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# IMPACT OF FIRM SPECIFIC FACTORS ON PROFITABILITY OF INDUSTRIAL GRINDING COMPANIES

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## ABSTRACT

In this paper, panel ordinary least squares model of industrial grinding companies listed on Belgrade Stock Exchange was used for examining the determinants of profitability. For this purpose, 62 observations of companies over the period of 2008 – 2014 were included. Return on equity considered as a measure for profitability is a dependent variable whereas size, leverage, years of firm existence, number of stock and book value per share are considered as independent variables. According to the findings, leverage, number of stock and book value per share are statistically significant of inverse relationship with profitability for selected listed industrial grinding companies in Serbia. Size (+) and age (-) indicate insignificant impacts on profitability. The results revealed that all independent variables explain 84.4% of the variance on return on equity. The results of Granger causality test indicated causality between profitability and leverage, profitability and number of stocks are bidirectional.

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## Introduction

Firms' profitability and ways of improving it are hotly debated issues among managers and scholars. Identification of the sources of variation in firm level profitability is an important research theme in economics, strategic management and accounting and finance (Goddard, Tavakoli & Wilson, 2005). It is known that the determinants of the profitability of manufacturing firms are very important in accordance with the economic development of any country, therefore, more research in this area is necessary. Stekla and Grycova (2016) said that the capital structure decision is very important because a bad decision can affect a company's profitability leading to a decrease in the shareholders' value. Several empirical studies have attempted to identify firm profitability determinants, focusing on firms in different industry sectors and in different periods (e.g. McDonald, 1999; Adams and Buckle, 2003; Yazdanfar, 2013; Tomsik et al., 2016; Kroupova, 2016). Profitability of the firm is highly influenced by internal and external variables.

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The study therefore proposed the following research questions:

1. What is the relationship between Firm size and corporate profitability?
2. What is the relationship between Years of firm existence and corporate profitability?
3. What is the relationship between Financial Leverage and corporate profitability?
4. What is the relationship between Number of stock and corporate profitability?
5. What is the relationship between Book value per share and corporate profitability?

#### Objectives of the Study

The objectives of the study are to:

1. Analyze the relationship between Firm size and corporate profitability?
2. Analyze the relationship between Years of firm existence and corporate profitability?
3. Analyze the relationship between Financial Leverage and corporate profitability?
4. Analyze the relationship between Number of stock and corporate profitability?
5. Analyze the relationship between Book value per share and corporate profitability?

#### The Tested Hypotheses

This study tests the following five null hypotheses: The following hypotheses have been developed to achieve the stated objectives

H01: There is statistical significant relationship between firm's size and profitability of industrial grinding companies in Serbia

H02: There is statistical significant relationship between years of firm existence and profitability of industrial grinding companies in Serbia

H03: There is statistical significant relationship between financial leverage and profitability of industrial grinding companies in Serbia

H04: There is statistical significant relationship between quotation on the stock exchange (number of stocks) and profitability of industrial grinding companies in Serbia

H05: There is statistical significant relationship between book value per share and profitability of industrial grinding companies in Serbia

Current studies do indicate that panel data analysis is more suitable than other methods of study in determining the profitability of manufacturing companies. Therefore, this research paper also hopes to explore the relative importance of determinant of profitability of industrial grinding companies in Serbia by using the panel data analysis.

Pratheepan (2014) concluded that size is statistically significant of positive relationship with profitability (Return on assets) whereas tangibility showed statistically significant of inverse relationship with profitability for selected listed manufacturing companies in Sri Lanka. Leverage and liquidity indicated insignificant impacts on profitability.

Sivathaasan et al. (2013) investigated whether factors such as capital structure, working capital, firm size, non-debt tax shield and growth rate, determining profitability have any impact on profitability of selected manufacturing companies listed on Colombo stock exchange, Sri Lanka over a period of five years from 2008 to 2012. The results revealed that whereas all independent variables explain 76.6% and 84.7% of the variance on ROA and ROE respectively where significant is at 5% levels. Further, while capital structure (+) and non-debt tax shield (+) have statistically significant impact on profitability, the remaining working capital (+), growth rate (-) and firm size (+) have no significant effect on the profitability.

