PROFITABILITY AND OPTIMAL DEBT LEVEL OF LARGE FIRMS IN SERBIA

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Summary: *The aim of this research is to analyse the impact of debt management on the profitability of firms. The research was conducted for a five-year period from 2016 to 2020, on a sample of 299 large non-financial firms in Serbia. The Generalized Method of Moments (GMM) is used to examine the ratio of the share of total debt in total assets to the profitability expressed through the ROA indicator. The first thing considered is the linear relationship between indebtedness and profitability followed by the nonlinear relationship between indebtedness and profitability. The results of research show that there is a statistically significant correlation and a linear, negative ratio of indebtedness indicators in relation to the profitability of the observed firms. The results of the study do not show a nonlinear (concave) relationship. They show both negative and statistically significant impact of tangibility on the profitability of large companies in Serbia, while company size and inflation do not have a significant impact on profitability.*

Key words: *indebtedness / profitability of firms in Serbia / GMM.*

INTRODUCTION

Profitability is the central indicator of a company's performance. The optimal level of profitability measures the long-term success and thus its

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survival. Since the Modigliani and Miller paper (1958), numerous researches have focused on ways to increase companies' profitability. There is no universal formula to explain why profitability varies among them and whether the optimal debt level exists or not.

There are numerous theories about optimizing the capital structure. Different views on the impact of debt management on a company performance have been noted in papers. Modigliani and Miller (1958) argue that the capital structure is irrelevant. The MM theory assumes that firms operate in a perfect capital market and that there is no taxation of profits implying that the choice of debt or capital has no impact on the capital expenses, i.e., the value of a firm is unaffected by how that firm is financed. The revised MM theory (Modigliani & Miller, 1963) indicates that the level of debt is relevant. Firms with better access to loans are rather privileged in terms of maximizing their value due to the tax shield, but this does not mean that firms should strive to use the maximum amount of debt in their sources of financing.

The trade-off theory of capital structure (Myers, 1984) argues that the capital structure is formed as a compromise between the benefits and costs of debt and one's capital, while taking into account market imperfections such as tax, bankruptcy, and agent expenses. Ross (1977) introduces the Incentive-Signalling Approach in the study of capital structure stating that a firm's value grows with the growth of financial leverage. The growth of leverage increases the market perception of value. Thus, regarding the asymmetric management information in relation to the market, an issue of debt will be perceived positively. Myers and Majluf in the Pecking order theory (1984) argue that there is no optimal or targeted structure of financial leverage. Authors Baker and Wurgler (2002), creators of the Market timing hypothesis, believe that "the current capital structure is the cumulated result of past attempts related to the capital market."

These theories are important for capital structure and imply certain relations which are expected among leverage and profitability. Enterprise indebtedness is important both at the enterprise level and the macroeconomic level due to its impacts. The business operations of firms in the real sector in Serbia are characterized by a high level of liabilities in relation to assets and equity, and an orientation towards

external sources of financing. Guided by the research of Kebewar (2013) and Ngo et. al. (2020), the aim of this paper is to answer to following question: What are the impacts of debt management on the profitability of large non-financial firms in Serbia?

Section 2 of this paper presents a review of the literature dealing with the relationship between debt management and profitability. Section 3 presents an analysis of the profitability of large businesses in Serbia and relevant market trends as a basis for the hypotheses. Section 4 presents the research methodology, sample description, and definition of the observed variables. Validation of the model with discussion of the obtained results are presented in Section 5. Section 6 is the conclusion.

THEORETICAL AND EMPIRICAL BACKGROUND

The relationship between debt and company profitability is one of the popular topics in the corporate finance literature. The importance and impact of indebtedness on a company's profitability has contributed to empirical research that has been going on for several decades. So far, no consensus has been reached on the debt-to-profitability ratio. The following is a summary of empirical research in chronological order starting with the latest papers (Table 1).

Most papers that focus on quantifying the impact of indebtedness on profitability use panel data analysis with, GMM, FE or OLS assessment techniques, but the results are contradictory.

