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Which legal form is a key to success in Slovak agriculture?

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Abstract:

In the Slovak Republic production cooperatives and companies are the main legal forms in terms of area. We compared these legal forms from the point of view of agency costs, individual risk and benefit for owners. We used two measures of agency costs: the ratio of operational expenses to annual sales and sales-to-total assets ratio. We also assessed the individual risk of each farm using the variability of return on equity (ROE).

There are no differences in direct agency costs measure, while the indirect agency costs are lower in companies. The companies also generate higher benefit for owners with lower relative risk.

Keywords: agriculture, legal form, agency costs, individual risk, benefit for owners.

Introduction

Main legal forms in the agriculture of the Slovak Republic

Before 1989, the structure in Slovak agriculture was influenced by the communist regime where only state owned farms or cooperatives existed. After 1989, when the centralised economy ceased to exist, all farms were privatised. Cooperatives were privatised by issuing cooperative shares and owners became the holders of these shares. Companies were established after 1989 and started to manage the Utilized Agriculture Area (UAA) of failed cooperatives. In 2012 still a substantial part of the agricultural land in the Slovak Republic was farmed by entities with large UAA (table 1).

Table 1: Land per farm as a percentage of total area (1 888 151 ha) in Slovakia

	0-5 ha	5-10 ha	10-50 ha	50-100 ha	100-250 ha	250-500 ha	over 500 ha
2010	0.99	0.94	3.43	2.91	6.08	7.91	77.74
2011	0.99	0.95	3.75	2.95	6.42	8.20	76.75
2012	0.99	0.98	3.97	2.94	6.60	8.28	76.24

Source: Data of the Agricultural Paying Agency of Slovakia (2013).

The situation in western European countries is different. The majority of the UAA is farmed by small, family-based firms which do not convert to factory-style corporate firms (Allen and Lueck, 1998; Brem, 2002; Gorton and Davidova, 2004). In the Slovak Republic production cooperatives and companies (joint stock company, JSC; limited company, Ltd.) are the main legal forms in terms of area (table 2).

Table 2: Main legal forms of agricultural farms in the Slovak Republic (2012).

Legal form	Number of farms	Land (ha)	Land per farm	Share on all farms (%)	Share on total land (%)
Joint stock company	111	139,295.53	1,254.91	0.68	7.38
Cooperative	570	715,093.21	1,254.55	3.47	37.87
Small – family farm	9,151	47,516.13	5.19	55.69	2.52
Ltd.	1,594	661,301.62	414.87	9.70	35.02
Farmers	4,847	312,561.43	64.49	29.50	16.55
Other	160	12,383.08	n.a.	0.97	0.66
Total	16,433	1,888,151.00	n.a.	100.00	100.00

Source: Data of the Agricultural Paying Agency of Slovakia (2013).

A number of studies have investigated the impact of legal, organisational and size structure on the performance of farms in central European countries (Mathijs et al., 1999; Macours and Swinnen, 2000; Lerman, 2001; Sojková, 2001; Fandel, 2003; Altman and Johnson, 2008; Ciaian et al., 2009 and Latruffe et al., 2012). We focus on the selected legal forms of agricultural farms in the Slovak Republic (cooperatives and companies) from the owner`s point of view. We evaluate the reasons why the number of cooperatives is getting steadily lower while the number of companies is rising (table 3). We focus on the agency costs, return on equity and the individual risk of these two selected legal forms.

Table 3: The numbers of agricultural firms in Slovak Republic (2003, 2005, 2007, 2010, 2012)

legal form	2003	2005	2007	2010	2012
cooperative	644	603	603	584	570
Ltd.	817	959	1,159	1,389	1,594
JSC.	123	127	123	128	111

