

STRUCTURAL SHIFT TRENDS IN RUSSIAN AGRI-FOOD EXPORTS

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Abstract: *This article examines trends in the development of Russia's agri-food exports amid intensifying global economic and technological challenges. The study focuses on long-term structural changes within key export product groups and assesses the role of technological factors in shaping diversification processes in the agri-food sector. Using an analysis of export diversification within competitive product categories of the Russian agri-food complex, the study identifies both general and group-specific trends in the depth and intensity of diversification.*

The results reveal a growing specialization of Russian exports in grain crops. Between 2001 and 2019, the share of wheat and meslin in total grain exports increased from 53.01% to 80.78%, indicating a consolidation of comparative advantages in this segment. An analysis of structural break coefficients shows that grain exports are characterized by relatively minor structural changes, reflecting stability in the export structure. At the same time, technological innovations have contributed to diversification in downstream industries. In particular, the introduction of innovative technologies enabled the expansion of exports in the flour-milling industry. Russia began exporting wheat gluten in 2006, and by 2019 its share within this product group had reached 16.04%. The most intensive restructuring of flour and cereal product exports occurred between 2010 and 2014.

The study also highlights the increasing integration of Russian meat and meat product producers into global food markets. Over the study period, the range of exported meat products expanded substantially, and structural change coefficients indicate that export diversification progressed most rapidly in this group. Overall, the adoption of innovative technologies in the agri-food complex has fostered the emergence of new industries and products, reshaping export structures, reducing risks, and enhancing the competitiveness of Russian agricultural producers in global food markets.

Keywords: *export, structural shifts, trends, food market, agri-food complex*

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Introduction

Changes in the conditions and factors governing the functioning of global and national markets under the influence of globalization processes stimulate the search for new sources of economic growth and the development of effective strategies to enhance competitiveness. The formation of a sustainable long-term economic growth model worldwide is increasingly determined by the expanding role of science, technology, and innovation.

Russia, like many other countries, faces global challenges associated with the emergence of new markets, technologies, and products with novel characteristics, the transformation of

traditional industries, and the accelerated flows of knowledge, technology, capital, and human resources. These technological challenges are further compounded by macroeconomic instability and heightened geopolitical uncertainty.

Under these conditions, a priority direction for enhancing the competitiveness of the Russian agri-food complex in both domestic and international markets is the transition to an innovation-driven stage of development. This transition is based on rapid advances in science and technology, the strengthening of scientific and technological potential, the reduction of innovation implementation cycles, improved access to new technologies for small and medium-sized enterprises, and a shift toward more advanced technological paradigms.

Diversification, as a key factor in improving the competitiveness of the Russian agri-food complex, is of considerable theoretical and practical importance. It contributes to saturating the domestic market with high-quality and affordable food products for all population groups, while also supporting the expansion of foreign economic relations. In recent years, increasing attention in the global academic literature has been devoted to examining the relationship between export concentration and diversification, the interaction between export dynamics and structure and national economic development, and the impact of production and export diversification on GDP growth [1].

The impact of factors such as per capita income, country size, remoteness and market accessibility on the concentration and diversification of exports and production is analyzed [2][3][4]. The development of convergent technologies, which are a synergistic combination of four main areas of science and technology: nano-, bio-, info- and cognitive technologies, has a significant impact on the functioning of the agri-food complex. New technologies are developing rapidly and determine the structure of the economy, its foreign economic relations, the predominance of certain industries [5].

Diversification as one of the country's economic competitive strategies is associated with penetration into new economic sectors and new markets, expanding the range of products, which allows reducing risks, increasing competitiveness and efficiency of resource use, and stabilizing cash flows [6]. For the Russian agri-food complex, the diversification strategy makes it possible to use a unique variety of competitiveness factors and their possible combinations, which makes it possible to effectively balance multiple risks in the global economy and ensure optimal integration into diverse and generally difficult to predict trends in global demand [7].

The aim of the study is to identify trends in structural shifts in Russian agri-food exports and the factors that form them, substantiate promising directions for diversifying agri-food exports based on the implementation of competitive advantages and strengthening competitive positions in traditional Russian segments of the world food market.

Methodology

The study of the agri-food exports structure makes it possible to determine the priorities of its development, structural aspects of efficiency and competitiveness, the possibility of transformation into a new qualitative state. Assessment of agricultural and food exports as a dynamic economic system requires a comparison of structural changes over time. For these purposes, structural change indices are used. The most common indices are: the H.S. Kazints, K. Gatev, A. Salai and V.M. Ryabtseva.

