Labour in Polish farms from the perspective of agricultural cooperatives

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Abstract:

The purpose of the paper is to analyze the differences between Polish agricultural production cooperatives and other farming entities in the context of the employment. The conclusions are made on the basics of the analysis of the "List of the 300 best agricultural enterprises" prepared by the Institute of Agricultural and Food Economics. The time range of this research covers the years 2009 – 2013.

The main finding is that there are no clear, significant differences between agricultural production cooperatives and other farming entities in terms of employment. However, some of them are able to create a lot of workplaces. Moreover, they can increase the return on sales by increasing the level of employment and maintain existing jobs even in the time of the global crisis.

Key words: agricultural production cooperatives, farming entities, employment, profitability

1. Introduction

An important issue for agricultural cooperatives is conducting not only economic, but also social activities for members and the local community. Thus, they should concern about the interests of their members and their environment even more than about the profit and other economic results. Creating workplaces and maintaining high level of employment could be the one of these interests.

From this point of view it seems to be justified to search the answers for the following questions: do the agricultural cooperatives provide more employment than other farming entities? How does the level of employment influence the profitability of agricultural cooperatives and other farming entities? How was and will be the level of employment in agricultural cooperatives and other farming entities?

The purpose of the paper is to analyze the differences between Polish agricultural production cooperatives and other farming entities (such as companies of state agency, individual farms, private companies) in the context of the employment. The author's intention is to verify if the worldwide trends in employment in cooperatives mentioned belove are the same in the case of Polish farming.

2. Theoretical Framework

According to the International Labour Organization (ILO), the world is suffering from unprecedented unemployment, dramatic youth unemployment, an historic level of migration and a very substantial presence of informal and precarious employment (ILO 2013, ILO 2014a, ILO 2014b). The trends in employment and unemployment worldwide are disturbing. Given the latest data provided by the ILO, in 2013 almost 202 million people were unemployed around the world, an increase of almost 5 million compared to the previous year. It seems like, in general, the enterprises are not able to maintain existing and create new jobs.

However, the studies on labor in cooperatives do not go hand in hand with this statement. Conover et al. (1993), who investigated fifteen service-sector cooperatives in California, proved that cooperatives were effective in improving employment opportunities. Besides, it turns out that cooperatives, as opposite to the other types of enterprises, have reportedly been showing remarkable resilience to the crisis which flared up at the global level in 2008, including in terms of employment (Roelants, Hyungsik, Terrasi, 2014). The report of the International Organisation of Industrial, Artisanal and Service Producers' Cooperatives (CICOPA) estimates that cooperative employment, both full time and part time, involves at least 250 million people in the world according to official data from 74 countries covering 75% of the world's population. 26.4 million of these people work in cooperatives, as employees (15.6 million) or worker-members (10.8 million), while 223.6 million producers organize their production together within the scope of cooperatives. When looking at the issue of employment growth, it is found this to be faster in employee owned businesses (such as cooperatives) – 7.46% in 2005-2008 and 12.9% in 2008-2009, compared to 3.87% and 2.70% for non-employee owned businesses during the same period (Lampel et al., 2010).

Determining the level of employment is an important decision in business activity. This refers to any kind of business, regardless of its size, organizational and legal form or the sector within it operates. It seems like simple math: the more the employer pays his employees, the lower are his profits. But while the costs of increasing labor are obvious and easy to measure, the benefits are often indirect and not immediately felt (Ton, 2009). There are verified hypothesis on the positive link between the level of employment or employee engagement and efficiency, productivity or profitability of the company. For example, Fisher et al. (2006), who examine retail stores, show that more labor is associated with substantially higher sales. Whittam and Talbot (2014) consider the employee ownership on firms' performance (profitability, productivity, employment growth, share price and resilience). Other studies have also analyzed the impact of employee ownership on firms' profitability (Lampel et al., 2010; Matrix Evidence, 2010). They associate productivity and profitability gains with employee ownership. But this phenomenon may depend on the size of a company. Nuttal (2012), who have analyzed businesses with share ownership, confirms that when 100 more workers are added to a business its productivity (on sale per employee basis) diminishes. This supports the view that the employee ownership model offers particular benefits to small and medium-sized businesses (Lampel et al., 2010).

