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MODELING OF STRUCTURAL CHANGES IN THE FOOD INDUSTRY OF KASHKADARYA REGION

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Abstract. This thesis studies the issues of economic and statistical assessment of changes in the structure of production in the food industry. The formation of the structure of food production and its trends over the years are analyzed. The proportionality coefficient and the improved Lilien index are used to quantitatively assess structural changes. Based on data for 2010–2025, changes in the structure of production of basic food products, the share of product types and the degree of proportionality to the reference structure are assessed. The results of the study allow for the formation of an effective structural policy in the food industry and the identification of priority areas for improving the structure of production.

Keywords: food industry, structural changes, structure of production, proportionality coefficient, Lilien index, reference structure, structural shifts, economic and statistical assessment, processing industry, production efficiency.

INTRODUCTION

The food industry is one of the strategically important sectors of the country's economy, playing an important role in providing the population with high-quality and safe food products, processing local raw materials, and increasing production efficiency. The growing need for food products and the constant change in the consumption structure increase the need to form the structure of production in this sector in accordance with market requirements.

In the sustainable development of the food industry, along with the growth of production volumes, ensuring an optimal balance in its structure is also of great importance. Changes in the share of product types in the structure of production over time represent structural shifts in the sector. Quantitative assessment of such changes makes it possible to identify trends in the food industry, assess structural imbalances, and determine effective structural policy directions. From this point of view, the assessment of changes in the structure of food production based on statistical methods is of particular scientific and practical importance [1].

The main goal of the study is to identify trends in the formation and change of the structure of product production in the food industry, to quantitatively assess structural shifts, and to formulate scientific conclusions on improving the structure of production.

Research methodology

The methodological basis of this study is an economic and statistical approach aimed at quantitatively assessing changes in the structure of food industry production, identifying their development trends, and studying the level of structural proportionality between product types. The study assessed the development of the food industry not only from the point of view of changes in production volumes, but also from the point of view of the formation and change over time of the share of individual product types in the total production structure [2].

The information base of the study is statistical data on the production of basic food products for 2010–2023. The analysis covered such main product groups as meat and meat products, milk and dairy products, vegetable and beef fat, sugar, margarine products, natural tea, bread and bakery

products, confectionery, pasta, flour, cereals, and table salt. The characteristics of changes in the structure of production over the years were studied based on the share of each product type in the total production of food products.

The research process used a comprehensive approach to statistical analysis, dynamic analysis, comparative analysis, grouping, generalization, and quantitative assessment of structural changes. Based on statistical analysis, the shares of food products in total production were determined, while dynamic analysis was used to assess the trends in these indicators over time. Through comparative analysis, the production structure formed in different years was compared, and the main differences and structural shifts in the share of product types were identified [3].

In the study, a reference structure was formed for the purpose of comparative assessment of the structure of food products. Reference values were determined based on the average values of the annual shares of individual food products in total production for 2010–2023. This approach made it possible to assess the current production structure formed in different years based on a single comparison criterion and determine the degree of its proximity to the reference state.

To assess the degree of proximity of the production structure to the reference structure, the proportionality coefficient proposed by P. Vatnik was used. This coefficient represents a quantitative measure of the proximity between the structure of food production in the period under assessment and the reference structure. A high coefficient value indicates the proximity of the current production structure to the reference structure, while a decrease in the value indicates an increase in the structural differences between them. On this basis, it was possible to compare the degree of proportionality of the production structure formed in different years [4].

The improved Lilien index was used to assess the intensity of structural shifts in the structure of food production over the years. This index allows us to determine how much the shares of individual food products in the total production structure have changed between two periods. A relatively low index value indicates a slowdown in changes in the structure of production, and an increase in it indicates an increase in the intensity of structural shifts.

