IS CAPITAL STRUCTURE IMPORTANT FOR THE VALUE OF AGRO-FOOD CORPORATIONS IN SERBIA?

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A R T I C L E I N F O	A B S T R A C T
	The research aims to consider the nature of the influence of capital structure on the value of the corporations from the agro-food sector in Serbia. A panel regression analysis was used to test the hypotheses. The research covered the period from 2011 to 2018, and the sample consisted of 14 agro-food corporations whose shares are on the regulated market of the Belgrade Stock Exchange. The obtained results indicate that the capital structure has a statistically significant impact on the value of agro-food corporations and that the profitability of investment projects determines the nature of that impact. Consequently, the financial managers of agro-food corporations must consider the decision on the choice of capital structure as one of the key issues in the process of generating and increasing the corporation value.

Introduction

Given that a corporation creates value if the expected rate of return is higher than the cost of capital, it can be said that financial decisions are essential to the value creation process. Namely, financial decisions directly determine, from the aspect of origin and maturity, the structure of financing sources, which consequently has an impact on the price of the corporation's capital, as one of the drivers of value. Accordingly,

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in financial decision-making, management should strive to establish such a capital structure that will result in a minimum cost of capital and a maximum corporation value. Recognizing the importance of the issue of the capital structure optimization, given the return on assets of the corporation and in specific market conditions, the focus in this paper will be on corporations that belong to the agro-food sector of Serbia.

This paper aims to examine the nature of the influence of capital structure on the value of corporations from the agro-food sector in Serbia. The panel regression analysis will be used to test the constructed research hypotheses. According to the previous knowledge, prior research in Serbia has mainly focused on the conditionality of the capital structure by different determinants without a special focus on specific economic sectors. Accordingly, it can be said that there have been no papers so far, fully dedicated to the research of the impact of capital structure on the value of corporations that belong to the agro-food sector of Serbia, so this paper would be a kind of filling the evident reference list gap. Also, the references outside of Serbia do not abound with a multitude of papers dedicated to the specifics of the analyzed issues in corporations from the agricultural and/or agri-food sector, which further increases the contribution of this research.

Besides the introduction and conclusion, the paper consists of third parts. The first part of the paper will be dedicated to the previous research. The second part will elaborate the research methodology and describe the sample. The results of the research and discussions will be given in the third part of the paper.

Previous research and hypothesis development

The theoretical debates about the composition of debts and share capital that maximize the value of the corporation, which have been present for decades, still do not stop, which makes the capital structure a constantly current financial phenomenon. Actually, there is still no single position on the optimal limit of corporate debt ratio in the form of a generally valid norm that maximizes the value of a corporation. However, one thing is certain - due to the ever-present degree of risk that the corporation may face financial difficulties, the debt ratio has an objective limit beyond which it is not profitable or it is not possible to further increase the level of debt in the capital structure

Serbia belongs to the group of predominantly agrarian countries, so the agro-food sector is considered one of the most important economic sectors. The agro-food sector has a significant share in employment and gross domestic product, as well as a contribution to reducing the foreign trade deficit (Gajić and Zekić, 2013). Compared to neighboring countries that are members of the EU, Serbia has a high share of the agro-food sector in gross value added and a high share in exports (Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024). Consequently, considering the issues of capital structure optimization and its

impact on the values of corporations in this sector can be considered a significant step towards improving the business operations of agro-food corporations and the development of this sector as a whole.

Simonovska, Gjosevski, and Campos (2012) researched the effect of capital structure on financial performance on a sample of companies from the Macedonian agricultural sector. Panel data consisted of 26 Macedonian agricultural companies during the period 2006-2010. The results of the research indicate that Macedonian agricultural companies have an average debt ratio of 0.45 and follow a financial strategy that corresponds to the model of the Pecking order theory. Also, the results of the research indicate that there is no statistical evidence that would confirm the hypothesis that the growth of the debt ratio leads to an increase in financial performance. The authors explain this by the increased risk exposure conditioned by the information asymmetry between the national market, the credit market, and agricultural companies. Mugera and Nyambane (2014) analyzed the impact of debt structure on the financial performance of Broadacre farms in Western Australia using a 10-year unbalanced panel. In conclusion, they point out that the short-term debt ratio has a negative impact on ROA and the long-term debt ratio has no effect on ROA. Buluma, Kung'u, and Gichohi (2017) also concluded that the capital structure has no statistically significant impact on the financial performance of dairy co-operative societies in Nakuru North Sub country, Kenya.