Source: Agricultural Paying Agency Slovakia

Agency Costs

The principal-agent theory has been a discussed topic since the early '30s of the 20th century. As stressed (Berle and Means, 1932), when managers hold little equity in the firm and shareholders are too dispersed to enforce value maximization, corporate assets may be deployed to benefit managers rather than shareholders. Very important contribution further developing the theory was made by Jensen and Meckling (Jensen and Meckling, 1976) who defined the agency costs as the sum of the monitoring expenditures by the principal, the bonding expenditures by the agent and the residual loss (Jensen and Meckling, 1976). Their work was further elaborated by many authors (Morck, 1988; Eisenhardt, 1989; Shleifer and Vishny, 1997; Holmstrom and Kaplan, 2001, 2003; Becht et al., 2003; Dennis and McConnell, 2003; Hermalin, 2005; Gillan, 2006; Tirole, 2006; Djankov et al., 2008). All authors conclude that agency problems arise when managers or controlling shareholders have the ability to redirect or consume corporate resources in a way beneficial for themselves but which is not in the best interests of the owners, including minority owners.

Therefore, to minimize agency costs in a firm is beneficial for all stakeholders. The main benefit for the owner in the short run is higher profit distributed and in the long run higher competitiveness. The main benefit for the state are higher tax revenues. The lower the agency costs, the higher the profitability and the higher the tax revenues for the government. Lower agency costs usually mean lower risk for financial intermediaries (banks). Other stakeholders like employees, suppliers and customers may also benefit from lower agency costs in different ways.

Few studies that have attempted to directly measure agency cost are analysing US and UK firms. For example they analysed small unquoted and quoted US companies (Ang et al., 2000; Singh and Davidson, 2003). Some authors undertook study on agency costs in large quoted UK companies (see McKnight and Weir, 2009). We analyse the unquoted agricultural farms in Slovakia.

Risk in Agriculture

Risk in agricultural sector is composed by many different individual sources of risk resulting from the product prices instability, food industry requirements, biological nature of production,

dependency on climate conditions, seasonality and others. These risks are very rarely completely independent from each other, particularly when measuring their impact on the income variability. For this reason, the classification of different types of agriculture risk seems very similar, and the boundaries are not strictly specified. Huirne et al. (2000) and Hardaker et al. (2004) distinguished two main types of agriculture risk. Firstly, the business risk, including the production, market, institutional and personal risk, and secondly, the financial risk resulting from different methods of financing the business activities, fluctuation of interest rate or loans availability. Holzmann and Jorgensen (2001) divided the risk into 6 main categories: natural, health, social, economic, political and environmental. Moreover, they crossed the typology with the dimension of systematic characteristic of different risk and determined the majority of individual agricultural risks to take a form of economic risk, which may not be diversified. In our study we focused on individual risk measured by volatility of ROE.

Data and Methods

For calculations we used the data from database of the Slovak Ministry of Agriculture and Rural Development (**IL MoARD, 2013**), over the period 2000-2012. The database consists of individual farm data, including balance sheets and income statements. Data submission is obligatory for all agricultural farms. For our analysis, data were selected according to the farm legal form to subset of the agricultural production cooperatives and the subset of the capital companies – Joint Stock Company (JSC) and Limited Liability Companies (Ltd.).

Assessment of the Agency Costs of a Farm

To assess the agency costs we analysed a panel consisting of 409 farms. Each farm in the panel was economically active during the period 2000 – 2011. The average number of owners and the number of owners per 100 ha of agriculture land with respect to legal form is presented by table 4.

Table 4: Numbers of owners with respect to legal form

Indicator	2005	2006	2007	2008	2009	2010	2011
Agricultural cooperatives							
Average number of owners	198	188	179	172	158	150	131
Number of owners per 100 hectares of agricultural land	13	12	12	11	11	10	9
Agricultural companies							
Average number of owners	21	17	15	16	12	11	10
Number of owners per 100 hectares of agricultural land	2.1	1.8	1.6	1.7	1.3	1.2	1.2

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

To measure agency costs of the firm, we used two alternative efficiency ratios that frequently appear in the accounting and financial economics literature (Ang et al., 2000; Singh and Davidson, 2003; Nagar et al., 2010): the expense ratio, which divides operating expenses by annual sales AC1 (1) and the asset utilization ratio, which is annual sales divided by total assets AC2 (2). The first ratio measures how effectively the firm’s management controls operating costs, including excessive perquisite consumption, and other direct agency costs. The second

ratio measures how effectively the firm's management deploys its assets. In contrast to the expense ratio, agency costs are inversely related to the sales-to-asset ratio.

