

## **Endogeneity and the relationship between Board Structure and Firm performance: A simultaneous equation analysis for the Athens Stock Exchange.**

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### **Abstract**

Focusing on the Greek market, we attempt to control whether the independence of the board, the leadership structure and the board size, are exogenous determinants to the firm's performance, using a simultaneous equations framework. We compose a database of firms quoted in the ASE, starting from 146 observations in 2000 and ending with 232 firms in 2006. Contrary to theoretical arguments but aligned with similar empirical works, the independence of the BOD and the leadership structure do not really have an impact in firm's value, whilst a larger BOD in size proves to be less efficient. We believe that our effort is valued to the extent that such an empirical work is the first time conducted for the Greek market. Having gained experience of econometric analysis, no prior study has incorporated in a system of equations, these three board characteristics when examining their possible relationship with firm performance. More than that another point of distinction from all recent papers treating the endogeneity of variables, is that our a larger sample, extended to more than one or two periods, allows to test dynamic responses and provides robustness in our conclusions. We consider our work as an extension of the long discussed issue of BOD structure and firm performance in an institutional environment that differs systematically from those of other developed countries. In testing well documented interlinks between qualitative variables and firm performance in a relatively understudied market in the governance literature, our main contribution is how these institutional differences affect corporate governance. We found that the law of corporate governance enforced in the middle of the period under examination, has led to a convergence of the BOD attitude and attributes with those reported as western style culture. Investors and portfolio managers should consider these qualitative characteristics in their valuation models/strategies.

**Keywords:** Corporate Governance, Simultaneous Equation Systems, Board Characteristics, Firm Performance.

## INTRODUCTION

According to the agency literature, there are several mechanisms that are able to mitigate agency conflicts within firms. Ownership structure, capital structure and board of directors are some of them. This study focuses on the role of the board of directors as an important corporate governance mechanism in controlling agency problems. Previous literature clearly recognizes the central role that the board of directors plays in order for an organization to maintain its effectiveness. Fama (1980) supported the notion that the board of directors is the central control mechanism for monitoring managers. Hermalin and Weisbach (1991) argued that “the board of directors is an economic institution that, in theory, helps to solve the agency problems inherent in managing an organization”. In the same line of thought, Jensen (1993) believes that the board of directors is the most outstanding governance mechanism, of the internal control systems.

The aim of this paper is to investigate the possible relationship between the principal characteristics of the board with the firm performance. Jensen (1993) and Mak and Li (2001) argued that three characteristics that affect the monitoring potential of a board are board composition, leadership structure and board size. Possibly, the most discussed issue regarding the operation of the board of directors is the relation between the independence of the board and the performance of the firm. The independence of the board is examined, in terms of its composition. In addition to the board composition, the investigation of the impact on both the board size and board leadership structure on the firm performance should also be examined simultaneously.

The attitude held by recent researchers towards the results of prior studies is critical because they did not take into account the variables' endogeneity. Hermalin and

Weisbach (2003) strongly suggest that all the variables of interest in the case of the board of directors are endogenous. Therefore, studies that neglect the problem of joint endogeneity, obtain results that are hard to interpret.

By using simultaneous equation systems, we address the possible endogeneity of the variables. At the same time, by using a sample of 966 firms we are led to more robust conclusions. This paper contributes to the empirical literature by analyzing through a system of four equations, the impact that the three most important characteristics of the board might have on firm value. Another contribution of this paper is the examination of the relationship between board characteristics and firm performance, in a peculiar institutional environment. The institutional environment in Greece is quite different from that in many developed western economies. The compulsory legal framework for the corporate governance (Law 3016/2002) of Greek listed companies varies significantly from that of other countries<sup>1</sup>. Moreover, the ownership structure in Greek listed firms differs to a great degree from that of US and UK firms<sup>2</sup>.

Our findings indicate that: 1) the independence of the board of directors does not affect the performance of the firm, 2) there is an inverse relationship between board size and firm performance, 3) the leadership structure of the board of directors does not affect the firm performance and 4) our results from the sample period are robust even when a different measure is used for the firm performance.

The remainder of this paper is structured as follows. Section 2 discusses the literature review. Section 3 describes the data and the definition of the variables used. Section 4 presents our methodology. In section 5 we discuss the empirical findings of our study and section 6 concludes the paper.

## LITERATURE REVIEW

The examination of the relationship between the three principal characteristics of the board of directors with the performance of the firm has occupied researchers intensely, especially during the last two decades. Given the lack of papers examining in whole the characteristics of the board with firm performance, a brief literature review for each of the characteristics is provided.