When researching the effect of capital structure on the performance of agricultural and agro-allied companies in Nigeria, Grace, Sunday and Monday Nweke (2018) found out that capital structure has a positive statistically significant impact on returns on investments. Accordingly, they point out that the capital structure is the main determinant of the performance of agricultural and agro-allied companies in Nigeria and they suggest that the financial managers of these companies should have adequate plans before making the capital structure decision to avoid the negative effects of bad financial choices. The positive impact of the long-term debt ratio on the profitability of food and beverage companies in Nigeria over ten years is also confirmed by the results of the Maria and Udeh (2019) survey. Moki Masavi, Kiweu and Kinyili (2017) came to the same conclusion researching the impact of capital structure on the financial performance of agricultural companies listed in the Nairobi securities exchange and indicate that debt ratio growth affects a significant reduction in after-tax profits. The need for managers to have a strategic approach when choosing the capital structure at Food and Beverages Industry in Vietnam, Nguyen et.al. (2020) is pointed out as the conclusion of a survey conducted on a sample of 22 corporations over eight years because they found a positive impact of capital structure on the value of Food and Beverages Industry companies. Siregar, Anggraenl, and Pranowo (2019) indicate that agribusiness companies in the Indonesian stock exchange can maintain an optimal capital structure because the capital structure has a positive impact on the value of companies, which is in line with the Trade-off theory of capital structure.

However, Stekla and Grycova (2016) who observed the relationship between profitability and capital structure of agricultural holdings in the Czech Republic over a period of six years, conclude that the capital structure has a negative impact on profitability. The negative impact of capital structure on the profitability and value of corporations of food and beverage companies, listed in the Indonesia Stock Exchange during 2010-2012, was disclosed by Manurung Suhadak Nila Firdausi Nuzula (2014) in her research. The results of a study by InunJariya (2015), conducted on a sample of listed companies in the Beverage, Food, and Tobacco industry in Sri Lanka, also indicate a negative statistically significant impact of capital structure on company profitability. Sahari, Abdul Rahim and Tinggi (2019) point out that in food-producing firms in Malaysia the capital structure is inversely proportional related to firm performance.

The results of empirical studies are not unique, but they reveal that the choice of capital structure can significantly determine the survival, growth, and development of a corporation; accordingly, the first hypothesis of the research is:

H1: The capital structure has a statistically significant impact on the value of corporations in the agro-food sector

For additional analysis, starting from the position that the capital structure for which the weighted average cost of capital is minimal, unless the cash flows are very small, can provide the maximum value of the corporation and that the nature of the impact of capital structure on the corporation value depends on the profitability of investment projects (McConnell and Servaes, 1995), another hypothesis was developed. Therefore, the fact that the operating profit is a form of results before the payment of interest and taxes is taken into account and that it represents the first condition for achieving tax shield and a positive signal that the corporation will be able to increase its value. Consequently, it can be assumed that the corporation value increases with the growth of debt ratio as long as the corporation achieves a positive operating result, so the second research hypothesis is:

H2: The value of an agro-food corporation with a positive operating result increases with increasing debt ratio.

Data and Methodology

The empirical research was conducted on a sample of all corporations belonging to the agro-food sector and whose shares were traded on the regulated market (Prime listing, Standard listing, Open market) of the Belgrade Stock Exchange in the period from 2011 to 2018. The sample consists of a total of 14 corporations, while the balanced panel makes 112 observations. Testing the second hypothesis implied that observations that characterize operating loss were excluded from consideration. In this case, the

regression analysis included 88 observations that characterize operating profit. Data were collected, primarily, from the websites of the Belgrade Stock Exchange (*www. belex.rs*) and the Serbian Business Register Agency (*www.apr.gov.rs*). The structure of the sample is given in *Table 1*.