$$AC1 = \frac{\text{operating expenses}}{\text{annual sales}} \quad (1)$$

$$AC2 = \frac{\text{sales}}{\text{total assets}} \quad (2)$$

To evaluate the influence of legal form in each year we use analysis of covariance (ANCOVA) and multivariate analysis of covariance (MANCOVA) which is an extension of multivariate analysis of variance (MANOVA). Analysis of covariance (ANCOVA) joints the features of analysis of variance (ANOVA) and multiple regressions (see Munk, 2011).

The assumption of the use of Analysis of Covariance is equality of the regression coefficient in each group. This condition is very often violated what restricts its use (see Klocoková, 2011).

Model of the analysis of covariance (ANCOVA) with one nominal factor and with one covariate takes the form:

$$Y_{ij} = \mu + \alpha_i + \beta(x_{ij} - \bar{x}) + e_{ij} \quad (3)$$

where μ is mean, α_i is a contribution of the i^{th} level of factor A and e_{ij} is a residual. The terms $\mu, \alpha_i, i = 1, 2, \dots, I$ are the estimated parameters, and $e_{ij}, i = 1, 2, \dots, I, j = 1, 2, \dots, n_i$ are independent variables with the distributions $N(0, \sigma^2)$. If the relationship between X and Y is significant, then the model of analysis of covariance explains most of the variability of the variable Y as a model of analysis of variance. Analysis of covariance tests whether the transformed means of groups (in our case legal form) are different. Means are modified as if the same (average) value of intensive/quantitative factor (in our case number of owners) were in all groups (see Hendl 2004).

Assessment of the Individual Risk of a Farm

We assumed that the return of the investor is based on the profit of the company and the equity (own capital) invested. Therefore, we considered return on equity ROE (Eq. 4) to be equivalent to the return on stocks, generally used in case of quoted companies.

$$ROE_i = \frac{\text{Earnings After Taxes}}{\text{Shareholders Equity}} \quad (4)$$

In order to assess the individual risk of the farms data of the following farms were excluded from the dataset:

- farms that started or quitted during the observed period 2001-2004; 2005-2008 and 2009-2012 respectively,
- farms with negative equity (liabilities exceeding total assets),
- farms with return on equity (ROE) exceeding +/- 100% (average profit or loss exceeds equity) over the observed period.

After the adjustment there remained 798 farms in 2001-2004 period, 968 farms in 2005-2008 period and 996 farms in 2009-2012 period.

In the next step we calculated the average return on equity $EROE_i$ (5) for each individual farm.

$$EROE_i = \sum_{t=1}^T ROE_{it} \cdot d_t \quad (5)$$

Where:

d_t – a weight of ROE_{it} over the observed period t ; $T=4$

The absolute individual risk of each farm (σ_i) is calculated using the standard deviation (6).

$$\sigma_i = \sqrt{\sum_{t=1}^T ROE_{it} - EROE_i^2 \cdot d_t} \quad (6)$$

Where:

σ_i – standard deviation of the individual return on equity (absolute individual farm risk),

ROE_i – individual return on equity,

$EROE_i$ – average individual return on equity.

The relative individual risk of each farm (v_x) is calculated as ratio between σ_i and $EROE_i$ (7).

$$v_x = \frac{\sigma_i}{EROE_i} \quad (7)$$

Mann-Whitney Test was used for evaluation of statistical significance of differences in profitability and individual risk indicators.

Results

Agency Costs

We compared agency costs in two legal forms (cooperatives and companies) using two ratios (AC1, AC2). We used statistical methods to confirm whether the indicators are influenced by legal form of the firm and number of owners. In our case we used MANCOVA because the legal form was coded as a binary variable (cooperatives 0, companies 1) and the number of owners was a continuous variable.

MANCOVA tested the hypothesis that there is no statistically significant difference in vector of indicators AC1, AC2 for years 2000, 2003, 2007 a 2011 based on the legal form when number of owners considered.

