

INFLUENCE OF FIRM SIZE ON ITS BUSINESS SUCCESS

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Abstract

A firm may use different methods and diverse (non)financial analysis/indicators in order to evaluate its business success. However, one of the most widely applied methods refers to financial analyses that use profitability ratios as the key measures of firm's overall efficiency and performance. In this research we focused our attention on firm size and evaluated its influence on firm profitability. Other than by the size of a firm, a firm performance is affected by a variety of internal and external variables. Therefore, apart from mere investigating the relationship between firm size and performance, we also explored the impact of some other variables crucial in determining firm profitability. The analysis was conducted for the 2002-2010 period and the results revealed that firm size has a significant positive (although weak) influence on firm profitability. Additionally, results showed that assets turnover and debt ratio also statistically significantly influence firms' performance while current ratio didn't prove to be an important explanatory variable of firms' profitability.

Key words: *Firm size, Manufacturing, Profitability*

1. INTRODUCTION

Firm performance can be measured in different ways and by applying different methods; however, one of the most widely applied methods refers to financial analyses that use profitability ratios as key measures of firm's overall efficiency and performance. Although a great number of theories tried to explain the reasons why some firms are more profitable than others, and numerous studies investigated different variables that may influence firm performance, the issue of firm business success continues to be an inexhaustible subject that draws attention of many practitioners and researchers.

In this research we focus our attention on firm size and evaluate its influence on firm profitability. Underlying theoretical basis for arguing that a firm size is related to profitability can be found in the traditional neoclassical view of the firm and the concept known as economies of scale. Economies of scale may occur for various reasons such as *financial* (a large firm can get a better interest rate and also a better discount rate due to a large quantity that it buys); *organizational reason* (specialization and division of labour); *technical reason* (division of high fixed costs across large number of units) etc. In line with this concept, a *positive* relationship between firm size and profitability is expected. Opposite to this, a conceptual framework that advocates a *negative* relationship between firm size and profitability is noted in the alternative theories of the firm, which suggest that large firms come under the control of managers pursuing self-interested goals and therefore profit maximization as the firm's objective function may be replaced by managerial utility maximization function. In order to test the relationship between firm size and profitability, different modalities of these two variables were created and investigated in this research.

Other than the size of a firm, firm performance is affected by a variety of internal and external variables. Therefore, apart from mere investigating the relationship between firm size and performance, we explored the impact of some other variables crucial in determining firm profitability. Furthermore, in order to examine the nature of the relationship among firm size and performance, both linear and non-linear specification were tested. Finally, as noted by some authors, majority of previous studies have focused only on large firms and/or only one year and/or one industry. Contrary to that, in this research we used a data set that covers a broad range of firm sizes operating in Croatian manufacturing industry during period between 2002 and 2010.

The paper proceeds as follows. Section 2 provides theoretical base and summary of previous research on firm size and profitability relationship. Data description, definitions of used variables and data analysis are presented in section 3, while conclusion is presented in section 4.

2. FIRM SIZE AND PROFITABILITY

2.1. Theoretical base

Theories of the firm try to explain why firms exist, what forms firm and market boundaries and why there are differences in their organisation and performance. Regarding firm's objective it is possible to divide theories of the firm in two groups: 1) those that believe a firm has only one objective and 2) those that think of firms as multi-purpose organizations. The backbone of the group of firm theories that consider firms aim to maximize a single objective is a classic or *traditional theory* which is focused on company's profit. Although importance of profit is unquestionable, complexity of internal

and external variables lead to separation of ownership and managerial functions and consequently development of managerial firm theories. Three most significant *managerial firm theories* are those formed by Baumol, Williamson and Marris which regard maximising revenue, utility and growth as a firm's objective. These theories assume manager's goals are likely to be different from owner's which resulted in development of principal-agent analysis (Foss, Lando and Thomsen, 1999). Cyert, March and Simon are responsible for development of *behavioural firm theories* which belong to the group of firm theories which think of firms as multi-purpose organizations. Simon's model of rational choice focuses on process of making business decisions in a firm and argues that firms seek to accomplish more humble goals than maximising utility or profit. According to Cyert and March's model a firm consists of individuals and groups with their own interests and aims and firm's performance is a result of conflicts and negotiation processes between these groups.

