HOW DOES BOARD STRUCTURE IMPACT ON FIRM PERFORMANCE IN THE UK?

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Abstract

The aim of this paper is to examine whether or not the structure of the board of directors and, in particular, board size, independence and remuneration have an impact on firm performance. The sample examined is UK FTSE 100 non-financial companies using data from the period 2012 to 2015. A regression analysis has been used concluding a significant positive correlation between board remuneration and firm performance, namely Return on Assets and Tobin's Q. The study also concluded a positive correlation between board size and ROA, and between board independence and Tobin's Q. Additionally, a significant negative correlation between the control variables (i.e. company size and industry) and Return on Assets.

Keywords: Corporate Governance Code (CGC), Board Structure, Board Size, Board Independence, Board Remuneration, Return on Assets (ROA), Tobin's Q (TQ), UK

1. INTRODUCTION[1]

Firms have been struggling with financial scandals over the last four decades and, consequently, these have impacted on the level of research into the features and characteristics of effective corporate governance mechanisms. Since 1992, following the Cadbury Report and the OECD Report, there have been a rapid worldwide changes with the development and prominence of Corporate Governance Codes (CGCs) and regulations aimed at, amongst other things, providing a clear description of the main features of an effective board of directors (Jermias & Gani, 2014).

The importance of the firm's board of directors is based on the Agency Theory, whereby the firm's shareholders appoint representatives to manage it on their behalf (part two of this paper provides more information about Agency Theory). However, Agency Theory leads to a separation between the firm's ownership and control and creates problems such as conflict of interest, information asymmetry and moral hazard.

As stated in the UK's CGC (2016), the key features of an effective board of directors relate mainly to; board size, board structure and the separation of the duties of the Chairman and the Chief Executive Officer (CEO). These features include also, effective remuneration policy independent directors monitoring executive directors and independent board committees such as a remuneration committee, an audit committee and a nomination committee, that can provide assurances to the firm's shareholders and stakeholders (Kaczmarek, Kimino, & Pye, 2011). Furthermore, while not identifying the number of directors required forming a board of directors, the UK's CGC states clearly that the board of directors should communicate effectively with the firm's shareholders in the general meetings.

Both issues of the separation of the Chairman's and the CEO's duties and the lack of sufficient independent directors have contributed to firm scandals such as WorldCom and Enron (Almadi, 2016). Therefore, the current worldwide CGCs recognised the importance of the independent non-executive directors as an effective mechanism in monitoring executive directors and ensuring an effective internal control system, which in result can mitigate agency problems.

Consequently, in investigating the link between the board of directors and firm performance, this paper highlights the importance of such a mechanism.

The main question, which this paper aims to answer, is whether or not there is a relationship between the size of the board of directors, the

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[1] This paper is based on master dissertation of the first author (Alqatan, 2017).

number of independent directors and the firm's performance. The objectives of this paper are as follows:

• To identify the main characteristics of an effective board of directors;

• To examine the relationship between board size and firm performance;

• To examine the relationship between the independence of the board of directors and firm performance; and

• To identify whether or not different performance measures change the impact of the above mentioned.

2. LITERATURE REVIEW

The UK CGC has been subject to continuous development over the years, with more attention being made since the financial crises in 2007. The importance of corporate governance can be traced back to Adam Smith's (1776) book entitled "The Wealth Nations" and Berle and Means's work in 1932.

The specific meaning of corporate governance depends on whether it is viewed through the Agency Theory or the Stakeholder Theory. Notwithstanding, there is general agreement about the importance of corporate governance in terms of whether a firm succeeds or fails. In this regard, several factors, such as increased risks due to weak control systems, privatization and globalization, have increased the importance of corporate governance and its effective practices (Almadi, 2016).

Corporate governance practices can vary between countries depending on the nature of the financial market, the corporate culture, the time of the definition and the theory used to define such practices (Kaczmarek et al., 2011).

As shown by the following, there are many definitions of corporate governance. The Cadbury Report (1992, p. 4) defined corporate governance as "the system by which companies are directed and controlled". The Dictionary of Accounting, Oxford University Press (1999) defined corporate governance as "the manner in which organisations, particularly limited companies are managed and the nature of accountability of the managers to the owner". Jermias and Gani (2014) defined corporate governance as 'the structure and function of a corporation in relation to its stakeholders generally, and its shareholders specifically".