Table 5: Influence of legal form and number of owners - MANCOVA results

	Test	Value	F	p
Intercept	Wilks	0.073	488.442	0.000*
	Pillai's	0.926	488.442	0.000*
	Hotellng	12.605	488.442	0.000*
	Roy's	12.605	488.442	0.000*
num_own	Wilks	0.952	1.918	0.030*

	Pillai's	0.047	1.918	0.030*
	Hotellng	0.049	1.918	0.030*
	Roy's	0.049	1.918	0.030*
leg_form	Wilks	0.822	8.382	0.000*
	Pillai's	0.178	8.382	0.000*
	Hotellng	0.216	8.382	0.000*
	Roy's	0.216	8.382	0.000*

* indicates statistical significance

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

We rejected the hypothesis at the 1 % significance level (see table 5). We confirmed that relation between covariate of number of owners, legal form and the vector of dependent variables (AC1, AC2) is statistically significant at the 5 % significance level. Based on the MANCOVA results we analysed the influence of legal form on indicators (AC1, AC2) separately in each year using analysis of covariance, ANCOVA.

Table 6: Differences in Agency Costs with respect to legal form - ANCOVA results

	2000		2003		2007		2011	
	AC1	AC2	AC1	AC2	AC1	AC2	AC1	AC2
p	0.16	0.00*	0.91	0.00*	0.78	0.00*	0.6	0.00*

* indicates statistical significance

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

The results of ANCOVA confirmed the existence of significant difference based on the legal form in indicator AC2 (table 6). As descriptive statistics (table 7) show and ANCOVA confirms there is no statistically significant difference between cooperatives and companies in AC1. We conclude that both selected legal forms are managed equally effectively in sense of operative expenditures to annual sales ratio.

Table 7: Agency Costs Measures (2000-2011) – descriptive characteristics

			Mean	Median	Perc. 25	Perc. 75	St. Dev.	Variance
AC1	Cooperatives	2000	1.758	1.524	1.300	1.903	0.782	0.612
		2003	1.651	1.458	1.255	1.767	0.747	0.559
		2007	1.786	1.462	1.259	1.872	1.045	1.093
		2011	1.990	1.577	1.251	2.198	1.282	1.643
	Companies	2000	1.835	1.501	1.222	1.994	1.102	1.214
		2003	1.632	1.345	1.098	1.754	0.982	0.964
		2007	1.897	1.353	1.077	1.891	1.531	2.343
		2011	2.161	1.453	1.158	2.307	1.744	3.043
AC2	Cooperatives	2000	0.427	0.384	0.270	0.515	0.271	0.074
		2003	0.503	0.457	0.317	0.601	0.317	0.100
		2007	0.464	0.426	0.292	0.576	0.312	0.097
		2011	0.451	0.414	0.229	0.624	0.282	0.080

Companies	2000	0.921	0.641	0.421	1.068	0.924	0.853
	2003	0.924	0.764	0.468	1.165	0.756	0.572
	2007	0.745	0.605	0.312	0.974	0.680	0.462
	2011	0.597	0.447	0.241	0.750	0.608	0.370

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

The values of indicator AC1 serve as direct measure of agency costs (see Ang et al., 2000; Singh and Davidson, 2003; McKnight and Weir, 2009). The mean value for total sample varies between 1.535 and 2.015. However, these values are for vast majority of industries simply not acceptable (for example, the AC1 values for firms analysed by Ang et al., 2000 are well within interval 0.3 – 0.7), because value higher than 1 means, that the firm generates loss. This is due to the fact, that in agriculture the farms rise cash not only on the market in form of sales, but a significant part is linked to subsidies.

The results of indicator AC2 present that to generate sales companies need to employ less assets in comparison with cooperatives. The difference in mean value of AC2 is significant in this case. However, the difference is shrinking. This is due to the increasing support in form of Common Agricultural Policy subsidies. The amount of subsidies received is not linked to the market production (generating of sales) and results in lower sales-to-assets ratio because of decoupling.