This paper aims to determine connection between firm size and its performance, or to be more precise, profitability. Focus of firm theories is broader than explaining reasons for differences in firms' performance; therefore, a more narrow theoretical background is here presented. Jónsson (2007) distinguishes three categories of theories that believe that firm size matters:

- Principal-agent theory – suggests that the separation of corporate ownership and control potentially leads to self-interested actions by managers who might expand their firm more or less to increase their own benefits, such as more prestige, better pay, and stock options;
- Strategic theories – Porter's ideas of three generic strategies that firms can use (to attain overall cost leadership, product differentiation, or focus-based domination) represent a useful starting point when considering strategic options;
- Institutional theory – suggests that organizations (firms) seek to behave in ways that will not cause them to be noticed as different and consequently singled out for criticism. Hence, firms will gradually become more similar in behaviour and adopt approaches to businesses that have been legitimized. Since the notion of business growth and "*larger is better than smaller*" is embedded in the institutional environment of organizations the isomorphic¹ pressure will force firms to comply with the institutional environment.

You (1995) in his paper gives a survey of the theories of the determinants of firm size and the distribution of firm sizes, with a special emphasis on small firms. He classified the diverse literature surveyed into four approaches:

¹ The isomorphic pressure for firms can be typified as mimetic, coercive, and normative.

- The conventional microeconomic approach (or the technological approach) in which firm size is determined by technical and allocation efficiency;
- The transaction cost approach (or the institutional approach) in which firm size is determined by transaction cost efficiency;
- The industrial organisation approach in which firm size and its distribution (market structure) are determined by market power;
- The fourth approach is that of the dynamic models of the size distribution of firms, including stochastic models, life-cycle models and evolutionary models.

Similar approach in classifying theories of the firm is presented by Bauman and Kaen (2003). They classify them as technological, organizational and institutional.

- Technological theories focus on the production process and emphasize physical capital and economies of scale and scope as variables that determine optimal firm size and, by implication, profitability.
- Organizational theories tie profitability and size together with organizational transaction costs, agency costs and span of control costs. Also, they include critical resource and competency theories of the firm.
- Institutional theories relate firm size to variables such as legal systems, anti-trust regulation, patent protection, market size and the development of financial markets.

Although different theories provide various insights on connection between firm size and its profitability, there is no unique standpoint whether this relationship *positive*, *negative* or *insignificant*.

2.2. Previous research

Studies on the effect of firm size on firm profitability have generated mixed results ranging from those supporting a positive relationship among these variables to those opposing it. Additionally, under the same sample of the firms, this relationship may be positive over some firm size ranges and negative for others. Beside previously presented theoretical explanations, contradictory empirical results could be a result of different used samples, industry groups, time horizons, indicators and business environment. Due to all stated above, some of the studies will be subsequently presented together with their main empirical results.

A positive relationship between firm size and profitability was found by Vijayakumar and Tamizhselvan (2010). In their study, which was based on a simple semi-logarithmic specification of the model, the authors used different measures of size (sales and total assets) and profitability (profit

margin and profit on total assets) while applying model on a sample of 15 companies operating in South India. Papadognas (2007) conducted analysis on a sample of 3035 Greek manufacturing firms for the period 1995-1999. After dividing firms into four size classes he applied regression analysis which revealed that for all size classes, firms' profitability is positively influenced by firm size. Using a sample of 1020 Indian firms, Majumdar (1997) investigated the impact that firm size has on profitability and productivity of a firm. While controlling for other variables that can influence firm performance, he found evidence that larger firms are less productive but more profitable.

Lee (2009) examined the role that firm size plays in profitability. He used fixed effect dynamic panel data model and performed analysis on a sample of more than 7000 US publicly-held firms. Results showed that absolute firm size plays an important role in explaining profitability. However, this relationship was nonlinear meaning that gains in profitability reduced for larger firms. Amato and Burson (2007) tested size-profit relationship for firms operating in the financial services sector. The authors examined both linear and cubic form of the relationship. With the linear specification in firm size, the authors revealed negative influence of firm size on its profitability. However, this influence wasn't statistically significant. On the other hand, the authors found evidence of a cubic relationship between ROA and firm size. Using financial and economic data, Ammar et al. (2003) examined the nature of the size-profitability relationship on a sample of electrical contractors for 1985-1996 period. Using a first-order autoregressive model built into the error term, the authors found a significant difference in terms of profitability between small, medium and large firms. Namely, they revealed that profitability drops as firms grow larger than \$50 million in sales. On a sample of a US manufacturing firms, Amato and Wilder (1985) tested size-profitability relationship in linear as well as quadratic form. However, the results of their analysis showed that there is no relationship between firm size and profit rate.

