

PROFITABILITY OF AGRICULTURAL COOPERATIVES. SELECTED METHODOLOGICAL ASPECTS OF MEASUREMENT AND ANALYSIS

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Abstract. The analysis of profitability enables the assessment of business efficiency while also providing information on the company's current economic situation and further development opportunities. The purpose of this paper is to identify the definitional and analytical problems related to the profitability of agricultural cooperatives, and to exemplify the possible solutions. The sample used in this study consists of ca. 100 agricultural production cooperatives based in Poland. Trend extrapolation and analysis of variance and correlation were the techniques employed to investigate the profitability (ROE, ROA, ROS, VI) and its relationship with main lines of production and the size (UAA) and quality (soil valuation index) of agricultural land. The results of research allowed to conclude that the profitability of agricultural cooperatives is decreasing each year; it does depend neither on the main line of production nor on the size and quality of agricultural land. The need for an in-depth study of profitability of agricultural cooperatives was pointed out. It was also stated that the potential determinants of profitability may include management quality and other internal and organizational issues.

Keywords: agricultural cooperatives, profitability, ROS, ROA, ROE, value index

INTRODUCTION

In today's economy dominated by strong competition, where all processes are highly dependent on information, business success requires the use of specific

measurement and management systems (Parkitna and Sadowska, 2011). To comply with the principle of rational business management, enterprises should systematically analyze their financial performance, which boils down to analyzing profitability.

In agriculture, the profitability level is a synthetic indicator of financial standing which fundamentally affects the assessment of the competitive capability (Gołaś, 2009). In turn, the competitive capability has an effect on the company's ability to continue agricultural production activities and on its development outlooks. Therefore, it can be said that the analysis of profitability enables the assessment of efficiency and provides information not only on the current economic situation of the company, but also on its capacity to develop (Paszko and Pawlak, 2014).

However, a question arises on how to measure and analyze the profitability having in mind the particularities of agricultural cooperatives? This paper gives some answers. Its purpose is to identify the definitional and analytical problems related to the profitability of agricultural cooperatives, and to exemplify the possible solutions.

LITERATURE OVERVIEW

In general, profitability reflects the effectiveness of business management and is a determinant of enterprise development (Paszko and Pawlak, 2014). Majed et al. (2012)

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consider it to be an indicator of the company's growth, success and control. In a broad sense, profitability is an effect-to-effort ratio; it means achieving a surplus of revenues over costs of activity as a result of merging individual business factors.

Although there are many approaches to enterprise profitability, its most popular aspects are as follows: sales profitability, defined as return on sales (ROS); return on assets (ROA), also referred to as economic return; and financial profitability, also known as return on equity or return on invested capital (ROE or ROIC). Sales profitability is the ratio of profit to revenue. The assets profitability ratio indicates the use efficiency of assets in relation to profit/loss. Similarly, return on equity refers to the efficiency of capital engaged by the owners and built up by the company.

It is well known that rates of return are one of the most important ways of analyzing and controlling the financial performance of enterprises, and represent a basis for making important decisions such as development strategies or investment policies, including in agriculture (Bumbescu, 2015). They are used to measure the company's earnings generated over a period of time based on sales figures, assets, capital employed, net worth and earnings per share, often regardless of the industry. Indeed, many researchers used the rates of return to evaluate the profitability of agricultural enterprises (see e.g.: Korom and Sagi, 2005; Machek, 2014; Bumbescu, 2015).

However, the aforementioned indicators are not the only ones. It is also important to note that profits or returns are not the only reason why enterprises exist. Currently, the prevailing theory assumes that the most important thing is to increase enterprise value, thereby increasing value for the owners. Therefore, to measure a firm's profitability, its value also needs to be taken into account. Because the owners of a cooperative are its members, this aspect turns out to be of a particular importance.

Moreover, in the case of cooperatives, their particularities unquestionably need to be taken into consideration. One has to remember that the objective of cooperatives is to maximize the benefits and welfare of their members and of the local community. Thus, cooperatives do not only seek to maximize profits but also attempt to satisfy the interests of their members. Usually, they do this by increasing their product prices as much as possible (Guzmán and Arcas, 2008; Soboh

et al., 2009; 2012; Hernández-Espallardo et al., 2013). Some claim that cooperatives are even expected to have a low profitability level (Martínez-Victoria et al., 2015). Therefore, in the case of cooperatives, the analysis of profitability takes on a special character.