Table 1. Sample structure

Characteristics	in %
Sample structure by the size of corporations	
Large	64.29
Medium	35.71
Sample structure by age of corporations	
from 0 to 20	14.29
from 20 to 40	57.14
over 40	28.57

Source: Authors calculations

According to the official criteria and thresholds from Article 6 of the Law on Accounting *("Official Gazette of the RS", No. 62/2013 and No. 30/2018*) for classification of legal entities by size, about two-thirds of the sample are large corporations. When it comes to the ages of corporations, approximately 86% of the sample are corporations with a tradition of more than 20 years. It can be said that the sample is dominated by large mature corporations.

Before testing the hypotheses, correlation analysis, and repeated measures ANOVA analysis were performed. The correlation analysis was performed by estimating Pearson's and Spearman's correlation coefficients. The purpose of repeated measures ANOVA analysis is to take into account any deviations in the values of variables over time when making conclusions. The research is based on the market and book values of corporations at the end of the observed years.

The applied research methodology is based on the methodology used in the empirical studies Simonovska, Gjosevski and Campos (2012) and Grace, Sunday and Monday Nweke (2018). A regression panel was used to test the hypotheses. In addition to the Pooled Ordinary Least Squares Model (Pooled OLS Model), the Fix Effects Model (FE Model) and the Random Effects Model (RE Model) were used to estimate the regression coefficients. To choose between the FE Model and RE Model, the Hausman test was used.

The capital structure is approximated by two variables: long-term debt ratio (LDA) - the ratio of long-term debt to total capital and total debt ratio (DA) - the ratio of total debt and total capital. The natural logarithm of the total assets was used to

approximate the size of the corporation (SIZE). The variables of capital structure and corporation size in the regression model represent independent variables.

The value of a corporation, as a dependent variable, is measured by Tobin's Q ratio (Q), more precisely by the ratio of the total market value of the corporation and the value (cost) of replacing their tangible assets. To take into account the importance of the macroeconomic environment during the research, the inflation rate was defined as a control variable and was taken from the official documents of the Statistical Office of the Republic of Serbia (www.stat.gov.rs).

To test both hypotheses, the following regression model was formed:

$$Q_{it} = \beta_0 + \beta_1 LDA_{it} + \beta_2 DA_{it} + \beta_3 SIZE_{it} + \beta_4 INF_{it} + \varepsilon_{it} \tag{1}$$

The model allows the analysis of the influence of control and independent variables on the value of the corporation, measured by Tobin's Q.

Results and discussion

The results of the descriptive statistical analysis are presented in *Table 2*. The difference in the average value and median long-term debt ratio can be explained by the fact that half of the corporations in the sample do not have long-term debts or have a long-term debt ratio between 1% and 5%. Compared to the average level of the long-term debt ratio of agricultural holdings in the Czech Republic, it can be concluded that the observed corporations in Serbia have a lower level of the long-term debt ratio. Although the median value of the total debt ratio is close to the average value, it can be noticed that some corporations operate almost without borrowed capital, while for some almost all the capital is equal to the borrowed capital. The average level of the total debt ratio of Serbian agro-food corporations corresponds to the average level of the total debt ratio of agricultural and agro-allied companies in Macedonia, Nigeria and the Czech Republic.

