

Analysis of the Effect of Legal Form and Size Group on the Capital Structure of Agricultural Businesses of Legal Entities

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Anotace

Příspěvek se zabývá analýzou vlivu právní formy a velikostní skupiny na kapitálovou strukturu českých zemědělských podniků právnických osob. Je sledován vliv tří právních forem a šesti velikostních skupin na kapitálovou strukturu podniku, vyjádřenou prostřednictvím třech kategorií zadluženosti. Analýza vlivu právní formy a velikostní skupiny je provedena prostřednictvím analýzy rozptylu dvojnásobného třídění.

Panelová data pro článek byla získána z databáze Albertina, poskytovaná společností Soliditet, s.r.o. Konkrétně byla využita data z účetních výkazů za roky 2004 – 2010 u zemědělských podniků právnických osob. Celkem bylo předmětem šetření 16075 podniků, které byly rozděleny dle právních forem (akciová společnost, družstvo a společnost s ručením omezeným) a následně příslušné velikostní skupiny (6 velikostních skupin). Celkem vzniklo 18 skupin podniků, kdy za každou skupinu byla sestavena průměrná rozvaha a výsledovka, na jejichž základě byly provedeny příslušné výpočty. Příspěvek je součástí grantového projektu IGA 20121069 „Identifikace hlavních determinant výsledku hospodaření zemědělských podniků právnických osob a určení jejich specifik“ a výzkumného záměru MŠMT 6046070906 „Ekonomika zdrojů českého zemědělství a jejich efektivní využívání v rámci multifunkčních zemědělskopotravinářských systémů“.

Klíčová slova

Kapitálová struktura, determinanty kapitálové struktury, zemědělské podniky, analýza rozptylu dvojnásobného třídění, Scheffého test.

Abstract

The article deals with the analysis of the effect of legal form and size group on the capital structure of Czech agricultural businesses of legal entities. The effect of three legal forms and six size groups on the capital structure of the business is studied, expressed by way of three categories of indebtedness. The analysis of the effect of legal form and size group is performed by way of an analysis of the dispersion of dual classification.

The panel data for the article were obtained from the Albertina database, provided by the company Soliditet, s.r.o. Specifically, data from accounting statements for the years 2004 – 2010 among agricultural businesses of legal entities were utilized. A total of 16075 businesses were the object of examination, which were divided up according to legal forms (joint-stock company (AS), cooperative (D) and limited liability company (SRO) and subsequently the relevant size group (6 size groups). A total of 18 groups of businesses resulted, whereby an average balance and profit and loss statement were drawn up for each group, on the basis of which the relevant calculations were conducted. The article is part of the grant project IGA 20121069 “Identification of the main determinants of the result of economic activity of agricultural businesses of legal entities and the determination of their specifics” and of the institutional research intentions MSM 6046070906 „Economics sources of Czech agriculture and their efficient use in the context of multifunctional agri-food systems“.

Key words

Capital structure, determinants of capital structure, agricultural businesses, analysis of the dispersion of dual classification, Scheffé test.

Introduction

The capital structure of a business is a very broad topic, whose precise definition, however, is not entirely clearly determined. In the Czech professional literature, we encounter the definition of capital structure in various manners. Kalouda (2009) and Valach (2006) define the capital structure of a business as the element of business resources that is present within a business on a long-term basis and by way of which fixed assets as well as the permanent portion of floating capital are financed. On the basis of this definition, it is thus possible to consider capital structure to be the structure of long-term capital within a business. A further approach to the concept of capital structure states that the capital structure of a business constitutes the structure of the resources (source, origin) from which the assets of the business were created (Synek, 2011). On the basis of this definition, one can thus perceive capital structure as the structure corresponding to the classification of the aggregate liabilities of a business. Numerous other authors identify with this theory, such as, for example, Grünwald and Holečková (2007), Růčková (2010), who, in their publications, address the issue of financial analysis and productivity of businesses. Kalouda (2009) then correctly calls such concept of capital structure the financial structure of a business, corresponding to the right side of the balance (liabilities) and based on the accounting approach. From this perspective, it is clearly evident that the financial structure of a business constitutes a broader term than capital structure. Financial structure is constituted by the total capital within a business from which the total assets of the business are financed.

Neumaierová and Neumaier (1996) define capital structure on the basis of the general finance theory, where that is represented by a combination of capital in the form of stocks, bonds and bank loans. Their schematic expression then shows that capital structure consists of the liabilities of the business, comprised of equity, interest-bearing external resources (external resources for which interest is paid) and liabilities (external resources from which interest is paid or coupons and other liabilities).