Some papers show a statistically significant, linear, and negative relationship between debt management and profitability such as the listed companies in Romania (Vătavu, 2014), non-financial companies in Serbia (Stančić, Janković and Čupić, 2016) where the research shows a negative effect of indebtedness (long-term debt) on profitability (Return on Assets). Stryckova (2017) finds negative effect of debt ratio and ROE on the example of Czech firms. Andersson and Minnema (2018) on the example of Swedish consulting firms show a negative effect of debt (short-term, long-term and total indebtedness) on profitability.

Table 1 –Literature review

Author/s	Sample	Period	Dependent variable	Result
		Method	Independent variable	
Baum, Schäfer and Talavera (2014)	Germany non-financial firms	1988-2000 GMM	ROA Cash/TA, Sales/TA, ST/TL, ST/TA, LT/TA, (ST+LT)/TA	Firms that rely on short-term liabilities have higher profitability
Kebewar (2013)	France Non listed firms, Trade sector	1999-2006 GMM	PROF1, PROF2 ROA DT, DT ² Tang, Tax, Growth	Linear model: Negative Quadratic model: concave relation in SME
Vătavu (2014)	Romania listed firms	2003-2012 GMM	ROA Debt, Tang, Size, Liqu, Tax, Inf, Risk	Negative
Vătavu (2016)	Romania listed firms	2003-2012 GMM	ROA Debt, Tang, Size, Liqu, Tax, Inf, Risk	Nonlinear relationship
Muscettola and Noccato (2016)	Italy SME	2006-2010 Simple linear regression model	ROE, ROA, ROI, ROS, OPD DOE, FDA, DR	In regions with large credit supply, a negative relationship. In regions with low credit supply, the effect is the opposite – more indebted companies are more profitable
Stančić, Janković and Čupić (2016)	Serbia Nonfinancial firms	2008-2012 OLS	LTD ROA, TANG, LIQU, INF	Negative

Anderson and Minnema (2018)	Sweden Consulting firms	2012-2016 OLS and FE	ROA TDA, STA, LDA, SIZE, LIQU, AGE	Negative
Raharja and Mranani (2019)	Indonesia Listed firms	1999-2018 Polynomial regression analysis	EAT TD TD2 SIZE EAT-1	Quadratic model: concave, nonlinear relationship. Indebtedness has a positive effect on profitability up to a certain level after which it is counterproductive.
Basdekis, Christopoulos, Katsampoxakis and Lyras (2020)	EU Car industry	2005-2017 EGLS	ROE DR DR ² GDPGR SIZE ACCRUALS ECBRATE EAESI	Quadratic model: concave, nonlinear relationship. Indebtedness has a positive effect on profitability up to a certain level after which it is counterproductive.
Ngo, Tram and Vu (2020)	Vietnam Listed nonfinancial firms	2009-2017 GMM	PROF (EBIT/TA) DT DT ² SIZE TANG TAX GROWTH	Linear model: negative impact of debt on profitability Quadratic model: concave relation, nonlinear relation statistically significant in SME

Source: Author

Some authors did not establish a negative effect of indebtedness on profitability. Muscettola and Noccarato (2016) confirm the impact of credit supply on the samples of SME in Italy. The high credit supply creates a negative effect of debt on profitability, whereas the low credit supply creates a positive effect. Baumm, Schäfer and Talavera (2014) show a positive effect of a short-term debt to profitability on the example of German non-financial firms. Kebewar (2012) shows on the example of French service firms that the indebtedness has no impact on profitability.

Kebewar (2013) also shows that indebtedness can have a linear or nonlinear impact on profitability using the sample of French unlisted companies from the trade sector. Linear model: negative impact of debt on profitability. Quadratic model: concave, nonlinear, and statistically significant relationship in small and medium enterprises. This research is in line with the research of Ngo, Tram and Vu (2020) on the example of listed firms in Vietnam, the research of EU car companies (Basdekis et al., 2020) and the research of listed companies in Indonesia (Raharja and Mranani, 2019).

