

The Impact of Board Composition on the Firm's Performance in Continental Europe

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ABSTRACT

The purpose of this paper is to investigate the relationship between composition of board of directors and firms' performance. Specifically, board size and board independence were studied, expecting small and large boards as well as highly independent boards to have the greatest performance. Three performance indicators were used - return on assets (ROA), return of equity (ROE) and Tobin's Q. The analysis found a slight indication for a U-shaped relationship between board size and ROA, and an inverted U-shaped relationship with ROE and Tobin's Q. However, they both were statistically not significant to draw conclusions. The research confirmed the hypothesis that boards with a higher ratio of independent directors have a higher level of ROE, but the results investigating the effect on ROA and Tobin's Q were not statistically significant.

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Keywords: Board Composition, Board independence, Board Size, Financial Performance, Corporate Governance

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1. INTRODUCTION

In the current increasingly competitive and dynamic market environment, the applied managerial practices are the central factors influencing firm's operational and financial performance. Corporate governance stands in the core of decision-making in a company, and represents a system, under which companies are controlled and directed (Carbury, 1992). It is a business area of vital importance, which is often undervalued or ignored (Oman, Fries & Buitter, 2003). The board of directors is the key mechanism of corporate governance in large business corporations (Fama and Jensen, 1983a). A superior board composition enhances firm's decision-making, and potentially improves wealth-creating capabilities with a sufficient level of corporate accountability (Thomsen & Conyon, 2012).

However, the existing literature has not yet reached a consensus of what are the exact elements of board composition that have a direct influence on firm's performance. The board characteristics this research focuses on can be divided into 2 parts: board size and board independence. The approximate most efficient number of board members varies from one research to another. While some suggest having larger boards (Kogan and Wallach, 1966; Lanser, R. 1969; Sah and Stiglitz, 1986; Sah and Stiglitz, 1991), the others argue that smaller boards are preferable (Lipton and Lorsch, 1992; Yermack, 1996). Other studies identified mixed results (Coles, Daniel & Naveen, 2008).

The same situation can be observed in studies of board independence-performance relationship. The mixed prior evidence makes it difficult to predict whether there will be an effect on firm performance in a presence of more or less independent directors in a board. Scholars more often found the increased firm performance in presence of more outside directors (Agrawal and Knoeber, 1996; Baysinger and Butler, 1985; Bharat and Black, 2002; Lorsch and MacIver, 1989; Mizruchi, 1983; Zahra and Pearce, 1989), yet other observations argued that independent directors are less effective due to their limited access to information (Adams and Ferrira, 2007; Harris and Raviv, 2008).

The relationship between board composition and firm performance is a topic under a continuous discussion. There is an uncertainty whether there is a positive or negative causality among elements of this specific issue, as studies received contradicting results; therefore a further investigation is necessary. This research builds up on the existing literature and investigates board composition-firm performance relationship under a new context. This paper studies annual reports of 79 continental Europe-based firms during a period of 5 years. The purpose of this paper is to examine empirical validity of claims that certain configurations of board characteristics positively affect its ability to function, and consequently enhance firm's performance. Therefore, this research paper is intended to explore the following research question:

RQ: How does the board composition affect firm's performance?

In order to answer the research question, the following sub questions will be studied:

SQ1: How does the board size affect firm's performance?

SQ2: How does the board independence affect firm's performance?

The paper is structured in the following way. The next section "Literature review" discusses the key concepts and findings of previous studies on the topic. A special focus is made on the underlying theories explaining the possible relationship among the later proposed variables. The hypotheses will be derived referring to the literature review. Next, the data methodology section presents subjects of study and research methods for testing hypotheses. The subsequent section "Results" includes the descriptive statistics of the sample, and results of linear regression. The last section "Discussion and Conclusion" contains in depth discussion of the results, key findings, limitations, and suggestions for further research.

2. LITERATURE REVIEW

2.1 Board Size

Several studies found that larger boards put more effort to negotiation and compromising among members, therefore their decisions are less risky and more shaped to satisfy different opinions than those of smaller groups (Kogan and Wallach, 1966; Lanser, R. 1969). Sah and Stiglitz (1986, 1991) compared outcomes of discussions under different structures of group decision-making. They noticed that bigger groups had a diversification of opinions effect, which lowered the likelihood of accepting bad projects. According to that, larger boards could be preferable due to more thought-out decisions. It is important to mention that large groups were also less likely to accept good projects (Sah and Stiglitz, 1991). Nevertheless, the majority of studies on this relationship found evidence that smaller boards more often result in a good performance (Lipton and Lorsch, 1992; Yermack, 1996). The cause for it could be partial elimination of bad communication, and poor decision-making (Guest, 2009). Free riders, which are more likely to be present in large boards, possibly also worsen and slower internal board processes (Thomsen & Conyon, 2012). Lipton and Lorsch (1992) argued that large boards may be less efficient because of difficulties to solve agency problems among members. Coles, Daniel & Naveen (2008) found a U-shaped relationship, meaning that either very small or very large boards are the most effective. Cheng (2008) examined the effect of different board sizes on variability of corporate performance. He empirically concluded that larger boards make less extreme decisions, and therefore have less variable performance. Smaller boards, on the other hand, are more likely to have extreme short wins and losses. Even though small and large boards have their shortcomings, they hold unique benefits, which the other one does not have. The difference between them is more frequent risk taking (smaller boards) versus circumspection (larger boards), which are not the result of director's personal qualities, but the internal environment shaped by its composition. In the long run the average performance indexes may have the same or similar value. The decisions of large boards are still well thought-out, but lack a radical increase in performance. Smaller boards have a higher chance of experiencing losses, which can be compensated by excessive gains further on. The medium-sized boards may

not have the same efficiency, and instead of getting the best advantages of the previously mentioned board compositions, suffer from the disadvantages, such as inability to make decisions fast, slow adjustment to new circumstances and unreasonable risk taking. Thus, it is possible to assume that small and large boards are more preferable in order to achieve a higher level of firm's performance.