In addition to defining the profitability of cooperatives, identifying its underlying factors could also be very helpful. According to Parkitna and Sadowska (2011), there is a number of factors affecting the profitability of an enterprise which fall into two major groups: external and internal. The first group includes the political and legal environment, the economic environment, market impacts, unemployment, the social and cultural environment, and technical and technological environment. The second group includes the internal environment (physical or financial resources, management board, employees and organizational culture), the close environment (suppliers, competition, substitute products, information and communication, labor markets, banks etc.) and other (such as the accounting policy, product quantity, R&D expenditure, cost optimization). These determinants can be of a positive or negative nature and, when identified, are very useful in enterprise management.

Another important issue is to determine how to measure, analyze and assess the profitability of enterprises. The measurement is relatively easy because of data availability. Actually, all necessary information (such as revenues, equity capital, profit at different levels) may be found in financial statements published by the companies. Thus, access to financial statements or relevant databases enables determining the profitability of each enterprise.

However, it should be noted that financial ratios highlight the link between two interconnected quantitative financial pieces of information (Bumbescu, 2015). In order to be significant, financial ratios should be compared with other meaningful information from the same domain, or within the same organization, and the analysis should include their evolution over time (dynamics of profitability). The last two editions of the World Cooperative Monitor show a stable trend of profitability measured by ROE and ROA in European cooperatives (World..., 2016, 2017). Therefore, it could be expected that the same trend is followed, in particular, by Polish agricultural cooperatives.

When it comes to a comparative analysis of profitability between cooperatives and other enterprises within

the same industry, the conclusions found in the literature are relatively clear. The profitability of cooperatives turns out to be either lower or similar to that of other companies (Table 1). Thus, it meets the aforementioned expectations. However, a comparison between cooperatives could also be interesting. It turns out that under the same economical conditions, some cooperatives experience rapid growth while some are characterized by stagnation and other are going through a recession (Mierzwa, 2013). Finding the reasons for this divergence can be instructive.

Table 1. Results of research on a comparison of profitability between cooperatives and non-cooperatives

Profitability level of cooperatives compared to non-cooperatives	Studies
Lower	Notta and Vlachvei, 2007 Soboh et al., 2011 Martínez-Victoria et al., 2015
Similar	Lermand and Parliament, 1991 Gentzoglanis, 1997 Boyle, 2004 Hardesty and Salgia, 2007

Source: own elaboration based on relevant literature.

In this context, the profitability of agricultural cooperatives might depend on productive inputs. Thus, cooperatives active in different agricultural markets may report different profitability figures. As a result of lower price fluctuations and greater bargaining power, the advantaged group may include cooperatives engaged mainly in plant production. Moreover, as land is among the key productive inputs, its area and quality may also have an impact on the profitability of agricultural cooperatives. However, these assumptions require a more in-depth verification.

MATERIAL AND METHODS

The question therefore is how to analyze the profitability of agricultural cooperatives taking into account the above recommendations. To add insight to the understanding of what the profitability of agricultural cooperatives looks like, the author proposes a set of three illustrative hypotheses:

- H1: the profitability of agricultural cooperatives is and will remain stable,
- H2: the profitability of agricultural cooperatives varies in function of the dominant line of production,
- H3: the profitability of agricultural cooperatives is impacted by the area and quality of agricultural land. Precisely, the area is measured as UAA, and the quality as the soil valuation index.

To verify the above hypotheses, the author proposes accordingly the following methods: trend extrapolation, analysis of variance, and correlation analysis. The extrapolation of trends consists in forecasting the future based on the current developmental of a phenomenon. This method is underpinned by two assumptions: that the phenomenon will change much like it does now, and that the processes are evolutionary in nature. These assumptions affect the scope of applicability of this method. Therefore, it is recommended to be used when analyzing phenomena in areas with low growth rates, occurring in a stable and structured environment. The analysis of variance (ANOVA) determines the impact of a classifying factor on research results through comparisons between all groups analyzed. However, it is imperative to check the distribution of data. If not normally distributed, a Kruskal-Wallis test (the non-parametric equivalent of one-way ANOVA method) can be used. The correlation analysis is used to accurately determine the degree to which two variables are related. It is mainly based on calculating the values of selected coefficients (such as Pearson's r linear correlation coefficient, Spearman's rank correlation coefficient, Kendall's t , Somer's d , Gamma coefficient, Cramér's V , Yule's F) and their interpretation. For example, the Spearman's rank correlation coefficient falls within the interval $\leq -1, \geq 1$. The minus sign indicates a negative correlation. The higher the absolute value of the coefficient, the stronger the correlation between the variables.

