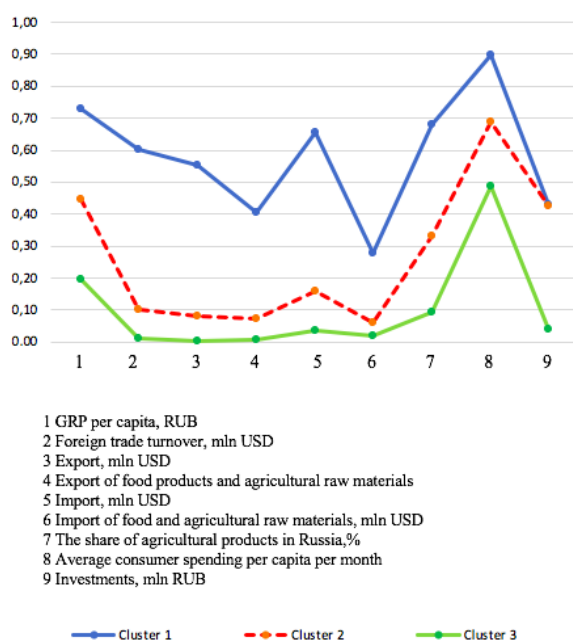


Figure 1. Average values for clustering indicators 2014.

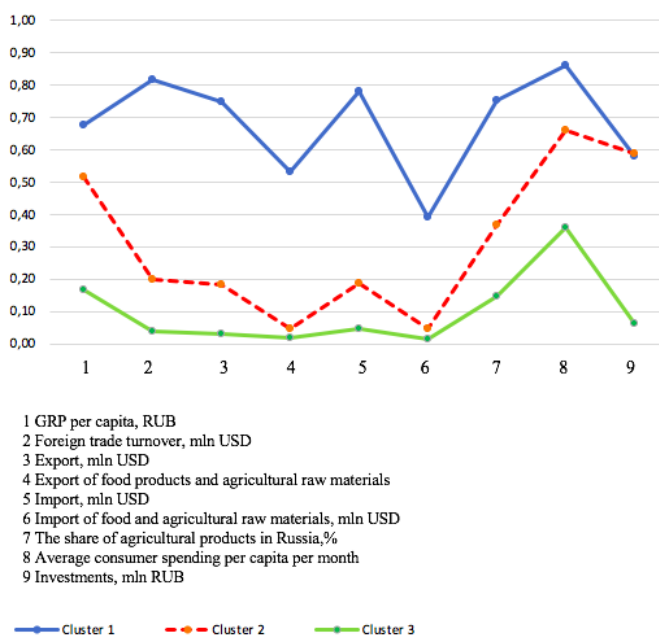


Figure 2. Average values for clustering indicators 2016.

The composition of the obtained clusters is presented in Table 5. The results show that the first cluster included 5 regions, in 2014 the second had 10, and the third one had only 9. In 2016, only 3



regions remained in the first cluster, and Tatarstan and Bashkortostan moved to the second cluster. However, the total number of regions decreased, 8 remained, and the Saratov, Volgograd regions, Altai Territory, and the Republic of Mari El moved to the third cluster (13 regions), which indicates an increase in the number of regions with the lowest values of the considered indicators.

**Table 5.** Composition of clusters by regions of Russia with a high proportion of agriculture.

	2014	2016
Cluster 1	Krasnodar Region Rostov Region Belgorod Region Republic of Tatarstan Republic of Bashkortostan	Krasnodar Region Rostov Region Belgorod Region
Cluster 2	Voronezh Region Stavropol Region Altai Region Saratov Region Volgograd Region Kursk Region Tambov Region Lipetsk Region Bryansk Region Mari El Republic	Republic of Tatarstan Republic of Bashkortostan Voronezh Region Stavropol Region Kursk Region Tambov Region Lipetsk Region Bryansk Region
Cluster 3	The Republic of Dagestan Orel Region Republic of Crimea Kabardino-Balkaria Republic Republic of North Ossetia-Alania Karachay-Cherkess Republic Republic of Kalmykia Republic of Adygea Altai Republic	Saratov Region Volgograd Region Mari El Republic Altai Region The Republic of Dagestan Oryol Region Republic of Crimea Kabardino-Balkaria Republic Republic of North Ossetia-Alania Karachay-Cherkess Republic Republic of Kalmykia Republic of Adygea Altai Republic

Let us analyze in more detail the dynamics of indicators for each cluster. Average values of indicators and their changes are presented in Table 6.