Table 2. Results of the descriptive statistical analysis for analyzed corporations from 2011 to 2018

	Mean	Median	Std. Dev.	Minimum	Maximum
LDA	0.1456	0.0524	0.2235	0.0000	0.9323
DA	0.4399	0.4139	0.2633	0.0000	0.9424
Q	0.8419	0.8467	0.4296	0.0381	2.4262
SIZE	15.3665	15.4906	1.1887	12.8604	17.8831
INF	3.9000	2.1000	3.5815	1.5000	12.2000

Source: Authors calculations

The average value of Tobin's Q ratio is 0.84, which means that more must be paid for the purchase of individual assets in the product market than is paid for the entire corporation belonging to the agro-food sector in the financial market. However, based on the minimum and maximum values of Tobin's Q ratio, it can be said that the market value of some corporations is significantly lower than the value of replacing their tangible assets, while in some corporations it is significantly higher and indicates their good growth prospects. Tobin's Q ratio in Serbian agro-food corporations corresponds to Tobin's Q ratio determined on a sample of corporations from Central, Eastern, and Southeastern Europe, which averages 0.824 (Koteski, Josheski and Magdinceva-Sopova, 2015). This similarity is not surprising given the similarity in the socio-political system between Serbia and the observed group of countries, as well as the degree and speed of economic development that characterizes the transition economies to which Serbia belongs. The maximum and minimum value of the SIZE variable indicate significant differences in the size of the total assets with which the observed corporations operate. The inflation rate in the observed period averaged 3.9%, but its value ranged from 1.5% to 12.2%.

Having in mind the results of the correlation analysis given in *Table 3.*, it can be said that the value of the corporation has a statistically significant positive relationship with both variables of capital structure and asset size.

Table 3. Pearson's and Spearman's correlation coefficients for analyzed corporations from 2011 to 2018

	Q	LDA	DA	SIZE	INF
Q		0.2957***	0.4652***	0.4987***	-0.0312
LDA	0.1918**		0.4841***	0.3177***	-0.1344
DA	0.3739***	0.6896***		0.6033***	-0.0477
SIZE	0.5284***	0.3382***	0.5802***		-0.0476
INF	-0.0574	-0.0652	-0.0435	-0.0451	

Notes: Pearson's correlation coefficients are below the diagonal. Spearman's correlation coefficients are above the diagonal. Statistically significant at 5% (**) and 1% (***);
Source: Authors calculations

Repeated measures ANOVA analysis was conducted as a supplement to the correlation analysis. The results given in *Table 4.* indicate that the values of the analyzed variables do not differ statistically significantly by years, so the entire observation period can be considered representative of the conducted analysis and making correct conclusions.

Table 4. Repeated measures ANOVA for variables from a sample from 2011 to 2018

	Wilks' lambda	F - value	Partial eta-squared	p - value
LDA	0.784	2.016	0.171	0.225
DA	0.854	1.321	0.158	0.411
Q	0.818	1.794	0.124	0.154
SIZE	0.910	0.763	0.194	0.267

Source: Authors calculations

The results of testing the first hypothesis are given in *Table 5*. Having in mind the results of the Hausman test, the score of the coefficients of the observed variables was conducted using the FE Model. Accordingly, the coefficient score obtained by applying the FE Model includes individual effects specific to each corporation that is constant over time. It can be noticed that the results of the FE Model lead to almost the same conclusions as the results of the Pooled OLS Model, which confirms the robustness of the set regression model. The regression model is valid in both cases, in the Pooled OLS Model; the independent variables used in the model explain approximately 27% of the variability in the value of the corporation, while in the FE Model the explained variability is around 59%. The level of the total debt ratio has a positive statistically significant impact on the value of agri-food corporations. The impact of the long-term debt ratio is also statistically significant, but negative. The size of the corporation also has a positive statistically significant impact on the value of agro-food corporations, while the impact of inflation is not at a statistically significant level.