Individual Risk

We measured individual risk of a farm based on the variability of its return on equity (ROE). Descriptive characteristics of ROE (figure 1) show differences in profitability of the selected legal forms. Companies over the period 2001-2012 were more profitable when compared to cooperatives in each observed year.

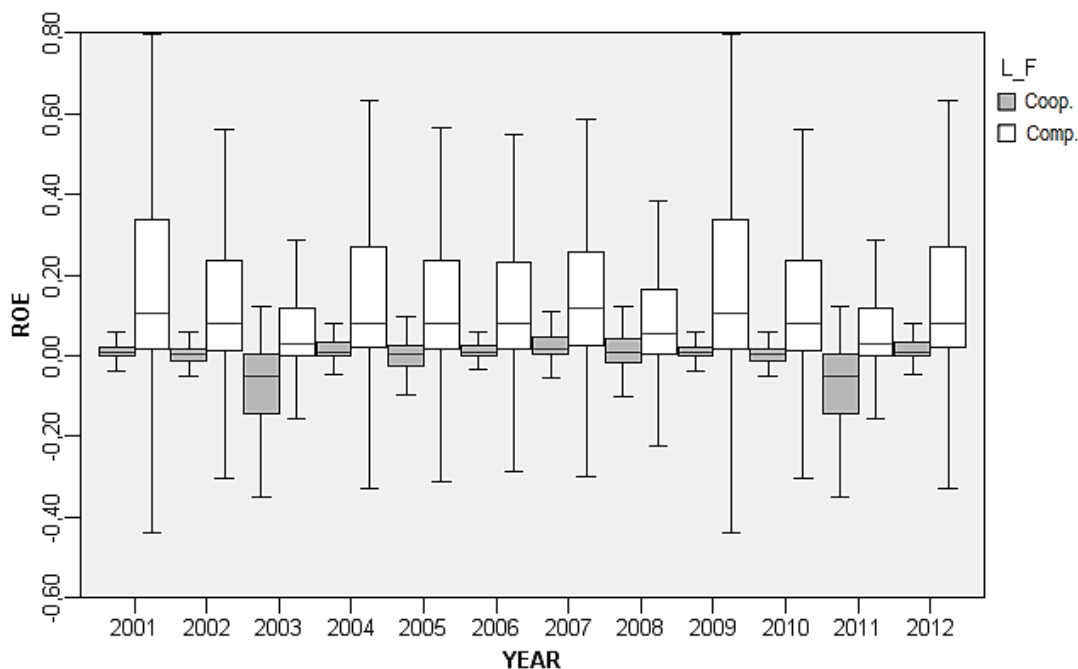


Figure 1: ROE (2001-2012) – Boxplot

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

When comparing the average ROE in three periods (2001-2004, 2005-2008 and 2009-2012, table 8) companies were profitable in each of the periods (measured by mean, median, percentile 25 and percentile 75). Average profitability of companies ranged from 7.3% to 12.6%.

Table 8: Average ROE (2001-2012) – descriptive characteristics

		Mean	Median	Perc. 25	Perc. 75
AVG_ROE 2001-2004	Cooperatives	-0.023	-0.011	-0.046	0.010
	Companies	0.123	0.079	0.020	0.242
AVG_ROE 2005-2008	Cooperatives	0.004	0.006	-0.022	0.032
	Companies	0.126	0.099	0.021	0.222
AVG_ROE 2009-2012	Cooperatives	-0.038	-0.013	-0.072	0.020
	Companies	0.073	0.053	0.002	0.160

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

We can conclude that the period average ROE of more than 75% companies was positive in each observed period. The situation in cooperatives was different. Average ROE measured by mean and median was positive only in period 2005-2008. In periods 2001-2004 and 2009-2012 more than 50% of all cooperatives were struggling with loss (figure 2).

