

THE INFLUENCE OF MARKET RISKS UPON THE AGRIBUSINESS VALUE

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The activities of agriculture enterprises are those referred to the riskiest types of entrepreneurship, because there exists certain dependence on the risks of production activities and market risks, especially marketing and price risks, each of the above mentioned has its own specific manifestation and impact on the company value in this sector. The aim of the study is to study the origins of the market risks emergence and their impact on the cost of agribusinesses in the new business environment. Farmers do not normally pay attention to market risks and do not analyze the types of products that increase their company value. This problem can be solved by using the ABC-analysis of the agricultural product mix, the "sales as contribution to reimbursement" analysis, the introduction of a restricting system on the use of valuable natural resources and diversification. The use of economic and mathematical methods allows us to find a rational production structure of an agricultural enterprise, to calculate the optimal structure of its crop area or an area of a separate group of agricultural crops.

Key words: Agribusiness, Assessment, Diversification, Entrepreneurship, Market, Risks, Value.

JEL classification: M21, Q12, Q13.

1. Introduction

Agriculture is one of the crucial components of the economy of any country. It produces food for the population, raw materials for the processing industry, satisfies other needs of the society. The efficiency of this type of economic activity is always a challenging matter, especially in the face of a harsh sales market competition for agricultural products. Market risks that arise during this type of economic activity can significantly affect the efficiency of agribusiness activities (Gontareva, 2011). Therefore, the valuation of market risks becomes the basis for strategic and operational management of successful agribusiness enterprises.

Quite many scholars paid their attention to risk origins at different times. So, for the first time, the idea of risk as a quantitative measure of uncertainty was expressed in the work "Risk, Uncertainty and Income" of the American economist Knight (1921). In turn, representatives of the classical theory of risk Mill (1848) and Senior (1854) considered the risk as a mathematical expectation of losses that may arise as a result of a certain decision. Marshall (1879) was one of the pioneer scientists to consider the problem of the economic risk's emergence, his works were the beginning of the neoclassical theory of risk. Keynes (1936) introduced the concept of "risk aversion" to science, characterizing investment and business risks, one of those economists who introduced the classification of risks. The American scholars Neumann and Morgenstern (1944) introduced further development of the theory of risk, as well as Hungarian economists Bakchai and Mesen (1979).

Significant contributions to the development of theory and practice of risk was presented by American economists - Nobel Prize winners Arrow (1965), Markowitz (1959), Sharp (1964) and others. Another direction was related to the development of market risk issues. They are based on the economics and mathematical studies of Bollerslow, Barone-Adese, Engli and Giannopoulos. The research results of the above-mentioned scientists have been widely used in the popular concepts of market risk management (RiskMetrics, CreditMetrics, CorporateMetrics) developed by Zangari, Gupton and Finger. The analysis of works published on the subject matter of the study shows that most scientific sources are devoted to the analysis of individual risk problems (Boiko, 2017; Shoaib, 2019). That is why there is still several unresolved issues related to the development of the concept and methods for managing market risks and assessing their impact on the cost of agribusinesses.

The unpredictability of climatic conditions and changes in harvest volumes, price fluctuations on the domestic and foreign markets are the key factors affecting the capitalization of incomes of agribusinesses and the change in their value (Lakis, 2013). Market risks are manifested as the probability of losses or additional opportunities as a result of changes in the economic situation in the market or in the segment where the company operates (Roussy, 2018). These risks can be divided into three groups: risks of changes in market prices, risks of changes in market demand and supply, risks of changes in the life cycle of the markets themselves (Ratas, 2017).

It is impossible to avoid uncertainty and all risks in the enterprise. However, analyzing the state of stocks of certain types of food, grain crops, it is possible to predict, with a certain probability, the price situation on the world agrarian markets and the possible risks from changing market conditions. In this context, the main purpose of this research is to study the origins of the market risks emergence and their impact on the cost of agribusinesses in the new business environment, in connection with which, to solve this problem a new method for assessing them is proposed.

2. Research methodology

The research is based on the data from the Ministry of Agrarian Policy and Food of Ukraine (Minagro). In the search for ways to overcome the market risks that exist in agribusiness, the producer, first, should determine the risks that significantly affect the performance of its activities, as well as the tools to minimize this impact. Farmers who annually engage in the production in this area do not normally analyze the impact of certain types of products on the value capitalization of the enterprise and the feasibility of replacing them with more promising ones.