We encounter completely different definitions in the foreign literature. Primarily in Anglo-Saxon literature, the definition of capital structure is identical to the definition of capital structure as the aggregate resources of a business.

In such literature, it is also evident that the financing of the assets of a business is conducted primarily by way of issued securities (Valouch, 2008). For example, Brealey and Myers (2000) define capital structure as a mixture of various securities. The authors then state that financial resources are equity created either through the issuance of stocks, or from retained earnings, debt, preferred stock, options. On the other hand, authors Levy and Sarnat (1999) define capital structure as the proportion of debt to equity capital.

The agricultural sector is a very significant part of the national economy. It is also among very sensitive areas of the economy, as it has its specifics that must be respected. Its specificity is brought about primarily by the seasonal nature of production, a high dependency on natural conditions, as well as by the production structure. These specifics are clearly reflected in the economic results of agricultural businesses and also affect the set-up of their capital structure.

The assessment of capital structure and its determinants is the object of research of numerous authors and one can thus identify a broad spectrum of professional literature and articles that deal with this area. Such studies originate primarily in the USA and focus primarily on industrial businesses, specifically on small and mid-sized businesses. In the area of Europe, such studies are usually based on those from the USA, and are variously expanded and supplemented (Rajan, Zingales, 1995; Weill, 2004; Michaelas, Chittenden, Poutziouris, 1999; Kayo, Kimura, 2011; Friend, Lang, 1988; Prášilová, 2012; Delcours, 1997 and others). However, none of these studies focuses directly on the issue of agriculture.

The set-up of the capital structure within a business is a demanding process that is affected by numerous factors. Prášilová (2012) divides such determinants up into external and internal. The group of external determinants includes those that the business **cannot** affect, such as, for example, economic policy (primarily monetary policy, its effect on the development of the interest rate), the legislative environment (the taxation rate), the level of development of the economy, environment, government interventions, the situation on the capital market, informational asymmetry and others. The group of internal determinants, i.e. determinants that the business can affect to a certain extent, can then be considered to include a number of factors that are

primarily given by the type and economic activity of the company. For example, in this group, Prášilová (2012) includes some indicators of the productivity of the business, such as the asset structure, asset profitability, liquidity, profit stability and cash-flow, as well as the uniqueness of the product, growth opportunities of the business, sector relevance and the age of the business.

The objective of this article is to identify the effect of legal form and size group on the capital structure of agricultural businesses of legal entities in the Czech Republic for the period of the years 2004 - 2010. The main objective is fulfilled by way of the following working hypotheses:

- among the individual legal forms of agricultural businesses of legal entities, there is a statistically significant difference in the achieved results of values of average indebtedness;
- among the individual size groups of agricultural businesses of legal entities, there is a statistically significant difference in the achieved results of values of average indebtedness.

Materials and methods

The analytical section is based upon data of agricultural businesses of legal entities in the Czech Republic within the period of 2004 – 2010. The data base of agricultural businesses of legal entities was obtained from the Albertina database of business entities, created by the company Soliditet, s.r.o. The object of examination was businesses of legal entities, specifically joint-stock companies, cooperatives and limited liability companies, with predominant activity in agriculture; according to the OKEČ classification, it is OKEČ 01. The acquired accounting statements of individual businesses were further supplemented with the area of agricultural land for each business. That was obtained from a publicly accessible database administrated by the State Agricultural Intervention Fund (hereinafter the “SZIF”), containing information regarding the amount of direct payments provided to businesses of legal entities. On the basis of such information, the area of individual agricultural businesses was subsequently determined, by way of the share of the obtained SAPS subsidy with its unit rate in the given year.

The data were aggregated from several different

information sources and the resulting table contained more than sixteen thousand entries. For the subsequent analysis, only data of companies with an accounting statement having a scope of at least 6 months within the given accounting period were utilized. In all, 16075 businesses were an object of examination, being divided up according to legal forms (joint-stock company, cooperative and limited liability company) and subsequently the relevant size group (6 size groups). A total of 18 groups of businesses were created, where an average balance and a profit and loss account were drawn up for each group, on the basis of which the relevant calculations were performed.

The number of observation in created groups is demonstrated in the table 1.

The manner of division of the businesses into individual size groups is demonstrated in the table 2.

For the conducting of the analysis of the effect of legal form and size group on indebtedness, analysis of dispersion of dual classification was utilized.

Analysis of Variance

The analysis of dispersion of dual classification is intended for the monitoring of the effect of **two factors** on the resulting quantitative attribute. Specifically, this analysis is utilized for the examination of the effect of legal form and size group on indebtedness (aggregate, short-term and long-term).