3. VARIABLES, SAMPLE DESCRIPTION AND DATA ANALYSIS

3.1. Sample description and variables definition

All data necessary for our research were obtained from the web site of Croatian Financial Agency and from Amadeus database. Since data were available only for medium size and large enterprises, only these enterprises were analyzed during the period comprised by the research (i.e. 2002-2010). Firms with zero employees (or with no information about their number) were excluded from the analysis. In former case it was considered that such firms were either fictive or under liquidation and as such they could cause incorrect results or provide an incorrect insight into the firm size and performance

relationship. Given that the total number of analyzed firms was changing over the years (as a result of the mergers, acquisitions and liquidations), we were dealing with the unbalanced data. Minimal number of analyzed firms (1722) was recorded in 2002, while the maximal number (2261) was achieved in 2009. On average, the sample comprised around 2 050 firms per year, yielding with a total of 18 492 observations for the period under consideration. In order to test the relationship between firm size and profitability in Croatian manufacturing industry, several different measures of firm's financial performance and firm size have been employed. Each of these measures is presented in the Table 1 together with its calculation methodology.

Table 1: Calculation methodology for analysed variables

Variable	Description
Return on assets (ROA)	Earnings after tax divided by total assets and multiplied by 100
Return on equity (ROE)	Earnings after tax divided by firm's equity and multiplied by 100
Profit margin	Earnings after tax divided by total sales and multiplied by 100
EBIT margin	This indicator is calculated by adding interest and tax back to earnings after tax. Obtained value was divided by firm's sales and multiplied by 100.
EBITDA margin	This indicator is calculated by adding interest, tax, depreciation, and amortization back to earnings after tax. Obtained value was divided by firm's sales and multiplied by 100.
Firm size 1 (SIZE 1)	Natural logarithm of firms assets
Firm size 2 (SIZE 2)	Natural logarithm of firms number of employees
Current ratio	Current assets over current liabilities
Asset turnover	Sales divided by total assets and multiplied by 100
Debt ratio	Total debt divided by total assets and multiplied by 100

Source: Compiled by authors.

Besides profitability measures, Table 1 comprises some additional variables used in the analysis. *Current ratio* is often used as a measure of internal liquidity in studies dealing with relations between profitability, liquidity and firm size (Owolabi, Obiakor and Okwu, 2011; Raheman and Nasr, 2007). Liquidity denotes the ability of asset or security to convert to cash and it is regarded as a precondition to ensure that firms are able to meet their short-term obligations. Since each firm has short and long-run goals to achieve, it is important to maintain a balance between liquidity and profitability. Analysis of liquidity-profitability relationship indicates that up to a certain level liquidity and profitability are complementary to each other, beyond that profitability remains constant with the increase in liquidity within a specified domain, hence any further investment in current asset will lead to decline in profitability (Goswami and Sarkar, 2011).

Asset turnover can also have an impact on profitability. This ratio helps to measure how efficiently a company and company's management use its assets in generating sales revenue or sales income (Belak, 1995). Namely, this variable gives information about company's asset productivity. Starting from the previously mentioned, a higher asset turnover ratio is more preferable compared to a lower

one, because the former indicates better business efficiency. Therefore, a positive influence of this variable on firms' profitability is anticipated.

Debt ratio, as the ratio of total liabilities to total assets, shows a level of the company's asset that is financed from other sources (short-term and long-term). This indicator shows the solvency of the company or its ability to cover all its obligations to creditors and investors. The higher this ratio, the greater the amount of debt used to generate profits (Obert and Olawale, 2010). Also, the higher the level of debt, the greater the risk of companies (theoretical limit of tolerance level of debt is 50%). Researches on the impact of firm debt ratio to its performance give conflicting results. While some studies showed a positive relationship, other studies found a negative relationship between the observed variables (Sarkaria and Shergill, 2001).

3.2. Data analysis and empirical results

The research into the nature of relationship between firm size and profitability requires analysis and quantification of intensity of correlation existing between these variables. For that purpose correlation analysis was used and its results were the basis for the subsequent course of research.

Table 2: Pairwise correlation coefficients between profitability and firm size for the 2002-2010 period

	ROA	ROE	Profit margin	EBIT margin	EBITDA margin	SIZE 1	SIZE 2
ROA	1						
ROE	0,542**	1					
Profit margin	0,674**	0,408**	1				
EBIT margin	0,641**	0,382**	0,923**	1			
EBITDA margin	0,559**	0,322**	0,780**	0,876**	1		
SIZE 1	-0,173**	-0,189**	-0,111**	-0,091**	-0,048**	1	
SIZE 2	-0,112**	-0,131**	-0,099**	-0,095**	-0,125**	0,659**	1

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

Source: Authors' calculations.