The employee ownership model, such as cooperative, exists in different areas of human life. In rural areas agriculture is the main source of employment and income (FAO, IFAD, WFP, 2012). Agricultural cooperatives play an important role in supporting small agricultural producers and marginalized groups. They:

- empower their members economically and socially,
- create sustainable rural employment through business models that are resilient to economic and environmental shocks,

– offer small agricultural producers opportunities and a wide range of services, including improved access to markets, natural resources, information, communications, technologies, credit, training and warehouses
– facilitate smallholder producers' participation in decision-making at all levels,
– support members in securing land-use rights,
– negotiate better terms for engagement in contract farming and lower prices for agricultural inputs such as seeds, fertilizer and equipment.

Agricultural cooperatives do not only perform the productive and economic functions (Matyja, 2014). An important element of their functioning is also conducting social activities for members and the local community. This is because APCs, in fact, are organizations which concern about the interests of their members and their environment more than about the profit and other economic results. They independently determine their objectives, programs, activities and organizational structures and adopt internal rules for business, which is based on work of members and their families.

An agricultural cooperative, also known as a farmers' cooperative, is a cooperative where farmers pool their resources in certain areas of activity (Smith, 2012). According to the definition adopted in 1987 by United States Department of Agriculture "a cooperative is a user-owned, user-controlled business that distributes benefits on the basis of use" (Zeuli & Cropp, 2004). It means, more or less, that net earnings in cooperatives should be distributes on the basis of proportional use – purchasing, selling, exchanging of services, trading etc. Indeed, probably this is the best model of agricultural cooperative: when farmers have shares in cooperative and therefore can control it, trade with their cooperative and do their daily agricultural activities on their own.

The practice shows that there are different types of agricultural cooperatives worldwide (Münkner, 2012; USDA 1991). In Poland agricultural cooperatives perform the functions of production, service and processing related to agriculture (Matyja, 2015). This includes mainly: supply and sales co-operatives, dairy co-operatives, gardening and apicultural co-operatives, co-operatives of agricultural organizations, cooperative agricultural producers groups and agricultural production cooperatives (APC). The last type of cooperatives is a subject of the analysis in this paper. The field of APC's activity is mainly crops and livestock farming. There are more than 700 APC registered in Poland (NCC 2013). In total they associate about 42 000 members and hire about 8 000 of workers.

The next parts of the paper focus on comparisons of the size of the labor force between agricultural production cooperatives and other legal forms of enterprises in agricultural area in Poland.

3. Methodology and Data

To add insight to the understanding how the employment situation in Polish agricultural enterprises looks like, the author proposes a set of three hypotheses. They are designed to assess if agricultural production cooperatives differ from other farming entities in the context of employment. They are the following:

H_A: The level of employment in the agricultural production cooperatives is higher than in other farming entities.

H_B: There is a correlation between the level of employment and profitability both in agricultural production cooperatives and other farming entities.

H_C: The level of employment increases in agricultural production cooperatives and decreases in other farming entities every year.

The level of employment is measured as an average number of employees in every year, including worker-members working in cooperatives. The profitability consists of three components:

- return on sales (ROS) – the ratio of profit on sales to the sum of revenues from sales of products, goods and materials. The operating costs, calculated in the profit on sales, include also the labor costs of member-workers of agricultural production cooperatives;
- return on equity (ROE) – the ratio of net financial profit, adjusted for profit (-) or losses (+) from the disposal of non-financial assets, to capital equity at the end of a year;
- value index (VI) – the ratio of return on equity and the cost of capital equity containing, among others, an average interest rates on bank deposits. Only index higher than one means that the value of the farm was increased for its owner.

The present study utilizes a sampling frame consisting of agricultural entities from the "List of the 300 best agricultural enterprises", also known as "300 ranking" or "300 list", prepared annually by the Institute of Agricultural and Food Economics – the National Research Institute in Poland (IAFE 2009, IAFE 2010, IAFE 2011, IAFE 2012, IAFE 2013). It includes agricultural enterprises established from the property of the Treasury (former state farms) and agricultural productions cooperatives. The source data are collected using a specially designed questionnaire, which is aligned with the official items of financial statements. This fact automatically limits the range of participants mainly to the units engaged in systematic records of business operations. The "300 list" ranks agricultural enterprises according to the specific criterion which is the summary index consisting of weighted indicators: business profitability, value creation, added value and generating of operating cash. A set of metrics and indicators is multi, so that it presents the performance of enterprises in a multidimensional way. Thus, in the ranking lists there are the relations in the field of profitability and efficiency, financial and operational liquidity, financial risk and solvency. In addition, the rankings present typical for agriculture characteristics, such as agricultural area or an indicator of bonitation.