In addition to the firm's functions and management, the Organisation for Economic Corporation and Development (OECD, 2004, p. 11) emphasizes the importance of the firm's shareholders and other stakeholders.

The main features of the UK's CGC are as follows:

• Firstly, it focuses more on the spirit of the Code rather than its content.

• Secondly, it encourages shareholders to engage more actively in monitoring the board of directors.

• Thirdly, it promotes the importance of the board of directors being effective with particular regard to separating the Chairman's and the CEO's duties; maintaining a balance between executive and non-executive directors; rewarding good performance through an effective remuneration policy; and increasing stakeholders' confidence in the financial statements and the disclosure of information through an effective audit committee.

2.1. Theoretical framework

Agency Theory and Stakeholder Theory are the two main theories used to define corporate governance. The Agency Theory better explains the UK's CGC and, consequently, is the basis of this paper. However, in order to highlight the differences between the two theories, the paper also discusses Stakeholder Theory in brief.

Agency Theory discusses the relationship between the board of directors and the firm's shareholders (the owners) and makes no reference to the firm's stakeholders. In addition, the firm's shareholders appoint the board of directors to manage the firm's business on their behalf and to look after their interests in respect of the firm's assets (Jensen & Meckling, 1976; Rowley, Shipilov, & Greve, 2017).

Bhagat and Black's (2002) findings highlight major Agency problems which include the separation of the firm's ownership and control besides the problem of information asymmetry and conflict of interest. Their findings show that there is no association between shareholders and the firm's managers, therefore, the managers are left to manage the firm's business from their own perspective. Such a relationship leads to a conflict of interest. Also, in order to reduce such a risk, it is important that the independent directors on the board of directors monitor and supervise the managers' work (Leung, Richardson, & Jaggi, 2014; Terjesen, Couto, & Francisco, 2016). Consequently, agency problems result in a negative association between board size and firm performance (Eisenberg, Sundgren, & Wells, 1998; Liang, Xu, & Jiraporn, 2013).

Guest's (2009) and Yapa Abeywardhana's (2016) findings show that such conflicts of interest can be reduced through the firm's owners taking either positive and/or negative actions.

Positive actions include incentives to the board of directors (financial rewards – both short- and long-term) and linking their interests to the shareholders' interests. Also, managers can be rewarded with shares and, thereby, their interests are identical to those of the shareholders (Das, 2019). Negative actions include a hostile takeover of the firm, shareholder activism, the dismissal of underperforming managers and shareholders challenging and rejecting the board of directors' proposals (Katsurada & Sugawara, 1998).

According to Guest (2009) and Yapa Abeywardhana (2016), information asymmetry occurs when the managers have more private information about the firm than the shareholders. In such circumstances, the board of directors may manipulate the information to their benefit and, thereby, prevent the firm's shareholders from making the correct economic decisions.

Since it makes no reference to the firm's stakeholders, Agency Theory helps to create the research hypothesis that evaluates the relationship between the board of directors and the firm's shareholders. The separation of the firm's ownership from its management control along with the problem of information asymmetry specify how the variables relate to one another and how they contribute to the firm's performance.

In contrast, Stakeholder Theory suggests that the board of directors focuses on the interests of all the firm's stakeholders not solely on the shareholders' interests (Freeman, 1984). Stakeholder Theory is based on all stakeholders contributing to and benefiting from the firm's activities (Donaldson & Davis, 1991; Jones, Harrison, & Felps, 2018). For instance, customers' inputs are the cash that they pay when they receive their products or services. According to Kaczmarek et al. (2011), firms are expected to act beyond their legal requirements and obligations so that they meet the demands and expectations of society and other stakeholders. It has become imperative for a firm to adopt such a strategy if it wishes to maintain a competitive advantage.

Accordingly, Stakeholder Theory is used to create a hypothesis that measures the firm's performance when the board of directors focuses their efforts towards rewarding all stakeholders rather than directing their efforts solely towards rewarding the shareholders. This paper aims to determine the circumstances that enable the firm to maintain a competitive advantage.

2.2. Board of directors and firm performance: An empirical discussion

According to the UK CGC (2016), the board of directors' main role is to provide effective management and leadership that make the best use of the firm's human resources and financial assets. In addition, the UK CGC insists that the board of directors must be of sufficient size and that there is a balance between the number of non-executive and executive directors.