In assessing the profitability of agricultural cooperatives, the data came from rankings of the best Polish agricultural cooperatives, published annually by the Institute of Agricultural and Food Economics (Lista..., 2010, 2011, 2012, 2013, 2014, 2015). The profitability in these rankings consists of four ratios:

- return on sales (ROS): ratio of profit on sales to the total revenue from sales of products, goods and materials; the operating costs, taken into account when calculating the profit on sales, also include labor costs of member-workers of the cooperative;

Table 2. Characteristics of the research sample

Parameter	2010	2011	2012	2013	2014	2015
Number of cooperatives	82	90	87	98	94	95
P: number of cooperatives with plant production as the dominant line of production	46	52	58	58	56	50
L: number of cooperatives with livestock as the dominant line of production	14	11	8	12	13	15
O: number of cooperatives with other production as the dominant line of production	0	1	0	1	2	4
M: number of cooperatives with mixed production (plant, livestock, other)	22	26	21	27	23	26
Average ROS	-17.89	-6.38	-3.37	-13.59	-13.43	-26.34
Average ROA	5.76	7.60	9.60	4.27	3.30	0.01
Average ROE	7.95	10.60	12.99	6.18	4.76	0.05
Average VI	1.96	1.90	2.48	1.67	1.75	0.03
Average UAA [ha]	600.9	572.8	575.7	560.4	561.4	541.8
Average soil valuation index	1.09	1.11	1.13	1.08	1.06	1.04

Source: own elaboration based on Lista..., 2010, 2011, 2012, 2013, 2014, 2015.

- return on assets (ROA): ratio of net financial profit (–) or loss (+) from the disposal of non-financial assets to the total value of assets at year-end;
- return on equity (ROE): ratio of net financial profit (–) or loss (+) from the disposal of non-financial assets to equity at year-end;
- value index (VI): ratio of the return on equity to the cost of equity, specifically including the average interest rates on bank deposits; only if greater than one, the index means an increase in the value for enterprise owners.

The time range of the study is a 6-year period from 2010 to 2015. The average number of operators covered by the analysis is around 90. For most of them, plant production was the dominant line of production. The detailed characteristic of the research sample is presented in Table 2. The average values are measured as the arithmetic mean of the dataset.

RESULTS AND DISCUSSION

When analyzing the average profitability trends for the cooperatives examined, it turns out that while they are not linear, they are downward sloping (Fig. 1). Hence,

the findings fail to support the hypothesis H1. Especially the ROS shows the greatest fluctuations and decreases. This is not very optimistic for the future of the overall profitability of agricultural cooperatives. VI seems to remain relatively stable. However, if the situation does not change, it will also reach a negative value in 2019.

The next step was the analysis of differences in profitability between cooperatives engaged in different dominant lines of production: plant (P), livestock (L), mixed (M) or other, non-agricultural production activities (O). A pairwise comparison of variances was performed (Table 3). The findings might sound a bit surprising as the level of profitability ratios does not depend on the line of production. There are some statistically significant indications that cooperatives mainly engaged in plant production have a higher median of profitability ratios. However, these figures are irregular and rather exceptional. Therefore, hypothesis H2 was also negatively verified.