**Table 6.** Average values of indicators and their changes by clusters (2014, 2016).

Indicators	2014	2016	$\Delta$	2014	2016	$\Delta$	2014	2016	$\Delta$
	Cluster 1			Cluster 2			Cluster 3		
GRP per capita, rub.	0.727	0.676	<b>-0.051</b>	0.444	0.515	<b>0.071</b>	0.194	0.167	<b>-0.026</b>
Foreign trade turnover, mln. US dollars.	0.603	0.816	<b>0.212</b>	0.103	0.199	<b>0.096</b>	0.011	0.038	<b>0.027</b>
Export, mln. US dollars.	0.553	0.747	<b>0.194</b>	0.081	0.183	<b>0.102</b>	0.002	0.030	<b>0.028</b>
Agri-food exports	0.406	0.533	<b>0.126</b>	0.071	0.047	<b>-0.023</b>	0.006	0.018	<b>0.012</b>

Import, mln. US dollars.	0.655	0.780	<b>0.125</b>	0.157	0.188	<b>0.030</b>	0.038	0.047	<b>0.009</b>
Agri-food imports	0.279	0.389	<b>0.110</b>	0.062	0.047	<b>-0.014</b>	0.020	0.016	<b>-0.004</b>
The share of agricultural products in Russia, %	0.679	0.751	<b>0.071</b>	0.329	0.368	<b>0.038</b>	0.092	0.148	<b>0.055</b>
Average consumer spending per capita per month, rub.	0.899	0.861	<b>-0.037</b>	0.688	0.659	<b>-0.029</b>	0.488	0.360	<b>-0.127</b>
Investments in agriculture, million rubles.	0.429	0.581	<b>0.152</b>	0.425	0.586	<b>0.161</b>	0.041	0.062	<b>0.020</b>
$\Sigma$	<b>5.913</b>	<b>6.890</b>		<b>2.692</b>	<b>3.164</b>		<b>0.988</b>	<b>1.039</b>	

The results of the study show that in the cluster 1 in 2016, an increase in average values is observed for all indicators, with the exception of GRP per capita and consumer spending, i.e. standard of living declined slightly. It is important to note that the growth of exports and exports of agricultural products is slightly higher than the growth of imports of agricultural products, and the export of agricultural products exceeds the import. There is also an increase in the share of agricultural products of these regions in GDP, in particular, due to the growth of investment in agriculture. It can be said that this cluster is trying to implement an export-oriented policy.

For the cluster 2, for most indicators, the dynamics of change are the same as in the cluster 1, but it is on a smaller scale. However, with the growing exports and imports, there is a decrease in both exports and imports of food products and agricultural raw materials. At the same time, the share of agricultural products of these regions in GDP increases, and the growth of investment in the cluster 2 is even higher than it is in the cluster 1. The increase in agricultural production in the regions of this cluster, apparently, allows them to provide themselves and slightly reduce the import of agricultural products, but so far this does not show an increase in competitive agricultural products or it does not make sense to export it, because own market has not been saturated yet. It is also seen that with a decrease in consumer spending, an increase in the GRP per capita is observed. In general, in cluster 2 there are tendencies of import substitution.

Describing the cluster 3 in dynamics, it can be said that a slight increase in investment in agriculture led to a significant increase in agricultural production (growth rate is higher than in the cluster 2), there is a slight increase in exports and exports of agricultural products import and very small but declining imports of agricultural products. At the same time, this cluster (as well as the cluster 1) is characterized by a decrease in the GRP and consumer spending. Thus, there are weak tendencies of both export orientation and import substitution in agriculture in this cluster, but their role is still less important than in the clusters 1 and 2.

## 8. Conclusion

To analyze and assess the current situation in modern Russian agriculture under conditions of active government support, import restrictions, reduction of competition in the domestic market, in theory, one should rely not only on traditional neoclassical approaches to the study of state protectionism methods but take into consideration new developments as well, including those proposed in the framework of the new trading theory of P. Krugman. This theory is related to the state strategic policy regarding industries characterized by external economies of scale, in the context of the studied industry, which has embarked on the path of modernization and transition to modern production technologies later than the main world competitors. For the accumulation of knowledge and experience, mechanisms of strategic government support are needed, including, among other things, import restrictions as a temporary measure. In this case, it is necessary to monitor the characteristics of

exports, imports, and the state of competition in the domestic market, as well as to promote the export of Russian products to world markets.

Analysis of the dynamics of exports, imports, and foreign trade turnover, its commodity structure, as well as the dynamics of the coefficients of import load, import priority and competitiveness for the period 2013-2016 indicate an increase in efficiency in agriculture and the agro-industrial complex of Russia and the increase of its competitiveness in the world market. Despite the small time interval, the results show an improvement in the position of the Russian agro-industrial complex, which is, to no small extent, a reflection of the import restrictions introduced since 2014 [23].

The complex implications of state regulation in the framework of the strategy for the development of the agro-industrial sector are shown by the results of cluster analysis of 24 regions of the Russian Federation; their share in agricultural production is sensitive to the country's GDP.

In general, as a negative trend of 2014-2016, we can note a decrease in consumer spending and a decrease in GRP per capita in 16 of 24 regions. However, all regions confirm their role in the agricultural sector of the country. There is an increase in the share of agriculture in the analyzed regions in the total agricultural output in GDP of the Russian Federation (in 2014, the total share of the regions under consideration was 53.6% of the agriculture of the Russian Federation, and it was already 56% in 2016).