Hypothesis 1: Board size has a U-shaped relation towards ROA.

Hypothesis 2: Board size has a U-shaped relation towards ROE.

Hypothesis 3: Board size has a U-shaped relation towards Tobin's Q.

2.2 Board Independence

Level of board independence is represented by a number of independent directors in contrast to a total number of board members. The results on relationship between firm performance and board independence are mixed. The majority of scholars observed a negative correlation and concluded that more effective boards are comprised of a greater proportion of outside directors (Agrawal and Knoeber, 1996; Baysinger and Butler, 1985; Bharat and Black, 2002; Lorsch and MacIver, 1989; Mizruchi, 1983; Zahra and Pearce, 1989). However, there are studies that found no evidence of causality between percentage of outside directors and firm performance (Adams et al., 2010; Hermalin and Weisbach, 1991; Mehran, 1995). The preference towards more outsider-dominated board can be explained by agency theory. The principal-agent problem discusses a behavior of an individual, and his willingness to serve self-interest first (Thomsen & Conyon, 2012). The person may take advantage of having control and pursue actions, which benefit him, but not company's owners. Personal characteristics of a superior board member must be integrity and open-mindedness (Salmon, 1993), which according to the agency theory more correspond to the trait of independent director. Based on that, outside directors are more favorable, as they have more independence from firm's management (Dalton, Daily, Ellstrand & Johnson, 1998). As a counter argument to favouring independent directors, they by their nature have less information for monitoring and have difficulties obtaining it, as management is reluctant to share important aspects of business (Adams and Ferreira, 2007; Harris and Raviv, 2008). Nonetheless, concealment of information from outside directors does not necessarily have to be the case in every company or have a high scale. Reiter and Rosenberg (2003) claim that independent directors can be highly valuable to the firms they serve when they are provided with all useful and timely information. Low representation of outside directors in boards can lead to an ineffectual oversight over firm's decision, and failure to monitor management's activities objectively (Lorsch, Andargachew & Pick, 2001). Boards today tend to be more independent, because companies aim for improved corporate governance mechanisms, higher accountability and transparency. Presumably, companies also work on elimination of information concealment issue. The role of board of directors is to monitor and provide resources (Korn and Ferry, 1999), which in theory has a direct influence on firm performance. The monitoring function

implies regulation of managers on behalf of shareholders. Resource dependence theory discusses how a board can contribute to accessing valuable resources and states that gathering and exploiting them better than competitors is fundamental to success (Rondøy, et al., 2006). Fama and Jensen (1983) claim that outside directors can perform the function of supervision better, as most of them are among decision- members in other organizations and are aware of other professional knowledge. This means by itself that independent directors can be a source of mental resources that contribute to over performing competitors and having higher returns. Furthermore, independent directors care about their reputation and put much effort to improve it. On the whole, it is possible to expect a higher number of independent members in a board to enhance firm's performance due to their unbiased opinion, extensive knowledge and experience.

Hypothesis 4: Larger board independence has a positive impact on ROA.

Hypothesis 5: Larger board independence has a positive impact on ROE.

Hypothesis 6: Larger board independence has a positive impact on Tobin's Q.

Overall, the causal model of the research is the following:

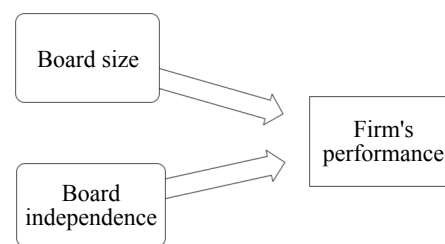


Figure 1. Causal model.

It is expected to find the effect of both board size and board independence on firm's performance: U shaped relationship in case of board size and positive relationship in case of board independence. The measurements for the variables were taken from the literature and will be discussed later on.

3. DATA METHODOLOGY

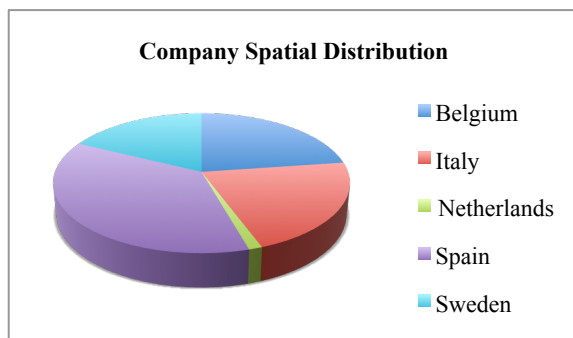
3.1 Sample

Firms included in the analysis are located in the continental Europe and data about their performance ranges from 2010 to 2014 (5 fiscal years). The choice of the years investigated was based on the intention to obtain the latest data, and therefore make the research more relevant for the use by the interested parties. 10 countries were selected based on the highest GDP in 2014 (International Monetary Fund, 2015). Turkey and Russia were excluded as not being part of the European Union and therefore possible major distinction in governance mechanisms. Germany, United Kingdom, France, Switzerland and Poland were as well excluded due to incomplete information or data not being consistently reported in annual reports. The countries included in the