We suggest solving this problem with the help of the ABC-analysis of the agricultural product mix, the “sales as contribution to cost recovery” analysis which will give the company the real opportunity to determine the efficiency of its range and optimize it (Dibb, 2001; Zipf, 1949). Our method should combine the traditional calculation of the company value based on its potential capitalization in the forecast and post-forecast period with the procedure for optimizing the income of the agro-enterprise by the ABC-analysis. Therefore, for the comprehensive assessment of the market risks impact on the agro-enterprise value, we suggest using the following algorithm (Figure 1):

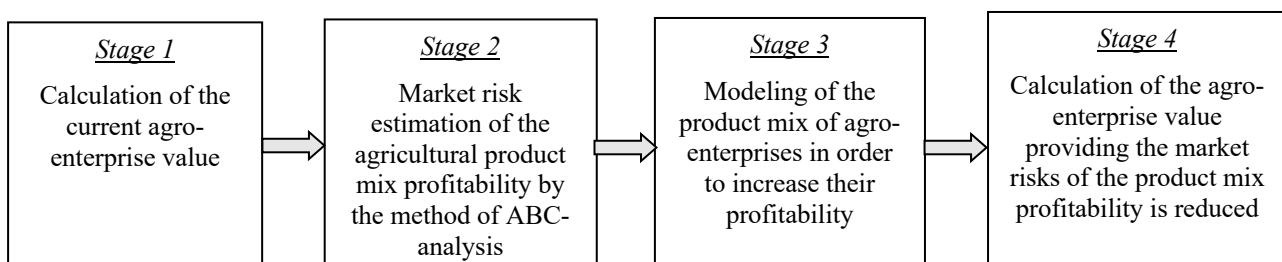


Fig 1. The algorithm of integrated assessment of the market risks impact on the agro-enterprise value

Stage 1: Calculation of the current agro-enterprise value.

To calculate the current agro-enterprise value we propose using the method of direct income capitalization. It is based on the transformation of the net operating income (I) received from the operation of the object under evaluation into value (V) by means of the capitalization factor (r):

$$V = \frac{I}{r} \quad (1)$$

This method measures the current company value and allows us to judge the efficiency of using all the assets in terms of their ability to generate income. The main advantage of this method is the simplicity of calculations. Another advantage is that the method of direct capitalization reflects the market situation immediately.

Stage 2: Estimation of profitability market risks of the agricultural product mix by the ABC-analysis.

To assess the profitability market risks of the agricultural product mix, the ABC-analysis can be used. This type of analysis is based on the Pareto Law, according to which 20% of the effort gives only 80% of the result, and the remaining 80% - only 20% respectively. That is, for any enterprise A Class product are important, 20% of which provides 80% of the total sales income (I). Its sales quantity (Q) should be maximized. At the same time, the company receives 15% of its income by selling 30% of B Class products (intermediate products) and 5% of its revenues by selling 50% of C Class products (by-products).

The general algorithm of the ABC-analysis is as follows:

- 1) determine the objects under analysis;
- 2) determine the parameters by which the analysis of the object will be carried out;
- 3) sort the parameters in the order of decreasing the parameter value;
- 4) determine the A, B and C groups.

Table 1. The ABC-analysis matrix of the product mix profitability

Indicator	Class A	Class B	Class C
Q, %	20	30	50
I, %	80	15	5
Zone of market risk of profitability losses	The zone of low market risk of profitability losses.	The zone of average market risk of profitability losses.	The zone of high market risk of profitability losses.
Function	$I_A = P_A \times Q_A \rightarrow \max$	$I_B = P_B \times Q_B$	$I_C = P_C \times Q_C \rightarrow \min$

Stage 3: Modeling of the agricultural product mix in order to increase its profitability.

This stage involves the definition of the product mix positions that will provide the maximum yield to the agribusiness. Eliminating product mix positions will enable agribusiness to use the released resources to increase profitability.

Stage 4: Calculation of the agro-enterprise value, provided that the market risks of the product mix profitability are reduced.

According to the results of the previous stage, the new value of the agro-enterprise is calculated, provided that the market risks of the product mix profitability are reduced through the refusal of the company to produce non-profitable type of commodities.

3. Results

It is obvious that market risk is a multidimensional phenomenon and can directly affect the profitability of an agro-enterprise and its value. To test the proposed method for assessing the impact of market risks on the agribusiness value, we use the data of an assumed "Z" company. This agribusiness specializes in manufacture of eight types of agricultural products:

- corn for grain;
- sunflower;

- milk;
- pork meat;
- winter wheat;
- meat of cattle;
- spring barley;
- soybeans

The income received by “Z” company from a separate product is different. Therefore, an increase or decrease in its share will change the company value. Figure 2 shows the calculation of the product mix profitability of “Z” company and its value over the past five years.

Table 2. Product mix profitability of “Z” company and its value

Indicator	Income, thousand EUR				
	2014	2015	2016	2017	2018
Corn for grain	252	307	506	850	749
Sunflower	339	227	411	583	438
Milk	328	247	363	373	480
Pork meat	104	118	160	135	115
Winter wheat	92	74	89	104	97
Meat of cattle	51	116	58	47	54
Spring barley	9	3	22	38	32
Soybeans	19	61	0	0	0
Annual income, ths. EUR	1194	1154	1610	2131	1965
Capitalization ratio	0,16	0,16	0,16	0,16	0,16
Value of “Z” company, ths. EUR	7460	7212	10060	13318	12284

From Table 2 it is evident that the value of “Z” company began to increase since the agro-company refused to grow soybeans. To test our hypothesis, we estimate the market risks of the product mix profitability of “Z” company by ABC-analysis (Table 3).

