

On the Issues of Using Factor Analysis of the Financial Results of the Organization in the Agricultural Sector of the Economy

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Abstract—The article focuses on the importance of applying factor analysis of financial results in the activities of organizations worked in the agricultural sector. The agricultural sector of the economy is a complex multisectoral productive-economic system. The level of its development largely determines the level of food security of the country, its political and economic stability. In this regard, there is an objective necessity to provide the stability of the development of agricultural enterprises. The value of the financial result of the organization is an indicator that is influenced by many factors, including specific, distinctive to a particular industry. In this connection, the implementation of factor analysis of profit in the context of the main types of production is an important element in the development of the marketing strategy of the company. The economic and financial development, financial incentives for employees depend on the size of the organization's profit, and profitability indicators allow the manager to assess the effectiveness of the organization and make a policy decision. A factor analysis, based on the example of one of the operating enterprise of the Krasnodar Territory, was carried out, as a result of which the influence of the quantity, cost, price and assortment of goods sold on the profit from the sale of wheat was revealed. As a result of the research, a number of issues were identified. The key issues are: a growth of material production costs for wheat, and also an insufficient price policy. The reserves of the organization's profit growth were determined and the possible economic effect of additional activities, which lie in the implementation of the strain renovation and the actualization of additional volume of wheat at higher prices, was calculated.

Keywords— price; sales figure; proceeds; cost; sales profit; factor analysis

I. INTRODUCTION

Information on the financial results of the activities of economic entities has always been a value both in the process of managing their activities and in the process of evaluating

the effectiveness of functioning, planning the prospects for their development, expanding the scope of work and many other goals. Contributions from profit to the budget serve as a source for the implementation of local and national programs [1]. At the same time, the food security of the country depends on the profitability of the activities of agricultural organizations. That is why the issue of choosing a tool for analyzing factors influencing profit, as well as justifying the reserves for its growth, should be given due attention. According to the statistics, currently, not all organizations in the agricultural industry implement a break-even activity. In this regard, it is necessary to analyze the factors that influence the formation of the financial result.

There are many approaches to implement the factor analysis. Depending on the specifics of the economic entity, as well as the forms of financial statements, it is possible to determine in varying degrees of accuracy the sources of financial issues and the degree of their impact on the profit of the organization. In the article the price and non-price aspects of the profit formation of an agricultural organization are considered, including the analysis of statistical indicators depending on the scale of the market.

II. METHODS AND RESULTS

The categorical apparatus of mathematical factor analysis is presented in the works of H. Kaiser, C. Pearson, R. Tucker, R. Thurstone G. Harman, G. Hotelling [2] [3] [4] [5] [6] [7]. Aspects of the factor analysis of the financial results of economic entities are investigated in the works of V. Gorfinkel, N. Zimin, A. Kanke. G. Savitskaya, I. Sergeeva [8] [9] [10] [11] [12].

In the article the methods of systemic, monographic, statistical, economic and mathematical research are used. Each of the methods is used according to its functionality.

III. DISCUSSION

Currently, agriculture is one of the few areas of the Russian economy that can demonstrate growth and production development. At the same time, high dependence on imports remains important, especially for such types of resources as plant protection, seeds, supplement feeds and others. An embargo from Russia allows only partially protecting local agricultural producers: half of the value added in the agricultural sector is due to foreign participation, and the share of products in total imports since the introduction of foreign economic measures has decreased by 1.6 percentage points (2018 in comparison with 2012), which is associated with a reorientation to new foreign counterparties [13].

Referring to the problem of import substitution of agricultural products on a global scale, protectionist wars of the main market players, which lead to increased volatility of world prices for basic agricultural raw materials, including wheat, cannot be ignored. So, the confrontation between the USA and China is indicative: the restrictive actions of countries in the form of increasing import rates for one type of a product (soybeans) affect related sectors of their domestic markets (pig farming, poultry farming), as a result of which priority macroeconomic development zones are changing and farmers are forced to bear additional costs, deal with an overabundance of products and adapt to the new conjuncture [14]. In this vein, the very essence of the sanctioned confrontation is doubtful, since it seems not only to change the rules during the game, but also to create unnecessary difficulties for oneself; and the policy of protectionism itself is often not always effective. Therefore, the leading economies of the world should observe a reasonable balance of foreign trade relations and to a greater extent resort to mutual cooperation than attack, because all this is faced by a larger problem - food security, food availability for the population.

The stability of the agricultural sector is largely related to the effectiveness of its economic mechanism [15]. Despite the positive dynamics of the financial and economic indicators of the industry over the past several years, it must be said that the increasing differentiation of income among agricultural producers, which is also related to the development of large agricultural associations, or agricultural holdings, the spread of which particularly currently affected the South Russia [16].