2.2.1. Board size and performance

Agency and Stakeholder Theories consider that the firm's performance is directly proportionate to the size of the board of directors. In this regard, Agency Theory states that, when controlling, monitoring and evaluating a firm's business, a number of directors must channel their efforts towards fulfilling the stakeholders' interests. This is because such exquisite monitoring contributes to an improvement in the firm's performance (Bermig & Frick, 2010).

In contrast, Stakeholder Theory states that the managers represent all stakeholders and, therefore, when they make the best use of their expertise, skills, knowledge and experience, the firm's performance improves (Almadi, 2016). There were mixed results from several research studies that examined the relationship between board size and the board of directors' performance (Cascio, 2004; Cheng, 2008; Baysinger & Butler, 1985).

On a positive note, the findings of studies by such as Eisenhardt and Schoonhoven (1990); Abidin, Kamal, and Jusoff (2009); Pearce and Zahra (1992); Boone, Field, Karpoff, and Raheja (2007) and Tulung and Ramdani (2018) demonstrate a positive relationship between board size and firm performance. A large board of directors can provide more effective information and creative ideas which the firm can use to improve its performance. These studies' findings recommend a higher number of independent non-executive directors to better monitor the firm and fewer agency problems such as information asymmetry and conflict of interest.

While the findings of Bermig & Frick's (2010) study indicate, a significant positive relationship between board size and TQ and, a negative association between board size and the return on the firm's shares.

On a negative note, by using Return on Equity (ROE) and Tobin's Q (TQ), Conyon and Peck's (1998) findings show that a large-sized board of directors has a negative association with firm performance Jensen's (1993) findings show that a large board of directors can result in ineffective firm performance because the CEO can easily direct the board to perform in his/her interests rather than those of the firm's shareholders. Hermalin and Weisbach's (2001) and Guest's (2009) findings demonstrate, also, that too many directors on the board can have a detrimental effect on the amount of communication between them, confirming Lee and Filbeck's (2006) findings of a negative association between board size and firm performance. In addition, findings of Weir, Laing, and McKnight (2002), Lin, Yang, and Sun (2009), Dulewicz and Herbert (2004), and Di Pietra, Grambovas, Raonic, and Riccaboni (2008) show no association between board size and firm performance.

In summary, we consider that the mixed results of these studies are due to the lack of methodological rigour and the evolution of the board of directors' role over the years.

2.2.2. Board independence and performance

According to the UK CGC (2016, p. 11), "Except for smaller companies, at least half the board, excluding the chairman, should comprise of non-executive directors determined by the board to be independent". This suggests that, in theory, independent non-executive directors provide an effective monitoring mechanism of the board of directors' overall performance and that they mitigate the problem of conflict of interest and information asymmetry. In this regard, the Agency Theory states that there is an expectation of a positive correlation between board independence and firm performance.

On a positive note, the findings of studies by such Anderson and Reeb (2003) and Noor and Fadzil (2013) show a positive correlation between board independence and TQ. Tulung & Ramdani's (2018) findings show a positive relationship between board independence and ROA. Also, the findings of Kao, Hodgkinson, and Jaafar (2019) show a significant and positive relationship between independent directors and firm performance.

On a negative note, Bhagat and Black's (2002) findings show that higher board independence renders the firm less effective in increasing its value. Also, findings of Coles, Daniel, and Naveen (2008) show a negative correlation between the level of Research and Development (R&D) (which leads to better performance) and board independence.

In addition, the findings of Weir et al. (2002), Dulewicz and Herbert (2004), and El-Faitouri (2014) show an insignificant association between board independence and firm performance.

In summary, we consider that the mixed results of these studies are due to model misspecifications and because some studies omitted variables, such as managerial behaviours in the market and differences in institutional factors, that affected firm performance.

2.2.3. Board remuneration and performance

According to the UK CGC (2016, p. 20), the agency theory believes that remuneration can play an effective role in mitigating the agency problem if it is linked effectively to the firm's financial performance. There are also, mixed results from the studies on the impact of remuneration on firm performance.

On a positive note and in accordance with the UK CGC's recommendations, the findings of Crespi and Gispert (1998), Conyon and Peck (1998), Perry (2000), Jiraporn, Kim, and Davidson III (2005) and Kamg, Kumar, and Lee (2006) show a positive correlation between executive directors' remuneration and firm performance.