final sample are: Belgium, Italy, the Netherlands, Spain and Sweden. The distribution of companies based on countries of their origin is presented in Table 1. As the board effects studied are of interest only for corporations; partnerships and individuals got excluded from the sample. The availability of data was a vital factor as to whether a particular company can be included. The final sample consists of 79 companies, which data for each variable was collected for a period of five years. Later, the mean average values for each company were calculated based on a period of five years in order to reduce the risk of outliers. In total 395 annual reports were studied for further analysis. This led to the database of 79 companies (n= 79) and corresponding mean averages of each variable (sum of values in years 2010, 2011, 2012, 2013 and 2014, divided by 5).

Table 1. Company spatial distribution.

Company Spatial Distribution		
Belgium	18	22,78%
Italy	17	21,52%
Netherlands	1	1,27%
Spain	29	36,71%
Sweden	14	17,72%
Total	79	100,00%



3.2 Data Measurements

3.2.1 Independent Variables: Measures of Board Composition

Board size is the total number of directors on the board (BOARDSIZE), inclusive CEO and Chairman. Outside, executive, non- executive and other directors are all included. Grey directors, thus those with a questionable status due to their partial connection to the firm (Baysinger and Butler, 1985), are not reflected in the study. The mean average of board size per company during the period of five years was later calculated (BOARDSIZE_5YAVG).

Board independence is measured as a percentage of independent directors (INDEP) in a board (Liu, Miletkov, Wei, & Yang, 2015). The criterion of member's independence determination slightly varies across Europe, but the basic guidelines exist. Independent director must not have strong ties to the company such as being an employee of this or associated company, be close family member to managing or executive director, have business relationship with the company, and not be or represent a

controlling shareholder (European Commission, 2005). The same as in case of board size variable, the mean average was used for the analysis (BOARDSIZE_5YAVG).

3.2.2 Dependent Variables: Measures of Firm Performance

There is not only a single measure of performance, yet this paper collects data on three profitability ratios, each with support of accounting and finance literature, as well as previous studies on the topic (see Table 2). Profitability means firm's capacity to generate profit. The measures used to evaluate firms' performance in this research are: Return on assets (ROA), Return on shareholder's equity (ROE), and Tobin's Q. ROE is an appropriate measure, as the study is concerned with shareholders' welfare. It relates to firm's earnings to assets invested by shareholders (net income/ average shareholders' equity). This profitability ratio shows the ability of a company to generate net profit with the available shareholders' investments. While ROE only takes the assets provided by shareholders into account, ROA includes all available assets that contribute to earnings (net income/ total assets) (Brealey & Myers, 1991). Tobin's Q is a commonly used measure of performance in corporate governance literature, and is a ratio of market value to total asset value. Tobin's Q does not always fully represent firm performance, and can also reflect growth opportunities that arise from external conditions rather than managerial decisions. (Pham, Suchard, & Zein, 2011). Different performance measures may produce different results due to different other factors that may also have an influence of each of them.

Financial measures fall into two categories: accounting- and market- based measures. Accounting measures (in this study ROA and ROE) focus on historical backward evaluation, and financial measures (Tobin's Q) are related to forward- looking market value indicators and expected future earnings. The higher the level of ROA, ROE and Tobin's Q, the higher is the performance (Bell, 1990).

Table 2. Performance measures.

Performance Measures		
Measure	Formula	Used in literature (examples)
ROA	Net income/ total assets	Daily and Dalton (1992), Judge and Dobbins (1995), Pearce and Zahra (1992)
ROE	Net income/ average shareholder's equity	Baysinger and Butler (1985), Kaufmann and Taylor (1993), Zahra and Stanton (1988)
Tobin's Q	Total market value/ total asset value	Fauzi (2012) Wang et. al (2013) Yermack (1996)

3.2.3 Control Variables

The essence of the control variables is to give recognition to the fact that there might be other company-related factors influencing the performance of firms in a given period.

Number of employees was taken as a control variable (EMPLOYEE). The mean average of 5 years of each company was collected (EMPLOYEE_5YAVG). Number of employees can be interpreted as a measure of firm's size. It is important to note that number of employees does not perfectly predict the size of a firm. For example, some big companies do not have many employees due to the fact that they make use of machinery that alone performs large-scale operations. This issue will later be addressed in robustness check.

Another control variable is a number of shareholders (SHAREHOLDERS). In the "shareholder view" shareholders are viewed as the most important body as the primary goal of corporations and managers is to maximize their returns (Smith, 2003), and as if any stakeholder have some influence on the company. Number of shareholders is highly influenced by firm size, as larger firms tend to have more analyst and press coverage, and therefore mostly have more shares available. More investments into advertising company and its products on the market, thereby more funds available, have a tendency to contribute to a bigger shareholder base. (Grullon, Kanatas, & Weston, 2003). A mean average of 5-year data was calculated for further analysis (SHAREHOLDERS_5YAVG).

