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Determinants of Corporate Performance: Modelling Approach

A b s t r a c t. This study is to investigate the influence of the selected factors of the capital structure on the corporate performance. An empirical analysis covers a sample of 90 non-financial companies traded on the Warsaw Stock Exchange, in the period of 2000–2015. The panel data models for two corporate performance measures such ROA and ROE were estimated. The company's capital structure negatively affects its performance. It is in line with pecking order theory and previous studies on capital structure of Polish companies.

K e y w o r d s: capital structure, efficiency, panel data modelling, ROA, ROE

J E L Classification: G32

Introduction

Chakravarty (1986) states that superior financial performance is a way to satisfy investors and could be represented by profitability, growth in sales and market value of the company. These three aspects complement each other (Santos, Brito, 2012). Profitability measures a company's ability to generate returns. Growth reflects firm's ability to enlarge its size. Increasing size, even at the same profitability level, lead to increase company's absolute profit and cash generation. Larger size also can bring economies of

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scale, leading to enhanced future profitability. Market value represents the external assessment and expectation of company's future performance. It is postulated, that company's value depends on its financing decisions (Jensen and Meckling, 1976; Myers, 1977, 1984). It means that capital structure has a significant impact on corporate performance. It is also argued that profitable companies are less likely to depend on debt than less profitable ones. Moreover, it was found that companies with high growth opportunities have a high profitability ratio. Also asset structure and size of the firm were found as important factors affecting firm performance level.

Therefore, one of the most important decisions that must be made by the financial managers is to choose the right combination of debt and equity capital that optimizes a corporate performance defined in terms of return on assets and equity. Moreover, it is necessary to identify the major factors influence the relationship between a company's capital structure and its performance. The purpose of this study is to investigate the influence of the selected factors of the capital structure on the corporate performance of Polish companies listed on Warsaw Stock Exchange.

Obtaining clear and comprehensive answers about the nature of the factors shaping the corporate performance of Polish companies is difficult due to the small range of domestic research. Previous research on capital structure of Polish companies showed that they prefer to finance with internal founds (e.g. Hamrol, Sieczko 2006; Wilimowska, Wilimowski 2010; Jędrzejczak-Gas, 2014). This is in line with pecking order theory, so it is assumed that:

H1. A company's leverage is expected to decrease its performance.
H2. Growth opportunities affect a company's performance positively.
H3. There is a positive relationship between size and a company's performance.
H4. A company's tangibility has a negative influence on its performance.

An empirical analysis covers a sample of 90 non-financial companies traded on the Warsaw Stock Exchange, in the period of 2000–2015. The panel data models for two corporate performance measures such ROA and ROE were estimated. The paper is organized in following way: after introduction, the first section discusses the literature review on corporate performance. The second section presents the determinants of corporate performance. The third section presents dataset and methodology of the research. The fourth section shows the empirical models used to investigate the effect of capital structure determinants on corporate performance, and the last one concludes the paper.

1. The Literature Review on Corporate Performance

Corporate performance is an ambiguous term and it is used interchangeably with terms of business or firm performance. It appears in most branches of management and finance and it is of interest to both academic scholars and practicing managers. Cameron and Whetten (1983) state that the importance of performance in strategic management can be argued along three dimensions, i.e. theoretical, empirical and managerial. Theoretically, the concept of business performance is at the center of strategic management and finance. Empirically, many research studies employ the construct of performance to examine a variety of strategy content and process issues. The managerial importance of this category is all too evident in many prescriptions offered for performance improvement.

Venkatraman and Ramanujam (1986) offered a scheme of three overlapping concentric circles with the largest one which is representing organizational effectiveness. This broadest domain includes the medium circle representing business performance. This one includes the inner circle representing financial performance. Santos and Brito (2012) state that business performance is a subset of organizational effectiveness that covers operational and financial outcomes. Corporate performance measures could be either financial or operational. Financial performance, for example profit maximization, maximizing profit on assets and maximizing shareholders' benefits are at the core of the firm's effectiveness. Operational performance could be measured by growth in sales and growth in market share. It provide a broad definition of performance and focus on the factors that ultimately lead to financial performance (Chakravarthy,1986; Hoffer and Sandberg, 1987).

Corporate performance could be defined in context of accounting or market measures. The most commonly used corporate performance measures are return on assets (ROA), return on equity (ROE) and return on investment (ROI). They are financial ratios that are assumed to reflect the fulfillment of the economic goals of the company (Venkatraman and Ramanujam, 1986). These indicators are used by many researchers (e.g. Rajan, Zingales, 1995; Nawaz et al., 2011; Addae, Nyarko-Baasi, Hughes, 2013; Gupta, 2015, Igbinosa, 2015).