Testing was performed for each parameter separately by using a one-way analysis of variance (ANOVA). This is a multi-sampled test when differences in more than two groups of units are tested, in our case, size groups and legal forms. Method of analysis of variance is based on the distribution of total variance on the dispersion between classes, which is related to the indicator (indebtedness) and the residual variance, which represents the rest of the influences on fluctuations of the values (Kába, Svatošová, 2012).

The null hypothesis that among the selected groups there is no difference in the average value of the given indicator is tested. To verify the rejection or acceptance of the null hypothesis, the F-test is used. Decisions are made by comparing the maximum first type error (the p-value), based on our data, and errors of the first type of alpha, which we have set before testing. Alfa is usually

Size group	Legal form	Number of observation
1	Joint-stock-company (AS)	1 707
	Cooperative (D)	1 362
	Limited liability company (SRO)	6 069
2	Joint-stock-company (AS)	105
	Cooperative (D)	155
	Limited liability company (SRO)	886
3	Joint-stock-company (AS)	409
	Cooperative (D)	599
	Limited liability company (SRO)	811
4	Joint-stock-company (AS)	485
	Cooperative (D)	496
	Limited liability company (SRO)	478
5	Joint-stock-company (AS)	439
	Cooperative (D)	357
	Limited liability company (SRO)	201
6	Joint-stock-company (AS)	710
	Cooperative (D)	647
	Limited liability company (SRO)	159

Source: own processing

Table 1: The number of observation in created groups.

Size group	Hectare area (ha)
1	0-99
2	100-499
3	500-999
4	1000-1499
5	1500-1999
6	2000 and more

Source: own processing

Table 2: Size classification of businesses, according to hectare area of agricultural land.

set at 5%. If the p-value is less than 5% alpha, the null hypothesis is rejected and it shows that there is a significant difference in the average value of the indicators in between monitored groups. Otherwise, the null hypothesis cannot be rejected and thus it is consider as valid.

In case of rejection of the null hypothesis further detailed evaluation is carried out. Alternative hypothesis applies. It can be formulated as follows: there is no significant difference in at least one pair of compared averages. We are not able to identify in which pair the difference exists and in which one it does not. For a more detailed evaluation many different methods are used, of which some of them are universal, other are not. Versatility of the methods allows even application

for comparison of groups, which contain different number of statistical units, which are presented in our case as regions. The Scheffe's method used in the paper also belongs to the group of methods with detail evaluation.

The quantification of the effect of legal form and size group on the capital structure of businesses is conducted with the utilization of the STATISTICA statistical software. Two-factor analysis of variance without interactions was conducted in two steps. In the first step, the effect of legal form and size group on the value of individual categories of indebtedness was tested, and then, in the second step, a more detailed assessment was possibly conducted.

In the model, two factors (size and legal form) were defined as independent variables, and categories of indebtedness (aggregate indebtedness, long-term indebtedness, short-term indebtedness) were defined as dependent variables (Table 3).

Results and discussion

By way of the analysis of variance of dual classification, the statistically significant differences in the average value of individual categories of indebtedness in at least one pair of the compared legal forms and size groups were first defined. Subsequently, by way of the Scheffé test, it was identified which of the pairs of compared averages are, in terms of legal form as well as in terms of size group, statistically significantly distinct. It was thereby possible to identify which of the analyzed pairs statistically significantly differ from one another. The analysis itself is conducted for agricultural businesses of legal entities in the Czech Republic within the period of the years 2004 - 2010, where the object of assessment was a total of 18 groups of agricultural businesses of legal entities.

1. Analysis of the effect of legal form and size group on the capital structure of businesses

The following text sets out and discusses the results of two-factor analysis of variance without interactions, which identifies statistically significant differences in the legal forms and size groups in regard to the indebtedness of a business.

A total of 3 models are set up, so that the effect of these determinants on the individual categories of indebtedness (overall, long-term, short-term) can be analyzed separately. Each of the tables set out below summarizes the results of the conducted analysis of variance of dual classification for the period of the years 2004 – 2010, as well as the results of the Scheffé test.

Total indebtedness

Table 4 show results of two-way analysis of variance for overall indebtedness.

For both of the analyzed factors, the zero hypotheses of the congruence of average values of individual variants were tested. On the basis of the above results, it can be stated that the p-value for both factors achieves a lesser value than the chosen level of significance 0.05. It is thus possible to rule out both zero hypotheses (meaning that there is a significant difference in the average value of overall indebtedness in at least one of the pair of compared legal forms and there is a significant difference in the average value of overall indebtedness at least in one pair of size groups). Thus, a significant difference was established in the average indebtedness among size groups, as well as among legal forms.