The growth of agricultural products as a whole, of course, is only the result of the imposed sanctions and restrictive measures against the import of food and agricultural raw materials, but also it is to a greater extent by the activation of state policy in relation to agriculture. Back in 2011, Russian agriculture reached a number of records, and Russia's agricultural enterprises showed a more than 20 percent increase in production. In 2016, agricultural production in Russia grew by 4.8%, and it was by 2.4% in 2017. The year of 2017 was also marked by a record grain harvest, good harvest of sugar beet and oilseed crops, and a significant increase in animal husbandry. In fact, at present, agriculture is one of the most profitable businesses in Russia. Its profitability in 2016 was close to 20%.

All of the above again emphasizes the need to use a set of tools and conduct continuous monitoring, systematically evaluating the effectiveness of the state strategy for the development of the agro-industrial complex.

## References

- [1] Government of the Russian Federation 2006 *Federal Law "On the Development of Agriculture" dated December 29, 2006 N 264-FZ* ([http://www.consultant.ru/document/cons\\_doc\\_LAW\\_64930/](http://www.consultant.ru/document/cons_doc_LAW_64930/))
- [2] Ministry of Information Technologies and Communications 2008 *National project "Development of the agro-industrial complex"* (<http://special.minsvyaz.donland.ru/Default.aspx?PageId=81498>)
- [3] Presidential Executive Office 2010 *Decree of the President of the Russian Federation of January 30, 2010 N 120 "On the approval of the Doctrine of Food Security of the Russian Federation"* (<http://base.garant.ru/12172719/>)
- [4] Matveeva L G 2015 Evaluation of the effectiveness of import substitution policies in industry: methodological tools *TSEU Bulletin* **3**(75) (<https://cyberleninka.ru/article/n/otsenka-effektivnosti-politiki-importozamesheniya-v-promyshlennosti-metodicheskiy-instrumentariy>)
- [5] Volchkova N A 2016 Microeconomics of Russian import substitution *NEA Journal* **4**(32) pp 140-146
- [6] Kadochnikov P A 2006 *Analysis of import substitution in Russia after the 1998 crisis* (Moscow: Institute for the Economy in Transition) p 148
- [7] Volkodavova E V 2009 Implementation of the strategy of import substitution of products at Russian industrial enterprises *Economic Sciences* **12** pp 281-286
- [8] Markusen J R 2002 *The Theory of International Trade* (New York, NY: Harpar &Row) p 342

- [9] Lindert P H 1992 *Economics of World Economic Relations* (Moscow, Russia: Progress Univer) pp 87-112
- [10] Prebish R 1984 Five Stages in My Thinking on Development *In Pioneers in Development* eds G Meier and D Seers (New York: Oxford University Press for World Bank) pp 173-196
- [11] Eljanov A 1999 Industrialization of developing countries in the interior of world economic relations and Russia *World Economy and International Relations* **2** pp 15-17
- [12] Edwards S 1993 Openness, trade liberalization and growth in developing countries *Journal of Economic Literature* **31** pp 1359-1393
- [13] Krugman P 1986 *Strategic Trade Policy and New International Economics* (Cambridge, MA: MIT Press) p 354
- [14] Helpman E and Krugman P 1989 *Trade Policy and Market Structure* (Cambridge MA: The MIT Press) p 191
- [15] Porter M 1990 *The Competitive Advantage of Nations* (New York, NY: Free Press) p 437
- [16] Baldwin R E 1992 Are Economists' Traditional Trade Policy View still Valid? *Journal of Economic Literature* **30** pp 804-830
- [17] Akulinicheva A V and Vasilyeva R P 2016 Import substitution, the advantages of reorienting trade flows in international trade during the period of extension of sanctions *Young Scientist* **10** pp 583-586
- [18] Charykova O G 2014 Features of the functioning of the meat market the Central Black Earth Region. Organizational-economic mechanism of innovation development of the agro-industrial complex: *a collection of scientific papers of the Research Institute of Economics and Organization of the Agro-Industrial Complex of the Central Black Earth Region of Russia, Voronezh State Agrarian University* (Voronezh: GNU NIIEOAPK CBER of Russia) p 359
- [19] Popkova E G, Ragulina Y V and Bogoviz A V 2019 Preface *Studies in Systems, Decision and Control* **169** p v
- [20] Bogoviz A V, Sandu I S, Demishkevich G M and Ryzhenkova N E 2019 Economic aspects of formation of organizational and economic mechanism of the innovational infrastructure of the EAEU countries' agro-industrial complex *Advances in Intelligent Systems and Computing* **726** pp 108-117
- [21] Zakshevsky V G and Charykova O G 2017 Improving the competitiveness of the agro-industrial complex of the region - the basis of export development *Agricultural Economics* **9** pp 2-9
- [22] Zakshevsky V G, Charykova O G and Kvasov A Yu 2017 Strategizing the socio-economic development of the agro-industrial complex of the region *AIC: Economics, Management* **12** pp 13-23
- [23] Bogoviz A V, Vorobyev S P and Vorobyova V V 2016 Statistical evaluation of the transformation of the industry structure of agriculture *Economics of Agriculture of Russia* **8** pp 54-60

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.