In the ,,value-based" approach market performance measures are more appropriate than accounting-based ratios (Hax and Majluf, 1984). Such indicators as price per share to the earnings per share (P/E), market value of equity to book value of equity (MBVR), and Tobin's Q are often used in many studies (e.g. Rajan, Zingales, 1995; Demsetz, Villalonga, 2001; Zeitun, Tian, 2007; Van Essen et al., 2015).

2. Determinants of Corporate Performance

The capital structure theories suggest that leverage level can have a major impact on corporate performance (Bandyopadhyay, Barua, 2016). Some of theoretical predictions on this effect are contradictory.

Under framework of trade-off theory Lewellen and Roden (1995) showed that the total debt and the profitability of a company are positively related. Hadlock and James (2002) using a sample of 500 non-financial United States firms concluded that companies prefer debt financing because they anticipate higher returns from a higher debt level. Fama (1985) argued that bank borrowings could lead to increase in company's performance, because it avoids the high information costs incurred in public debt offerings through bonds issuance. Thus, companies relying more on bank loans are expected to be more profitable.

The pecking order theory (Donaldson, 1961; Ross, 1977; Myers and Majluf, 1984) proposes a negative relationship, because companies prefer to finance with internal funds rather than debt ones. A negative relationship between capital structure and corporate performance (profitability) was also found by Kester (1986), Rajan and Zingales (1995) Wiwattanakantang (1999) and Chen, Strange (2005).

The assumptions of trade-off theory and pecking order theory are often used to explain the factors that determine the capital structure. These factors also could be used to describe the corporate performance. Among these factors the most frequently mentioned are: size of the firm, company's tangibility (asset structure), growth opportunities (e.g. Margaritis and Psilaki, 2010; Banerje and De, 2014; Yinusa, et al., 2016).

A company's profit is in line with its sales turnover. This is why it could be said that if a company's sales increases, there is a probability that its profit will increase. Wagner (1995) argues that large companies leads to scale expansion. As a result of such expansion, a company becomes more profitable. Further research (Harvey et al., 2001) showed that firm size is significantly and nonlinearly related to profitability. It suggests that although bigger companies are likely to experience higher profitability, revenue growth is likely to slow faster in larger firms.

Tangibility refers to a company's investments in tangible assets. If these investments are effective, the company's performance improves. Ghosh (2008) found that the greater asset tangibility, the lower the scope for informational asymmetries between insiders and outsiders. It allows for higher leverage with a concomitant positive effect on profitability. This relationship

is U-shaped. It suggests that greater increases in tangibility exerts a positive effect on profits, what is in line with trade-off theory.

In turn, in line with pecking order theory there is a negative relationship between tangibility and company's performance. High profits motivate companies to accumulate surpluses. They are invested in short-term securities. These funds can be spent to fund the investment. In such a situation, the company does not need to have large amounts assets in the form of collateral, as its investments are financed by cash from the sale of its short-term securities.

Companies in the growth phase have a high performance ratio. They are able to generate profit from investment. So, growth opportunities are expected to be positively related to a company's performance.

Literature also indicates other factors of corporate performance. There are age of the firm, risk, debt service capacity, dividend pay-out, development expenditures, degree of operating leverage, ownership structure and ownership type industry affiliation, macro factors (e.g. Bandyopadhyay and Barua, 2016; Margaritis and Psillaki, 2010; Banerje and De, 2014; Zeitun and Tian, 2007).

3. Dataset and Methodology

The object of analysis are companies continuously listed on the main market of the Warsaw Stock Exchange in 2000–2015. There were 117 companies, including 6 from the sub-index WIG-20, 17 from the sub-index WIG-40, 22 from the sub-index WIG-80 and 72 not included in any of them. The affiliation of a company to a given sub-index was determined by its composition at the end of December 2015. In this analysis we omitted the fact that the company could change its size during the period of the analysis. Of the above companies only entities from the non-financial sector were included into research. Therefore, 16 companies were excluded from the sample. In addition, entities that did not submit complete financial statements were also rejected, i.e. 11 companies. Finally, 90 companies were qualified for the study, i.e. 77% of the pre-selected entities and the balanced panel was created.