Although the "300 list" is very detailed and the source data is repeatedly verified, it doesn't include individual farms formed privately, not in the process of transformation of the property of Treasury. The list and this study analyzes the following types of agricultural entities:

- agricultural production cooperatives – APC;
- companies of state agency (Agricultural Property Agency) – CSA;
- individual farms with estate mostly bought – IFB;
- individual farms with estate mostly leased – IFL;
- private companies with estate mostly bought – PCB;
- private companies with estate mostly leased – PCL;
- the rest of the entities – RE.

The time range of this study covers the years 2009 – 2013. The analysis is made of the sample of 300 entities in every year, except of 2009. The first year of analysis contains only 260 enterprises due to the difficulties in determining the types of entities that were different than in the years 2010 – 2013. The detailed data on number and percentage of entities in the research sample is presented in the table 1. It is worth nothing that agricultural productive

cooperatives comes high in the list of agricultural enterprises in Poland. Approximately 30% of positions on the ranking list is taken by APCs in every year. In general, this may mean that these entities, as well as private companies with estate mostly leased, achieve comparatively high economic and financial results.

Table 1. The number and percentage of entities in the research sample in every year

Type of entity	2009		2010		2011		2012		2013		Average %
	Number	%	Number	%	Number	%	Number	%	Number	%	
APC	82	31,5	82	27,3	90	30,0	87	29,0	98	32,7	30,1
CSA	43	16,5	40	13,3	41	13,7	38	12,7	36	12,0	13,6
IFB	5	1,9	12	4,0	9	3,0	12	4,0	13	4,3	3,5
IFL	5	1,9	7	2,3	5	1,7	5	1,7	8	2,7	2,1
PCB	31	11,9	47	15,7	47	15,7	53	17,7	56	18,7	15,9
PCL	85	32,7	103	34,3	93	31,0	88	29,3	75	25,0	30,5
RE	9	3,5	9	3,0	15	5,0	17	5,7	14	4,7	4,4
Total	260	100	300	100	300	100	300	100	300	100	100

Source: own study.

Unfortunately, the research sample, although relatively large, cannot be seen as representative. There are some constraints that influence on the representativeness of the research sample. The main are the following:

- non-random sampling;
- not all of the agricultural types of entities included, for example producers groups;
- relatively large differences in the number of particular entities, especially in the case of individual farming;
- not exactly the same entities of every type analyzed in every year;
- the source data collected only from financial statements with all the objective accounting imperfections.

However, because of its large size and the level of detail the research sample undoubtedly provides interesting information on economic and financial results of agricultural enterprises in Poland. Moreover, it enables to make comparisons between these entities, which is going to be done in this study.

The data analysis was done in STATISTICA software. In order to accomplish the objectives of research and verify hypotheses, the following research methods are used:

- analysis of variance for verifying HA;
- correlation analysis for verifying HB;
- extrapolation for verifying HC.

The variables used in the data analysis are: type of entity, employment, profitability (ROS, ROE, VI), time. A grouping variable is the type of entity. Because the variables (employment and profitability) in each group are not normally distributed there is a need to use the non-parametric methods of correlation and variance's analysis.

Analysis of variance is done with the use of Kruskal-Wallis test – the non-parametric equivalent of one-way ANOVA method. It determines the impact of one classifying factor on the research results by the comparisons between each analyzed groups (Stanisz, 2006). In the Kruskal-Wallis test there are adopted the following formula of statistical hypotheses:

– null hypothesis HA0: the medians in the groups are the same;

– alternative hypothesis HA1: at least two medians differ from each other.

The process of verifying hypotheses consists in rejecting the null hypothesis in favor of the adoption of its alternative. The adopted level of significance of $\alpha = 0.05$ means 5% probability of committing the error of the first kind (rejecting the null hypothesis although it is true). Moreover, the procedure of multiple comparisons of averages ranks is used in order to verify which medians differ between each other. If the p-value (the level of the test probability) is lower than α, the null hypothesis can be rejected. The test results are supplemented with graphic interpretation by box and whisker plot.

Correlation analysis is used to accurately determine the degree to which two variables are related. In the correlation analysis there are adopted the following formula of statistical hypotheses:

– null hypothesis HB0: there is a lack of correlation between variables;

– alternative hypothesis HB1: there is a correlation between variables.

As in the analysis of variance, the process of verifying hypotheses consists in rejecting the null hypothesis in favor of the adoption of its alternative. The correlation is statistically significant with the p-value lower than $\alpha = 0.05$.