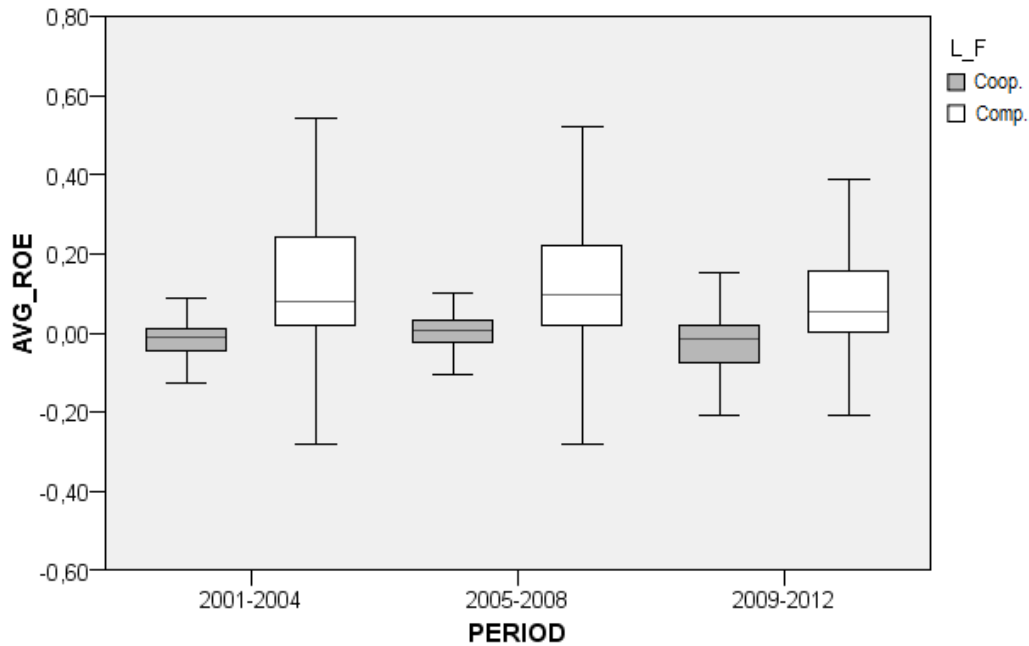


Figure 2: AVG_ROE (2001-2012) – Boxplot

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

Individual risk of a farm measured by standard deviation (volatility) of ROE is in favour of cooperatives. This is due to the huge differences in ROE. Higher profitability of companies is accompanied by higher volatility.

Table 9: Individual Risk (2001-2012) – descriptive characteristics

		Mean	Median	Perc. 25	Perc. 75
IND_RISK 2001-2004	Cooperatives	0.084	0.040	0.019	0.081
	Companies	0.230	0.121	0.047	0.242
IND_RISK 2005-2008	Cooperatives	0.067	0.032	0.012	0.077
	Companies	0.178	0.090	0.037	0.206
IND_RISK 2009-2012	Cooperatives	0.124	0.066	0.036	0.126
	Companies	0.174	0.099	0.039	0.205

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

The average volatility of ROE in companies ranged from 17.4% to 23.0%. The average volatility of ROE in cooperatives ranged from 6.7% to 12.4% (table 9). This observation corresponds with the investment theory in the sense of the relationship between return and risk (the higher the return, the higher the risk, figure 2 and 3).