Table 5. Influence of capital structure on the value of Serbian agro-food corporations from 2011 to 2018

	Q (dependent variable)	
	Pooled Ordinary Least Squares	*Fix Effects Model*
C	-1.8744*** (-3.5700)	4.2341*** (3.1579)
LDA	-0.1258** (-2.2634)	-0.8519*** (-3.5819)
DA	0.2483** (2.0562)	0.4283* (1.9111)
SIZE	0.1684*** (4.6045)	0.2250** (2.5579)

	Q (dependent variable)	
	Pooled Ordinary Least Squares	*Fix Effects Model*
INF	0.0096 (0.9835)	0.0004 (0.0533)
Adjusted R²	0.2683	0.5940
F	10.9947***	10.3809***

Notes: n=112; Statistically significant at 10% (*), 5% (**) and 1% (***). Hausman test: Chi-Sq Statistic 28.0859 (Prob. 0,000);

Source: Authors calculations

The noticed positive influence of the corporation size on the value of the corporation is in line with the attitude and results of the research of Berger and Bonaccorsi di Patti (2006) who point out that the size of the corporation is an important determinant of the value of the corporation. They also explain that the reason for the positive impact of corporate size on corporate value is that large ones are more diversified than small and medium-sized corporations; they are better managed, have a higher threshold of risk tolerance, and do not have too many difficulties in solving information asymmetry, which in this case can be explained by the fact that the sample is dominated by large and mature corporations from the agro-food sector.

Given that the results indicate that both variables to which the capital structure is approximated have a statistically significant impact on the value of agro-food corporations, it can be said that there is not enough statistically significant evidence to reject the first hypothesis. Actually, it can be said that the choice of capital structure has statistically significant implications for the value of agro-food corporations, indicating the importance of this decision by financial management.

The results of testing the second hypothesis are given in *Table 6*. As in testing the first hypothesis according to the results of the Hausman test, the score of the coefficients of the observed variables was performed using the FE Model. Based on the results of both models, it can be noticed that the robustness of the set regression model was confirmed in this case as well. The regression model is valid in both cases, in the Pooled OLS Model; the independent variables used in the model explain approximately 17% of the variability in the value of corporations, while in the FE Model the explained variability ranges around 64%. The level of debt ratio (long-term and total) has a positive statistically significant impact on the value of the agro-food corporation with operating profit. Also, the size of corporations has a positive statistically significant impact on the value of an agro-food corporation with operating profit, while the impact of inflation is not at a statistically significant level.

Table 6. Influence of capital structure on the value of Serbian agro-food corporations that make positive operating earnings from 2011 to 2018

	Q (dependent variable)	
	Pooled Ordinary Least Squares	*Fix Effects Model*
C	-1.4992** (-2.1829)	1.3691*** (5.3656)
LDA	0.2934** (2.0309)	0.9845*** (3.7978)
DA	0.3589** (2.1212)	0.6197** (2.4114)
SIZE	0.1451*** (3.0976)	0.5500*** (4.8614)
INF	0.0062 (0.5278)	0.0133 (1.5307)
Adjusted R^2	0.1658	0.6373
F	5.2243***	9.7858***

Notes: n=88; Statistically significant at 10% (*), 5% (**) and 1% (***). Hausman test: Chi-Sq Statistic 44.5313 (Prob. 0.000).
Source: Authors calculations

Taking into account that the results indicate that both variables that approximate the capital structure have a positive statistically significant impact on the value of agro-food corporations with the positive operating result, it can be said that there is not enough statistically significant evidence to reject the second hypothesis. It can be said that the increase in the level of the debt ratio of agro-food corporations that achieve an operating profit affects the growth of their value. This can be explained by the fact that an operating profit is the first precondition for interest payment and a signal that the agro-food corporation engages its operating funds and uses borrowed resources in a profitable way. The profitability of an investment project is especially important for the impact of the level of the long-term debt ratio on the value of agro-food corporations because depending on it, the nature of that impact changes. This corresponds to the conclusion of Grace, Sunday, and Monday Nweke (2018) that financial managers of agricultural and agro-allied companies should especially take into account the use of long-term debt here because of its high cost of repayment. The observed characteristic of companies in Serbia speaks in favor of the fact that financial managers should pay special attention to long-term debt, and that is that the increase in the long-term debt ratio is often accompanied by an increase in losses (Ranković, 2011).