### **Board Composition and Firm Performance**

The most discussed issue regarding boards is whether the composition of the board has a positive or negative effect on the performance of the firm. Previous studies have adopted two different approaches. The first one examines directly the relation between the performance of the firm and the board composition, while the second one investigates to what extent the board composition constitutes a determining factor for specific issues which regard the decision making procedure, such as, for example, the replacement of the CEO, the compensation of the board members in cases of takeovers, etc.

Researchers have not reached a common conclusion. On the contrary, outcomes have been divided into 3 basic categories. Specifically, while some researchers have not observed a statistically significant correlation between board independence and the overall performance of the firms [MacAvoy *et al.*, 1983; Hermalin and Weisbach, 1991; Mehran, 1995; Bathala and Rao, 1995; Klein, 1998; Barnhart and Rosenstein, 1998; Pablo de Andres *et al.*, 2005; Beiner *et al.* 2006; Harris and Raviv, 2006], some others have concluded that there is a negative correlation between these two variables [Agrawal

and Knoeber, 1996; Bhagat and Black, 2000]. Diametrically opposed are the researchers who have ascertained that there is a statistically positive correlation between the composition of the board and the performance of the firm [Rosenstein and Wyatt, 1990; Prevost *et al.*, 2002; Dahya and McConnell, 2007], even if this is posteriorly observed [Baysinger and Butler, 1985].

In other words, despite the fact that most codes on corporate governance propose and prompt firms to increase their number of independent non-executive members, the empirical studies do not confirm the positive relation between board independence and firm performance.

### **Board Size and Firm Performance**

In addition to the investigation of the relation between the composition of the board of directors and the firm performance, a number of studies emphasize the impact the board size has (in other words, the total number of directors on the board), on corporate performance. However, since empirical work on the specific issue was documented in the late 90s, the evidence is limited in comparison to the evidence acquired when investigating for the independence of the board.

Most researchers have concluded that there is negative correlation between board size and firm performance [Jensen, 1993; Yermack, 1996; Gertner and Kaplan, 1996; Mak and Kusnadi, 2005, Pablo de Andres *et al.*, 2005; Harris and Raviv, 2006; Cheng, 2008]. Eisenberg *et al.* (1998) agreed with the findings of previous studies, but drew the conclusion that there is a negative relation between the two variables in both small and medium sized firms. Loderer and Peyer (2002), based on the research conducted by

Eisenberg *et al.* (1998), considered that poor performance is not exclusively due to big boards. They additionally maintained that the firms presenting poor performance happen to have big boards. Beiner *et al.* (2004), contrary to the findings reported in previous studies, deem the two variables to be in no way interrelated. Finally, Coles *et al.* (2008) concluded that there is a positive relationship between board size and firm performance but only in complex firms.

### **Leadership Structure and Firm Performance**

One further issue, which is related with the board of directors and has occupied international literature to a smaller extent than the two previous matters we already examined, is the leadership structure of the board. The topic to be addressed is, whether and to what extent the CEO duality, where the same person acts simultaneously as both CEO and Chairman of the board, affects the performance-value of the firm. This subject has constituted an object for research<sup>3</sup>. Several papers consider as threatening, the exercise of independent judgment by the board members and the occupation of both these important positions by one person. They claim that in this case the chief of the administrative pyramid (i.e. the CEO) is responsible for the supervision and auditing the management of the firm. According to many writers, this dual role creates problems within the firm.

The number of published papers is limited, while their results are conflicting. In fact, the empirical findings could be divided into three basic categories. The first one includes those papers that, found no correlation between the leadership structure and the performance of the firm [Berg and Smith, 1978; Chaganti, Mahajan and Sharma, 1985;

Baliga, Moyer and Rao, 1996; Mak and Kusnadi, 2005; Schmid and Zimmerman, 2008]. The second category includes the studies which support the notion that there is a positive relation between the dual role of a leadership structure and the firm performance [Donaldson and Davis, 1991; Dahya, Lonie and Power, 1996; Brickley, Coles and Jarell, 1997]. The last category, pertains to the arguments that firms that separate the roles of CEO and the chairman of the board, outperform firms with combined roles [Rechner and Dalton, 1991; Pi and Timme, 1993; Kaymak and Bektas, 2008]. Finally, Palmon and Wald (2002) provide proof that the optimal leadership structure depends on firm size. In other words, small firms benefit more when one person holds both positions, while larger companies benefit more from a management structure when the CEO is not one and the same as the Chairman of the Board.