On a negative note, Kostiander and Ikäheimo's (2012) findings show that a negative association between remuneration and firm performance can result in an increase in managers' wealth rather than shareholders' wealth. This is because the board of directors controls the level of remuneration.

In summary, we consider that the mixed results of these studies findings are due to the omission of important variables, such as the trends in the market and the differences in institutional factors that affect firm performance.

3. DEVELOPMENT OF HYPOTHESES

3.1. Board size and performance

The existing literature supports the notion of the agency theory that board size can have an impact on the board of directors' monitoring mechanism and, therefore, on the firm's performance. A large board of directors can result in more talent and skills but, also, may reduce board communication and may run the risk of disagreements amongst board members. Thus, the first hypothesis, which we tested, is:

H1: There is an association between board size and firm's performance (ROA & Tobin's Q).

3.2. Board independence and performance

The board of directors consists of two types of directors, namely managerial directors (executive directors) and non-executive directors. Both have their own areas of function. The board of directors is responsible collectively for the firm's shareholders and other stakeholders.

The Stakeholder Theory suggests that, in some circumstances, non-executive directors can fail to monitor the executive directors and can fail to reduce the agency problems and, in particular, those of information asymmetry and conflict of interest (Kaczmarek et al., 2011). Nevertheless, based on the UK CGC's recommendation, it is clear that non-executive directors play an important role in monitoring executive directors; improving their performance; and, therefore, increasing

shareholders' wealth. Hence, the second hypothesis, which we tested, is:

H2: There is an association between the level of board independence and firm's performance (ROA & Tobin's Q).

3.3. Board remuneration and performance

Both the Agency Theory and the Stakeholder Theory support the view that board remuneration affects firm performance. The more remuneration the board members receive the greater the increase in firm performance. Although, based on the Agency Theory, previous studies' findings show mixed results, we expected that paying the board directors more remuneration would increase the firm's performance. Therefore, the third hypothesis, which we tested, is:

H3: There is an association between board remuneration and firm's performance (ROA & Tobin's Q).

4. METHODOLOGY

For this study, we used as the sample the UK FTSE 100 non-financial companies, since a good number of the firms in the index operate globally, the FTSE 100 paints a clear picture of the current economic events (McCann & Wheeler, 2011). We excluded financial firms because they differed in terms of how financial institutions were governed, financially structured, and supervised.

The sample covers a four-year period from 2012 to 2015 inclusive. The reason for choosing this period was that it would have the least effect following the 2008 financial crisis and would add value and reliability to the findings.

We collected data about these firms from the Bloomberg database and, from online sources such as the firms' annual reports. The data relates to 78 firms and 312 observations and, having regard to previous articles by such as Tregear and Ness (2005) and Muzari, Kupika, Danha, and Mapingure (2013), this data exceeds the minimum number of 30 observations.

We used the collected data to measure accounting-based performance, market-based performance, the total number of directors, the ratio of independent directors to total board size, total remunerations, firm's size and firm's industry type. The following outlines and defines the main measures (variables) that we used in the analysis. Table 1 (Appendix A) summarizes the variables, their definitions and measures.

5. RESULTS AND DISCUSSION

For this paper, we used a multi-regression analysis and created the following model to test the hypotheses:

$$FP = \beta_0 + \beta_1 BSZ + \beta_2 BID + \beta_3 BRM + \beta_4 CSZ + \beta_5 CID + \varepsilon \qquad (1)$$

Where:

FP	–	Firm performance	BRM	–	Board remuneration
β_0	–	Constant	CSZ	–	Company size
BSZ	–	Board size	CID	–	Company industry
BID	–	Board independence	ε	–	Error term

5.1. Descriptive analysis

The main descriptive statistics measures, which we used, are the minimum, maximum, mean, and standard deviation. Table 2 (Appendix B) shows the figures generated using STATA. It shows a summary of the main descriptive statistics measures for the data. It is important to mention that these figures are for the average of the four years period from 2012 to 2015.

The total number of valid data (N) represents 78 companies of the used sample. As shown, Table 2 starts with ROA as performance measures. The mean value is 7.06 and the maximum value is 45.55 while the minimum value is 19.02. Also, the Tobin's Q mean value is 2.06 and the maximum value is 10.41 where the minimum value is 0.66. Also, independent variables start with board remuneration with the mean value of 1400625 where the maximum value is 15920000 and the minimum value is 0.