This result confirmed that size is statistically significant determinant of capital structure in terms of the overall indebtedness of a business. Such result is also in accordance with the results of empirical studies that confirmed the statistical

Indicator	Determination*
<i>Dependent variables</i>	<i>Total Debt</i> / <i>Total Assets (R1)</i>
	<i>Long-term Debt</i> / <i>Total Assets (R1)</i>
	<i>Short-term Debt</i> / <i>Total Assets (R1)</i>

Note: *) This is an expression of individual indicators in relation to the balance sheet lines (R).
Source: own processing

Table 3: Identification of dependent variables entering the regression models.

Variability	Sum of squares	Degrees of discretion	Average square	F-test	p-value
Agregate	32.28401	1	32.28401	4595.439	0.000001
Legal form	2.22804	2	1.11402	158.574	0.000001
Size group	0.46173	5	0.09235	13.145	0.000001
Residual	0.82898	118	0.00703		

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 4: Results of two-way analysis of variance for overall indebtedness.

significance of the determinant (Rajan, Zingales, 1995; Weill, 2004; Song, 2005; Michaelas, Chittenden, Poutziouris, 1999; Delcoure, 2007; Chittenden, Hall, Hutchinson, 1996; Hutchinson, Hall, Michaelas, 1998; Kayo, Kimura, 2011; Chen, 2004; Aulová, 2013). These studies, however, use expression of size by way of revenues. Better expression of the determinant of size for the category of agricultural businesses is size of its hectare area, as the main factor of production. On the basis of businesses distribution into different size groups it can be found differences in specific size groups.

The influence of legal form as a determinant of capital structure has not been studied yet. In agricultural sector the legal form is an important factor affecting the capital structure of the business. Further examination of this determinant of capital structure could thus bring new conclusions.

In order to identify which of the pairs of compared averages are statistically significantly distinct in terms of legal form as well as in terms of size group, the Scheffé method was utilized. This is the technique of multiple comparison, on the basis of which it may be stated which of the analyzed pairs significantly differ from one another. The results of the conducted method are set out in Table 5 and Table 6.

According to these results, it can be stated that all of the legal forms (joint-stock company, cooperative and limited liability company) are

mutually statistically significantly distinct. In all combinations, the p-value is lesser than the chosen level of significance α 0.05, and thus we rule out the zero hypothesis of the congruence of averages.

As far as size groups are concerned, a significant difference between groups 1-2, 1-3, 1-4, 1-5 and 1-6 was also established here, where the p-value was lesser than the chosen level of significance of α 0.05. The difference between the first group and all of the other size groups is a result of the conditions for the size classification of agricultural businesses of legal entities. The first group was made to include such businesses that, within the analyzed period, had an area of agricultural land of 0 - 100 hectares available. This category comprised the greatest percentage share out of the entire number of businesses; specifically, 56% of all analyzed businesses fell under this category. The greatest representation in this size category in terms of legal form is seen for limited liability companies, whose share is 66% (see Table 1). Businesses in this group are characterized by a higher value of indebtedness. Subsequently, it is thus possible to state **that**, in the analyzed sample of businesses, **the working hypothesis**: There is a statistically significant difference among the individual size groups of agricultural businesses of legal entities in the achieved results of values of average indebtedness, **could only be established among groups 1-2, 1-3, 1-4, 1-5 and 1-6**, where the p-value

Legal form	AS	D	SRO
Joint-stock-company (AS)		0,0001*	0,0001*
Cooperative (D)	0,0001*		0,0001*
Limited liability company (SRO)	0,0001*	0,0001*	

Note: *) p-values are less than 0.0001

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 5: Results of the Scheffé test for the legal form factor - p-values (overall indebtedness).

Size group	1	2	3	4	5	6
1		0.000641	0.000034	0.000001	0.000002	0.000001
2	0.000641		0.98819	0.767118	0.825922	0.489649
3	0.000034	0.98819		0.983107	0.992266	0.874609
4	0.000001	0.767118	0.983107		0.999998	0.998258
5	0.000002	0.825922	0.992266	0.999998		0.994866
6	0.000001	0.489649	0.874609	0.998258	0.994866	

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 6: P-values of the Scheffé test for the size group factor - overall indebtedness.

was lesser than the selected level of significance of α 0.05. A statistically significant difference in values of average indebtedness was not found in the combinations of the other size groups.