In this study we used four variables: growth opportunities, firm's size and tangibility (asset structure) as determinants of corporate performance. Capital structure is measured by total debt ratio to total assets (LEVERAGE). Growth opportunities are represented by growth of sales (GROWTH). The SIZE is measured by the growth of company's total assets. Asset structure is measured by assets tangibility (TANG), i.e. the ratio of

fixed assets to total assets. As a corporate performance measures we used return on assets (ROA) and return on equity (ROE). As it was mentioned, in the literature there are more factors that could influence the corporate performance. Due to the scope of this research only four factors out of all was taken into account. The selected factors are the factors of the capital structure of companies. So the rest of them was omitted.

The two variables, ROA and ROE are modelled using the panel data approach. The proposed model takes a form:

$$y_{it} = \beta_0 + \beta_1 LEVERAGE_{it} + \beta_2 GROWTH_t + \\ + \beta_3 SIZE_{it} + \beta_4 TANG_{it} + \xi_{it} \tag{1}$$

where y_{it} is the explained variable, represented by the ROA or ROE of *i'th* company in time *t*, $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ are the structural parameters and the ξ_{it} is the error term. The model will be estimated by the pooled OLS and using the fixed effects estimator and the random effects estimator. Application of three testes, that are the Chow F-test of the joint significance of group effects, the Breusch-Pagan test and the Hausman test will allow for selecting the best model. The first of them tests that the pooled OLS is adequate, in favor of the fixed effects alternative, the second one tests that the pooled OLS is adequate, in favor of the random effects alternative. The null hypothesis of the last test states that the random effects estimator is consistent and more effective than the fixed effect estimator.

4. Empirical results

4.1. Performance of Companies Listed on WSE in 2000–2015

The fluctuations of ROE and ROA ratios in companies listed on the Warsaw Stock Exchange in 2000–2015 were similar to each other throughout the period considered (Table 1). For this reason, the description focuses only on one of them, i.e. ROE. The value of the first quartile, calculated for ROE in companies listed on WSE, decreased systematically in 2000–2002. In 2002 it reached the lowest level in the whole period, i.e. –13,76%. It means that 25% of companies achieved a value of ROE not greater than –13,76% in 2002. Starting from 2003, the ratio was increasing until 2007 when it reached 4,57%, i.e. the highest value in the whole period analysed. In subsequent years, the value of the ROE fluctuated. However, only in 2012–2013 it was negative (Table 1.). The value of ROE has been increasing since 2003 to 2007.

Table 1. Return on assets (ROA) and return on equity (ROE) in companies listed on WSE in 2000–2015

Years	ROA(%)			ROE(%)		
	I quartile	Median	III quartile	I quartile	Median	III quartile
2000	–2,76	2,71	5,67	–1,11	5,17	10,36
2001	–5,82	0,99	4,02	–9,12	2,07	6,09
2002	–4,29	1,76	3,99	–13,76	3,46	7,04
2003	0,61	3,24	6,11	0,97	5,85	12,64
2004	1,83	4,04	7,92	2,64	8,33	17,03
2005	1,03	4,22	9,39	0,54	7,92	16,11
2006	1,38	4,91	10,38	2,22	10,03	19,42
2007	2,69	5,49	10,69	4,75	9,50	17,72
2008	0,72	3,46	6,42	0,92	4,99	12,81
2009	0,60	3,42	6,91	0,80	4,84	10,39
2010	0,93	3,32	5,95	1,25	5,50	10,54
2011	1,05	4,62	6,39	1,61	6,68	10,89
2012	–0,73	2,43	5,14	–1,63	4,08	8,45
2013	0,01	2,71	6,88	–0,17	4,50	10,20
2014	1,33	3,78	6,71	1,25	6,06	11,63
2015	0,12	2,97	6,85	0,16	5,15	11,67

The median, calculated for ROE in the entities in 2000–2015, ranged from 2,07% in 2001 to 10,03% in 2006. A similar situation was noted for the third quartile of ROE. In 2001 and 2006, it was at the level of 6,09% and 19,42% respectively, which means that 25% of the companies achieved ROE not lower than the third quartile. The trends described above are related to the economic situation in Poland during the period considered. In the years when the companies achieved the highest profitability level, there was a prosperity in Polish economy. In turn, during the economic downturn profitability ratios ROE and ROA were relatively low (Table 1).

In the next step the stationarity of the two selected ratios was tested. Statistics of the tests for the panel data are given in the Table 2. In all cases the null hypothesis that the series is integrated in order of one or higher at the 0.05 level of significance need to be rejected. Consequently, it can be assumed that all series are stationary.