Table 2 shows the existence of the statistically significant relationship between different measures of firms' profitability. This relationship is positive (as expected) and spans from moderate to high. Opposite to that, correlation coefficients between different indicators of firm size and profitability are relatively *small* (and negative), also statistically significant. Its highest value is achieved when analysed variables are expressed in terms of ROA (or ROE) and natural logarithm of firms' assets (SIZE 1).

Having in mind results presented in Table 2 as well as previous discussion on the possible effect of the firm size and the various variables on firm performance, the following panel data regression model is formulated and tested:

$$\text{ROA} = f(\text{SIZE 1, Current ratio, Asset turnover, Debt ratio}) \quad (1)$$

A model (1) can be estimated using a fixed-effect estimator (which is an LSDV method and in which all behavioural differences between individual firms and over time are captured by the intercept) or using a random effect estimator (which employs a GLS method to decompose unobserved firm and/or time effects from the error term). In order to apply appropriate estimator we performed the Hausman specification test (test that examines if the individual effects are uncorrelated with the other regressors in the model) whose results (significant p-value) indicated that fixed-effect (FE) model is more appropriate than the random effect (RE) model. Therefore, we applied fixed-effect estimator on model (1) and obtained results that are presented in Table 3².

Table 3: Regression results with panel data

Fixed-effect model		
Variables	Coefficients	p-value
Current ratio	-0.041	0,198
Asset turnover	1.834	<0,001
Debt ratio	-0.191	<0,001
Firm size 1	1.018	<0,001
Constant	5.701	<0,001
R ²	0,14	
Observation	18 426	

Source: Authors' calculations.

As it can be seen from the Table 3, the *firm size* parameter is statistically significant; however, its sign has changed and now became positive. This is not so surprising if we have in mind that the firm-size relationship presented in Table 2 was quite small. Moreover, this could mean that the inclusion of other relevant variables into analysis shed true light on the relationship between firm size and its profitability. Positive sign of *size* variable implies that if a firm grows in size, the profitability of the firm would rise. Possible reasons for such a size-profit behaviour i.e. higher profitability of large firms can be due to:

² The estimations based on any of the other measure of profitability analyzed in this paper produce inferior results (and hence they are not reported), as suggested by both the coefficients estimates and the specification tests. The same applies for the nonlinear form of firm-size relationship.

- Market power – larger firms have more market power that provides them the possibility to charge higher prices and earn higher profits;
- Economies of scale – larger firms can due to their size benefit from lower costs; size brings bargaining power over the suppliers and when products are standardized and produced on a mass scale with longer production-runs, a large firm will be more efficient;
- Market experience – a relatively bigger firm is expected to cope better with changes and it has better chances to offset random losses, i.e. due to market uncertainties bigger firms have lower riskiness;
- Favourable financing conditions – small firms often suffer from borrowing constraints; however they may not require large amounts of capital; therefore, the capital constraints might not be severe as the firm grows larger;
- Advantage in the R&D process – bigger firms have an advantage in the R&D process by enjoying economies of scale in the R&D effort and have a superior ability to exploit the outcomes of research.

The regression coefficient of the *asset turnover* variable is robustly significant and has a positive sign, meaning that the profitability of the firm will increase parallel with the growth of asset utilization. Namely, higher asset turnover ratio indicates higher effectiveness of management (e.g. no excess production capacity; existence of a good inventory management, etc.) what directly enables the achievement of a better firm performance. The negative sign of *debt ratio* variable indicates that a fall of firm profitability will occur if the ratio between total liabilities and total assets of a company increases. Expressed in terms of profitability of firms operating in the manufacturing industry, one might conclude that a high level of debt due to high interest payments and consequently increased firm risk, is leading to poor business results and to poor profitability. Finally, the coefficient of the *current ratio* variable turned out to be statistically insignificant.

4. CONCLUSION

Although a great number of theories provide explanations why some firms are more profitable than others, exploring different variables of firm business success continues to be a prolific research path. Aim of this research was to explore the impact of firm size on its profitability. Unlike most studies with the same research problem, this research observed a large number of profitability indicators, two different firm size indicators and data set that covered a broad range of firm sizes operating in Croatian manufacturing industry during a nine-year period (2002-2010). Beside size variable, the

analysis included some other variables such as current ratio, asset turnover and debt ratio. Data were tested using fixed effect panel data estimator.