The last control variable is number of subsidiaries (SUBSIDIARIES). Agency problem also has an effect when it comes to management of subsidiaries. Local managers may act in their own interest following their own preferred strategies, which contradict the overall strategy and plans of the firm. It is assumed that smaller number of subsidiaries contributes to the alignment of strategies and therefore better joint performance. Moreover, an increasing number of subsidiaries requires additional and advanced managerial capabilities and more complex decision-making that sometimes can lead to a detrimental effect on firm's financial performance (Tihanyi, Griffith, & Russell, 2005). A mean average of 5-year data was calculated (SUBSIDIARIES_5YAVG).

3.2.4 Robustness Check

Additional robustness check was conducted in order to analyze the sensitivity of results. The effect of different industries was investigated between the independent and outcome variables. Companies were classified using 2-digit NACE codes (see Table 3). The more detailed industry codes were not used due to a very small number of companies falling into each category. The existing literature points out the relationship between industry and financial performance of companies (Brammer & Milington, 2006, Ullman 1985). For example, some companies are more sensitive to economic and market changes or type of product/ service a specific industry works with has an impact. As it was mentioned earlier, number of employees does not always exactly predict the

size of a firm. Industry dummy is expected to reduce this effect.

In addition to that, the data was also checked for potential multicollinearity issues, examining the correlation values of variables included in the analysis and exploring VIF values. The findings of robustness checks will be reflected in further sections.

Table 3. Industry distribution.

Industry Distribution		
Chemicals, rubber, plastics, non-metallic products (CH)	10	12,66%
Construction (CON)	7	8,86%
Food, beverages, tobacco (FB)	3	3,8%
Gas, Water, Electricity (GWE)	5	6,33%
Information and communication (INF)	10	12,66%
Machinery, equipment, furniture, recycling (MAC)	18	22,78%
Metals & metal products (MET)	5	6,33%
Other services (OS)	12	15,19%
Textiles, wearing apparel, leather (TX)	3	3,8%
Wholesale & retail trade (WS)	6	7,59%
Total	79	100,00%

3.2.5 Causal Relationship Model

$$\text{Performance measure} = \alpha + \beta_1 \text{BOARDSIZE_5YAVG} + \beta_2 \text{INDEP_5YAVG} + \beta_3 \text{EMPLOYEE_5YAVG} + \beta_4 \text{SHAREHOLDERS_5YAVG} + \beta_5 \text{SUBSIDIARIES_5YAVG} + \varepsilon$$

β_1 captures the incremental effect of board size on the corresponding financial ratio (ROA, ROE or Tobin's Q); β_2 corresponds to the effect of board independence. β_3 shows the effect of number of employees, β_4 - effect of number of shareholders, β_5 - effect of number of subsidiaries. Each performance indicator was investigated separately; therefore the models for each analysis are as follows:

$$\text{ROA_5YAVG} = \alpha + \beta_1 \text{BOARDSIZE_5YAVG} + \beta_2 \text{INDEP_5YAVG} + \beta_3 \text{EMPLOYEE_5YAVG} + \beta_4 \text{SHAREHOLDERS_5YAVG} + \beta_5 \text{SUBSIDIARIES_5YAVG} + \varepsilon$$

$$\text{ROE_5YAVG} = \alpha + \beta_1 \text{BOARDSIZE_5YAVG} + \beta_2 \text{INDEP_5YAVG} + \beta_3 \text{EMPLOYEE_5YAVG} + \beta_4 \text{SHAREHOLDERS_5YAVG} + \beta_5 \text{SUBSIDIARIES_5YAVG} + \varepsilon$$

$$\text{TOBIN'S Q_5YAVG} = \alpha + \beta_1 \text{BOARDSIZE_5YAVG} + \beta_2 \text{INDEP_5YAVG} + \beta_3 \text{EMPLOYEE_5YAVG} + \beta_4 \text{SHAREHOLDERS_5YAVG} + \beta_5 \text{SUBSIDIARIES_5YAVG} + \varepsilon$$

3.3 Data Collection

For the analysis purposes all data concerning firm's board characteristics and financial performance was collected from the annual reports (retrieved from firms' websites and ORBIS database). The information concerning the board size and board independence could not be found in ORBIS database, and was therefore collected manually with a use of annual reports. Data on other variables (number of employees, ROA, ROE, Tobin's Q, number of subsidiaries, number of shareholders) was exported from ORBIS.

3.4 Data Analysis

For data analysis descriptive statistics will be applied to analyze and compare companies included in the sample. The suitable method for predicting one variable from one or several other variables and understanding relationship among them is multivariate linear regression (De Veaux, Velleman, & Bock, 2005; Field, 2009). Hence, the goal of this paper is to explore the impact of board size and board independence on firm performance indicators. Multivariate linear regression is conducted using SPSS 22 Software Tool to test the proposed hypotheses.

4. RESULTS

4.1 Descriptive Statistics

Table 4 presents descriptive statistics of the variables in the collected sample. The average board size ranges from 5.6 to 18.8 members, with a mean of 10.16 (median= 9.40) and standard deviation of 3.21. The board independence ranges from 11.11% to 90% with a mean of 43.22% (median= 44.37%) and standard deviation 15.68%. This descriptive statistics indicates towards a normal distribution and there is no major skewness detected. The performance measures used in the analysis depict different results. The mean average of ROA has a positive value within the sample used in the analysis (mean= 1.88; median= 2.69). A similar positive pattern was also observed for Tobin's Q (mean= .96; median= .50). However, ROE within a sample showed a negative mean average value (mean= -.34; median= 7.76). This suggests that companies in the sample had a widely distributed performance over the period of five years.