Further descriptive characteristics for the legal form and size group factor are set out in Table 7 and Table 8.

On the basis of the descriptive characteristics, it can also be stated that, within the analyzed sample of businesses, the lowest average value of indebtedness was achieved among joint-stock companies. This fact is clearly evident from the achieved results, where the other companies show more than a 50% share of external resources among aggregate assets. This result is thus clearly determined by the legislative requirements in regard to the registered capital of these companies, which is several times higher than among the other assessed legal forms, and is a part of the equity capital.

On the basis of this result, it is thus evident that the legal form of businesses can be considered another deciding factor of capital structure. This fact is also in accordance with some empirical studies that consider this determinant to be a deciding factor of capital structure (Wiwattanakantang, 1999).

According to the descriptive characteristics of the individual size groups, we cannot conclude that the average value of indebtedness among businesses with a small hectare area is lower than

among large businesses. According to this result, it is evident that more difficult access to external capital among agricultural businesses of legal entities with a small hectare area was not confirmed. According to this result, it can thus be presumed that currently the hectare area of agricultural land of a business is not a factor determining access to external capital.

Long-term indebtedness

Also in the case of long-term indebtedness, two-factor analysis of variance without interactions was conducted in two steps. In the first step, the effect of legal form and size group on the value of long-term indebtedness was tested, and, in the second step, more detailed assessment was possibly conducted. The results of the conducted analysis of dual classification are summarized in the Table 9.

For both analyzed factors, the zero hypothesis of the congruence of the average values of the individual variants was tested. On the basis of the results set out above, it can be stated that the p-value for both factors achieves a lesser value than the chosen level of significance of 0.05. Therefore, both zero hypotheses can be ruled out (meaning that there is a significant difference in the average value of long-term indebtedness in at least one pair of compared legal forms and there is a significant difference in the average value of long-term indebtedness in at least one pair of size groups). A significant difference in average

Legal form	Average	Standard deviation	Lower limit RI*	Upper limit RI*
Joint-stock-company (AS)	0.332774	0.004666	0.323351	0.342197
Cooperative (D)	0.529874	0.023634	0.482144	0.577603
Limited liability company (SRO)	0.655905	0.013008	0.629634	0.682175

Note: *) Limits of 95% of the reliability interval for the average value of indebtedness.

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 7: Descriptive characteristics of overall indebtedness for the legal form factor.

Size group	Average	Standard deviation	Lower limit RI*	Upper limit RI*
1	0.635894	0.049765	0.532086	0.739702
2	0.511005	0.033714	0.440679	0.581331
3	0.491138	0.027469	0.433839	0.548436
4	0.46964	0.033841	0.399048	0.540231
5	0.473015	0.030376	0.409652	0.536377
6	0.456413	0.029034	0.39585	0.516977

Note: *) Limits of 95% of the reliability interval for the average value of indebtedness.

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 8: Descriptive characteristics of overall indebtedness for the size group factor.

Variability	Sum of squares	Degrees of discretion	Average square	F-test	p-value
Agregate	10.74559	1	10.74559	1600.003	0.000001
Legal form	1.06985	2	0.53492	79.649	0.000001
Size group	0.08782	5	0.01756	2.615	0.027903
Residual	0.79249	118	0.00672		

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 9: Results of two-way analysis of variance for long-term indebtedness.

Legal form	AS	D	SRO
Joint-stock-company (AS)		0.000001	0.000001
Cooperative (D)	0.000001		0.052741
Limited liability company (SRO)	0.000001	0.052741	

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 10: Results of the Scheffé test for the legal form factor - p-values (long-term indebtedness).

Size group	1	2	3	4	5	6
1		0.071458	0.9913	0.999477	0.990045	0.901566
2	0.071458		0.284253	0.163894	0.293786	0.567579
3	0.9913	0.284253		0.999824	1	0.997707
4	0.999477	0.163894	0.999824		0.999758	0.980193
5	0.990045	0.293786	1	0.999758		0.998109
6	0.901566	0.567579	0.997707	0.980193	0.998109	

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 11: Results of the Scheffé test for the size group factor - p-values (long-term indebtedness).

indebtedness was thus established for size groups as well as for legal forms.