This means that there are firms which do not pay remuneration to the directors. Board size has the mean value of 11 directors and the maximum value is 20 directors and the minimum value is 6 directors.

The board independence mean value is 0.73; this means that independent directors make up more than half of the board's membership. It indicates, also, that firms with the maximum value of 1.0 and the minimum value of 0.00 independent directors comply with the UK CGC requirement and act on behalf of shareholders and monitor the executive team closely. This means that there are some firms which have 100% independent board directors and there are firms they do not have any independent directors on their boards. In terms of firm size, the mean value is 23578. Finally, the mean value of the industry type is 3.346 and the maximum value is 7 and the minimum value is 1. This means that the sampled 78 firms came from 7 industry types.

5.2. Correlation analysis

As an initial step, we conducted a simple correlation analysis between the average values of the variables. Table 3 (Appendix C) presents the results of the correlation analysis. There are no multicollinearity problems because, according to Gujarati (2003) and Adkins, Hill, Griffiths, and Lim (2011), the highest R^2 is less than 80 percent and the larger number is the correlation between board remuneration and firm size at 63%. These results confirm that there are no multicollinearity problems.

According to Table 3, the firm performance, measured by ROA, has a significant and negative correlation with firm size and industry type. On the other hand, firm performance, as measured by TQ, has also, a significant and negative correlation with board remuneration, board size and firm size. Finally, the current results are initial, however, the final ones will be presented in the following Section 5.3.

5.3. Multi-regression results and analysis

Table 4 (Appendix D) presents the outcomes generated from the regression test for the model when using ROA as the dependent variable, board size, board independence, and board remuneration as the independent variables and firm size and industry type as the control variable.

As shown in Table 4, the regression results are similar to the results that show a significant and positive correlation at the 5% level between board remuneration and ROA. Such results support most of the previous studies that investigated the impact of remuneration on firm performance (Nahar Abdullah, 2006; Dogan & Smyth, 2002).

Also, Table 4 shows a significant and positive correlation at the 10% level between board size and ROA. Generally, these results support the findings of Pearce and Zahra (1992), Eisenhardt and Schoonhoven (1990), Abidin et al. (2009), Boone et al. (2007), and Tulung and Ramdani (2018), that there is a positive correlation between board size and ROA.

However, Table 4 shows a significant and negative correlation between firm size and ROA at the 1% level. Similarly, the results show, also, a significant and negative correlation between industry type and ROA at the 1% level. In addition, board independence has no effect on ROA.

Such a conclusion is surprising since we would have expected that with more independent directors there would have been fewer Agency Theory problems (information asymmetry and conflict of interest) and the firm's performance would have been better. However, in theory, this particular result, suggests that with a higher number of independent directors, the firm loses executives who have the relevant experience and make a daily contribution to the business. The results do not support Anderson and Reeb's (2003) findings that there is a positive correlation between board independence and ROA.

Therefore, in terms of the relationship between the board structure and ROA, the general conclusion is the existence, on the one hand, of a significant and positive association between board remuneration and board size and ROA and, on the other hand, a significant and negative association between firm size, company type and ROA.

Table 5 (Appendix E) presents the outcomes generated from the model's regression test when using TQ as the dependent variable, board size, board independence, and board remuneration as the independent variables and firm size and industry type as the control variables.

Table 5 shows, also, a significant and positive correlation at the 5% level between board independence and TQ because, as expected, with more independent directors, there is less of an Agency Theory problem and, consequently, the firm's performance improves. These results support most of the previous empirical studies which concluded that there was a positive association between board independence and firm performance (Anderson & Reeb, 2003; and Noor & Fadzil, 2013).

These results indicate the importance of independent directors as the internal monitors of the firm's executive directors since they can be highly effective and can reduce the Agency Theory problems of information asymmetry and conflict of interest.

Also, surprisingly, Table 5 shows that board size has no effect on TQ. However, when considering the statistical significance of each variable, this reveals that there is no statistical significance that can support these correlations. Therefore, we conclude from this analysis that there is an insignificant positive relationship between board

size and TQ. However, there is a significant and positive relationship at the 1% level between remuneration and TQ.