Table 5 presents correlation results. The generated correlation values of the variables included in the model are relatively low, indicating results mainly lower than

0.70 threshold (Cohen, Cohen, West, & Aiken, 2013). In two cases values were higher. The dependent variables ROA and ROE are high on correlation due to financial similarity, however have no impact on regression results, because these two variables are tested independently. In the second case, board size and board size squared have a high correlation value, which is expected and could be predicted. Therefore, variables included in the analysis can be analyzed in a combined manner.

4.2 Regression Results

The results of linear regression are reported in Table 6. Further argumentation will be based on the full regression model. Hypothesis 1 states that Board size has a U- shaped relation towards ROA. To conclude that there is a curvilinear relationship, a negative main effect of board size is expected, while a positive squared board size coefficient would indicate for a U- shaped effect. In the first model (See Model 1, Table 6) the curvilinear effect of board size on ROA were explored. The regression results indicate that the main effect of board size has an expected negative coefficient (b= -3.15), while the squared board size coefficient is positive (b= .072). This indicates for a U- shaped effect, however results are not significant (p> .10 both for board size and board size squared). Thus, Hypothesis 1 cannot be confirmed and has to be rejected. In the second model (See Model 2, Table 6) curvilinear effect of board size on ROE was investigated. Contrary to the expected direction, the results of the regression shows that the main effect of board size has a positive coefficient (b= 1.172), and the squared board size coefficient is negative (b= -.132). The result points out that board size has an inverted U- shaped effect on ROE, though the results are also not significant (p> .10 both for board size and board size squared). Based on the results, Hypothesis 2 cannot be confirmed and has to be rejected. The result is not consistent with some of the previous observations on the topic (Claessens, Djankov, & Lang, 2000). Similarly to the Hypothesis 2, result indicates a positive main effect of board size (b= .030) and a negative squared effect (b= -.006), but both coefficients are not significant (p> .10). Based on these findings Hypothesis 3 examining U-shaped effect towards Tobin's Q cannot be confirmed and therefore has to be rejected. The result contradicts the findings of Coles, Daniel & Naveen (2008).

Hypothesis 4 proposed that larger board independence has a positive impact on ROA. The first model (See Model 1, Table 6) investigates the effect of board independence on ROA. The regression results depict that board

Table 4. Descriptive Statistics

	N	Minimum	Maximum	Mean	Median	Std. Deviation
Return on Assets (ROA)	79	-48.044	36.639	1.877	2.688	10.808
Return on Equity (ROE)	79	-162.021	56.060	-0.340	7.755	32.055
Tobins' Q	79	.042	7.622	.950	.502	1.416
Board Size	79	5.600	18.800	10.157	9.400	3.215
Board Size Squared	79	31.360	353.440	113.369	88.360	74.304
Independence %	79	11.111	90.000	43.224	44.369	15.680
Number of Employees	79	72.400	191949.800	15186.190	2198.600	34600.170
Number of Shareholders	79	2.000	150.000	45.063	35.000	37.803
Number of Subsidiaries	79	.000	1754.000	105.810	24.000	278.729

Table 5. Correlation Results

	Return on Assets (ROA)	Return on Equity (ROE)	Tobins' Q	Board Size	Board Size Squared	Indep. %	N of Empl.	N of Sharehold.	N of Subsid.
Return on Assets (ROA)	1								
Return on Equity (ROE)	.724**	1							
Tobins' Q	.188	.151	1						
Board Size	-.230*	-.174	-.271*	1					
Board Size Squared	-.204	-.183	-.263*	.987**	1				
Independence %	.267*	.295**	.240*	-.189	-.153	1			
Number of Employees	.064	-.019	-.038	.522**	.561**	.054	1		
Number of Shareholders	.093	.104	-.127	.611**	.605**	.177	.508**	1	
Number of Subsidiaries	-.008	-.326**	-.097	.481**	.524**	-.033	.623**	.376**	1

N of cases 79

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6. Regression Results

	ROA	ROE	Tobins' Q
(Constant)	18.201 (14.605)	-21.621 (41.018)	.588 (1.976)
Board Size	-3.15 (2.478)	1.172 (6.96)	.030 (.335)
Board Size Squared	.072 (.108)	-.132 (.303)	-.006 (.015)
Independence %	.076 (.083)	.411* (.234)	.019 (.011)
Number of Employees	.001 (.000)	.000* (.000)	.001 (.000)
Number of Shareholders	.080* (.043)	.192 (.122)	-.003 (.006)
Number of Subsidiaries	.000 (.006)	-.052*** (.016)	-.001 (.001)
R square (adj.)	.109	.201	.050
N of cases	79	79	79

Table presents regression results. Standard errors are presented in brackets beneath the B coefficients.

***. Statistical significance at 1% level.

**. Statistical significance at 5% level.

*. Statistical significance at 10% level

independence has an expected positive coefficient ($b = .076$), however is not significant ($p > .10$). Thus, Hypothesis 4 cannot be confirmed. Hypothesis 5 proposed that larger board independence has a positive impact on ROE (see Model 2, Table 6). The results show an expected positive statistically significant effect ($b = .411$; $p < .10$), which means that Hypothesis 5 is confirmed at 10% level. This result is consistent with observations of Lorsch and MacIver (1989) and Mizruchi (1983). In case of board independence effect on Tobin's Q, an expected positive coefficient is observed ($b = .019$) and is almost significant at 10% level ($p = .101$). Although the result is almost significant, Hypothesis 6 still cannot be confirmed and thus has to be rejected. This result contradicts the findings if Fama and Jensen (1983) who found a significant positive relationship between board independence and Tobin's Q.