Correlation analysis is based mainly on the calculation and interpretation of Spearman's rank coefficient. This coefficient takes values from the range of $\leq$-1, 1$\geq$. Minus coefficient indicates the negative correlation. The higher the absolute value of the coefficient is, the stronger is the correlation between the variables. Particularly, a scale for evaluating the strength of the correlation between variables is the following:

correlation coefficient = 0 – variables are not correlated;

0 < correlation coefficient < |0,1| – correlation very weak;

|0,1| ≤ correlation coefficient < |0,3| – correlation weak;

|0,3| ≤ correlation coefficient < |0,5| – correlation average;

|0,5| ≤ correlation coefficient < |0,7| – correlation high;

|0,7| ≤ correlation coefficient < |0,9| – correlation very high;

|0,9| ≤ correlation coefficient < |1| – correlation almost full.

The extrapolation method is the process of estimating, beyond the original observation range, the value of a variable on the basis of its relationship with another variable. In this study it is used in simplified form, just to present previous and predict future data of the employment in agricultural entities. Scatter plots enable to make comparisons between each of analyzed group.

4. Results

The Kruskal-Wallis test and multiple comparisons procedure are used to determine if agricultural production cooperatives differ from other farming entities in view of the level of employment. Their results are presented in table 2. The analysis reveals differences in

analyzed groups in average employment in every year (p=0,00 in Kruskal-Wallis test). The detailed results indicate that there is statistically significant difference in the level of employment between CSA and other entities in every year (p<0,05 in multiple comparisons). The two exceptions are the years 2009 and 2010 and comparisons between CSA and RE. Moreover, the detailed results indicate that there is statistically significant difference in the level of employment between PCL and PCB in 2009 and 2010. In comparison of the average employment between other entities there is no statistically significant difference.

These findings are confirmed by the box and whisker plots (fig 1.). The median of the level of employment in CSA is noticeably higher than in other entities in every year. The average employment in APC, IFB, IFL, PCB, PCL and RE seems to achieve similar level. Hence, the findings fail to support the HA. However, it is worth noting, that in the case of APC, as well as CSA and PCL, the relatively large group of entities (25%) have relatively high level of employment (long upper whisker). This means that APC, as opposed to for example IFB, IFL, PCB or RE, are able to create a lot of workplaces.

Table 2. Verifying H_A. Results of Kruskal-Wallis test and multiple comparisons*

Year	Type of entity	Number of entities	Kruskal-Wallis test p-value	p-value for multiple comparisons (bilateral)					
				APC	CSA	IFB	IFL	PCB	PCL
	APC	82							
	CSA	43		0,000000					
	IFB	5		0,918245	0,000068				
2009	IFL	5	0,0000	1,000000	0,022100	1,000000			
	PCB	31		0,074252	0,000000	1,000000	1,000000		
	PCL	85		1,000000	0,000000	0,712552	1,000000	0,033695	
	RE	9		1,000000	0,056024	1,000000	1,000000	0,803529	1,000000
	APC	82							
	CSA	40		0,000000					
	IFB	12		1,000000	0,000000				
2010	IFL	7	0,0000	1,000000	0,000269	1,000000			
	PCB	47		0,115300	0,000000	1,000000	1,000000		
	PCL	103		1,000000	0,000000	0,664251	1,000000	0,018215	
	RE	9		1,000000	0,146626	0,537514	1,000000	0,250024	1,000000
	APC	90							
	CSA	41		0,000000					
	IFB	9		1,000000	0,000003				
2011	IFL	5	0,0000	1,000000	0,000345	1,000000			
	PCB	47		1,000000	0,000000	1,000000	1,000000		
	PCL	93		1,000000	0,000000	1,000000	1,000000	1,000000	
	RE	15		1,000000	0,004330	1,000000	1,000000	1,000000	1,000000
	APC	87							
	CSA	38		0,000000					
	IFB	12		1,000000	0,000000				
2012	IFL	5	0,0000	1,000000	0,000457	1,000000			
	PCB	53		1,000000	0,000000	1,000000	1,000000		
	PCL	88		1,000000	0,000000	1,000000	1,000000	1,000000	
	RE	17		1,000000	0,006340	0,254306	1,000000	0,300999	1,000000
	APC	98							
	CSA	36		0,000000					
	IFB	13		0,236711	0,000000				
2013	IFL	8	0,0000	1,000000	0,000001	1,000000			
	PCB	56		1,000000	0,000000	1,000000	1,000000		
	PCL	75		1,000000	0,000000	0,085732	0,584663	0,348700	
	RE	14		1,000000	0,014886	0,097278	0,383810	0,616965	1,000000

*Dependent variable: level of employment. Independent (grouping) variable: type of entity.
Source: own study.