The linear and quadratic coefficients of absolute structural shifts of Kazinets show how many percentage points on average deviate from each other compared specific weights [8]. The

more the structure changes, the higher the values of the coefficients. The use of the quadratic coefficient is preferable, since it is more sensitive to strong fluctuations in the structure. The integral coefficient of structural changes by K. Gatev and the coefficient of structural differences by A. Salai take into account the intensity of changes in individual groups and the proportion of groups in the compared structures, as well as the number of groups. The Ryabtsev index is the most preferable from the point of view of economic interpretation and allows us to judge the sustainability of the economic system development [9]. It is applied to any set of statistical data, and also has a scale for assessing the significance of structural differences, which allows interpreting the obtained coefficients without using comparative analysis. Its meaning comes down to the ratio of the component's values divergence actual measure of the two structures with their maximum possible value.

The information base for assessing the dynamics and structure of agricultural products and foodstuffs exports in Russia was the Trade Map - International Trade Center (ITC) data on the harmonized system (HS). The available database is represented by data on the volume of exports in thousands of US dollars. The calculations were carried out in current prices; therefore, the results of calculations are affected by the influence of interregional price differentiation.

Results

The formation of measures system of state regulation and support for the agri-food complex sectors made it possible to increase the competitiveness of national producers in the food market and significantly increase the volume of agricultural products and food exports. The competitive position of Russia in the market of grains and oilseeds, vegetable oil and animal fats has significantly strengthened. The competitiveness of the milling industry products, animal feed, and certain types of animal products has increased [10]. The maximum increase in export volumes is observed in the group of meat and meat products. The export of meat and meat products from Russia from 2001 to 2019 increased 156 times in value terms. Export of grain crops is also characterized by high, but unstable dynamics. The increase in exports for the group of flour-grinding industry products for the analyzed period amounted to 7.9 times.

However, a further increase in export volumes does not give positive effects to the national agri-food complex. The risks of random price fluctuations in the specialization markets of Russian exporters and a sharp drop in demand are growing. The country's specialization in a narrow-limited range of goods, especially raw materials, significantly slows down the development of processing and high-tech industries due to the lack of incentives for such development. Diversification of the commodity structure of Russia's foreign trade is a strategic direction for the development of the country's agri-food complex [11]. Groups of goods characterized by high sales dynamics and competitiveness in foreign markets were selected for the study. The analysis was carried out on the basis of the following groups of goods: cereals, flour and cereals industry, meat and meat products.

From 2001 to 2019, there is a positive trend for all analyzed grain crops. There have been changes in the structure of grain exports (Fig. 1). In 2001, the main exported crops were barley, wheat and meslin. Their share was 97.9% of the total export of grain crops. Corn, rice, buckwheat, millet accounted for 2.1% of grain exports. In 2019, the range of grain crops exported from the country expanded. The share of corn exports increased significantly (from 1.1% to 7.8%). Russian producers began to export oats, rye, grain sorghum. However, during the study period, there has been an increase in Russia's specialization in the grain market. The share of wheat and meslin

increased from 53.01% in 2001 to 80.78% in 2019. The remaining types of grain crops in 2019 accounted for only 19.22% of the Russian producers' export.

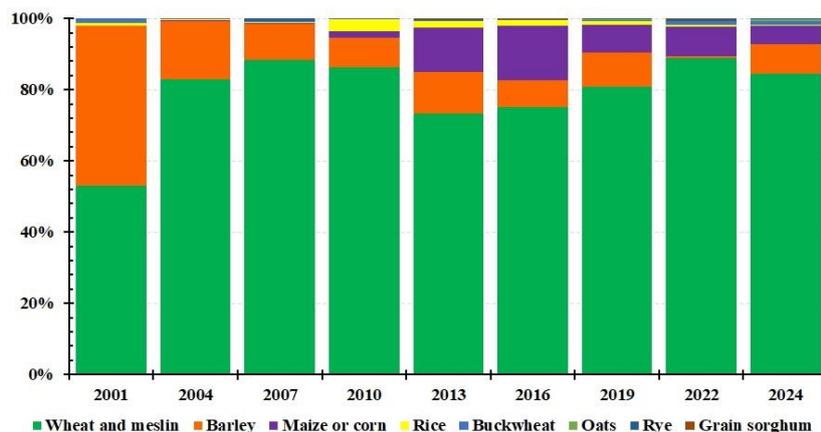


Figure 1. Change in the structure of Russian grain crops exports, %, thousand US dollars

Significant changes during the study period were revealed in the group of flour-and-cereal industry products (Fig. 2). Russian producers were actively exploring new sales markets. In 2001, the main exported product of this group was wheat or wheat-rye flour (75.13%). Other types of products accounted for less than 25.0%. By 2019, the share of wheat and wheat-rye flour decreased to 30.98%. The share of processed cereals and malt in the export structure of this group increased more than 4 times. Since 2006, Russia has been exporting wheat gluten. In 2019, its exports amounted to USD 52.6 million, or 16.04% in the structure of exports of the flour and cereals industry products.