Concerning the control variables, mixed results were identified. The regression result in the first model (See Model 1, Table 6) shows that number of employees has a minor positive effect on ROA ($b = .001$) and is not significant ($p > .10$). Furthermore, number of shareholders indicates a statistically significant positive effect on ROA at 10% level ($b = .080$; $p < .10$). According to the results in Model 1, number of subsidiaries has a minimal effect on ROA ($b = .00$), and is not significant.

The Model 2 represents the impact of control variables on ROE (See Model 2, Table 6). Number of employees has a minor positive effect on ROE ($b = .000$), and is significant at 10% level ($p < .10$). Number of shareholders also has a positive effect on ROE ($b = .192$), but the result is not significant ($p > .10$). Number of subsidiaries has a statistically significant negative impact on ROE ($b = -.052$; $p < .01$).

The Model 3 looks at relationship between the control variables and Tobin's Q (See Model 3, Table 6). Number of employees has a minor positive impact ($b = .001$), number of shareholders has a negative impact ($b = -.003$), and number of subsidiaries also indicates a minor negative impact ($b = -.001$). All three control variables are not statistically significant in Model 3 ($p > .10$).

Regarding the explained variance, in the first model 10.9% of (adjusted) variability in the score of ROA is accounted for the level of board size, board size squared, board independence, number of employees, number of subsidiaries and number of shareholders combined ($R^2_{\text{adjusted}} = .109$). With respect to the second model, 20.1% of (adjusted) variability in the score of ROE falls on the level of board size, board size squared, board independence, number of employees, number of subsidiaries and number of shareholders combined ($R^2_{\text{adjusted}} = .201$), while in case of third model, 5% of (adjusted) variability in the score of Tobin's Q is explained by the used variables respectively ($R^2_{\text{adjusted}} = .050$).

4.3 Robustness Check of Results

4.3.1 Check for Potential Multicollinearity Issues

As mentioned before, variables included in the analysis were tested for correlation. The correlation results did not identify any major violations proposing for a sufficient

robustness of data. Additionally, variance inflation factors (VIF) were tested in order to check for the possible multicollinearity issues. The board size and board size squared variables have VIF values higher than 10, which is the result of their same origin. The observed values of other variables are below the threshold of 10 (all the other observed VIF values fall between 1 and 3), thus they can be used in the model at the same time (Field, 2009).

4.3.2 The Impact of Industry Dummies on Regression Results

The industry variable was introduced as an additional control variable to examine the sensitivity of data analysis. Additional regression analysis was conducted including industry dummies. The results are shown in Table 7 (Appendix).

$$ROA_{5YAVG} = \alpha + \beta_1 BOARD_SIZE_{5YAVG} + \beta_2 INDEP_{5YAVG} + \beta_3 EMPLOYEE_{5YAVG} + \beta_4 SHAREHOLDERS_{5YAVG} + \beta_5 SUBSIDIARIES_{5YAVG} + \text{industry dummies} + \varepsilon$$

$$ROE_{5YAVG} = \alpha + \beta_1 BOARD_SIZE_{5YAVG} + \beta_2 INDEP_{5YAVG} + \beta_3 EMPLOYEE_{5YAVG} + \beta_4 SHAREHOLDERS_{5YAVG} + \beta_5 SUBSIDIARIES_{5YAVG} + \text{industry dummies} + \varepsilon$$

$$TOBIN'S\ Q_{5YAVG} = \alpha + \beta_1 BOARD_SIZE_{5YAVG} + \beta_2 INDEP_{5YAVG} + \beta_3 EMPLOYEE_{5YAVG} + \beta_4 SHAREHOLDERS_{5YAVG} + \beta_5 SUBSIDIARIES_{5YAVG} + \text{industry dummies} + \varepsilon$$

Model 1 (Table 7, see Appendix) investigates the effect of board size and board independence on ROA. Results reveal that two industries, Information and communication (INF) and Other services (OS) respectively, have a statistically significant effect at 10% level. This means that the relationship between board size and board independence towards ROA might be different across various industries, proposing that industry-specific factors might have a performance-determining role and should be further investigated. In two other models investigating the relationship of board size and board independence towards ROE and Tobin's Q respectively, no significant industry effects were found. In addition to that, all the coefficients of all variables included in the analysis, except the number of subsidiaries, retained the same positive or negative signs as in the original regression panel without included industry dummies (Table 6). In more details, the relationship between number of shareholders and ROA, and also the relationship between number of subsidiaries and ROE, remained statistically significant. In one case the relationship between board independence and ROE became statistically not significant, while in case of board independence impact on Tobin's Q the relationship became statistically significant at 10% level ($p < .10$).

Overall, the additional regression results are in line with the original models and consistent, proposing that this data could be used for analysis with some awareness towards industry-specific conditions.

5. DISCUSSION & CONCLUSIONS

Corporate governance is a topic under a continuous discussion. Countries have different corporate governance standards and institutional mechanisms, as well as companies themselves have their own structures influenced by institutions and management. There is no consensus concerning what is the exact corporate governance structure that works best. Board of directors is one of the many elements that is crucial for the good performance and survival of a company. It is responsible for the major important decisions on company's management, direction and future development. The quality of decisions made by the board of directors must in theory influence productivity of a company and its profit generating capabilities (Thomsen & Conyon, 2012).