Turning to the experience of Europe and the USA in this matter, a significant structural difference from domestic practice can be found. So, abroad cooperative associations of farmers predominate to a greater extent, sharing among themselves a part of property and risks; at the same time, each farmer can be attached to many larger organizations that are involved in further processing of products, their packaging and sales. Thereby the viability of small market players is maintained, and the level of competition is growing. In Russia, the principle of operation of agricultural holdings boils down to building a complete production chain within one company, and entrepreneurs adhere to the principle of "all by yourself", which, on the one hand, reduces the company's internal costs, and on the other creates difficult conditions for new entities to enter the market and stay on existing ones - as a result, the quality and price of the products fall entirely on the

conscience of the manufacturer. As a result, the collective management experience for Russia is a passed stage, collective farms had their own advantages, a return to which is possible, but long-term and is connected with the regulation of the legal mechanism. At the same time, the problem of the present day is the nominal enlargement of farms; investors who are not related to a given industry or region come to the agricultural market, and buying up the property of many small and medium-sized entities, thereby monopolizing local trade zones [17].

The economic mechanism is implemented mainly through government programs for the development of agriculture and the regulation of the market for raw materials and food. The last such program was adopted for the period from 2013 to 2020, but was almost changed and refined annually, its directions, forms, and mechanisms, as well as the volumes of state support [18]. According to the tasks that the industry faces, it is necessary to achieve proportionality between the goals set before the agro-industrial complex and the financial resources allocated for their solution.

Comparing the growth rates of producer prices in agriculture and industry over the past few years, it can be observed that the last is occupied the prevailing position. In this connection, there is a need to limit the growth of prices for material and technical resources [19].

In Russia, agricultural production has certain tax exemptions [20]. However, according to a comparison of the tax burden on agricultural organizations with the EAEU countries, it turns out that it is higher than average [21].

Climate factors influence on the activities of agricultural organizations a lot. In the long turn, they can lead to a change in the system of agricultural production, its distribution in the country's zones, the need for new approaches to crop breeding, and the technological justification in the industry [22].

Especially, particular importance in the process of evaluating the effectiveness of production, the level of its reliability has the financial results. They reflect all items of income and expenses of the organization, as well as summarize the results of activities [23].

IV. RESULTS

A detailed analysis of the financial results was carried out on the example of the agricultural organization of the Krasnodar Territory, the main activity of which is the cultivation of winter wheat.

As the sources of analysis data, the annual financial statements of the organization for 2016-2018 were used, including: a report on financial results; report on production, expenses, costs, expenses and sales of crop production [24] [25].

Referring to the calculation part, the performance indicators of the wheat sales of the organization under study over the years, Table I, should be considered. Thus, an increase in the volume of sales by 34.2% can be argued that 2018, although it turned out to be unfavorable in climatic

terms, but at the same time distinguished by a larger sowing area, and the impact of adverse rainfall was minimal [26] [27].

TABLE I. THE PERFORMANCE INDICATORS OF THE WINTER WHEAT SALES OF THE ORGANISATION

Indicator	2016	2018	Variance	
			±	%
Quantity of products sold, hwt	534 444	717 012	182 568	134.2
Sell price rubles/hwt	873.90	1 084.24	210.34	124.1
Full cost price, thousand rubles	259 515	356 185	96 670	137.3
Proceeds, thousand rubles	467 027	777 410	310 383	166.5
Income, thousand rubles	207 512	421 225	213 713	By 2.03
Level of profitability, %	44.43	54.18	9.75	X

Source: compiled by the authors

A 24.1% price increase identified the general market trends [28]. External reasons for the growth of the indicator were long periods of drought, a forecast of reduced gross grain harvest, devaluation of the national currency and rising prices in the global market. Internal factors also had equally impact - production technology affects.

Comparing the dynamics of prices for winter wheat of the 3-4th grade of the studied organization with the average annual prices for Russia, the Southern Federal District and the Krasnodar Territory, it can be stated that it has a predominant nature in the framework of 2016-2018. [29]. In absolute terms, in 2017 and 2018 the price was also the highest, Table II.

TABLE II. COMPARATIVE ASSESSMENT OF THE WINTER WHEAT PRICES DYNAMICS

Markets	Price, RUB				Growth rate%
	2016	2017	2018	2019	
Russian Federation	883.7	730.4	853.7	1 044.2	118.16
Southern Federal District	928.6	827.7	965.0	1 083.1	116.63
Krasnodar Territory	957.5	872.5	1 011.0	1 116.7	116.62
Organization	873.9	881.1	1 084.2	-	-

Source: compiled by the authors

Having data on average prices for different markets for 9 months of 2019, it can be said about the falling character of the indicator as a whole, which should eventually affect the reaction of the organization, Figure 1 [30].