### **DATA AND VARIABLES DEFINITION**

Data for this study was obtained for a sample of firms listed on the Athens Stock Exchange for the years 2000 through 2006. Data related to board composition, board size, leadership structure and ownership structure were manually collected from company annual reports. On the other hand, performance data were retrieved from Datastream.

Based on the previous studies, for the selection of the sample, the following criteria were applied:

- 1) The firms had to be quoted in the Athens Stock Exchange at least one year prior the year of analysis,
- 2) Firms within the financial sector were excluded,
- 3) Publicly owned utility firms were omitted and

4) Firms with modifications in their ownership structure due to mergers, acquisitions or takeovers were excluded.

With these limitations and exclusions, we extend our survey to a wide sample of firms, starting from 160 companies in 2000 and concluding at 232 companies in 2006. Due to some limitations encountered from the database utilized to measure corporate performance, our initial sample suffered a decrease to 146 firms for 2000, 187 for 2001, 198 for 2002, 207 for 2003, 216 for 2004, 223 for 2005 and finally 232 for 2006. This results in a final sample of 1409 firm-years.

The three corporate governance mechanisms that were empirically explored were the board composition, the board size and the leadership structure. The key variable of interest, for our study is also the performance of the firm. Starting with the board characteristics variables, focus was given to board independence. In Greece, disclosure of a director's background and qualifications is sufficiently detailed to identify whether the director is an insider, outsider or independent outsider<sup>4</sup>. We used the ratio derived from the number of independent outside directors on the board divided by the total number of directors in order to identify board independence. The next endogenous variable, board size, was measured by the total number of directors on board. Finally, for the leadership structure we used a dummy variable following the example set from studies discussed in the previous literature<sup>5</sup>. The commonly used Tobin's Q ratio was selected to measure corporate performance. In this study, we used an approximation of Tobin's Q (Chung and Pruitt, 1994; Perfect and Wiles, 1994), which requires only basic financial accounting information. The selection of instrumental variables follows the paradigms of previous

empirical studies, modified accordingly for some peculiarities for the Greek capital market. The definitions and the sources of the variables are provided in Table 1.

*Insert Table 1. Definition of Variables*

## **THE MODEL**

The board of directors is an institution which, according to theory, helps to solve the agency problems between the owners and managers. However, although the operation framework of the boards is defined by the legal framework of each country and the charter of each firm, this does not apply to the economic operation of the boards. The role of the board is very important for the long-term operation of the firm and it thus comes as no surprise that its individual characteristics have constituted an object of research. As was previously mentioned, the economic theory is very restricted.

From a methodological perspective, we model board composition, leadership structure, board size and firm performance in a simultaneous equations regression framework. Prior literature suggests that the relationship between the corporate governance mechanisms with the firm performance, in a single equation regression model confronts the problem of endogeneity. To account for the problem of joint endogeneity, our analysis applies a three stage least squares (3SLS) method to a system of four equations<sup>6</sup>. The specific econometric method has been implemented to a restricted number of papers<sup>7</sup> without nevertheless integrating the three key characteristics of the board into a common system with the firm's performance.

To our knowledge, no prior study has used the board independence, board size, and leadership structure with the firm performance in a simultaneous equations system to address possible endogeneity and examine the variables of the board of directors collectively and not excursively. Thus, using the above thoughts as a base, we developed the following equations system:

$$\text{outdir} = a_0 + a_1 \text{ceo\_chair} + a_2 \text{bod\_size} + a_3 q + a_4 \text{divp} + a_5 \text{debtoas} + a_6 \ln\_assets \quad (1)$$

$$\text{ceo\_chair} = b_0 + b_1 \text{bod\_size} + b_2 \text{outdir} + b_3 q + b_4 \ln\_sales + b_5 \text{ceo\_own} + b_6 \text{growth} \quad (2)$$

$$\text{bod\_size} = c_0 + c_1 \text{ceo\_chair} + c_2 \text{outdir} + c_3 q + c_4 \text{bod\_own} + c_5 \ln\_assets + c_6 \text{roa} \quad (3)$$

$$q = d_0 + d_1 \text{outdir} + d_2 \text{ceo\_chair} + d_3 \text{bod\_size} + d_4 \ln\_assets + d_5 \text{roa} + d_6 \text{growth} \quad (4)$$