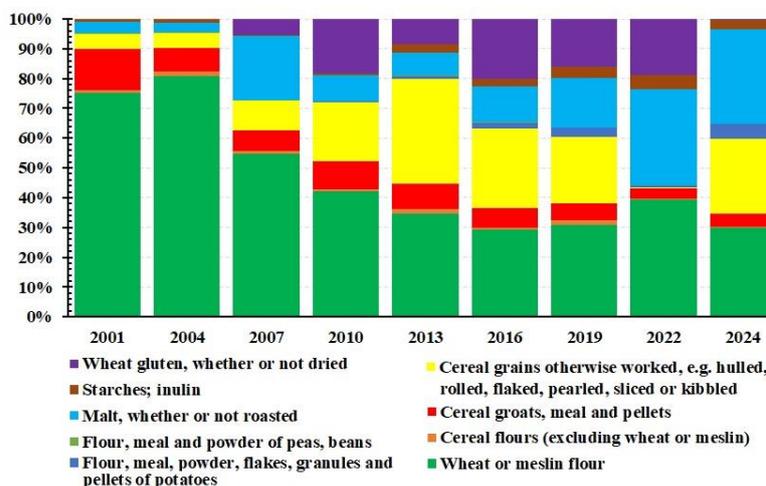


Figure 2. Change in the structure of Russian flour and cereals products exports, in%, thousand US dollars

The production of meat and meat products is one of the most actively developing sectors of the country's agri-food complex, which is explained by the spread of advanced technologies mainly at large enterprises that have the financial capabilities to purchase them. Large agricultural holdings are engaged in the construction of export-oriented farms by introducing large-scale "conveyor" animal husbandry. The implementation of the import substitution strategy and the increase in government support have made it possible to significantly increase the

domestic production of meat and meat products, and increase the country's self-sufficiency. Russian meat and meat products producers are becoming active participants in the global food market [12]. Structural changes took place in the range of exported meat products (Fig. 3). In 2001, Russia exported mainly poultry meat (60.1%) and edible offal and other meat (34.97%). Other types of meat and meat products accounted for less than 5.0%. During the study period, the highest growth rates were observed in the export of poultry and pork meat. Since 2012, the export of lamb and goat meat has been growing. At present, it accounts for 8.93% of the total export of meat products. The share of cattle export increased 2.5 times.

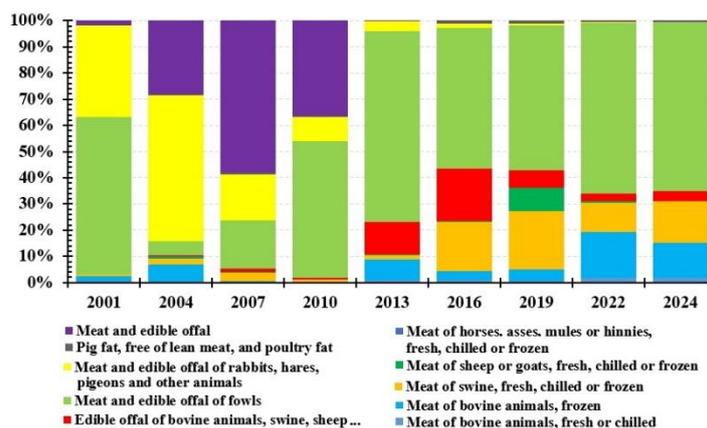


Figure 3. Change in the structure of Russian meat and meat products exports, %, thousand US dollars

The assessment of the structural changes in exports that occurred in the main commodity groups of Russia's agri-food exports was carried out on the basis of a set of universal indicators.

In the group of grain crops during the study period, there is an increase in export specialization. The main manufacturers focused on a significant market with low growth rates from the traditional category, the development of which does not require a large-scale introduction of new technologies and a radical change in consumer preferences.