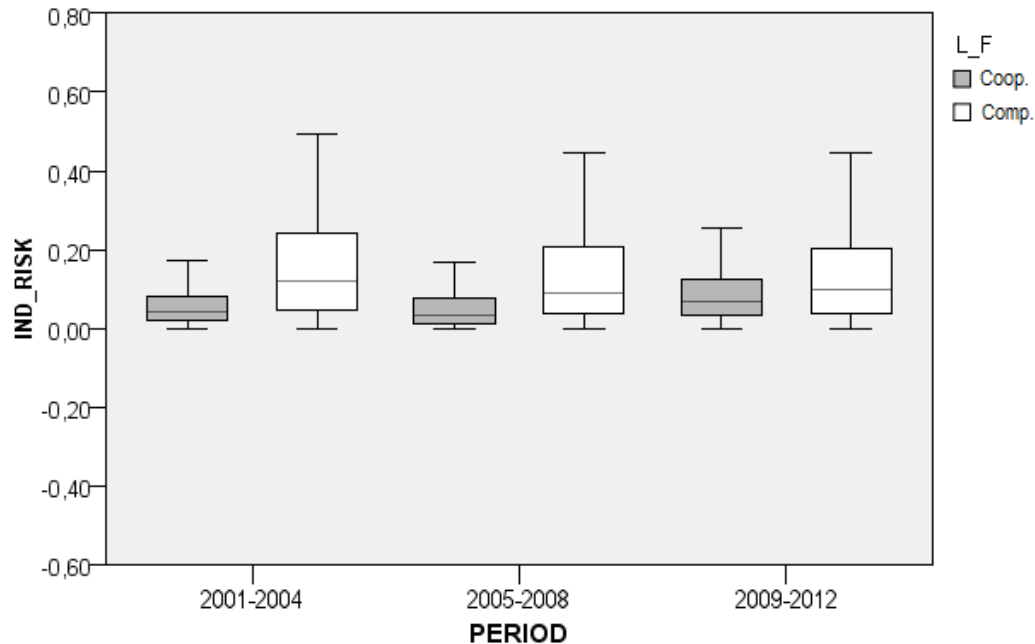


Figure 3: IND_RISK (2001-2012) – Boxplot

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

The limitation of standard deviation is that it can be used to compare differences in volatility only in case the mean values are equal. In all other cases the coefficient of variation should be used. Applying this approach to our data the individual risk changes in favour of the companies (table 10, figure 4).

It is difficult to comment the mean values of coefficient of variation as the values are strongly affected by the very low ROE of some farms. Median and percentiles present clearer picture. The median and both percentile values of coefficient of variation are higher in cooperatives in each observed period.

Table 10: Coefficient of Variation (2001-2012) – descriptive characteristics

		Mean	Median	Perc. 25	Perc. 75
COEF_V 2001-2004	Cooperatives	4.271	1.417	0.843	2.610
	Companies	3.025	0.920	0.536	1.832
COEF_V 2005-2008	Cooperatives	4.132	0.955	0.572	1.980
	Companies	2.035	0.705	0.440	1.447
COEF_V 2009-2012	Cooperatives	19.077	1.448	0.751	2.923
	Companies	7.784	0.864	0.546	1.791

In all observed periods the coefficient of variation of companies is lower than in cooperatives. This means that absolute risk measured by standard deviation (figure 3) is affected by difference in return on equity and the relative measure of risk (measured by the coefficient of variation) eliminates this disproportion (figure 4). No matter the fact that the absolute risk in companies is higher when compared to cooperatives it is preferable for investors or owners to invest into companies. Each rational-thinking investor should prefer the favourable ratio of risk and potential return.