The first regression equation considers board independence (*outdir*) as the dependent variable. Apart from the three endogenous variables, we also include three control variables such as the dividend policy (*divp*), the firm's leverage (*debtoas*) and the size of the firm proxy by *lnassets*. More specifically, earlier literature suggests that dividend policy can be used to control agency problems of the firm (Bathala and Rao, 1995). The plausible relationship between board independence and dividend policy is expected to produce a negative sign. Leverage (*debtoas*), is included in the board independence equation because debt can mitigate agency conflicts (Bathala and Rao, 1995; Barnhart *et al.*, 1994; Prevost *et al.*, 2002). In this case, an inverse relationship is expected to occur between *outdir* and *debtoas*. Finally, the last instrumental variable used in the board independence equation is the size of the firm (*lnassets*). Agrawal and Knoeber (1996) support the notion that “the greater visibility of large firms may induce more board seats devoted to representatives of the public, for example consumer or

environmental interests”. Therefore, we expect a positive relationship to occur between the independence of the board and the firm size.

The second equation relates to the board’s leadership structure (*ceo\_chair*). We control whether the CEO duality (CEO is also chairman of the board) affects firm performance. In this equation, we also include three exogenous variables. The first is the variable *lnsales* to proxy for the size of the firm. The second instrumental variable in the leadership structure equation is the ownership percentage of the CEO (*ceo\_own*). Companies with dual leadership structure are expected to have CEOs with high stock ownership. Therefore, we expect a positive relationship to occur between leadership structure and CEO ownership. The last exogenous variable used in the second equation is the firm’s growth (*growth*).

The dependent variable in the third equation of our system is board size, denoted as *bod\_size*, which constitutes the total number of directors on board. According to Lipton and Lorsch (1992), board size is an independent governance mechanism. Many researchers strongly believe that large boards may be less effective than small boards. The main reasons for this conclusion are the communication problems between the members of large boards. Therefore, we expect an inverse relationship to arise between board size and firm performance. Following the valuation model advanced by Yermack (1996), apart from the endogenous variables, we incorporate the board ownership (*bod\_own*), firm size (*lnassets*) and Return on Assets (*roa*) as instrumental variables in the board size equation. Board ownership is included in the equation because according to Yermack (1996) “boards with high stock ownership monitor managers more effectively”. The second exogenous variable is firm size (Yermack, 1996; Eisenberg *et*

*al.*, 1998; Beiner *et al.*, 2006). We expect a positive relationship between board size and firm size. Finally, to capture the possibility that firms adjust their board size in response to the past performance, Return on Assets (*roa*) was the last variable used in our equation.

Firm performance is used as a dependent variable in the fourth regression equation the performance of the firm. In order to examine the possible relationship between the corporate governance mechanisms and the company performance, we incorporate Tobin's Q as the fourth endogenous variable. In this case, we follow the valuation model advanced by Beiner *et al.* (2006) and apply the variables firm size (Yermack, 1996; Beiner *et al.*, 2006) growth (Yermack, 1996; Beiner *et al.*, 2006) and Return on Assets (Beiner *et al.*, 2006), to the firm performance equation.

According to the order condition for the system identification, the number of the instrumental variables excluded from the equation must be greater than or equal to the number of endogenous variables minus one. The system of equations that we develop includes 4 endogenous and 8 exogenous variables. It is obvious that in each equation at least 4 variables have been eliminated, thus the system is identified.

## **EMPIRICAL RESULTS**

### **Descriptive Statistics**

The descriptive statistics for the study variables are indicated in Table 2. By focusing the analysis on the board size, we could observe that the average number of directors is 7.18. The boards in the sample can be characterized as flexible. It is important to note that the size of the Greek Board of Directors is half the one reported in the US<sup>8</sup>. As regards the composition and consequently the independence of the boards, we also

observed important differences when comparing the Greek boards with the respective ones of the U.S. and U.K. More specifically, one can easily identify that the Greek BOD's are not as independent as the U.S. and U.K. boards. The ratio of board independence for the Greek listed companies is only 31% when the respective percentages for U.S listed companies, according to the Bhagat and Black (2001) study is 64%. An important notion here is that, according to the compulsory legal framework for corporate governance (3016/2002) applied to the Greek listed firms at least 1/3 of the board members must be independent outsiders. This limitation was enforced at the beginning of 2003 and resulted in a tendency towards increased board independence between 2000 and 2006.