Azhagaiah and Deepa (2012) showed that volatility and growth are the major predictors in determining profitability in case of small size firms while growth is important in determining the profitability of medium size firms. Capital intensity has a significant positive coefficient with the profitability of large size firms. The overall result showed that the larger the size of the firm, the more the investment in long lived assets has helped to increase the profitability of the firm unlike the trend in cases of small size and medium size firms.

Vătavu (2014) established the determinants of financial performance in 126 Romanian companies listed on the Bucharest Stock Exchange, over a period of ten-years (2003-2012). Regression results indicated that profitable companies operate with limited borrowings. Tangibility, business risk and the level of taxation have a negative impact on return on assets. Although earnings are sustained by significant sales turnover, performance is affected by high levels of liquidity. Periods of unstable economic conditions, reflected by high inflation rates and the current financial crisis, have a strong negative impact on corporate performance.

Bhayani (2010) covered the all listed cement firms working in India for the period of 2001 to 2008. To determinant profitability backward regression analysis were used on the variables of the study. The result of the study showed that liquidity, age of the firm, operating profit ratio, interest rate and inflation rate has played a vital role in the determination of the profitability of Indian Cement Industry.

Al-Jafari and Al Samman (2015) investigated the determinants of profitability for industrial firms in Oman. Therefore, a sample of 17 industrial companies listed on Muscat securities market covering the period from 2006 till 2013 is utilized. Results from the panel ordinary least squares model revealed a positive and statistical significant relationship between profitability, the firm size, growth, fixed assets and working capital. On the other hand, the average tax rate and the financial leverage variables showed a negative relationship with profitability. However, this relationship was significant only for the financial leverage variable. The study concluded that large growing firms with efficiently managed assets improve revenue and ultimately enhance profitability.

Stekla and Grycova (2016) found a negative relationship between the profitability and debt across of agricultural holdings in the Czech Republic for a period of six years from 2008 to 2013.

## Materials and methods

In summary, studies researching the determinants of profitability have identified several factors. The impact of specific firm factors was derived from previous studies - theoretical and empirical concepts. To analyze the factors which influence the profitability of industrial grinding companies in Serbia.

**Table 1.** Research variables - dependent and independent variables

Symbol		Measurement	Expected sign
<b>Independent variable</b>			
ROE	Profitability	Return on equity	
<b>Dependent variables</b>			
SIZE	Firms' size	Total Assets	+
AGE	Years of firm existence	Number of years of firm existence	+/-
LEV	Leverage ratio	Ratio between total loans and equity	-
STOCK	Quotation on the stock exchange	Number of stocks	-
BV	Capital structure	Book value per stock	-

*Source:* Author

In order to obtain a regression model, it was necessary to determine: which observed factors influence the profitability of industrial grinding companies, by what intensity and in what direction.

The panel ordinary least squares model is used as in equation 1 to examine the effect of the independent variables on the dependent variable of profitability of industrial grinding companies in Serbia, and to test the above five null hypotheses:

$$ROE = \beta_0 + \beta_1 SIZE_{it} + \beta_2 AGE_{it} + \beta_3 LEV_{it} + \beta_4 STOCK_{it} + \beta_5 BV_{it} + \varepsilon_{it} \quad (1)$$

Where:

Profitability: Measured by return on equity (ROE)

$\beta_0$  = Coefficient of Intercept (Constant)

$\beta_1 - \beta_5$  = Coefficients of Slope

$\varepsilon$  = error term.

$i, t$  – company (i) in time (t)

## Results and Discussions

Descriptive statistics for the variables are given in Table 2. The descriptive statistics is based on 9 industrial grinding companies' 7 years data set which includes 62 observations.