PROFITABILITY OF LARGE COMPANIES IN SERBIA

The profitability, measured by the rate of Return on Assets (ROA) of businesses in real sector in Serbia in 2020 was 3.0%. The positive trend in the period from 2014 to 2018 was interrupted in 2019 but recorded a slight increase in 2020. According to the data of the Serbian Business Registers Agency [hereinafter SBRA] (2021, pp11) ROA was 1.6%, 2.5%, 3.4%, 4%, 2.9% and 3% respectively in the period 2015 - 2020.

Large companies in Serbia, although few in number, have a significant impact on the economic parameters. Large systems, as generators of economy, achieved a 41.2% market share in the realized incomes in 2020 and participate with 43.3% of Total Assets and 50.2% of the Total Equity in Serbian economy (2021, pp24).

Serbian economy is recording an increasing trend in total liabilities and indebtedness. In the past five years, total liabilities increased by 7%, total liabilities have grown at an average annual rate of 1.7% (Statistical Office of the Republic of Serbia, 2020, pp71). The indebtedness continues to grow in 2020, among other things, as a consequence of measures aimed at combating the negative effects caused by the coronavirus pandemic in the form of stimulated loans from the guaranteed scheme and loans for liquidity and working capital (SBRA, 2021, pp13). According to the SBRA (2021, pp6) the total liabilities of real sector in 2020 amount to RSD 10,778.8 billion which is an increase of 10.4% compared to the previous year. One third of the liabilities belong to large companies. Liabilities tend to increase faster (increase of 10.4%) than capital (increase of 4.7%) in 2020 (SBRA, 2021, pp13). According to the SBRA (2021, pp13)

the trend is to finance businesses' activities at the expense of suppliers. The indebtedness trend (ratio of total debt and total assets) of real sector and large companies in the observed period is shown in Figure 1. The average debt ratio (DR) of the real sector is 61% in the observed five-year period.

Figure 1. *Debt (DR) in real sector and large companies in Serbia*

Source: Author's calculation based on data by SBRA

The Return on Asset (ROA) trend in Serbian economy and large enterprises in the observed period is shown in Figure 2. The ROA of the real sector in Serbia in average is 3.16%. The ROA indicator of profitability of 299 large companies in Serbia varies in the observed period, but it is higher than the real sector average (SBRA, 2021).

Figure 2 *ROA in real sector and large companies in Serbia*

Source: Authors' calculation based on data by SBRA

DATA AND METHODOLOGY

The subject of this paper is the analysis of the impact of debt trends on the profitability of large firms in Serbia for the period from 2016 to 2020 in order to determine whether debt management in the observed period contributes to higher profitability. The companies included in the analysis are active, non-financial companies for which there are available financial data for the period from 2016 to 2020 on the date of data collection and which are classified as large companies in 2020 in accordance with Article 6 of the Law on Accounting (Law on Accounting, Official Gazette of the RS, 2019). Large companies are businesses that meet two of the three criteria: average number of employees 250, revenue EUR 40,000,000 converted in RSD and the value of total assets at the balance sheet date EUR 20,000,000 converted in RSD. According to the data of the Serbian Business Registers Agency, there were 422 large companies in Serbia in 2020, but only 299 of them met the stated criteria, so the sample includes 299 large companies. These enterprises were selected due to its importance to the Serbian economy. Large companies achieve 41.2% market share in total real economy revenues in 2020 (SBRA, 2021, p. 24). The data set for the analysis was done using the database SBRA. However, the final database was put together manually, computed, and constructed by the author, including manual calculation of ratios. The sample includes 299 firms ($N=299$) and a five-year period ($T=5$) which resulted in total of 1,495 observations for the study.