The results of the analysis showed that a firm size has a weak positive impact on firm profitability. There are several possible reasons for this kind of firm size influence. Namely, due to their market power larger firms are able to charge higher prices and hence earn higher profits. Additionally, higher profits could also be result of economies of scale and stronger negotiating power that provides larger firms more favourable financing conditions. However, reasons why this relationship is relatively weak can be found in separation of ownership from management in modern corporations that shifted managers' focus from maximization of profit to maximization of managerial utility. Along with inflexible organization structure and used technology, a change in strategic logic of firms (it became more important to survive during a global economic crises than to increase profitability) also provides some additional explanations of a weak relation between firm size and profitability. Regarding other variables, the results of the formulated model, as expected, showed that growth of asset utilization will increase firm profitability, while a greater indebtedness of a firm will lead to lower profitability. Liquidity measured by current ratio turned out to have a statistically insignificant impact on profitability.

Depending on available data, future studies on firm profitability may include additional explanatory variables as well as enlargement of used sample in a way that it involves cross-country analysis.

REFERENCES

- Amato, L. and Wilder, R. P. (1985), "The Effects of Firm Size on Profit Rates in U. S. Manufacturing", *Southern Economic Journal*, Vol. 52, No. 1, pp. 181 – 190.
- Amato, L. H. and Burson, T. E. (2007), "The effects of firm size on profit rates in the financial services", *Journal of Economics and Economic Education Research*, Vol. 8, Issue 1, pp. 67 – 81.
- Ammar, A. et al. (2003), "Indicator Variables Model of Firm's Size-Profitability Relationship of Electrical Contractors Using Financial and Economic Data", *Journal of Construction Engineering and Management*, Vol. 129, pp. 192 – 197.
- Baumann, H. D. and Kaen, F. R. (2003), "Firm Size, Employees and Profitability in U.S. Manufacturing Industries", *Social Science Research Network*, January 13, 2003.
- Belak, V. (1995), *Menadžersko računovodstvo*, RRI plus, Zagreb.
- Foss, N. J., Lando, H. and Thomsen, S. (1999), "The Theory of the Firm", *Encyclopedia of Law and Economics*, Edward Elgar and the University of Ghent, Ghent, pp. 633 – 635.
- Goswami, S. and Sarkar, A. (2011), "Liquidity, profitability analysis of Indian airways sector – an empirical study", *International journal of research in commerce & management*, Vol. 2, Issue 6, pp. 116 – 122.

- Jónsson, B. (2007), “Does the size matter? The relationship between size and profitability of Icelandic firms”, *Bifröst Journal of Social Science*, Vol. 1, pp. 43 – 55.
- Lee, J. (2009), “Does Size Matter in Firm Performance? Evidence from US Public Firms”, *Int. J. of the Economics of Business*, Vol. 16, No. 2, pp. 189 – 203.
- Majumdar, S. K. (1997), “The Impact of Size and Age in Firm-Level Performance: some Evidence from India”, *Review of Industrial Organization*, Vol. 12, pp. 231 – 241.
- Obert, M., and Olawale, F. (2010), “Does debt really matter on the profitability of small firms? A perspective on small manufacturing firms in Bulawayo, Zimbabwe”, *African Journal of Business Management*, Vol. 4, No. 9, pp. 1709 – 1716.
- Owolabi, S. A., Obiakor, R. T. and Okwu, A. T. (2011), “Investigating Liquidity-Profitability Relationship in Business Organizations: A Study of Selected Quoted Companies in Nigeria”, *British Journal of Economics, Finance and Management Sciences*, Vol. 1, No. 2, pp. 11 – 29.
- Papadogonas, T.A. (2007), “The financial performance of large and small firms: evidence from Greece”, *Int. J. Financial Services Management*, Vol. 2, No. ½, pp. 14 – 20.
- Raheman, A. and Nasr, M. (2007), “Working Capital Management And Profitability – Case Of Pakistani Firms”, *International Review of Business Research Papers*, Vol. 3, pp. 279 – 300.
- Sarkaria, M. S. and Shergill, G. S. (2001), “Market Structure And Financial Performance - An Indian Evidence With Enhanced Controls”, *The Indian Economic Journal*, Vol. 48, No. 2, pp. 97 – 107.
- Vijayakumar, A. and Tamizhselvan, P. (2010), “Corporate Size and Profitability-An Empirical Analysis”, *College Sadhana – Journal for Bloomers of Research*, Vol. 3, No. 1, pp. 44 – 53.
- You, J.-I. (1995), “Small firms in economic theory”, *Cambridge Journal of Economics*, Vol. 19, pp. 441 – 462.