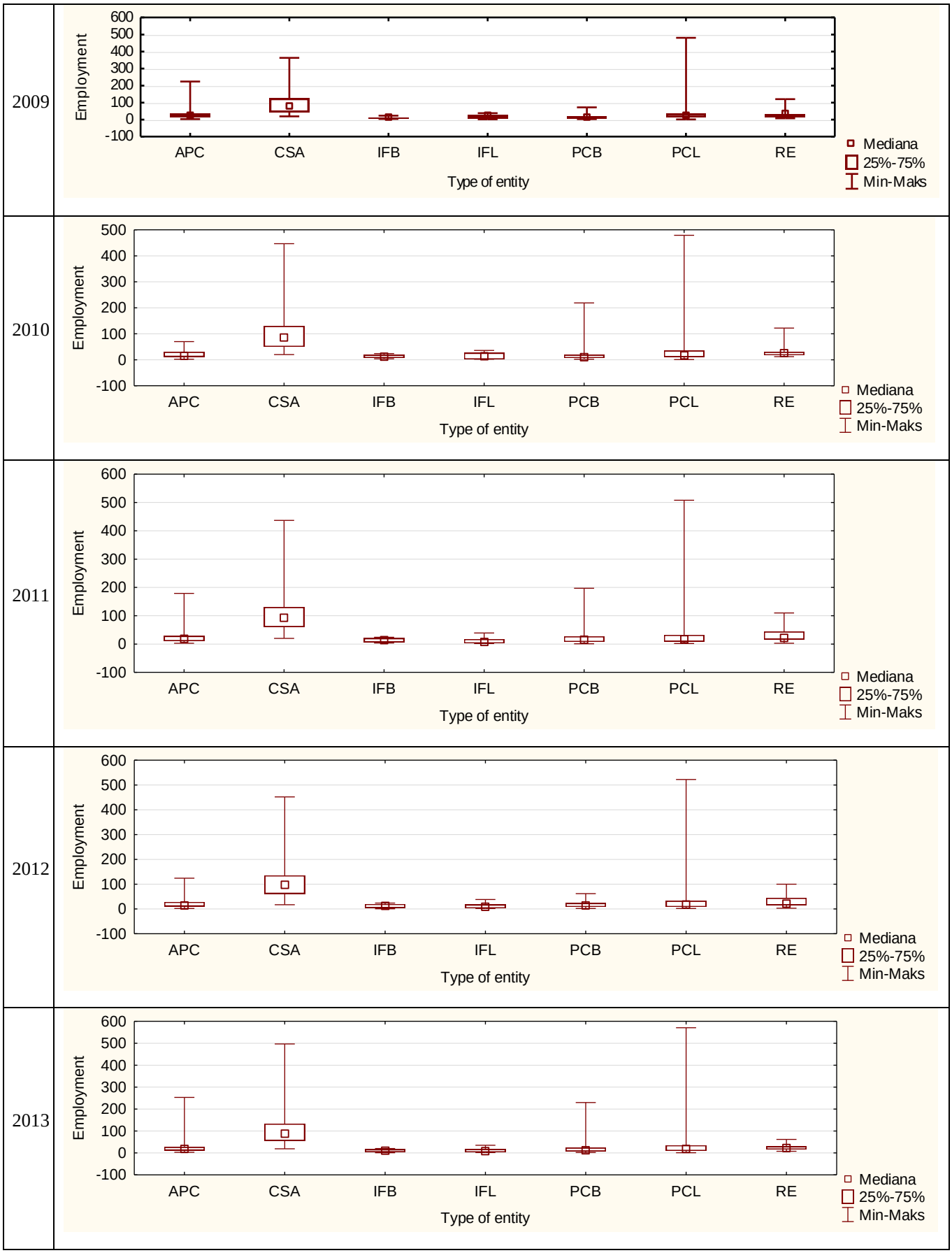

Fig. 1. Verifying H_A. Interpretation of the results of analysis of variance by box and whisker plots.
Source: own study.

The Spearman's rank correlation is conducted to determine if and how the level of employment is associated with the profitability in particular agricultural enterprises. The values of correlation coefficients are presented in table 3. The interpretation of correlation coefficient is shown in table 4.