The selection of dependent and independent variables was made on the basis of literature analysis. Profitability is a dependent variable in this research, most commonly measured using ROE and ROA. In this research, Return on Assets (ROA) = Net profit / Total Asset was selected. The study is based on the debt ratio (DR), leading variable for debt management and is defined as $(DR) = (\text{Total debt: long term} + \text{short term}) / \text{Total asset}$, according to the research (Kebewar, 2013; Ngo, Tram and Vu, 2020; Basdekis et al., 2020 and Raharja and Mranani, 2019). In line with the previous research (Kebewar, 2013; Ngo, Tram and Vu, 2020; Basdekis et al., 2020 and Raharja and Mranani, 2019) quadratic model was analysed to examine nonlinear impact of debt on profitability. This study introduces another independent variable square debt ratio (DR^2).

Based on the previously conducted studies, control variables are included in the model in order to improve it and to explain the profitability of large firms in Serbia that are not captured by debt ratio. The Asset Size Indicator (Size) is the natural logarithm of an asset and expresses the impact of asset size on a company's profitability. In the results of research by many authors, there is no clear consensus regarding the relationship between asset size and profitability. Kebewar (2013) and Basdekis et al. (2020) found that there is no relationship between size and profitability while the authors Gabrijelčić et al. (2013), Andersson and Minnema (2018) and Ngo et al. (2020) found a positive relationship which implies that larger firms achieve higher productivity. The control variable is also the tangibility of assets (TANG): total tangible assets / total assets. Authors Stančić, Janković Čupić (2016) show a negative ratio in production facilities but not in service firms, authors Vätavu (2014) and Ngo et al. (2020) found a negative relationship between tangibility and profitability. The third control variable is inflation. The data on the inflation rate was taken from the report of the National Bank of Serbia (NBS, 2021) in order to take into account, the impact of the macroeconomic environment during the observed five-year period. Inflation in this study is presented as the INF variable. Research has shown that inflation may have a negative influence on profitability (Vätavu, 2014) and also that there is no impact on profitability (Stančić et al., 2016).

The aim of the analysis is to prove or disprove the hypotheses formulated by the research:

H1: There is a linear and negative correlation between debt management (DR) indicators and firms' profitability.

H2: There is no linear relationship between debt management indicators (DR) and the profitability, but the optimal level, above which profitability of firms decreases.

As a research method, dynamic panel analysis is widely used in economic research in which the current value of a variable, for example ROA, depends on the value of the same variable from previous periods. The optimal choice is a dynamic model because the autocorrelation, i.e., a situation in which relation errors in time t affect relation errors in time $t+1$, is not included in the assumptions of static models. The following

empirical model is formulated to analyse the influence of debt management on the profitability of the observed enterprises:

$$ROA_{i,t} = \beta_0 + \beta_1 DR_{i,t} + \beta_2 Size_{i,t} + \beta_3 Tang_{i,t} + \beta_4 INF_{i,t} + \beta_5 ROA_{i,t-1} + \sum_{n=1}^5 \beta_n dumt_n + n_i + \varepsilon_{i,t} \quad (1)$$

where i represents the number of observed firms in Serbia ($i=1...299$) and t represents the time period 2016-2020 ($t=1...5$). The dependent variable is profitability (ROA), the independent variable is the debt ratio (DR), while Size, Tang and INF represent the control variables of size, tangibility, and inflation. The presence of the dependent variable from the previous period ($ROA_{i,t-1}$) as an independent variable in the dynamic model allows control of bias and inconsistency. The time influence is taken into account by introducing a binary (dumt) variable that takes into consideration the specific effect of the year (2016-2020). The regression coefficients with independent variables are β , the individual fixed effect of the firms is n_i and a ε it is a random error.

A quadratic model that takes into account the square of the debt ratio in the regression equation was applied in order to examine the nonlinear relationship between debt and profitability:

$$ROA_{i,t} = \beta_0 + \beta_1 DR_{i,t} + \beta_2 DR_{i,t}^2 + \beta_3 Size_{i,t} + \beta_4 Tang_{i,t} + \beta_5 INF_{i,t} + \beta_6 ROA_{i,t-1} + \sum_{n=1}^5 \beta_n dumt_n + n_i + \varepsilon_{i,t} \quad (2)$$

Hypothesis 1 tests a linear effect where the coefficient β_1 is 0.

Hypothesis 2 tests a non-linear effect where high debt ratio should have positive values.