Additionally, the correlations between analysed series were tested. Only one statistically significant correlation at the level of 0.05 appeared (see Table 3). That was between ROA and LEVERAGE which means that companies listed on WSE prefer to finance with internal founds what is in line with pecking order theory. Similar results could be found in most of previous studies for Poland (e.g. Hamrol, Sieczko 2006; Wilimowska, Wilimowski 2010; Jędrzejczak-Gas, 2014).

Table 2. Statistics of the stationarity tests of the indicators

test	statistic	
	ROA	ROE
Im-Pesaran-Shin	–2.5162	–2.7011
Choi meta-tests:		
Inverse chi-square	406.944	458.669
Inverse normal test	–9.8127	–11.1538
Logit test	–9.8738	–11.6641
Levin-Lin-Chu pooled ADF	–3.6030	–35.2900

Table 3. Correlation coefficients of the indicators, 2000–2015

	ROA	ROE	LEVERAGE	GROWTH	SIZE	TANG
ROA	1	–0.0017	–0.9997	0.0008	0.0039	0.0359
ROE		1	–0.0004	–0.0002	–0.0013	0.0355
LEVERAGE			1	–0.0010	–0.0041	–0.0360
GROWTH				1	–0.0008	0.0506
SIZE					1	–0.0399
TANG						1

4.2. Estimated Models

The proposed model (1) was estimated for both ROA and ROE ratios. The 90 selected companies in years 2000–2015 constituted the panel data sample. Additionally, we propose to estimate the model dividing the sample into four subsamples. The first subsample holds large companies, included in the WIG20. There were only 4 of them. To the second one contains medium-size companies (included in the mWIG40). There were 14 of them. The group of 21 companies (included in the sWIG80 index) constituted the sub-sample of the small companies. The rest of companies (51) represents the last subsample.

The models, for all companies and for subsamples, were estimated using three estimators: the pooled OLS, the fixed effects estimator and the random effects estimator. Application of such estimators for modelling the corporate performance could be found , for example, in Majumdar and Chhibber (1999), Berger, Bonaccorsi di Patti E. (2006) or King, Santor (2007).

Then the selection of the most appropriate model was based on the basis of the three tests, mentioned above. Results are given below (Tables 4 and 5). It can be noticed that in almost all cases (in four out of five cases) the best model for the ROA was the one obtained with the fixed effects estimator, and for ROE the pooled OLS (also in four out of five cases). Also the values of the measure of goodness of fit (R-squared), the values of the Durbin-Watson statistic (DW) and the Akaike criterion are presented in the tables.

Table 4. Estimates of the model of ROA and statistics of the tests for companies listed on WSE in 2000–2015

Variable	all companies	large companies	medium companies	small companies	rest of companies
	fixed effects	fixed effects	fixed effects	random effects	fixed effects
constant	0.1279	0.2334	0.0221	0.1160	0.1139
LEVERAGE	–0.2379***	–0.4011***	–0.0993**	–0.1887***	–0.2379***
GROWTH	0.0000	0.1051*	–0.0001	0.0013	0.0000
SIZE	–0.0006	0.0456	0.1035***	0.0425***	–0.0006
TANG	–0.0159	–0.0788	0.2123***	–0.0745*	–0.0140
Joint significance test	2.2854#)	3.6343#)	7.3432#)	2.7666#)	2.0205#)
Breusch-Pagan test	56.2668#)	0.5627	85.3518#)	13.6845#)	19.8526#)
Hausman test	14.0096#)	na	24.2201#)	8.4723	11.1615#)
R squared	0.9995	0.4203	0.4282	na	0.9996
DW	1.4859	1.7440	1.5033	na	1.4954
Akaike crit.	–214.2246	–104.6516	–444.6726	–554.2151	265.8595

*) **) ***) statistically significant at the level of 0.1, 0.05 and 0.01 respectively; #) the null hypothesis is rejected at 0.05 significance level

If the ROA ratio is modelled, in all cases the LEVERAGE negatively influences its volatility. As it was mentioned such relationship is in line with pecking order theory. It is interesting that for large companies the GROWTH of the company positively affects the ROA ratio. It means that they are able to generate profit from investment, what is also in line with pecking order theory. GROWTH is not significant if the medium, small size companies and rest of companies are analysed. For the medium size companies the hypothesis of the negative relationship between asset structure (TANG) and their performance is not confirmed. In turn, it is confirmed in the case of small companies. There is a positive relationship between the size of the company (SIZE) and the company's performance for medium and small size companies. In the case of the rest of companies the size of the company and its tangibility do not affect their performances.