Table 3. Verifying H_B. Results of correlation analysis with the use of Spearman's rank coefficient*

Year	Couple of variables	Type of entity	Number of entities	R Spearman coefficient	p-value
2009	Employment & ROS	APC	82	0,224724	0,042380
	Employment & ROE			-0,265931	0,015744
	Employment & VI			-0,281215	0,010489
	Employment & ROS	CSA	43	0,378252	0,012385
	Employment & ROE			0,244289	0,114397
	Employment & VI			0,260868	0,091102
	Employment & ROS	IFB	5	-0,900000	0,037386
	Employment & ROE			-0,500000	0,391002
	Employment & VI			-0,500000	0,391002
	Employment & ROS	IFL	5	0,000000	1,000000
	Employment & ROE			-0,100000	0,872889
	Employment & VI			-0,100000	0,872889
	Employment & ROS	PCB	31	0,305379	0,094804
	Employment & ROE			0,114845	0,538426
	Employment & VI			0,105996	0,570365
	Employment & ROS	PCL	85	0,271201	0,012054
	Employment & ROE			-0,133260	0,224048
	Employment & VI			-0,138189	0,207223
	Employment & ROS	RE	9	0,300000	0,432845
	Employment & ROE			-0,133333	0,732368
	Employment & VI			-0,133333	0,732368
2010	Employment & ROS	APC	82	0,228198	0,039209
	Employment & ROE			-0,157633	0,157253
	Employment & VI			-0,164336	0,140123
	Employment & ROS	CSA	40	0,510533	0,000763
	Employment & ROE			0,490640	0,001308
	Employment & VI			0,491579	0,001276
	Employment & ROS	IFB	12	-0,091068	0,778346
	Employment & ROE			-0,413311	0,181721
	Employment & VI			-0,343258	0,274671
	Employment & ROS	IFL	7	-0,360375	0,427149
	Employment & ROE			-0,666694	0,101920
	Employment & VI			-0,648675	0,114996
	Employment & ROS	PCB	47	0,100538	0,501329
	Employment & ROE			0,071267	0,634050
	Employment & VI			0,053798	0,719485
	Employment & ROS	PCL	103	-0,002659	0,978736
	Employment & ROE			-0,397257	0,000033
	Employment & VI			-0,404911	0,000022
	Employment & ROS	RE	9	0,183333	0,636820
	Employment & ROE			-0,550000	0,124977
	Employment & VI			-0,466667	0,205386
2011	Employment & ROS	APC	90	-0,172807	0,103366
	Employment & ROE			-0,320521	0,002071
	Employment & VI			-0,358621	0,000519
	Employment & ROS	CSA	41	0,381359	0,013888
	Employment & ROE			0,436585	0,004320
	Employment & VI			0,424739	0,005641
	Employment & ROS	IFB	9	-0,016667	0,966055
	Employment & ROE			-0,516667	0,154390

	Employment & VI			-0,483333	0,187470
	Employment & ROS			-0,10000	0,872889
	Employment & ROE	IFL	5	-0,90000	0,037386
	Employment & VI			-1,00000	
	Employment & ROS			0,060802	0,684749
	Employment & ROE	PCB	47	0,022794	0,879126
	Employment & VI			-0,054614	0,715407
	Employment & ROS			0,125409	0,231004
	Employment & ROE	PCL	93	-0,026786	0,798823
	Employment & VI			-0,084001	0,423398
	Employment & ROS			-0,168007	0,549494
	Employment & ROE	RE	15	-0,391421	0,149084
	Employment & VI			-0,459339	0,084983
	Employment & ROS			0,210988	0,049804
	Employment & ROE	APC	87	-0,049858	0,646521
	Employment & VI			-0,076109	0,483522
	Employment & ROS			0,328116	0,044310
	Employment & ROE	CSA	38	0,124111	0,457851
	Employment & VI			0,091496	0,584841
	Employment & ROS			-0,238598	0,455173
	Employment & ROE	IFB	12	0,175440	0,585489
	Employment & VI			0,150878	0,639740
	Employment & ROS			-0,10000	0,872889
2012	Employment & ROE	IFL	5	-1,00000	
	Employment & VI			-1,00000	
	Employment & ROS			0,111589	0,426326
	Employment & ROE	PCB	53	-0,005648	0,967983
	Employment & VI			-0,095371	0,496945
	Employment & ROS			-0,132495	0,218483
	Employment & ROE	PCL	88	-0,244700	0,021578
	Employment & VI			-0,258937	0,014850
	Employment & ROS			0,009810	0,970192
	Employment & ROE	RE	17	-0,247701	0,337782
	Employment & VI			-0,236665	0,360425
	Employment & ROS			0,351923	0,000380
	Employment & ROE	APC	98	0,083495	0,413710
	Employment & VI			0,067218	0,510778
	Employment & ROS			0,538808	0,000698
	Employment & ROE	CSA	36	0,641524	0,000025
	Employment & VI			0,647960	0,000019
	Employment & ROS			-0,159560	0,602582
	Employment & ROE	IFB	13	-0,167813	0,583689
	Employment & VI			-0,165062	0,589961
	Employment & ROS			-0,060245	0,887313
2013	Employment & ROE	IFL	8	-0,771140	0,025059
	Employment & VI			-0,771140	0,025059
	Employment & ROS			0,073795	0,588840
	Employment & ROE	PCB	56	-0,060391	0,658393
	Employment & VI			-0,074685	0,584346
	Employment & ROS			0,218337	0,059854
	Employment & ROE	PCL	75	-0,029985	0,798432
	Employment & VI			0,001651	0,988785
	Employment & ROS			0,098901	0,736585
	Employment & ROE	RE	14	0,195604	0,502750
	Employment & VI			0,094505	0,747938