ANALYSIS, RESULTS AND DISCUSSION

The research covers the period from 2016 to 2020. The data sources used in the research are the financial statements obtained from the SBRA. However, the final database as well as the ratio analysis, was compiled manually, computed, and made by the author.

The results of descriptive statistics for the sample are shown in Table 2. The table shows the average values, standard deviation, minimum and maximum values of the observed variables. These variables comprise data from 1,495 observations. ROA is a dependent and a central variable for

answering the research question. Most theories believe that a good level of profitability for ROA is greater than 10%. The statistics show that the average profitability of large enterprises (ROA) in Serbia in a period of five years is 0.0358 or 3.58% which can be considered low profitability. The average ROA values were adjusted after applying the Winsorizing method in STATA due to extreme values. The value of ROA is comparable to the ratios presented by listed firms in Romania 3.9% (Vătavu, 2016) and below those recorded in the trade sector in France 5.8% (Kebewar, 2013), listed firms in Vietnam 8.02% (Ngo et al., 2020) and the car industry in EU 14.4% (Basdekis et al., 2020). The average value of debt ratios for large Serbian firms is 59.17% with a standard deviation 0.3768. The average values of DR were further adjusted as an effect of limiting the maximum value to 2.3665 and minimum to 0.0514 by using the Winsorizing method in STATA for outliers (99th and 1st percentile). The pre-adjusted values for ROA and DR, before using the Winsorizing method in STATA, can be seen in Appendix 1. The size of the observed large firms measured as the natural logarithm of assets averages is 15.70 % yearly, tangibility is 46.98% and inflation on average is 1.93%.

Table 2 *Descriptive statistics for the sample*

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA_wi	1495	.0358012	.1175785	-.6004202	.3682075
DR_wi	1495	.5917819	.3768044	.0514122	2.36651
Size	1495	15.70922	1.141661	12.64528	20.72844
Tang	1495	.4698222	.2616035	.0010055	.9989492
INF	1495	.193804	.0059353	.0125136	.0300625

Source: Authors' calculation based on STATA Statistics v.12.0

The correlation between the observed independent variables is examined first in order to detect a possible problem of multicollinearity that can cause disturbances in the assessment of parameter values, their significance and impact on the dependent variable ROA. The Pearson correlation matrix for the variables is presented in Table 3. Analyzing the correlation matrix, all the statistically significant correlations are of low intensity. In relation to the ROA, statistically significant, negative and moderate correlation with debt ratio (DR) and statistically significant,

positive and low correlation with a firm's size (Size) was noted as well as negative and low correlation with tangibility (Tang); positive and weak correlation with inflation (INF). The correlation between tangibility and size is positive, moderate, and significant. While correlation of debt and the firm size and debt and tangibility is significant, moderate, and negative.

Table 3 *Pearson correlation coefficient*

	ROA_wi	DR_wi	Size	Tang	INF
ROA_wi	1.0000				
DR_wi	-0.4069* 0.0000	1.0000			
Size	0.0010* 0.9680	-0.1348* 0.0000	1.0000		
Tang	-0.0494 0.0562	-0.2519* 0.0000	0.4116* 0.0000	1.0000	
INF	0.0250 0.3331	0.0194 0.4531	-0.0355 0.1706	-0.0052 0.8404	1.0000

* Statistical significance at the level of 5% . Source: Authors' calculation based on STATA Statistics v.12.0

Thus, the precondition for the use of the regression model is the absence of multicollinearity between independent variables. Although this is visible in the Pearson correlation matrix, in order to test the multicollinearity, the author chose to construct a correlation matrix and to conduct the VIF test in STATA. As there is no correlation between two variables that exceed 10 and $1/VIF$ is not below 0.2, it can be concluded that there is no multicollinearity in the model.