This result confirmed that size is statistically significant determinant of capital structure in terms of the long-term indebtedness of a business. Such result is also in accordance with the results of empirical studies that confirmed the statistical significance of the determinant (Song, 2005; Michaelas, Chittenden, Poutziouris, 1999; Delcoure, 2007; Chittenden, Hall, Hutchinson, 1996; Hutchinson, Hall, Michaelas, 1998; Chen, 2004; Mateev, Poutziouris, Ivanov, 2012; Bevan, Danbolt, 2002; Aulová, 2013). These studies, however, use expression of size by way of revenues. Better expression of the determinant of size for the category of agricultural businesses is size of its hectare area, as the main factor of production. On the basis of businesses distribution into different size groups it can be found differences in specific size groups. The influence of legal form as a determinant influence the capital structure in terms of long-term indebtedness has

not been studied yet.

For the identification of which of the pairs of compared averages are statistically significantly distinct both in terms of legal form, as well as in terms of size group, the Scheffé method was utilized. The results of the conducted method are set out in Table 10 and Table 11.

On the basis of the results stated above, the zero hypothesis of congruence can only be ruled out for combinations AS - D, AS - SRO. These legal forms are mutually statistically significantly distinct. In these combinations, the p-value is lesser than the chosen level of significance α 0.05, and this we rule out the zero hypothesis of congruence. In the combination D - SRO, the zero hypothesis cannot be ruled out, as the achieved p-value is greater than the chosen level of significance. These combinations of legal forms do not show a statistically significant difference in the value of long-term indebtedness. Subsequently, it can therefore be stated that **the working hypothesis:**

There is a statistically significant difference among the individual legal forms of agricultural businesses of legal entities in the achieved results of values of average indebtedness, **could only be established partially** on the analyzed sample of businesses.

As far as size groups are concerned, a statistically significant difference among the individual size groups was not established in the case of long-term indebtedness, as the achieved p-value was, in all cases, greater than the selected level of significance α 0.05. According to these results, it can be stated that **the working hypothesis**: There is a statistically significant difference among the individual size groups of agricultural businesses of legal entities in the achieved results of values of average indebtedness, **could not be established** on the analyzed sample of businesses.

Further descriptive characteristics for the factor

of legal form and size group are set out in Table 12 and Table 13.

The results of the conducted analysis of dual classification for short-term indebtedness are summarized in the Table 14.

For both of the analyzed factors, a zero hypothesis of the congruence of average values of individual variants was tested. On the basis of the results stated above, it can be stated that for both factors, the p-value achieves a lesser value than the chosen level of significance of 0.05. Both zero hypotheses can thus be ruled out (meaning that there is a significant difference in the average value of short-term indebtedness in at least one pair of compared legal forms and there is a significant difference in the average value of short-term indebtedness in at least one pair of size groups). A significant difference in average short-term indebtedness

Legal form	Average	Standard deviation	Lower limit RI*	Upper limit RI*
Joint-stock-company (AS)	0.164210	0.004512	0.155097	0.173322
Cooperative (D)	0.333978	0.005876	0.322111	0.345845
Limited liability company (SRO)	0.377907	0.021362	0.334766	0.421048

Note: *) Limits of 95% of the reliability interval for the average value of indebtedness.
Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 12: Descriptive characteristics of long-term indebtedness for the legal form factor.

Size group	Average	Standard deviation	Lower limit RI*	Upper limit RI*
1	0.318798	0.045011	0.224907	0.412689
2	0.237051	0.022290	0.190555	0.283547
3	0.300622	0.023139	0.252355	0.348890
4	0.308707	0.023935	0.258779	0.358635
5	0.300083	0.021495	0.255245	0.344922
6	0.286927	0.018465	0.248411	0.325444

Note: *) Limits of 95% of the reliability interval for the average value of indebtedness.
Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 13: Descriptive characteristics of long-term indebtedness for the size group factor.

Variability	Sum of squares	Degrees of discretion	Average square	F-test	p-value
Agregate	5.759567	1	5.759567	897.373	0
Legal form	0.405451	2	0.202725	31.5857	0
Size group	0.561872	5	0.112374	17.5086	0
Residual	0.757354	118	0.006418		

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 14: Results of two-way analysis of variance for short-term indebtedness.

for size groups as well as for legal forms was thus established.

Also this result confirmed that size is statistically significant determinant of capital structure in terms of the short-term indebtedness of a business. Such result is also in accordance with the results of empirical studies that confirmed the statistical significance of the determinant (Song, 2005; Michaelas, Chittenden, Poutziouris, 1999; Delcours, 2007; Chittenden, Hall, Hutchinson, 1996; Hutchinson, Hall, Michaelas, 1998; Mateev, Poutziouris, Ivanov, 2012). These studies, however, use expression of size by way of revenues. Better expression of the determinant of size for the category of agricultural businesses is size of its hectare area, as the main factor of production. On the basis of businesses distribution into different size groups it can be found differences in specific size groups. The influence of legal form as a determinant influence the capital structure in terms of short-term debt has not been studied yet.