**Table 2.** Descriptive statistics of variables

	ROE	SIZE	AGE	LEV	STOCK	BV
<b>Mean</b>	-0.123440	1183790.	16.32258	2.074137	246129.9	11318.53
<b>Median</b>	0.036715	882077.0	16.50000	0.928787	124433.0	1876.152
<b>Maximum</b>	0.580337	3289873.	24.00000	42.21247	1465771.	51398.05
<b>Minimum</b>	-4.323703	91202.00	9.000000	0.046635	32757.00	24.23442
<b>Skewness</b>	-4.722447	0.729367	0.008034	6.482181	2.594759	1.487105
<b>Kurtosis</b>	26.34651	2.183138	1.785200	46.86051	8.006591	3.615555
<b>Jarque-Bera</b>	1638.519	7.220850	3.812991	5403.866	134.3257	23.83083
<b>Probability</b>	0.000000	0.027040	0.148600	0.000000	0.000000	0.000007
<b>Observations</b>	62	62	62	62	62	62

Source: Author

Table 2 comprises the main descriptive statistics for the variables used in the analysis. Furthermore, the table above indicates that there is high variation in return on equity. This result is consistent with high variation in financial leverage variable because higher degree of financial leverage will lead to more volatility in earnings. The correlation matrix for the variables is reported in Table (3).

**Table 3.** Correlation between variables

	ROE	SIZE	STOCK	LEV	AGE	BV
<b>ROE</b>	1					
<b>SIZE</b>	-.153	1				
<b>STOCK</b>	<b>-.517**</b>	<b>-.363**</b>	1			
<b>LEV</b>	<b>-.905**</b>	.156	.467**	1		
<b>AGE</b>	.078	-.125	-.124	-.058	1	
<b>BV</b>	.107	.693**	-.698**	-.151	-.135	1

Source: Author

Note: \*\*Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows that there are negative and significant relationship between return on equity and leverage and number of stock. In addition, we can observe that there is no significant relationship between return on equity and size, age and book value.

One of the requirements for testing a good multi-regression model is the non-linearity of the model between independent variables. It is imperative to check for multi-collinearity between the independent variables before we utilize the regression techniques. In general, there are the tolerance test and the variance inflation factor test (VIF) that can detect multi-collinearity. The tolerance level test represents the reciprocal value of the VIF test and is interpreted as a percentage of the variance of the predictor that is independent of the other predictors. The arbitrary value for the multi-collinearity indicator represents for a VIF amount greater than 10, i.e. tolerance level is less than 0.1. The variance inflation factor (VIF) for the test of multi-collinearity measures the relationship of all predictor variables concurrently. It explains how much the variance of a coefficient is inflated due to linear dependence with other explanatory variables.

**Table 4.** Multi-collinearity statistics - Tolerance test and variance inflation factor

Independent variable	Tolerance (1/VIF)	VIF (>10 collinearity problem)
SIZE	.449	2.228
STOCK	.341	2.936
AGE	.880	1.136
LEV	.655	1.528
BV	.270	3.705
		<b>Mean VIF: 2.3066</b>

*Source:* Author

Values of tolerance test and variance inflation factor in the VIF test are significantly below the critical values and it can be concluded that the assumption of non-existence of multi-collinearity for model was not impaired. The mean value of VIF (Table 4) is 2.3066, less than 10, which confirms the absence of any multi-collinearity, and the VIF test for individual variables does not exceed the maximum value of 10, and therefore there is no need to eliminate certain variables from the regression analysis. It can be concluded that there is no multi-collinearity problem in this regression model. Further diagnostic tests are executed to ascertain the validity of the model.

**Table 5.** Heteroskedasticity Test: ARCH

<b>F-statistic</b>	0.465125	Prob. F(1,59)	0.4979
<b>Obs*R-squared</b>	0.477130	Prob. Chi-Square(1)	0.4897

*Source:* Author

The test for heteroskedasticity (ARCH) also reveals an F-statistic and Obs\*R-squared probability values of 0.4979 and 0.4897 respectively, both of which are greater than 0.05, and indicates the absence of heteroskedasticity.

**Table 6.** Breusch-Godfrey Serial Correlation LM Test

<b>F-statistic</b>	1.408213	Prob. F(2,54)	0.2534
<b>Obs*R-squared</b>	3.073380	Prob. Chi-Square(2)	0.2151

*Source:* Author

Breusch-Godfrey serial correlation test, used to investigate the presence or absence of autocorrelation. The F-statistic and Obs\*R-squared probability values are greater than 0.05 (5% level of confidence), which indicates the absence of autocorrelation in the model.