The aspects of board characteristics studied in this research are board size and board independence. The dilemma between having a bigger or smaller board size has a root in communication issues among directors. The majority of studies found that smaller board is preferable (Lipton and Lorsch, 1992; Yermack, 1996), which could be explained by faster decision-making and flexibility. Larger boards have more thought-out decisions, as there are more opinions and remarks to be taken into account. Some scholars also found evidence that larger boards contribute more to the better performance (Kogan and Wallach, 1966; Lanser, R. 1969). Still, there were shortcomings detected in both small and large boards: unjustified risk-taking, and slow response together with smaller likelihood of accepting good projects respectively. It was assumed that during the long-term period small boards would make up for possible big losses by having extreme gains, while larger boards would have a stable performance results throughout the whole period. Looking at average performance in a period of five years, it was expected for companies with small and large boards to have similar level of performance. It was also assumed that medium sized boards would not feel an impact of the advantages of small and large boards, but rather face the disadvantages of both. All in all, the proposed Hypotheses 1, 2 and 3 stated that the research results are expected to show a U-shaped relationship between board size and firm performance.

The second part of the research dealt with independence of the boards. Similarly to the board size, the previous studies have not yet determined the effect of presence of independent directors in a board on firm performance. Most of the previous studies concluded that the higher ratio of independent board members contributes to the higher firm performance (Agrawal and Knoeber, 1996; Baysinger and Butler, 1985; Bharat and Black, 2002; Lorsch and MacIver, 1989; Mizruchi, 1983; Zahra and Pearce, 1989). The other researches found contradicting results (Adams and Ferrira, 2007; Harris and Raviv, 2008). Based on the agency theory, independent directors are much less likely to act in the own interest, but only in the interest of company instead, as they do not have any possible financial advantages other than variable remuneration related by making certain decisions. On the other hand, they do not always have complete information concerning company's business. The Hypotheses 4, 5 and 6 proposed having a positive relationship between board independence and firm performance.

The five-year data (2010- 2014) of 79 companies from Belgium, Italy, the Netherlands, Spain and Sweden was studied in order to investigate the relationship between board composition and firms' performance, making up in total a database consisting of information from 395 annual reports. The first independent variable was board size. It is expressed as total number of board of director's members. Most of the companies had changes in board size through five years of their activity. The second independent variable was board independence, which implies a percentage of independent directors in a board of directors. The definition of independent director included absence of any ties with company's business and its major shareholders, as well as not being a current or recent employee of the company. The control variable was the number of employees in a company. On one hand this measure reflects the size of the company, on the other can possibly give an estimate on firm's capabilities. Other control variables were number of shareholders and number of subsidiaries. In order to measure firms' performance, three profitability ratios were used- ROA (return on assets), ROE (return on equity) and Tobin's Q.

The testing of hypotheses was conducted by analyzing data with multivariate linear regression. It was decided to take the mean averages of each of the observed variables in 2010- 2014, as otherwise many outliers could occur and make the research biased through showing unrealistic interrelations among variables. For example, a company could have extreme gains or losses (hence, very high or low ROA) due to random factors, such as economic situation in a country; high scale long-term investments, etc. It was expected that the coverage of several years at once would represent a clearer picture. All in all, the analysis was based on 79 samples each containing corresponding data of mean averages of each variable.

The regression analysis showed mixed results concerning the relationship between board composition and performance. In case of board size and ROA, the indication for a U-shaped relationship was found, however it was not significant ($p > .05$ both for board size and board size squared). The interesting pattern was found when analyzing interrelationship between board size and ROE. In contrary to the model containing ROA, the second model found an indication towards inverted U-shaped relationship, but it was also not significant ($p > .05$ both for board size and board size squared). Regression result of relationship between board size and Tobin's Q had similar nature, but as well not significant. The previous studies showed diverse results on board size- firm performance relationship; therefore the chance to have no confirmation to the proposed hypothesis in the analysis could be expected. The regression analysis showed an indication for U-shaped effect, although not significant. This result contradicts the findings of Coles, Daniel & Naveen (2008) who found a significant U-shaped effect between board size and performance. In this study the number of board members has only a minor contribution to the performance of a firm; therefore other firm characteristics that could have a potential impact on performance must be studied further on. Companies should examine their board composition in more detail and experiment in order to find the optimal board size for them. In some cases companies might prefer smaller or larger board based on, for example, their strategy and current phase of company's development.

The second part of the regression analysis examined the effect of board independence on firm's performance. The statistically significant positive relationship was found in case of board independence and ROE. This specific result was in line with the proposed theories and hypothesis, and showed that the higher number of independent directors positively contributes to the performance of a firm. The result is also in line with the findings of Lorsch and MacIver (1989) and Mizuchi (1983). Based on the theory, independent directors have advantages over inside and non- executive directors, as they gain more knowledge through being outside directors in other firms (Fama and Jensen, 1983), have unbiased solutions to problems and better overview of the business activities (Lorsch, Andargachew & Pick, 2001). The satisfactory regression result could be explained by these attributes of an independent director. The result only partially confirmed that the theory has a sign of it in reality, because results on ROA and Tobin's Q were not statistically significant. The relationship should still be further studied under other limitations to get a better and more complete understanding on the topic.