In order to identify which of the pairs of compared averages are, in terms of legal form as well as in terms of size group, statistically significantly distinct, the Scheffé method was utilized. The results of the conducted method are set out in Table 15 and Table 16.

On the basis of the results set out above, the zero hypothesis of congruence can only be ruled out for combinations AS - SRO, D - SRO. These legal forms are mutually statistically significantly distinct. In these combinations, the p-value is

lesser than the selected level of significance of $\alpha = 0.05$, and therefore we rule out the zero hypothesis of congruence. In the combination AS - D, the zero hypothesis cannot be ruled out, as the achieved p-value is greater than the selected level of significance. These combinations of legal forms do not show a statistically significant difference in the value of long-term indebtedness. Subsequently, it can thus be stated that **the working hypothesis**: There is a statistically significant difference among individual legal forms of agricultural businesses of legal entities in achieved results of values of average indebtedness, **could only be partially established** in the analyzed sample of businesses.

As far as size groups are concerned, a significant difference among groups 1-3, 1-4, 1-5 and 1-6 was established, where the p-value was lesser than the selected level of significance of $\alpha 0.05$. Further, a significant statistical difference was established among groups 2-4, 2-5, 2-6. According to these results, it is possible to conclude that **the working hypothesis**: There is a statistically significant difference among the individual size groups of agricultural businesses of legal entities in the achieved results of the values of average indebtedness, **could only be established among groups** 1-3, 1-4, 1-5,1-6, 2-4, 2-5, 2-6 within the analyzed sample of businesses. This result indicates that the values of short-term indebtedness do not show statistically significant differences between the third, fourth and fifth size group.

Legal form	AS	D	SRO
Joint-stock-company (AS)		0.450881	0.000001
Cooperative (D)	0.450881		0.000001
Limited liability company (SRO)	0.000001	0.000001	

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 15: Results of the Scheffé test for the legal form factor - p-values (short-term indebtedness).

Size group	1	2	3	4	5	6
1		0.137853	0.000018	0.000001	0.000001	0.000001
2	0.137853		0.165255	0.001137	0.012121	0.008825
3	0.000018	0.165255		0.644000	0.945130	0.919222
4	0.000001	0.001137	0.644000		0.989696	0.995041
5	0.000001	0.012121	0.945130	0.989696		0.999999
6	0.000001	0.008825	0.919222	0.995041	0.999999	

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 16: Results of the Scheffé test for the size group factor - p-values (short-term indebtedness).

Legal form	Average	Standard deviation	Lower limit RI*	Upper limit RI*
Joint-stock-company (AS)	0.163132	0.006024	0.150966	0.175298
Cooperative (D)	0.185272	0.019453	0.145987	0.224558
Limited liability company (SRO)	0.292999	0.018746	0.255141	0.330857

Note: *) Limits of 95% of the reliability interval for the average value of indebtedness.

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 17: Descriptive characteristics of short-term indebtedness for the legal form factor

Size group	Average	Standard deviation	Lower limit RI*	Upper limit RI*
1	0.337646	0.036478	0.261554	0.413737
2	0.265379	0.028627	0.205664	0.325093
3	0.195438	0.013283	0.167730	0.223146
4	0.150053	0.010605	0.127932	0.172175
5	0.168486	0.012983	0.141404	0.195567
6	0.165805	0.012688	0.139339	0.192271

Note: *) Limits of 95% of the reliability interval for the average value of indebtedness.

Source: own processing, calculated by using statistical software STATISTICA, 2012

Table 18: Descriptive characteristics of short-term indebtedness for the size group factor.

Further descriptive characteristics for the legal form and size group factor are set out in Table 17 and Table 18.

Conclusion

The legal form and size of agricultural businesses is among the significant factors affecting the capital structure of businesses. The goal of this article was to identify differences in capital structure, expressed by way of three categories of indebtedness, in terms of the legal form as well as in terms of the size group of agricultural businesses in the Czech Republic within the period of the years 2004 – 2010. The analysis itself was based on extensive sectional data obtained from the Albertina database, supplemented with data from the publicly accessible SZIF database. Calculations were performed with the utilization of the Statistica statistical software. For the monitoring of the effect of two factors on the dependent variable (indebtedness), analysis of variance of dual classification was selected, and for the defining of statistically significant differences among the compared pairs, Scheffé method of multiple comparison was utilized.