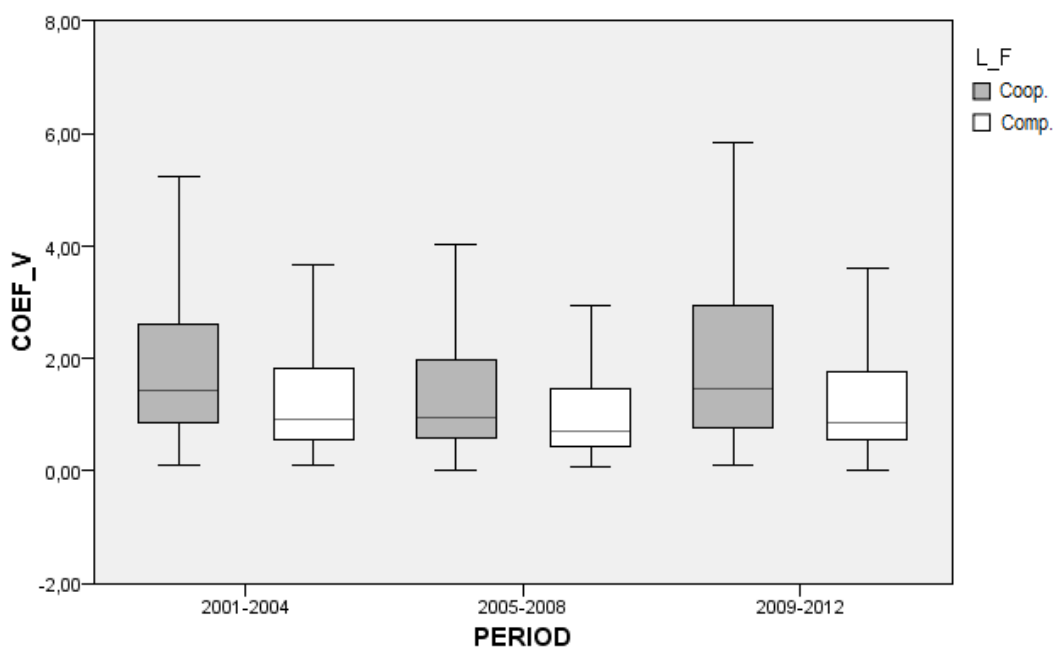


Figure 4: COEF_V (2001-2012) – Boxplot

Source: own calculation based on data from the Information Letters of the MoARD SR (2013).

In the last step of our analysis we evaluated the statistical significance of differences in all three indicators linked to individual risk (table 11). The results of Mann-Whitney U test confirmed that the differences are statistically significant in all cases at 99% significance level.

Table 11: Differences in Individual Risk indicators with respect to legal form Mann-Whitney Test Results

	2001-2004			2005-2008			2009-2012		
	AVG_ROE	IND_RISK	COEF_V	AVG_ROE	IND_RISK	COEF_V	AVG_ROE	IND_RISK	COEF_V
p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Summary

In Slovakia the structure of farms is specific compared to almost any other member state of European Union. The majority of agricultural land is farmed by big farms. These farms with high acreage usually have two main legal forms. The older one are cooperatives which existed before 1989. They are being replaced by companies. In our paper we analysed the reasons (from the point of view of owner) why is the legal form “company” nowadays preferable over cooperatives. We focused on differences in agency costs, profitability and individual risk.

The high values of AC1 would be not acceptable in the majority of industries. We have to take into consideration that the evaluated sector is agriculture. In agriculture subsidies play an important role and therefore the agricultural firm does not have to cover all the operational expenses by sales (Pokrivčák et al., 2005). Slovakia as a member state of the EU benefits from the Common Agricultural Policy and the subsidies are over 30% of the annual sales (see Tóth et al., 2010). The indicator AC1 is the ratio of operative expenses (that cover not only market production) and annual sales (which are not the one and only source of cash). The literature (see Ang et al., 2000; Singh and Davidson 2003; McKnight and Weir 2009) recommends AC1 (operational expenses to annual sales ratio) as a measure of direct agency costs. Our results suggest in agriculture there are limitations of this indicator. The relevance of AC1 in industries strongly affected by public funding (subsidies) is limited. In such industries the ability to generate profit and the resulting agency costs do not depend solely on market revenues in form of sales. Therefore operational expenses to sales ratio (AC1) does not include all revenues as it was the case of the firms analysed by Ang and others. This is definitely confirmed for Slovak agriculture by AC1 results. We suppose that the same limitations stand for other sectors with public influence as well.

Our results show there is no difference in AC1 between companies and cooperatives. On the other hand, results of AC2 indicator are in favour of companies. We can conclude based on AC2 and profitability that companies are managed more effectively when compared with cooperatives.

The individual risk measured by volatility of ROE was evaluated in two forms – absolute (standard deviation) and relative to profit achieved (coefficient of variation). The results are again in favour of companies. This partially gives an answer for the question why the number of companies is rising while the number of cooperatives is decreasing. Companies are easier to manage, are more profitable and the profit is generated with lower relative risk (table 12).

Table 12: Recommended legal form according to selected indicators

indicator	recommended legal form
operative expenses to annual sales ratio (AC1)	both
annual sales to assets ratio (AC2)	company
return on equity (ROE)	company
absolute individual risk of a farm (IND_RISK)	cooperative
relative individual risk of a farm (COEF_V)	company

Based on results we conclude that the “company” legal form should be preferred over “cooperative” legal form. Our results apply only to the Slovak Republic, where the average farm is much larger than the average farm in the EU. But the decision regarding the legal form of agricultural farm depends on legislative of individual member state.

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