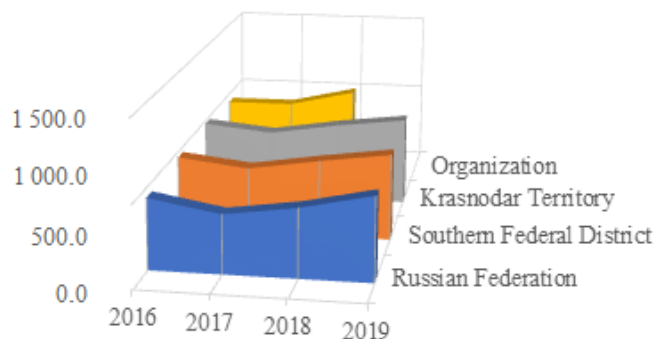


Fig. 1. Comparative assessment of the winter wheat prices dynamics (Source: compiled by the authors)

The increase in the prices of the research object had a positive effect on the proceeds. As a result of high growth in sales and prices, the company's proceeds increased by 66.5%.

Largely because of the reasons associated with the growth of material costs, the cost of production and sale of wheat increased by 37.3%. In considering the cost structure more specifically, private articles, which have influenced this growth, can be distinguished. Detailization of the aggregate costs is presented in Table III.

TABLE III. COST STRUCTURE OF THE ORGANIZATION FOR PRODUCTION AND SALES OF THE WINTER WHEAT

Input item	2016		2018		Variance	
	Thous. RUB	%	Thous. RUB	%	±	%
Aggregate costs, Thousand rubles	259 515	100.0	356 185	100.0	96 670	137.2
including:						
I Costs for sales, Thousand rubles	41 092	15.8	12 903	3.6	-28 189	31.4
II Production costs, thousand rubles	218 423	84.2	343 282	96.4	124 859	157.2
among them:						
1) Remuneration	18 562	7.2	20 635	5.8	2 073	111.2
2) Material costs	181 146	69.8	208 269	58.5	27 123	114.9
2.1) for seeds	12 428	4.8	23 101	6.5	10 673	185.9
including:						
2.1.1) elite	9 374	3.6	0	0.0	-9 374	-
2.2) mineral fertilizers	71 079	27.4	77 545	21.8	6 466	109.1
2.3) plant protection products	32 545	12.5	41 555	11.7	9 010	127.7
2.4) oil -products of all types	16 932	6.5	20 396	5.7	3 464	120.5
2.5) supplies of the main financial resources	48 162	18.6	45 672	12.8	-2 490	94.8
3) Costs for insurance	18 715	7.2	0	0.0	-18 715	-
4) Other costs	0	0.0	114 378	32.1	114 378	-

Source: compiled by the authors

Despite the small proportion of the structure, the maximum absolute and relative increase are clearly traced by the input item of seed, 86.9% growth. Moreover, elite varieties of wheat in the reporting year ceased to be purchased by the organization, the emphasis was placed on 3-4 grades.

Nevertheless, the sales efficiency of the main product has increased. Outstripping the rate of proceeds growth over cost by 29 percentage points led to an increase in the nominal positive financial result of the organization by more than twice over the period, and the real one - by 9.75 percentage points.

Based on the above, it should be noted that the organization's activities are profitable, but at the same time not fully effective, especially in the sense that the grain growing sub-sector in the Krasnodar Territory remains one of the leading and plays an important role in ensuring the country's food security, and also has high potential for development [31]. In this regard, a tool to analyze the impact of key factors on the profit of the organization should be used. Among the many approaches, based on the indicator and the specifics of the organization, the most suitable method is by G. Savitskaya [11].

So, in the framework of the task, the profit from the sale of wheat, among other financial results, is the most sensitive indicator to the influence of factors of production and sales, among which the volume of production, cost, price, as well as the structure of the organization's marketable products are included.

To calculate the impact of these variables, a table with initial data (the number of products sold, cost and price of 1 hwt of products), where 2016 was taken as the base (indicators q_0, z_0, p_0), and for the reporting year - 2018 (indicators q_1, z_1, p_1) was compiled, Table IV.

TABLE IV. RAW DATA FOR THE FACTOR ANALYSIS OF THE ORGANIZATION'S PROFIT FROM THE SALE OF WINTER WHEAT

Product	Quantity of sold, hwt		Cost price 1 hwt, RUB		Price for 1 hwt, RUB	
	2016	2018	2016	2018	2016	2018
	q_0	q_1	z_0	z_1	p_0	p_1
Wheat	534 444	717 012	485.58	496.76	873.86	1084.24

Source: compiled by the authors

By sequentially calculating the indicators, the magnitude of the influence of each factor in monetary terms was determined. The result of factor analysis is shown in Table 5.