The research methodology used the proportionality coefficient and the improved Lilien index as complementary assessment tools. If the proportionality coefficient serves to determine how close the structure of food production formed in a certain period is to the reference structure, the Lilien index allows you to assess the intensity of changes in the structure of production in successive periods. As a result, it was possible to comprehensively assess the structure of food production from the point of view of both proportionality and the dynamics of structural shifts at the same time [5]. At the final stage of the study, the results obtained were systematized and economically generalized, and it was determined in which periods structural stability or relatively high structural shifts were observed in the food industry. Also, based on the share of product types in production and the degree of proximity to the reference structure, the necessary directions for improving the structure of food production were determined. This methodological approach serves as a methodological basis for regular monitoring of structural changes in the food industry, identifying existing imbalances, and formulating effective structural policy.

Analysis and main results

The results of the analysis of changes in the structure of food industry production show that there were significant structural differences in the share of product types during 2010–2023. In particular, the share of basic food production in the structure of the processing industry had a fluctuating trend in different years, with the highest indicator being 29.29 percent in 2016 and the lowest indicator being 16.1 percent in 2019. This indicates that the structure of food production was not formed at the same pace in each period.

Analysis by product types also showed significant differences in the structure of production. In the reference structure formed based on the average shares for 2010–2023, flour production has the

largest share with 41.68 percent. Next in line were bread and bakery products (25.24 percent), milk and dairy products (8.83 percent), and sugar (7.45 percent). The smallest shares were accounted for by the production of natural tea, margarine, and cereals [6].

Table 1.

Reference values of the production composition of basic food products

№	Food products	Benchmark value, %
1	Meat and meat products	5,14
2	Milk and dairy products	8,83
3	Vegetable and beef fat	5,02
4	Sugar	7,45
5	Margarine products	0,62
6	Natural tea	0,43
7	Bread and bakery products	25,24
8	Confectionery products	1,52
9	Pasta products	1,94
10	Flour	41,68
11	Cereals	0,75
12	Dish salt	1,38
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Source: Author's calculations based on data from the Statistical Agency under the President of the Republic of Uzbekistan.

The table data show that flour and bread and bakery products occupy a leading position in the structure of food production. The total reference share of these two product groups is 66.92 percent. On the contrary, the share of natural tea, margarine products and cereal production in the total structure is relatively low. Such a structure indicates a high concentration of production in certain product groups [7].

According to calculations based on the proportionality coefficient, the structure of food production formed in 2012 was closer to the reference structure than in other years. This means that the structural proportion between product types was relatively high during this period.

As a result of assessing structural shifts using the improved Lilien index, it was determined that the lowest value of the index was 0.89 in 2011–2012, and the highest value was 9.48 in 2017–2018. Thus, while changes in the structure of food production in 2011–2012 were relatively low, structural shifts significantly increased in 2017–2018. The research materials also note that structural changes in 2015–2018 occurred at a high rate [8].

In general, the results obtained show that the structure of food industry production did not remain stable in 2010–2023, and certain structural shifts occurred in the share of product types. This justifies the need to regularly assess the structural balance in the food industry, stimulate the production of products with high added value, and improve the structure of production in accordance with market demand and available resource capabilities

Conclusion and suggestions

The conducted analyses showed that significant structural changes occurred in the structure of food industry production in 2010–2023. In the structure of products, flour production accounted for the highest share with an average of 41.68 percent, and natural tea production accounted for the lowest share with 0.43 percent. In terms of the proportionality coefficient, the production structure formed in 2012 was closer to the reference structure than in other years. The improved Lilien index showed that the lowest level of structural changes was 0.89 in 2011–2012, and the highest level was 9.48 in 2017–2018.

Based on the results obtained, in the development of the food industry, in addition to increasing production volumes, it is important to ensure its structural proportionality. To do this, it is advisable to regularly monitor changes in the structure of production by product type based on the proportionality coefficient and the Lilien index, identify periods of sharp structural shifts and assess their economic causes. It is also necessary to deeply process local raw materials, expand the production of high-value-added food products, and diversify the product composition in accordance with market demand [9]. The proposed approach creates an economic basis for timely identification of existing structural imbalances in the food industry, optimization of the production structure, and the formation of an effective structural policy in the sector. As a result, the possibility of more efficient use of existing production and raw material resources, improvement of the product composition, and ensuring sustainable development of the food industry will expand.

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