Table 4 *VIF test of multicollinearity*

Variable	VIF	1 / VIF
Tang	1.26	0.791133
Size	1.21	0.828483
DR_wi	1.07	0.935096
INF	1.00	0.998333
Mean VIF	1.14	

Source: Authors' calculation based on STATA Statistics v.12.0

A problem of serial correlation ($DW=1.136655$) and heteroskedasticity in the model occur ($BP\ Prob > F= 0.000$ and $F(5.1489) = 20.62$). The GMM method was applied to work around the heteroskedasticity and the endogeneity problem. As suggested by Roodman (2009, pp102) the endogeneity problem was corrected by the instrumental variables $ROA_i, t-1$.

We use linear and nonlinear models to evaluate the relation between dependent (ROA) and independent variable (DR). The results are shown in Tables 5 and 6. The models show that there is no second order of autocorrelation $AR(2)$ and that instruments in our model are valid (the Hansen test).

In the linear model, the results show a negative, linear, and significant impact of debt ratio on profitability and support H1. The results are in line with the results obtained by analysing trade firms in France (Kebewer, 2013), listed firms in Vietnam (Ngo et. al., 2020), firms in the car industry, cement, and sugar sectors in Pakistan (Nazir et. al., 2021), Swedish consulting companies (Andersson and Minnema, 2018), large companies in Serbia (Stančić et. al., 2016), and listed companies in Poland (Anton and Nucu, 2020).

The results of the quadratic model show that coefficient β_1 and β_2 for DR and DR^2 are negative and do not support the H2 (that DR^2 has positive values). The analysis of the trade firms in France (Kebewar 2013, pp10) also did not show nonlinear relation within large firms, only with SME. On the other hand, the quadratic model, concave, and nonlinear relationship are shown in analysis of the listed companies in Indonesia (Raharja and Mranani, 2019), EU car industry (Basdekis et. al., 2020), and the listed companies in Vietnam (Ngo et. al., 2020). In this research, indebtedness has a positive impact on profitability up to a certain level after which it is counterproductive.

Asset tangibility (TANG) shows a negative and statistically significant impact on profitability (ROA), also confirmed by Vătavu (2014), Ngo et. al. (2020) and Stančić et. al. (2016) but only within production facilities, while Kebewar shows positive impact of tangibility on profitability with small and medium sized companies. The size potential (Size) has a positive but not statistically significant impact on profitability (Anderson and Minnema, 2018; Nazir et. al., 2021; Basdekis et. al., 2020), the inflation also has positive but not statistically significant impact on

profitability (Stančić et. al, 2016), while the listed firms in Romania (2016) show nonlinear relationship between inflation and profitability.

Table 5 Results of GMM – linear model

ROA_wi	Model two step system GMM		
Independent variable	Coef.	Corrected Std. Err.	P> t
ROA_wi_l1	.260393	.1122953	0.021*
DR_wi	-.0800185	0.199541	0.000***
Size	.0015555	.0035629	0.663
Tang	-.0419463	.0137982	0.003**
INF	.6456323	.3748868	0.086
No of observations	1196	F(7,298)	68.01
No of groups	299	Prob > F	0.000
No of instruments	11	AR(2)	0.381
Year Dummies	Yes	Hansen test	0.447
Obs per group	4		

Note: * Statistical significance at the level of 5%; ** of 1%; *** of 0.1%. Each equation includes year as dummy variables. p-values are expressed for AR (2) and Hansen statistic. Hansen test is Saragan-Hansen test. AR (2) is test for the second level of autocorrelation. Estimations of the two-step GMM System. Instruments (ROA_wi_l1 as 1 year lag, other variables DR, DR², Size, Tang and INF are exogenous). Source: Authors' calculation based on STATA Statistics v.12.0

Table 6 Results of GMM – nonlinear model

ROA_wi	Model two step system GMM		
Independent variable	Coef.	Corrected Std. Err.	P> t
ROA_wi_l1	.2853832	.1122744	0.012*
DR_wi	-.0624745	.017407	0.000***
DR ²	-.002682	.0006337	0.000***
Size	.0009667	.0033745	0.775
Tang	-.0380962	.0132224	0.004**
INF	.5729852	.372428	0.125
No of observations	1196	F (8,298)	69.90
No of groups	299	Prob > F	0.000
No of instruments	12	AR(2)	0.219
Year Dummies	Yes	Hansen test	0.367
Obs per group	4		