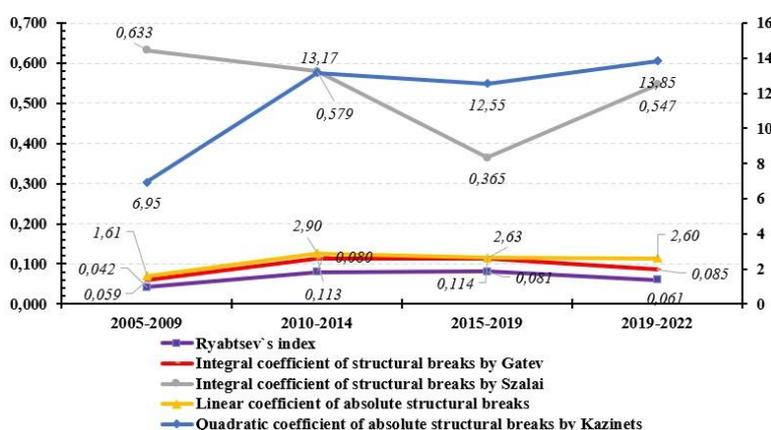


Figure 4. Dynamics of changes in the coefficients of structural shifts in the grain crops export

More complex dynamics were observed in the export structure of flour-milling industry products during the study period (Figure 5). In 2001, Russia exhibited a narrow specialization in the flour and cereal market. Until 2010, wheat and rye-wheat flour constituted the dominant

export products within this group. Between 2010 and 2014, a new export structure began to emerge. The calculated coefficients indicate substantial structural shifts, while the Ryabtsev index reflects a high degree of structural differentiation. Since 2015, a gradual attenuation of structural changes and stabilization of the export structure of Russian flour and cereal products have been observed. Diversification of flour-milling industry exports represents a priority direction for the development of the agri-food complex, as it promotes the expansion of exports of high value-added products.

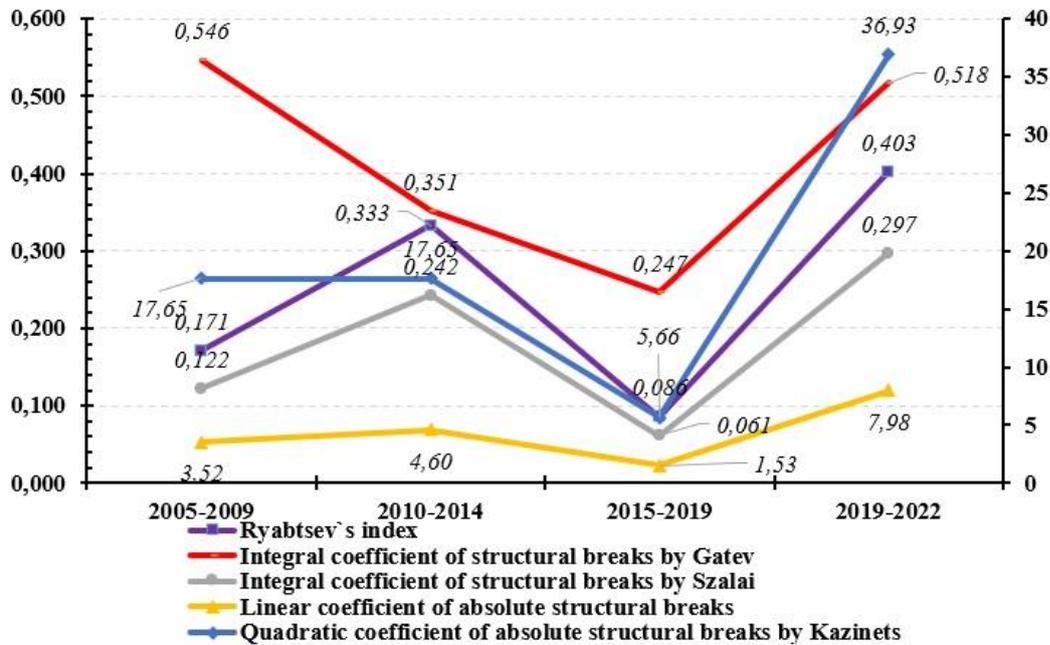


Figure 5. Dynamics of changes in the coefficients of structural changes in the flour and cereals industry products export

The processes of exports commodity structure diversification are the highest in the group of meat and meat products (Fig. 6). However, this group also revealed the features of structural changes. In 2010-2014 in the group of meat and meat products, significant structural changes are observed. In recent years, the structure of meat and meat products exports has stabilized.