McConnell and Servaes (1995) explain the results of their study, which are consistent with the obtained results, by the fact that the level of the debt ratio has a fundamentally

different impact on the value of the corporation depending on the return on investment; respectively profitable investment provides a positive impact of capital structure on the value of the corporation, and vice versa. In the context of the conducted research, and having in mind the numerous limitations that characterize the agricultural development and consequently the food industry in the Western Balkans, and thus in Serbia, which are reflected in low productivity, the use of outdated techniques and technology, low level of investment, low income and lack of alternative types of financing (Stojadinović Jovanović and Dašić 2015), the significance of the obtained results is even greater. Namely, they point out that agro-food corporations in Serbia that can overcome the mentioned limitations in their business can operate profitably and provide a positive effect of capital structure on the value of the corporation, even though in the agriculture and processing industry operating profitability has declined in the last three years of the observed period (Živanović, 2019 and 2018). Accordingly, it can be said that the choice of capital structure in corporations from the agro-food sector in Serbia has a significant impact on the value of corporations, but the profitability of operations significantly determines the nature of this impact.

Conclusions

The choice of the optimal capital structure is one of the essential problems faced by corporate-type companies, which is why the interest in this issue is still not waning. Although the debate over whether there is a level of the debt ratio, in the form of a generally valid norm, which maximizes the value of a corporation, has been going on for decades, there is still no single position on the optimal limit of the corporate debt ratio. However, one thing is certain - due to the ever-present degree of risk that the corporation may face financial difficulties, the level of debt ratio has an objective limit beyond which it is not profitable or it is not possible to further increase the level of debt in the capital structure.

The results of the research indicate that agro-food corporations in Serbia, compared to the results of previous research in this sector, have a lower level of the long-term debt ratio, while the level of total debt ratio corresponds to them. Testing the first hypothesis showed that the capital structure has a statistically significant impact on the value of corporations in the agro-food sector in Serbia, and therefore there is not enough evidence to reject the hypothesis. When testing the second hypothesis, the obtained results indicate that the capital structure has a positive and statistically significant impact on the value of corporations from the agro-food sector in Serbia, which operate with operating profit. Therefore, the second research hypothesis cannot be rejected. Additionally, having in mind the results of the research, it can be said that the capital structure represents a significant determinant of the value of agro-food corporations, so financial managers must have a strategic approach when choosing the capital structure. The profitability of investment projects determines the nature of the impact of the level

of debt ratio on the value of agro-food corporations, which is especially evident in the impact of the level of the long-term debt ratio, which indicates the importance of achieving a positive synergy of financial and investment decisions in agro-food corporations in Serbia.

When it comes to the contribution and significance of this paper, it can be said that the considered issues with a focus on the agro-food sector in Serbia, contribute to filling the gap in the references list. It also draws attention to the importance of the decision to choose the optimal capital structure for agro-food corporations. Apart from that, it provides financial managers of corporations from the agro-food sector in Serbia certain guidelines when making, in the first place financial, but also investment decisions; all of that to create conditions for generating and increasing the value of the corporation. Besides, taking into account the economic importance of the agro-food sector in Serbia and other transition economies, as well as many limiting factors in the development of this sector, the contribution and importance of this paper can be placed in the context of providing guidelines for improving agro-food corporations on the whole.

Despite the mentioned contributions, the conducted research has certain limitations in terms of sample size and structure, research period, an approximation of observed variables, and the applied methodology. Namely, the focus of the research was corporations whose shares were traded on the organized market of the Belgrade Stock Exchange in eight years' time. In the following research, the sample can be extended to companies from the agro-food sector that have a different legal form and the time span can be likewise extended. Also, companies from different countries that belong to the agro-food sector can be included in future research. The market value of the corporation in the research was approximated by Tobin's Q ratio. For future research purposes, accounting indicators can be used to approximate corporation performance, especially if the sample is extended to companies of different legal forms. Regarding the applied methodology, in addition to the panel analysis, the Generalized Method of Moment-GMM or Two-Stage Least Squares-TSLS can be used in future research.

Conflict of interests

The authors declare no conflict of interest

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