Estimated models of ROE for all companies and small companies did not point out any statistically significant relationships between explanatory and explained variables. For the large, medium-size and the small-size companies the ROE was negatively influenced by the LEVERAGE and positively by the TANG variable. Asset structure (TANG) refers to a company's investments in tangible assets. If these investments are effective, the company's performance improves. In contrary to previous relationships this one is in line with trade-off theory.

Table 5. Estimates of the model of ROE and statistics of the tests for companies listed on WSE in 2000–2015

Variable	all companies	large companies	medium companies	small companies	rest of companies
	pooled	pooled	fixed effects	pooled	pooled
constant	–0.9658	0.1237*	0.0699	1.6421	–0.8189
LEVERAGE	0.0006	–0.5718***	–0.8700***	–7.0535***	0.0005
GROWTH	–0.0000	0.2200*	0.0001	0.0794	–0.0000
SIZE	0.0003	0.0685	0.1685*	0.8597	–0.0009
TANG	4.3894	0.4979***	1.0623***	2.0505	6.1764
Joint significance test	1.0420	2.3126	6.0486#)	1.3991	1.0197
Breusch-Pagan test	0.0322	0.0449	21.8961#)	1.1299	0.0023
Hausman test	0.7468	na	80.6125#)	0.3983	1.0782
R-squared	0.0012	0.2563	0.3272	0.0331	0.0016
DW	1.9694	1.7481	1.6607	1.4721	2.0026
Akaike crit.	13339.5	–24.705	231.6411	2616.291	7980.600

*) **) ***) statistically significant at the level of 0.1, 0.05 and 0.01 respectively; #) the null hypothesis is rejected at 0.05 significance level

Finally, for those models, for which the fixed effects estimator was in use, the test for differing group intercept was applied. For all models the null hypothesis that the groups have the common intercept was rejected at the level of significance of 0.05. It means that there were specific differences among companies in the level of ROA and ROE.

Conclusions

On the basis of the empirical analysis in the case of ROA only the first hypothesis stated in the paper cannot be rejected. The company's capital structure negatively affects its performance. The rest of the hypotheses need to be rejected, with some exceptions. Only for the large companies the second one, that the growth opportunities lead to the increase of the company's performance, cannot be rejected. Also for the medium size companies the third hypothesis cannot be rejected. It means the positive relationship between the size and the performance of the company. In turn, the forth hypothesis, that a company's asset structure affects its performance negatively need to be rejected. Generally, these results are rather consistent with assumptions of pecking order theory than with trade-off theory.

Estimates of the model of ROE for the full panel data and for the subsample of the small companies point the necessity of rejection of all four hypotheses. In the case of the large, medium and the small size companies

separately the first one cannot be rejected, so the negative relationship between the company's capital structure and its performance is found. The last hypothesis need to be rejected in all cases, even if for the large companies and the medium ones the structural parameters were statistically significant at 0.05 significance level. It means no negative influence of tangibility on performance.

The subsample, called the rest of companies, include the companies of different size. The results for this group are close to those for all companies, because they show similar volatilities of variables. Both subsample and the full sample include large companies. Changes in the size of these companies, expressed in total assets growth, are relatively small, so the variable SIZE is irrelevant. In other words, this growth is too small to influence the value of the explanatory variable.

However, we have to remember that the sample size was relatively small, especially the number of large companies taken into account and the short time series. It is due to the short history of the capital market in Poland and lack of the data. It would be interesting to extend the analysis and to compare results with outputs from the other markets. One of the ways could be to create the non-balanced panel, so more companies would be included in the sample.

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Czynniki kształtujące wyniki finansowe firmy: ujęcie panelowe

Z a r y s t r e ś c i. Celem artykułu jest zbadanie wpływu wybranych czynników struktury kapitału spółek notowanych na GPW na ich rentowność. Do badań zakwalifikowano 90 przedsiębiorstw z sektora niefinansowego notowanych na GPW w latach 2000–2015. Oszacowano model panelowy dla dwóch miar rentowności, tj. ROA i ROE. Pomiędzy strukturą kapitału (dźwignią finansową) a rentownością występuje związek ujemny, co jest zgodne z teorią hierarchii źródeł finansowania i wynikami dotychczasowych badań w zakresie struktury kapitału polskich przedsiębiorstw.

S ł o w a k l u c z o w e: struktura kapitału, efektywność, modelowanie panelowe, rentowność kapitału, rentowność aktywów.