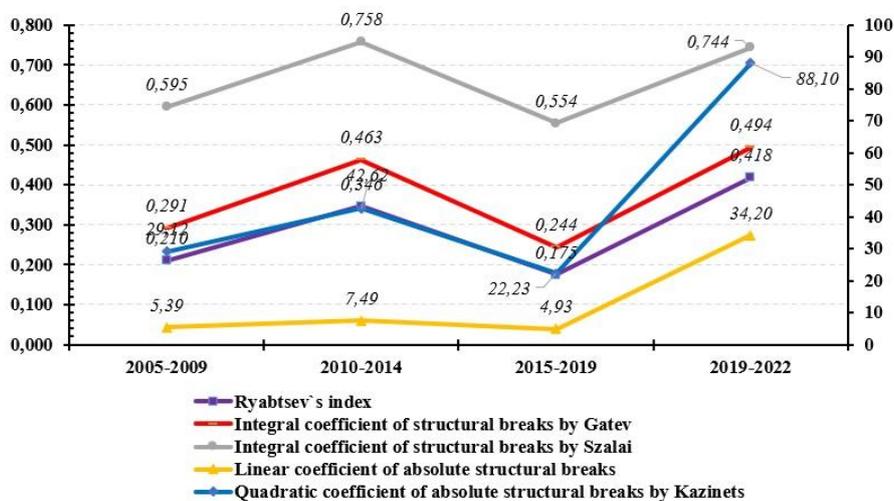


Figure 6. Dynamics of Changes in Structural Shift Coefficients of Meat Products and Edible Meat Offal Exports

The structure of food industry production is characterized by the predominance of products with low level of newness. The share of new products for enterprises, but already known on the markets and improved based on previously produced products is 90%. The priority areas for increasing the competitiveness of the Russian agri-food complex in the global food market should be, on the one hand, the outstripping development of fundamentally new high-tech sectors and markets, and on the other hand, deep technological modernization of traditional industries and manufacturing. The combination of these two areas can ensure the technological modernization of the country's agri-food complex in the medium term, will create new competitive advantages of national producers, strengthen their competitive position in the world food markets.

Discussion

Russia's principal competitive advantage in the global agricultural and food market lies in the availability of abundant renewable raw material resources. The adoption of innovative technologies at the post-agricultural stages of food value chains, together with the expansion of deep processing of agricultural raw materials, leads to the fragmentation of production chains, enabling the parallelization of production processes and their broader geographical dispersion. Deep processing of agricultural products involves the separation of raw materials into individual components and their efficient utilization in high-value-added products. This approach makes it possible to produce a wide range of outputs used across multiple industries.

For instance, derivatives and bioproducts obtained from grain are applied not only in the food industry but also in petrochemical and related sectors. The development of a grain-based product chain oriented toward innovative technologies would allow a more comprehensive exploitation of regional competitive advantages, including favorable natural and climatic conditions, as well as scientific and industrial capacity, human capital, and developed infrastructure.

Technological challenges also create new opportunities for the development of environmentally friendly food products and next-generation foods with predefined quality characteristics, including specialized, functional, and fortified products. These advances increasingly rely on modern genomic and post-genomic technologies. In addition, the development of organic agriculture, due to the high margins associated with organic products, can support the sustainable development of rural areas and enable the implementation of a more differentiated agricultural policy.

Conclusion

The diversification of Russia's foreign trade in agricultural products and food represents a complex and multifaceted challenge. Taking into account the internal capabilities of the Russian agri-food complex and the intensification of contradictions arising from globalization, a strategy for diversifying agri-food exports can be pursued simultaneously along two main directions: the development of an innovation-driven model and related diversification within individual product groups.

Diversification processes across product groups are uneven and shaped by a variety of factors. Under favorable conditions in global food markets, grain producers have intensified their specialization in wheat production. However, against the backdrop of domestic market stagnation

and increased price volatility in international markets, such specialization may slow economic growth, reduce financial returns, and heighten production dependence on external conditions. During the same period, enterprises in the flour and cereal industry expanded their export product range by entering new markets for wheat gluten, malt, starch, inulin, and related products.

State support for domestic meat and meat product production has strengthened the foreign economic activity of national producers. This support has not only increased the volume of Russian exports of meat and meat products but has also stimulated diversification processes within the meat segment of the agri-food complex.

Diversification of exports within product groups enables producers to incorporate new goods into export flows without altering their core specialization, thereby preserving competitive positions based on existing comparative advantages. More broadly, the promotion of diversification creates a foundation for stable economic dynamics and medium-term fiscal sustainability, supports the modernization of the production structure of Russia's agri-food complex, and establishes conditions for more dynamic growth in exports of innovative and high value-added products.

Conflict of Interest

The authors declare no conflicts of interest.

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