When compared with previous empirical studies, this study's results support the findings of Jiraporn et al. (2005) and Kamg et al. (2006) who concluded that there was a significant and positive relationship between board remuneration and TQ and long-term investments. To some extent, it can be noted that the positive correlation between remuneration and TQ means that board remuneration influences firm performance. Namely, the more remuneration leads to an increase in firm performance which will reduce the Agency Theory problems of both information asymmetry and conflict of interest.

However, the results show a significant and negative correlation between firm size and Tobin's Q at a level of less than 1% significance. This suggests that, in terms of TQ, large firms tend to perform less than smaller firms.

Finally, Table 5 shows a significant and negative correlation at the 1% level of significance between industry type and TQ.

Therefore, in terms of the relationship between the board of directors and TQ, the general conclusion is the existence, on the one hand, of a significant and positive association between board independence and TQ and, on the other hand, a significant and positive association between board remuneration and TQ.

However, there is a significant and negative association between firm size, industry type and TQ. Accordingly, the figures of the analysis, shown in Tables 4 and 5, are similar to the outcomes generated in the previous model.

Therefore, having tested the hypotheses, the regression analysis results accept hypothesis "*H1*" that there is an association between board size and firm's performance (ROA). However, the regression analysis results reject the hypothesis "*H1*" that there is an association between board size and firm's performance (TQ). Also, the regression analysis results reject the hypothesis "*H2*" that there is an association between board independence and firm's performance (ROA). However, the regression analysis results accept hypothesis "*H2*" that there is an association between board independence and ROA. Finally, the regression analysis results accept hypothesis "*H3*" that, in terms of both ROA and TQ, there is an association between board remuneration and firm's performance.

6. CONCLUSION

Following the financial scandals and struggles faced by firms in the past decades, this paper aimed to investigate effective corporate governance with regard to the characteristics of the board of directors, and, in particular, board structure in terms of size, independence and remuneration. Part 1 of this paper sets out we used a quantitative study, based on secondary data, in which ROA and TQ were the two main performance measures.

In this regard, we reviewed extensive literature on recent empirical and theoretical studies relevant to Corporate Governance and corporate performance. Then, we identified and developed the hypotheses, analysed the collected data and the results of the regression analysis, and finally, we arrived at conclusions. The theoretical framework of

corporate governance and the importance of the board of directors depends largely and relates to the current and previous practices provided and recommended by the UK's CGC. Regardless of their size and industry, the board of directors plays a critical role in whether or not firms are successful. Such importance highlights the necessity of an effective board of directors. The UK CGC recommends a balanced board with balanced numbers of executive and non-executive directors, with clear segregation of duties existing between the Chairman and the CEO Chief Executive Officer, and where remuneration policy is effective and linked to the firm's financial performance.

With regard to the empirical studies, there are no clear conclusions on the relationship between board size and firm performance because there is no agreement on the impact that large boards have on firm performance. Some studies concluded that there was a positive relationship between board size and firm performance and a large board of directors would produce more ideas and have expertise and experience which could enrich the quality of decision making and effective investments.

Other studies concluded there was a negative relationship between board size and performance and supported the theoretical debate that a large board of directors could increase the ineffectiveness of communication between the board members and could lead to a higher risk of disagreement between them which might make the board's performance less effective.

Studies on the importance of independent non-executive directors in reducing the Agency Theory problems provided mixed results and conclusions and there were no unified suggestions. Similarly, there were disagreements about the impact of board remuneration on board performance.

It is necessary to mention that the inconsistent conclusions between these studies depended largely on the used performance measure, methods of analysis, the time period and sample used in the analysis.

This paper's findings show a significant positive correlation between Board size and ROA. These are slightly different results when using TQ as a performance measure. In this respect, there is a significant positive correlation between board independence and board remuneration and TQ. Similarly, in terms of both ROA and TQ, there is a significant negative correlation between firm size and company type.

6.1. Recommendations for further research

This paper proposes areas of potential future research. These studies should not be restricted to a period of three years because the findings are likely to be different if the samples cover a longer period of time. Future studies should make use of the qualitative aspects of the board of directors. The research should focus on the directors' functions and not only on their numbers. In order to determine exactly the degree to which the board size and structure influences firm performance, the dummy variable for all the board sizes should be added when assessing the relationship between firm performance and board size. Future research can conduct more advanced analysis such as year-to-year analyses in order to identify whether or not changes occur between the periods. Future studies should

use, also, both quantitative and qualitative measures to assist in the evaluation of the firm's performances. In addition, future studies should examine more variables relating to board characteristics. This will reduce the research gap by improving on this paper's limitations on the impact of board structure on firm performance.