Finally, the relationship between profitability ratios and the size and quality of utilized agricultural land was examined. The results are presented in Table 4. Generally, it turns out that the level of profitability ratios does depend neither on the area nor on the quality

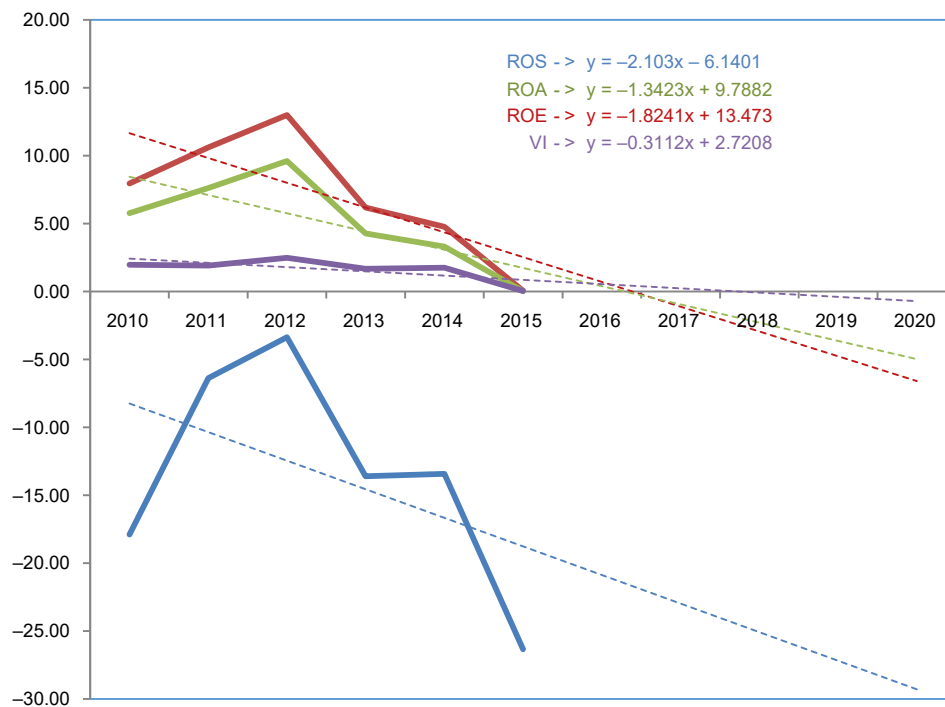


Fig. 1. Trends followed by profitability ratios in agricultural cooperatives
Source: own elaboration based on Lista..., 2010, 2011, 2012, 2013, 2014, 2015.

Table 3. Results of the analysis of variance

Index	Pairs compared	2010		2011		2012		2013		2014		2015	
		p-values	higher median	p-values	higher median	p-values	higher median	p-values	higher median	p-values	higher median	p-values	higher median
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROS	P-M	1.00	N/A	0.01	P	0.25	N/A	1.00	N/A	1.00	N/A	1.00	N/A
	P-L	1.00	N/A	0.71	N/A	0.59	N/A	0.38	N/A	0.50	N/A	1.00	N/A
	P-O	N/A	N/A	1.00	N/A	N/A	N/A	1.00	N/A	1.00	N/A	1.00	N/A
	M-L	1.00	N/A	1.00	N/A	1.00	N/A	0.45	N/A	0.38	N/A	0.27	N/A
	M-O	N/A	N/A	1.00	N/A	N/A	N/A	1.00	N/A	1.00	N/A	1.00	N/A
	L-O	N/A	N/A	1.00	N/A	N/A	N/A	1.00	N/A	1.00	N/A	1.00	N/A
ROA	P-M	1.00	N/A	0.00	P	0.02	P	1.00	N/A	0.68	N/A	1.00	N/A
	P-L	0.02	P	0.00	P	0.01	P	1.00	N/A	1.00	N/A	0.19	N/A
	P-O	N/A	N/A	1.00	N/A	N/A	N/A	1.00	N/A	0.99	N/A	0.01	P
	M-L	0.24	N/A	1.00	N/A	1.00	N/A	1.00	N/A	1.00	N/A	1.00	N/A
	M-O	N/A	N/A	1.00	N/A	N/A	N/A	1.00	N/A	1.00	N/A	0.09	N/A
	L-O	N/A	N/A	0.78	N/A	N/A	N/A	1.00	N/A	1.00	N/A	0.45	N/A