Table 3. ABC-analysis matrix of the product mix profitability of “Z” company

Indicator	Income, thousand EUR					Profitability over 5 years, ths. EUR	Income structure, %	Product class
	2014	2015	2016	2017	2018			
Corn for grain	252	307	506	850	749	2664	33,1	A class products (80,1%)
Sunflower	339	227	411	583	438	1998	24,8	
Milk	328	247	363	373	480	1791	22,2	
Meat of pigs	104	118	160	135	115	632	7,8	B class products (13,5%)
Winter wheat	92	74	89	104	97	456	5,7	
Meat of cattle	51	116	58	47	54	326	4,0	C class products (6,3%)
Barley is springy	9	3	22	38	32	104	1,3	
Soy	19	61	0	0	0	80	1,0	
Annual income, thousand EUR	1194	1154	1610	2131	1965	8054	100	X

According to Table 3, the most important product mix for “Z” company is corn for grain, sunflower and milk. The intermediate products are pork meat and winter wheat. In turn, the rest

commodity products in the enterprise are not very important positions and bring the lowest income. These are, in particular, meat of cattle, spring barley and soybeans.

In order to reduce the market risk of product mix profitability, “Z” company management needs to increase the product share in the B class by 1.5% due to the reduction of commodity positions in C class. This can be achieved through crop rotation on areas previously occupied by spring barley. It is worth sowing more winter wheat. In 2018, spring barley occupied 150 hectares of land, and winter wheat - 256 hectares. The income from 1 hectare of spring barley is 0.21 thousand Euro / ha. And the income from winter wheat is 0,38 thousand EUR / hectare. In the case of sowing other crops, “Z” company may earn additional revenue in 2019: $(0.38-0.21) \times 150 = 25.5$ thousand EUR. Using Formula for calculating current value of “Z” agro enterprise, one can calculate the increase of income, which will affect its value, namely:

$$V_{2019} = (1965 + 25.5) / 0.16 = 12441 \text{ thousand EUR} \quad (2)$$

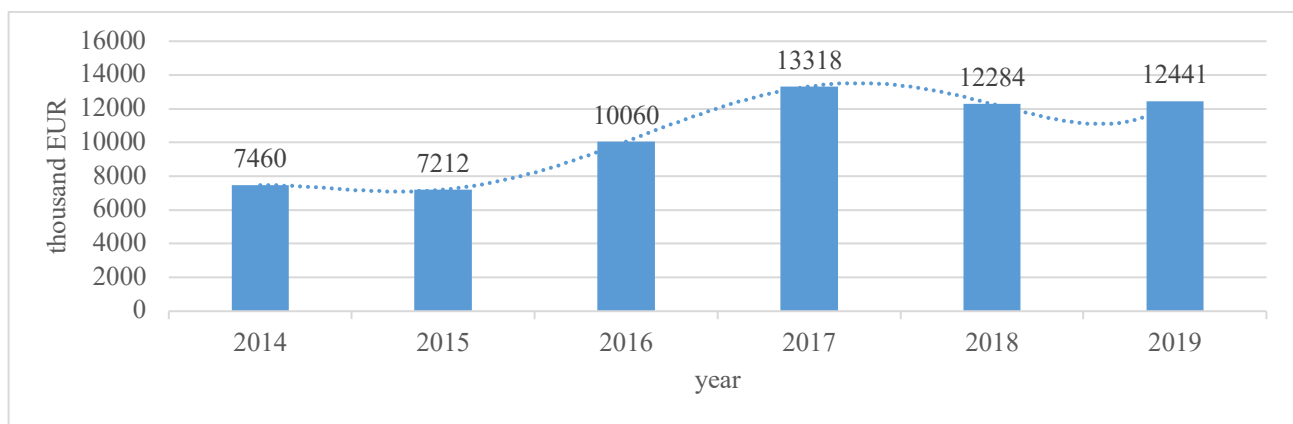


Fig.2. “Z” company value forecast, thousand EUR

Consequently, our hypothesis concerning the influence of market risks of product mix profitability on the agro-enterprise value has been verified. Optimization of the product mix by the ABC-analysis matrix of its profitability (80/15/5) leads to an increase in the company value.

4. Conclusions

According to the results of the study, it can be stated that market risks associated with the product mix profitability have a significant impact on the agro-enterprise value ($\Delta V = [5-20\%]$). When properly evaluated, by using economic, mathematical and logistic methods of analysis, company executives can make sound management decisions that will help increase the agribusiness value. The reduction of the market risk level is possible through introducing a system of limits on the use of valuable natural resources and diversification.

Comparison of the actual and optimal income structure received from the sale of a certain agricultural product mix reveals significant reserves to increase the value of agribusinesses.

When conducting a regular ABC-analysis, it is possible to develop your own strategy to transfer low-yielding products from C class to B class. This is possible to be implemented due to the improvement of product quality, including the means of rational crop rotation, the revision of pricing policy, etc.

Possible further direction of research is a detailed classification of market risks of agro-enterprises and their impact on the company value, taking into account the peculiarities of doing business in different countries.

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