Short communication

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Which legal form of agricultural firm based on return on equity should be preferred? A panel data analysis of Slovak agricultural firms

This paper examines the impact of the legal form of agricultural firms on the benefit to their owners for a panel of Slovak agricultural firms. We use return on equity (ROE) as a measure of the benefit to owners. Using the repeated measures ANOVA technique, we find that the legal form of a firm is a relevant determinant of the benefit to owners. We conclude that from the point of view of ROE the legal form 'company' is preferable over 'cooperative'.

Keywords: legal form, agricultural firm, benefit of owner, return on equity

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Introduction

A number of studies have investigated the impact of legal, organisational and size structure on the performance of farms in central European countries (Macours and Swinnen, 2000; Ciaian *et al.*, 2009; Latruffe *et al.*, 2012). Before 1989, Slovak agriculture consisted only of cooperatives and state farms with large acreages. After 1989, when the centralised economy ceased to exist, all farms were privatised. Cooperatives were privatised by the issuing of cooperative shares and owners became the holders of these shares (Swain, 2007). Companies were established after 1989 to manage the land of failed cooperatives (Table 1).

In 2012 a substantial part of the agricultural land in the Slovak Republic was still farmed by entities with large areas, contrary to the situation in western European countries, where most of the agricultural area is farmed by small, family-based firms. These 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 1).

The purpose of this short communication is to show whether the legal form of an agricultural firm is a determinant of its performance, and the level of benefit to its owners.

Methodology

Our analysis was based on a database with individual company data including balance sheets and income statements for each firm over the period 2000-2011. The data are collected by the Slovak Ministry of Agriculture and the participation of all companies and cooperatives is obligatory. We used the entire dataset and split the firms into cooperatives and companies. To be able to perform the analysis from the entire dataset we analysed the panel data consisting of 479 firms which were in continual existence during the period 2000-2011.

We used return on equity (ROE) in 2000, 2003, 2007 and 2011 to measure the benefits to owners. ROE is a ratio between return (earnings after tax) and equity (own capital). It is a standard measure of the owner's benefit (Rábek and Čierna, 2012; Klieštik and Valášková, 2013). To verify the

Table 1: Distribution of agricultural firms in the Slovak Republic by legal form, in terms of numbers (2003-2012)* and share of land (2012).

legal form	2003	2005	2007	2010	2012	Share of land, 2012, %
Cooperative	644	603	603	584	570	37.87
Limited company	817	959	1159	1389	1594	35.02
Joint stock company	123	127	123	128	111	7.38
Natural persons	6550	7172	6893	6008	4847	16.55
Other	70	110	147	166	160	0.66
Total	8204	8971	8925	8275	7282	97.48**

* Annual data for the number of family-based farms are not available. According to census data, there were 16,179 farms in 2010. The estimate for 2012 was 9,151.
** The missing 2.52% is related to small family farms not registered in the business register of the Slovak Republic
Source: Data of the Agricultural Paying Agency of Slovakia

hypothesis that the legal form of a firm determines the level of benefit to owners we used Analysis of Variance (ANOVA) for repeated measures for a single dependent variable (ROE). The independent variable was legal form (cooperative or company). For the calculations we used IBM SPSS v.21.

Results

Of the 479 firms, 303 were cooperatives and 176 were companies. In every year there is at least a 10 per cent difference in the mean values of ROE in favour of companies (Figure 1). The most significant difference in the mean values occurred in 2003 (over 16 per cent), when the cooperatives were struggling with a 9.5 per cent loss while the average profit of the companies was over 7 per cent. However, the development of ROE is very similar in both legal forms in the sense of year on year performance.

These differences in the mean values indicate a difference in the benefit to owners based on the legal form of the agricultural firm. The results of repeated measures ANOVA (Table 2) confirmed that the difference is statistically significant. However from the results of Mauchly's sphericity test (p<0.05), we conclude that there are significant differences in the variances of the ROE of cooperatives and companies (see also Figure 1) and that the results should be interpreted with caution as the sphericity of variances was violated.
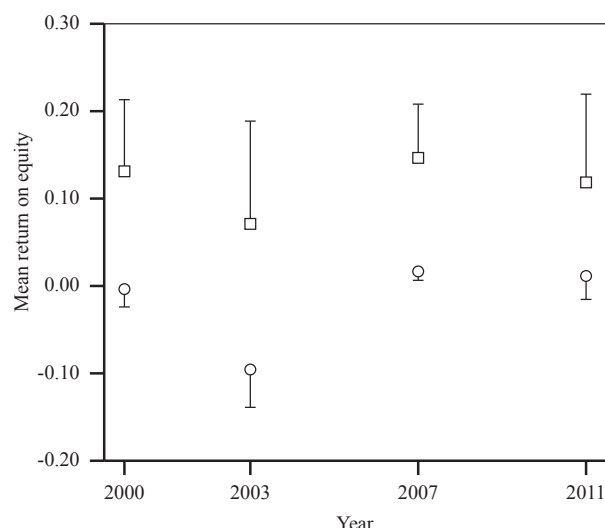
Figure 1: Mean return on equity and ± 95% confidence intervals for a sample of cooperative (circles, n = 303) and company (squares, n = 176) agricultural firms in the Slovak Republic in 2000, 2003, 2007 and 2011.

Source: own composition

Table 2: Tests of significance of difference in the mean return on equity values for agricultural firms in the Slovak Republic by legal form.

	Mean Square	**F**	**Significance**
Sphericity assumed	0.781	4.052	0.007
Greenhouse-Geisser	1.027	4.052	0.014
Huynh-Feldt	1.020	4.052	0.013
Lower-bound	2.344	4.052	0.045

We used a non-parametric approach (the Friedman test) to confirm the results. The probability distribution of the test statistic, Q, can be approximated by that of a chi-squared distribution. We obtained a chi-square value of 189.769 (n = 479, 3df) and the asymptotic significance was 0.000. We conclude that there is a statistically significant difference in ROE based on the legal form of the agricultural firms (p < 0.05).

Discussion

Slovak agriculture has its specific features (Pokrivčák *et al.*, 2005; Kadlečíková and Kapsdorferová, 2012). One of them is a relatively small share of family farms in terms of total acreage. This means that, in this sense, cooperatives and companies are the main legal forms. Our analysis shows two major results. Firstly, the companies generate higher benefit for their owners, measured by ROE, in comparison with cooperatives. From this point of view this legal form should be preferred over cooperatives. However, they do so with higher volatility with respect to the differences in equity. The lower volatility in the case of cooperatives is determined by their higher equity employed. The average equity of cooperatives is 90 per cent higher than that of companies. As this is the denominator of the ROE ratio it results in lower volatility (in case of cooperatives) on condition of the equality in return (earning after tax). These two observations correspond with the investment theory in the sense of the relation-

ship between return and risk (Virlics, 2013).

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 firm cannot of course be based solely on return on equity. For different types of farming activities different organisational forms will be the most suitable. The topic of organisational form in agriculture is addressed by Mathijs *et al.*, 1999; Lerman, 2001; Fandel, 2003; and Altman and Johnson, 2008.

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