The control variables showed mixed results. Results on number of employees and number of subsidiaries were statistically significant in relation to ROE; number of shareholders had a statistically significant result on ROA. All other results were not significant. These interrelationships should be studied further to see whether there is actually any effect of these control variables on performance present.

To sum up, the general recommendation towards companies with a presence of board of directors is to aim for a balance in board size depending on their strategy, goals, and company- related characteristics. This research showed a slight indication of a U- shaped relationship, but the result was not significant enough to claim that a specific board size works best. Companies should also simultaneously attempt to put the increase of board independence on trial and look after the changes in performance. The regression results showed an indication of a positive effect of board independence on ROE, however relationships with ROA and Tobin's Q were not proved to be statistically significant. In the robustness check relationship between board independence and Tobin's Q became statistically significant, and with ROE- not significant. Thereby, it could be assumed that board independence only partially affects the performance. Other industry- and company- specific, or presumably institutional and market parameters may affect the results.

5.1 Theoretical and Managerial Implications

The purpose of this paper was to highlight the importance of corporate governance, test the existing theories and contribute to the existing studies on the topic by investigating the problem under different limitations with a different sample. The research addresses the existing gap in the literature that has not yet extensively and comprehensively studied the topic of board composition and firms' performance. While the scholars conducted similar studies previously, the contradicting results did not let the concepts and interrelationships relationships to be fully understood. Still, the on- going debate takes place

concerning the extent each composition of board of directors influences the performance of a firm. Board of directors is responsible for major decisions within a company and basically represents the main controlling body within an organization. Therefore, it is vital to identify what are the elements of a successful board that make a company perform at its best. This research found evidence on the effect of board independence on performance measure ROE, thereby partially confirming the theory. The board size should be further studied under new limitations with a bigger and more diverse sample. Other performance measures should also be taken into consideration, as ROA, ROE and Tobin's Q are not the only profitability ratios used in financial assessment.

This research has a notable value for managers who aim to optimize their corporate governance policies and board structure. Board composition must help to successfully cope with the assigned tasks, and the results showed that at least board independence has a positive impact on performance. According to the findings of this paper, managers should examine their existing board of directors and seek to enlarge its independency over internally determined period of time, based on the strategic development goals.

Undoubtedly, other factors also influence performance, however, board of directors is the key mechanism of corporate governance that is a primary source of any initiatives and directives. The research does not only concern companies' management, but also other stakeholders. For example, shareholders are interested in how the company is managed, as decisions made by the board of directors directly influences their earnings. Investors may also look at the board composition to make sure of continuity of business and company's capabilities. Suppliers and customers may as well draw attention to the board of directors to monitor how the decisions are made and whose interests are put first. All in all, any person who is interested or is doing business with a company can already draw preliminary conclusions by investigating the composition of board of directors.

5.2 Limitations and Further Research

This study has limitations, which could be reduced in the future studies on the topic. Companies included the analysis were from five countries in Europe. Corporate governance mechanisms of these countries have similar nature due to membership in the European Union, but nonetheless also have differences, such as legal requirements concerning corporate structure, procedures, hierarchies, and power allocation. The country factor could be added as an independent variable as each holds country- specific attributes. For example, economic situation, population or GDP of a particular country could also have an impact on companies and their performance. The further research could potentially cover a higher number of European countries, and could even be expanded to international scale. The time span of five years and number of companies could also be enlarged to grasp more periods of time or study and compare different periods.

Some independent variables that could perhaps have an impact on the estimated relationship and partially explain variability in the scores of ROA, ROE and Tobin's Q were not taken into account in this study. First, the external and

internal environment of a firm may have an impact on profitability. For example, it would be interesting to investigate the same topic in combination with data about capital and ownership structure, maturity of industry the company operates in, number of issued shares, competitors and customers, composition and independence of supervisory board (in case if there is any), investments, etc. Second, board composition's characteristics are not only limited to board size and board independence. Other studies that investigated relationship between board composition and firms' performance also included CEO duality, psychological and cultural distance among directors, gender, remuneration, and job experience/education of directors. However, there was also no consensus reached concerning the nature of effect of these on firms' performance.

In addition, ROA, ROE and Tobin's Q are not the only indexes to identify firm's performance. The other examples include: earnings per share, solvency ratio, and profit margin.

6. BIBLIOGRAPHY

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APPENDIX

Table 7. Regression Results, included industry dummies for robustness check.

	ROA	ROE	Tobins' Q
(Constant)	25.800 (16.169)	-20.205 (46.060)	.413 (2.141)
Board Size	-3.500 (2.669)	2.413 (7.603)	.025 (.353)
Board Size Squared	.095 (.118)	-.180 (.335)	-.005 (.016)
Independence %	.019 (.095)	.358 (.270)	.023* (.013)
Number of Employees	.001 (.000)	.000 (.000)	.001 (.000)
Number of Shareholders	.098* (.050)	.212 (.142)	-.002 (.007)
Number of Subsidiaries	.000 (.007)	-.049** (.019)	.000 (.001)
Industry Dummies	Included	Included	Included
R square (adj.)	.068	.140	.048
N of cases	79	79	79

Table presents regression results. Standard errors are presented in brackets beneath the B coefficients.

***. Statistical significance at 1% level.

** . Statistical significance at 5% level.

*. Statistical significance at 10% level