**Table 7.** Impact of Firm Specific Factors on profitability of industrial grinding companies

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Model Quality
		B	Std. Error	Beta			
1	(Constant)	2.543	.977		2.601	.012	<b>Adjusted R Square</b> 0.844 <b>F (Sig.)</b> 67.058 (.000) <b>Durbin-Watson stat</b> 2.094315
	SIZE	.026	.050	.039	.515	.608	
	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta				
	STOCK	-.220	.059	-.323	-3.731	.000	
	AGE	-.006	.008	-.040	-.748	.458	
	LEV	-.102	.008	-.804	-12.868	.000	
BV	.000	.000	-.273	-2.800	.007		

Source: Author

The results of the regression model and their statistically significant coefficients presented in table above. Leverage, number of stocks and book value per share are the determinants of return on equity. The presented coefficients in the table above indicate the direction of the relationship between independent variables and the dependent variable. By comparing the absolute values, leverage (-), number of stocks (-) and book value per share (-) have statistically significant influence respectively according to their intensity. An analysis of the model obtained for profitability of industrial grinding companies indicates negative impact of leverage, number of stock and book value per share, that is, with the increase of negatively correlated independent variables, there is a decrease in the value of return on equity. The validity tests of the model, i.e. the *F*, Durbin-Watson, ANOVA and VIF, confirm that the results are robust. In addition, the adjusted R<sup>2</sup> (84.4%) is high, indicating that the explanatory variables have a significant ability to explain change in the dependent variable.

Based on above results the researcher accepts or rejects the following hypothesis.

H<sub>01</sub>: There is statistical significant relationship between firm's size and profitability of industrial grinding companies in Serbia. **Rejected**

H<sub>02</sub>: There is statistical significant relationship between years of firm existence and profitability of industrial grinding companies in Serbia. **Rejected**

H<sub>03</sub>: There is statistical significant relationship between financial leverage and profitability of industrial grinding companies in Serbia. **Accepted**

H<sub>04</sub>: There is statistical significant relationship between quotation on the stock exchange (number of stocks) and profitability of industrial grinding companies in Serbia. **Accepted**

$H_{05}$ : There is statistical significant relationship between book value per share and profitability of industrial grinding companies in Serbia. **Accepted**

**Table 8.** Pairwise Granger Causality Tests

<b>Null Hypothesis:</b>	<b>Obs</b>	<b>F-Statistic</b>	<b>Prob.</b>
SIZE does not Granger Cause ROE	60	1.28154	0.2858
ROE does not Granger Cause SIZE		0.16225	0.8506
BV does not Granger Cause ROE	60	0.11348	0.8929
ROE does not Granger Cause BV		0.19596	0.8226
<b>LEV does not Granger Cause ROE</b>	<b>60</b>	<b>3.68060</b>	<b>0.0316</b>
<b>ROE does not Granger Cause LEV</b>		<b>3.56644</b>	<b>0.0350</b>
<b>STOCK does not Granger Cause ROE</b>	<b>60</b>	<b>11.5985</b>	<b>6.E-05</b>
<b>ROE does not Granger Cause STOCK</b>		<b>3.43954</b>	<b>0.0391</b>
AGE does not Granger Cause ROE	60	0.71415	0.4941
ROE does not Granger Cause AGE		0.02923	0.9712

Source: Author

The results of Granger Causality Test for the sample indices during the study period is presented in Table 8. We have found that causality between profitability (ROE) and leverage (LEV), profitability and number of stocks (STOCK) are bidirectional, no causality exist between profitability (ROE) and size (SIZE), return on equity (ROE) and age, and return on equity (ROE) and book value per share (BV). The results indicate that, there is bidirectional causality that return on equity have a feedback effect on leverage and number of stocks.

### Conclusions

The general of objective of this study was to evaluate the determinants of the profitability of industrial grinding companies in Serbia. A panel ordinary least squares technique is utilized on a sample of 9 industrial grinding companies covering the period 2008 till 2014. The results show a significant negative relationship between leverage, number of stocks, book value per share and profitability. Size (+) and age (-) variables found to have insignificant relationship with profitability. The findings of this study are similar to the results of some variables utilized by Nunes et al. (2009), Asimakopoulos et al. (2009), Sivathaasan et al. (2013), Al-Jafari and Al Samman. (2015). It is known that the determinants of the profitability of manufacturing firms are very important in accordance with the economic development of any country, therefore, more research in this area is necessary.

### Conflict of interests

The authors declare no conflict of interest.



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