A total of 3 models were drawn up, within which capital structure was expressed by way of three dependent variables, specifically aggregate

indebtedness, short-term indebtedness and long-term indebtedness.

The first working hypothesis presumed that among the individual legal forms of assessed businesses, there is a significant difference in their average value of indebtedness, primarily because of differing legislative requirements in regard to the registered capital of such legal forms. The hypothesis was verified by way of an analysis of variance of dual classification. The results of this analysis, including a more detailed evaluation by way of the Scheffé method, established statistically significant differences among all of the legal forms (joint-stock company, cooperative, limited liability company) mutually. **On the basis of this result, it is thus evident that the legal form of businesses can be considered another deciding factor of capital structure.**

This hypothesis was subsequently elaborated for long-term and short-term indebtedness. It was also established in both of these categories of indebtedness that there is, at least in one pair of compared legal forms, a significant difference in the average value of indebtedness. In the case of long-term indebtedness, a statistically significant difference in the combinations of legal forms AS - D, AS – SRO was identified by way of the Scheffé method. Further, in the case of short-term indebtedness, only the combinations

of legal forms AS - SRO, D – SRO were mutually statistically significant.

On the basis of the results stated above, this hypothesis can thus only be accepted partially, specifically for the category of aggregate indebtedness.

The second hypothesis presumed that there is a significant difference among individual size groups of evaluated businesses in their average value of indebtedness. In setting it, the fact that the size groups of businesses were created on the basis of the hectare area of agricultural land of the businesses was taken into consideration, and it was thus presumed that the capital structure of each group would be different in connection with its hectare area. Further, the effect of subsidies was also presumed, specifically of individual payments per area, the amount of which is dependent primarily on the hectare area of agricultural businesses. Subsidies as one of the sources of financing, and primarily SAPS, which comprise the greatest share of paid subsidies, thus determine the capital structure of a business to a great extent. The hypothesis was, just as in the case of dissimilarities among legal entities, verified by way of the analysis of variance. On the basis of that, including a more detailed evaluation by way of the Scheffé method, the following can be stated: A significant difference at a level of significance of 5% was established among groups 1-2, 1-3, 1-4, 1-5 and 1-6. It can thus be stated that businesses with a hectare area of over 100 hectares do not show statistically significant differences in indebtedness. The dissimilarity specifically between the first group and all of the other size groups is caused by the conditions for size classification of agricultural businesses of legal entities. The first group was made to include such businesses that, within the analyzed period, had an available area of agricultural land of 0 - 99 hectares, and the other groups were then set within a size range of 500 hectares. From this perspective, it is possible to assume that the greatest differences in the value of indebtedness will be identified specifically between the first group and all of the other size groups. The businesses in this group are also characterized by the greatest value of indebtedness. Consequently, it can be stated **that the working hypothesis could only be established among groups 1-2, 1-3, 1-4, 1-5 and 1-6, at a level of significance of 5% in the analyzed sample of businesses.** In the combinations of the other

size groups, a statistically significant difference in the values of the average indebtedness was not found. This hypothesis was subsequently elaborated for the category of long-term and short-term indebtedness.

In the case of long-term indebtedness, **a statistically significant difference** at a level of significance of 5% among the individual size groups **was not established.** This result is very surprising, as it can be stated on the basis of this that in the case of long-term indebtedness, there are no statistically significant differences in long-term indebtedness among businesses that have a varying hectare area of agricultural land. Therefore, the need for long-term external resources is not bound to the area of agricultural businesses, but primarily to their investment activity and financing primarily by way of long-term bank loans.

However, in the case of short-term indebtedness, the achieved results are substantially different. In this case, a statistically significant difference among groups 1-3, 1-4, 1-5 and 1-6 was established. This result indicates that in terms of short-term indebtedness, businesses in the first and second size group do not show statistically significant differences. Thereby, it is thus evident that businesses with an area of 0 - 99 and 100 - 499 hectares have **similar demands for short-term sources of financing.** Differences among groups 2-4, 2-5, 2-6 can also be considered statistically significant differences in short-term indebtedness. That means that a statistically significant difference in average short-term indebtedness was not established among businesses with a hectare area of 500 - 999 hectares, and further, among businesses with an area of 500 hectares or more. According to these results, it is possible to conclude that there is a statistically significant difference among the individual size groups of legal entities in the achieved results of values of average indebtedness, **could only be established at a level of significance of 5% among groups 1-3, 1-4, 1-5, 1-6, 2-4, 2-5, 2-6** in the analyzed sample of businesses. This result indicates that the values of short-term indebtedness do not show statistically significant differences among the third, fourth and fifth size group.

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