*Dependent variable: level of employment. Independent variable: profitability – ROE, ROS, VI. Grouping variable: type of entity.
Source: own study.

Table 4. Verifying H_B. Interpretation of the results of correlation analysis

Indicator of profitability	Type of entity	Correlation between the level of employment and profitability in year 2009	2010	2011	2012	2013
ROS	APC	+ weak	+ weak	lack	+ weak	+ average
	CSA	+ average	+ high	+ average	+ average	+ high
	IFB	- almost full	lack	lack	lack	lack
	IFL	lack	lack	lack	lack	lack
	PCB	lack	lack	lack	lack	lack
	PCL	+ weak	lack	lack	lack	lack
	RE	lack	lack	lack	lack	lack
ROE	APC	- weak	lack	- average	lack	lack
	CSA	lack	+ average	+ average	lack	+ high
	IFB	lack	lack	lack	lack	lack
	IFL	lack	lack	- almost full	lack	- very high
	PCB	lack	lack	lack	lack	lack
	PCL	lack	- average	lack	- weak	lack
	RE	lack	lack	lack	lack	lack
VI	APC	- weak	lack	- average	lack	lack
	CSA	lack	+ average	+ average	lack	+ high
	IFB	lack	lack	lack	lack	lack
	IFL	lack	lack	lack	lack	- very high
	PCB	lack	lack	lack	lack	lack
	PCL	lack	- average	lack	- weak	lack
	RE	lack	lack	lack	lack	lack

Source: own study.

The level of employment is found to be positively and significantly correlated in:
- APC with ROS in years: 2009, 2010, 2012, 2013 (correlation weak in most cases);
- CSA with ROS in every year; with ROE in years: 2010, 2011, 2013; with VI in years: 2010, 2011, 2013 (correlation average in most cases);
- PCL with ROS in 2009 (correlation weak).

The level of employment is found to be negatively and significantly correlated in:
- APC with ROE in 2009 (correlation weak) and 2011 (correlation average);
- APC with VI in 2009 (correlation weak) and 2011 (correlation average);
- IFB with ROS in 2009 (correlation almost full);
- IFL with ROE in 2011 (correlation almost full) and 2013 (correlation very high);
- IFL with VI in 2013 (correlation very high);
- PCL with ROE and VI in 2010 (correlation average) and 2012 (correlation weak).

The rest of cases shows no correlation between the level of employment and profitability. Hence, the findings fail to support the HB. This means, that in general the number of workplaces is not associated with the profitability in almost all of analyzed enterprises (except of CSA). However, it is worth emphasizing, that in APC, like in CSA and opposed to the other entities, the level of employment is slightly positively correlated with the return on sales. The larger number of employees is, the higher values the ROS takes. Thus, one can say that by hiring more people APC achieve more profit from the unit of sold good.