Table 3 – cont.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROE	P-M	1.00	N/A	0.01	P	0.02	P	1.00	N/A	0.87	N/A	1.00	N/A
	P-L	0.02	P	0.01	P	0.09	N/A	1.00	N/A	1.00	N/A	0.32	N/A
	P-O	N/A	N/A	1.00	N/A	N/A	N/A	1.00	N/A	0.94	N/A	0.02	P
	M-L	0.27	N/A	1.00	N/A	1.00	N/A	1.00	N/A	1.00	N/A	1.00	N/A
	M-O	N/A	N/A	0.60	N/A	N/A	N/A	1.00	N/A	1.00	N/A	0.11	N/A
	L-O	N/A	N/A	0.38	N/A	N/A	N/A	1.00	N/A	1.00	N/A	0.49	N/A
VI	P-M	1.00	N/A	0.01	P	0.02	P	1.00	N/A	0.69	N/A	1.00	N/A
	P-L	0.05	N/A	0.01	P	0.07	N/A	1.00	N/A	1.00	N/A	0.31	N/A
	P-O	N/A	N/A	1.00	N/A	N/A	N/A	1.00	N/A	0.92	N/A	0.02	P
	M-L	0.35	N/A	1.00	N/A	1.00	N/A	1.00	N/A	1.00	N/A	1.00	N/A
	M-O	N/A	N/A	0.64	N/A	N/A	N/A	1.00	N/A	1.00	N/A	0.11	N/A
	L-O	N/A	N/A	0.40	N/A	N/A	N/A	1.00	N/A	1.00	N/A	0.48	N/A

Source: own elaboration based on Lista..., 2010, 2011, 2012, 2013, 2014, 2015.

Table 4. Results of correlation analysis

	Year	UAA	Soil valuation index
1	2	3	4
ROS	2010	0.34	0.09
ROA	2010	0.06	-0.08
ROE	2010	0.05	-0.10
VI	2010	0.05	-0.10
ROS	2011	0.11	0.42
ROA	2011	0.03	0.31
ROE	2011	0.06	0.29
VI	2011	0.03	0.30
ROS	2012	0.43	0.25
ROA	2012	0.20	-0.02
ROE	2012	0.23	0.01
VI	2012	0.21	-0.01
ROS	2013	0.35	0.09
ROA	2013	0.13	-0.06
ROE	2013	0.13	-0.07
VI	2013	0.12	-0.07
ROS	2014	0.36	0.02

Table 4 – cont.

1	2	3	4
ROA	2014	0.26	0.03
ROE	2014	0.25	0.01
VI	2014	0.26	0.01
ROS	2015	0.28	0.31
ROA	2015	0.10	0.20
ROE	2015	0.10	0.20
VI	2015	0.10	0.19

Source: own elaboration based on Lista..., 2010, 2011, 2012, 2013, 2014, 2015.

of agricultural land. Similarly to the findings above, a weak or medium correlation existed (for example with the soil valuation index in 2011 or with UAA in 2014), however it was also irregular. Thus, it cannot be concluded that the profitability of agricultural cooperatives is determined by the area of utilized land. These findings also fail to support hypothesis H3.

The findings reveal that the profitability of Polish agricultural cooperatives follows a downward trend. This contradicts the results of a recent global study on

cooperatives (World..., 2016; 2017). To find the reasons for this discrepancy, there is a need for a more sophisticated research across countries, extending to environmental, economical, social and even political conditions for profitability in agriculture. Moreover, these phenomena could also be explained by clear differences in market position between cooperatives from northern or western Europe and those from CEE countries (Mierzwa, 2009; Suchoń, 2012; Bijman et al., 2012). Besides, the decreasing profitability could be the result of inefficient management and other internal problems experienced by many Polish cooperatives (Kožuch, 2010; Brzozowski and Kmiecik-Kiszka, 2014; Brodziński, 2014). Furthermore, this could even be one of the key determinants of profitability for cooperatives, especially if factors such as the area and quality of utilized land were excluded from the findings.

CONCLUSIONS

This paper presents an approach to defining and analyzing the profitability of agricultural cooperatives. It also shows some examples of profitability analyses. However, it should be emphasized that the profitability of agricultural cooperatives is a complex problem that requires special consideration in light of their particularities. On the one hand, although they are not profit-oriented, they still operate in a conventional agricultural market and compete with other enterprises. Therefore, they should care about their profitability as it determines their capacity to invest, a matter of great importance for agricultural businesses.

In summary, it could be concluded that factors which have a strong impact on the profitability of agricultural cooperatives need to be identified. However, note also that the measurement and analysis of profitability of agricultural cooperatives is a problem that should be investigated in a broader context.

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