* Statistical significance at the level of 5%; ** of 1%; *** of 0.1%. Each equation includes years as dummy variables. p-values are expressed for AR (2) and Hansen statistics. The Hansen test is the Saragan-Hansen test. AR (2) is a test for the second level of autocorrelation. Estimations of the two-step GMM System. Instruments (ROA_wi_l1 as 1 year lag, other variables DR, DR², Size, Tang and INF are exogenous). Source: Authors' calculation based in STATA Statistics v.12.0

CONCLUSION

The conclusion on the optimal relationship of debt and profitability are not consistent in the empirical studies. The results of this study on a sample of large firms in Serbia in a five-year period (2016-2020) indicate that debt management, measured by share of total debt in total assets, has statistically significant, negative, and linear influence of profitability. The increased level of debt of large companies in Serbia decreases profitability. The results support the capital structure theory by Myers and Majluf (1984) which states that internal financing leads to a reduced level of indebtedness and negative relations to profitability.

The second hypothesis which states there is no linear relationship between debt management (DR) and profitability is not confirmed.

Tangibility and profitability have a significant and negative relationship. Enterprise size potential and inflation have a positive but not statistically significant influence on profitability. Many internal factors affect a firm's business performance, and their recognition can significantly improve the business performance.

Large companies in Serbia, although few in number, have a great influence on economic parameters and are generators of Serbian economy. They participate with 41.2% in total realized revenues of the Serbian economy in 2020 and employ 32% of workers (SBRA, 2021, pp9 and pp24). They have an average profitability of 0.0358 in the observed five-year period which indicates that on average only 3.58% of company assets are retained as net profit.

Further research might take into consideration more determinations of profitability that have a significant influence on profitability and are not included in this model. Also, future research can take into account sector analysis and longer observation periods as well as SME analysis. As the economy is affected by Covid-19 (the coronavirus), future research may be focused on examining the speed of adjustment and/or recovery of debt management during the financial crisis or pandemic period.

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Appendix no 1. Minimum and maximum values before and after Winsorized adjustment

	All observations		Extreme values excluded	
	Min	Max	Min	Max
ROA	-2368.346	3.364722	-.6004202	.3682075
DR	.0293719	13.34359	.0514122	2.36651
Size	12.64528	20.72844	12.64528	20.72844
Tang	.0010055	.9989492	.0010055	.9989492
INF	.0125136	.0300625	.0125136	.0300625

Source: Authors' calculation based on STATA Statistics v.12.0

PROFITABILNOST I OPTIMALNI NIVO DUGA KOD VELIKIH PREDUZEĆA U SRBIJI

Milošev Ivana

Sažetak: Cilj rada je analiza uticaja upravljanja dugom na profitabilnost preduzeća. Istraživanje je sprovedeno za petogodišnji period od 2016. do 2020. godine, na uzorku 299 velikih nefinansijskih preduzeća u Srbiji. Primenom dinamičkog panela generalizovanom metodom momenata (GMM) ispitan je odnos učešća ukupnog duga u ukupnoj imovini na profitabilnost preduzeća izražene kroz ROA pokazatelj. Prvo je istraženo da li postoji linearan odnos zaduženosti i profitabilnosti, zatim je istraženo da li postoji nelinearan odnos zaduženosti i profitabilnosti. Rezultati istraživanja pokazuju da postoji statistički značajna korelacija i linearan, negativan odnos pokazatelja zaduženosti u odnosu na profitabilnost posmatranih preduzeća. Rezultati istraživanja nisu pokazala nelinearan (konkavan) odnos. Istraživanje pokazuje i negativan i statistički značajan uticaj materijalnosti imovine na profitabilnost velikih preduzeća u Srbiji, dok veličina preduzeća i inflacija nemaju značajan uticaj na profitabilnost.

Ključne reči: zaduženost, profitabilnost preduzeća u Srbiji, GMM.