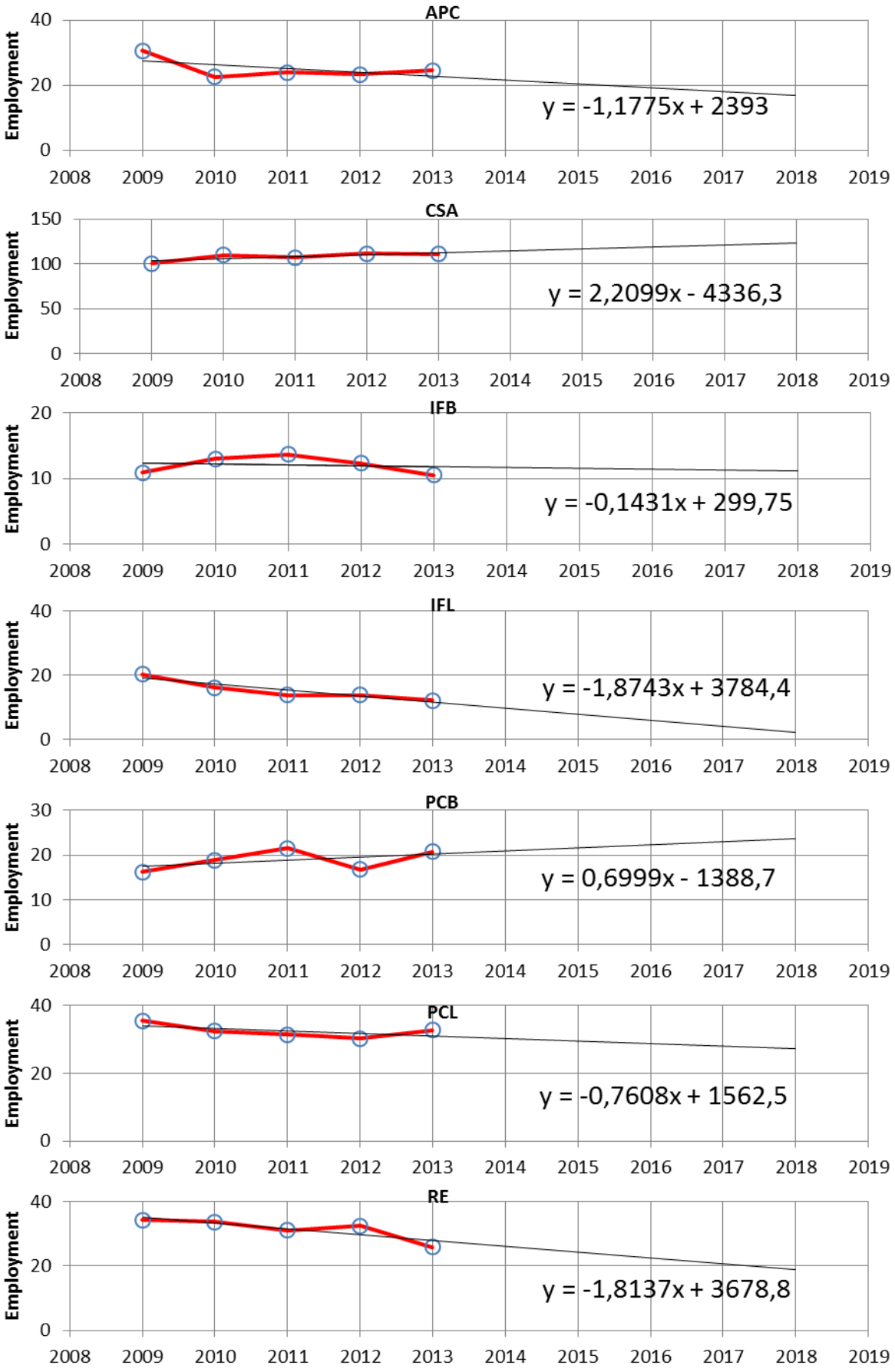

Fig 2. Verifying H_C. The trend of employment in analyzed entities.
Source: own study.

The extrapolation of trend is conducted to determine what the average level of employment in the agricultural enterprises is like. The results are presented in fig. 2. The average number of employees inconsiderably increases in CSA and PCB. The downward trend of employment can be observed in APC, IFB, IFL, PCL and RE. Hence, the findings fail to support the HC. However, besides of the relatively big fall of employment in 2009, the number of people working in APC stays at the same level (23 – 24 employees average per one cooperative). Still, it is exactly in the middle of stakes between all of the agricultural enterprises.

5. Conclusions

The main question posed in the article investigated the differences between agricultural production cooperatives and other farming entities in the context of employment. The question was investigated using empirical data on agricultural enterprises functioning in Poland, collected annually by IAFE. The literature review resulted in three research hypotheses which were tested by statistical analysis.

The findings seem to not correspond to the studies of other researchers mentioned in the introduction. The main conclusion that can be drawn from the present study is that there are no clear, significant differences between agricultural production cooperatives and other farming entities in terms of employment. The level of employment in APC in general:

A. is not higher than in other entities:

B. is not correlated with the overall profitability, similarly to other entities;

C. does not increase every year, similarly to other entities except of CSA and PCB.

However, the findings show also some positive aspects of employment in APC. It turns out that some of them are able to create a lot of workplaces. Moreover, they can increase the return on sales by increasing the level of employment and maintain existing jobs even in the time of the global crisis.

The present study is based on the secondary data that do not provide representativeness of the sample. Besides it does not take into account other important aspects of employment in agricultural enterprises, such as worker/members' age and gender structure, engagement, earnings, social benefits etc. There is a need for future research to explore these problems further.

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