TABLE V. RESULTS OF THE FACTOR ANALYSIS OF THE ORGANIZATION'S PROFIT FROM THE SALE OF WINTER WHEAT

ΔP	Change in income, thousand RUB (\pm)			
	Growth due to changes in factors			
	q	z	p	structure
213 713	13 393.10	-8 016.62	150 844.89	57 491.63

Source: compiled by the authors

So, in general, the profit from the sale of wheat for three years has changed by 213 713 thousand rubles. Of this amount, the greatest positive effect was exerted by an increase in the price of wheat 1centner, as a result of which the financial result increased by 150 844.89 thousand rubles. To a lesser extent, the number of products sold in physical terms (13 393 thousand rubles) and an increase in the level of profitability relative to other types of products (57 491.63 thousand rubles) influenced profit growth.

Only the increase in the cost of 1 hwt of wheat had a negative effect, the financial result decreased by 8016.62 thousand rubles. That is, the most significant reserves for the organization's profit growth were optimization of production costs and pricing policy adjustment.

An increase in the volume of sales of wheat at a price that is too high relative to the market, or at a price that disproportionately covers the cost price of a production unit, will not lead to a significant positive effect or a positive result will not be achieved at all. Therefore, in the first place, it is advisable to use internal reserves. Changes in production technology can be .among them.

Based on the results of factor analysis of profit and structural study of cost price, the feasibility of using elite

seeds in wheat production can be determined. A business case is given in Table 6.

So, under the project, the purchase and sowing of seeds of winter wheat of the 1-2 grade to a predominant degree towards the varieties of 3-4 grade in 2018 would allow the organization to increase the gross output from 1 hectare by 14.9% [32]. And with a fixed value of the price and an increase in total costs by 9.9% (or 35 163 thousand rubles), it can reduce the cost of sales of 1centner of the final product by 4.4%, thereby cutting the profit from wheat sales by 19.2% (or 81 024 thousand rubles). In this case, a real increase in economic benefits could amount to 2.02 percentage points.

TABLE VI. COMPARISON OF WINTER WHEAT PRODUCTION TECHNOLOGIES IN THE ORGANISATION

Indicator	Existing production technology, 2018	Suggested production technology, 2018 (project)	Variance	
			\pm	%
Crop acre, hectare	9 618	9 618	-	-
Crop yields hwt/hectare	74.64	85.80	11.16	114.9
Gross output, hwt	717 928	825 224	107 296	114.9
Products sold, hwt	717 012	824 172	107 160	114.9
Aggregate costs, thousand rubles	356 185	391 348	35 163	109.9
including:				
- costs for sales, thousand rubles	12 903	14 831	1 928	114.9
- production costs, thousand rubles	343 282	376 516	33 234	109.7
among them:				
- costs for seeds, thousand rubles	23 101	42 729	19 628	185.0
Cost price of sales 1 hwt, thousand rubles	496.76	474.84	-21.92	95.6
Cost price of production 1 hwt, rubles	478.16	456.26	-21.90	95.4
Cost for sales, rubles	1 084.24	1 084.24	0.00	-
Proceeds, thousand rubles	777 410	893 596	116 186	114.9
Income, thousand rubles	421 225	502 249	81 024	119.2
Profitability level of production, %	54.18	56.21	2.02	X

Source: compiled by the authors

Also, the results of factor analysis and research on the dynamics of prices for winter wheat for 2016-2019 allowed to substantiate another proposal. Thus, the organization could use an increased 14.9% (107296 hwt) gross output of winter wheat as a reserve for sale in the next period at higher prices, especially considering that the annual loading of the elevator belonging to the object of study is not higher than 75% and the fact that, under conditions, this type of product can be stored for 10 years [33]. So, selling wheat of 1-2 grades at the average annual price of the Krasnodar Territory in 1 square meter 2019 (1116.7 rubles/hwt), the organization could additionally receive economic benefits in the amount of 119 817 thousand rubles.

V. CONCLUSIONS

The implementation of these recommendations will allow the agricultural organization in the study to increase the type of financial condition to the maximum possible.

Thus, it is necessary to emphasize the importance of factor analysis of the financial results of agricultural organizations. Revealed reserves of profit growth will allow business entities to increase the efficiency of their activities.

The country's food security largely depends not only on ongoing state programs in the agricultural sector, but also on the individual effectiveness of each agricultural producer. On the example of the agricultural organization of the Krasnodar Territory, the effectiveness of factor analysis has been proved and new ways of profit growth have been justified.

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