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APPENDICES

Appendix A

Table 1. Variables

Variable	Symbol	Measurements
Independent variables		
Board size	BSZ	Total number of directors on the board
Board independence	BID	The proportion of independent directors divided by the total number of directors on the board
Board remuneration	BRM	Total remuneration paid to all board directors (executive) "Long-term pay"
Control variables		
Company size	CSZ	Total assets
Company industry	CID	The industry type in which the company is listed
Dependent variables		
Accounting-based measure	ROA	Return on assets
Market-based measure	TQ	Tobin's Q

Hence, based on the above symbols, the regression model can now be presented as follows:

$$ROA = BSZ + BID + BRM + CSZ + CID \qquad (2)$$

$$TQ = BSZ + BID + BRM + CSZ + CID \qquad (3)$$

Appendix B

Table 1. Descriptive statistics for all firms (N. 312)

Variables	Count	Mean	Standard Deviation	Minimum	Maximum
ROA	304	7.06	7.50	-19.02	45.55
TQ	292	2.06	1.17	0.66	10.41
BRM	298	1400625	1968740	0	15920000
BSZ	298	11	2	6	20
BID	298	0.73	0.12	0.00	1.00
CSZ	307	23578	43768	111	230865
CID	312	3.346	1.578	1	7

Note: BRM is board remuneration, BSZ is board size, the BID is Board independence, CSZ is company size, CID is Industry type, ROA is Return on Assets, and TQ is Tobin's Q

Appendix C

Table 2. Matrix of correlations

Variables	ROA	TQ	BRM	Log BSZ	BID	Log CSZ	CID
ROA	1						
TQ	0.6780*	1					
Log BRM	-0.1107	-0.1301*	1				
Log BSZ	-0.0408	-0.1310*	0.4827*	1			
BID	-0.03	0.0553	0.3593*	0.3216*	1		
Log CSZ	-0.3823*	-0.5682*	0.6305*	0.4730*	0.2571*	1	
CID	-0.1297*	-0.0871	-0.2341*	-0.1274*	-0.1236*	-0.1476	1

** p<0.05, * p<0.1

Note: BRM is board remuneration, BSZ is board size, the BID is Board independence, CSZ is company size, CID is Industry type, ROA is Return on Assets, and TQ is Tobin's Q

Appendix D

Table 4. Regression analysis outcome using ROA as the dependent variable (linear regression)

ROA	Coef.	St. Err	t-value	p-value	Sig.
Rem	*1.637*	0.664	2.46	0.014	**
LogBS	*3.822*	2.089	1.83	0.068	*
nonexe	-1.654	3.490	-0.47	0.636	
Logsize	*-3.073*	0.357	-8.62	0.000	***
Industrytype	*-0.847*	0.243	-3.49	0.001	***
_cons	7.821	7.540	1.04	0.300	
Mean dependent var		7.255	SD dependent var		7.244
R-squared		0.237	Number of obs		292.000
F-test		17.792	Prob > F		0.000
Akaike crit. (AIC)		1917.035	Bayesian crit. (BIC)		1939.096

*** *p<0.01, ** p<0.05, * p<0.1*

Appendix E

Table 5. Regression analysis outcome using TQ as the dependent variable (linear regression)

TQ	Coef.	St. Err	t-value	p-value	Sig.
Log BRM	*0.441*	0.091	4.84	0.000	***
Log BSZ	0.434	0.291	1.49	0.137	
BID	*1.240*	0.488	2.54	0.012	**
Log CSZ	*-0.711*	0.049	-14.56	0.000	***
CID	*-0.104*	0.033	-3.14	0.002	***
_cons	0.908	1.035	0.88	0.381	
Mean dependent var		2.071	SD dependent var		1.175
R-squared		0.459	Number of obs		287.000
F-test		47.667	Prob > F		0.000
Akaike crit. (AIC)		741.553	Bayesian crit. (BIC)		763.510

*** *p<0.01, ** p<0.05, * p<0.1*