***Insert Table 2. Descriptive statistics for study variables***

Finally, regarding the leadership structure issue in boards, from 2000 to 2006 one can observe that companies prefer to distinguish the roles of CEO and chairman of the board. Table 3, clearly illustrates that firms where the same person acts simultaneously as both CEO and Chairman of the board represented 56,2% of the total sample in 2000, and six years later, in 2004, the respective percentage was 43,5%. Brickley *et al.* (1997) found that a CEO holds the title of the chairman in 80% of U.S. firms. On the other hand, Dahya and Travlos (2000) supported the notion that the leadership structure for U.K. companies presented important changes between 1985 and 1995. Their study provides evidence that in 1985, 52% of firms had a dual CEO structure. However, ten years later,

in 1995, the researchers reported a dramatic shift towards separation of titles, when only 9,8% of UK firms retained the dual CEO structure.

*Insert Table 3. CEO Duality in Greek listed firms.*

The analysis of the descriptive statistics confirms the notion that the institutional environment in Greece differs to a great extent with that of the developed western economies. One can observe that the principal board characteristics for the Greek listed companies are totally different from that of U.S. and U.K. companies. The important question here is whether these obvious differences in corporate governance mechanisms could possibly affect the relationships between board characteristics and firm performance.

### **Regression Results**

As was previously mentioned, in order to empirically examine the possible relationship between board characteristics and corporate performance, we employed the 3SLS econometric techniques. Many researchers suggest the specific methodology in order to address the possible endogeneity of the variables used. On the other hand, given that the endogeneity problem one of omitted variables, the use of simultaneous equations does not necessarily lead to the solution of the specific problem. According to Arellano (2003), Baltagi (2008) and Wooldridge (2006) the appropriate method to address this problem, especially in our case where we employed an unbalanced panel data between 2000 and 2006, would be to employ panel data techniques while dealing with the issue

of simultaneity. Wooldridge (2006), strongly support the notion that in order to apply a simultaneous equations technique to panel data, it is necessary to have a correct model specification. In a different case, the results are misleading.

In order to construct our model we took into consideration the above concerns and, at the same time, we followed the technique applied by Demsetz and Villalonga (2001) who used time-demeaning data for all variables. Given that our initial sample was unbalanced we selected a common sample of 138 firms for the 7 years (a total of 966 observations). As a result our final model is given as follows:

$$(\text{outdir})' = a_0 + a_1 (\text{ceo\_chair})' + a_2 (\text{bod\_size})' + a_3 (Q)' + a_4 (\text{divp})' + a_5 (\text{debtoas})' + a_6 (\ln\_assets)' \quad (5)$$

$$(\text{ceo\_chair})' = b_0 + b_1 (\text{bod\_size})' + b_2 (\text{outdir})' + b_3 (Q)' + b_4 (\ln\_sales)' + b_5 (\text{ceo\_own})' + b_6 (\text{growth})' \quad (6)$$

$$(\text{bod\_size})' = c_0 + c_1 (\text{ceo\_chair})' + c_2 (\text{outdir})' + c_3 (Q)' + c_4 (\text{bod\_own})' + c_5 (\ln\_assets)' + c_6 (\text{roa})' \quad (7)$$

$$(Q)' = d_0 + d_1 (\text{outdir})' + d_2 (\text{ceo\_chair})' + d_3 (\text{bod\_size})' + d_4 (\ln\_assets)' + d_5 (\text{roa})' + d_6 (\text{growth})' \quad (8)$$

Our empirical results regarding the relation between the board characteristics and the firm performance, agree to a great extent with those reported in international literature. The regression results are depicted in Table 4. Regarding the relation between independence of the board of directors with performance, no correlation seems to exist. Despite the fact that theory suggests the addition of independent members to the board, the results of the econometric analysis do not confirm this notion. Through the application of 3SLS methods we were not able to confirm that the independence of the board increases the performance of the firm. It is equally worth noting that the statistical significance of the equation of board independence is consistently low. With regard to the exogenous variables used in the specific equation, there are indications which reveal a

negative but not statistically important relation between the independence of boards of directors with the size of the firm.

The results indicate that there is no correlation between the independence of boards of directors and the performance of the firm. This finding is consistent with the studies of Hermalin and Weisbach (1991) and Beiner *et al.* (2006) who have taken into account the variables' endogeneity. Independently however, of the endogeneity issue, the same conclusion has been reached by several more researchers, such as Mehran (1995), Klein (1998) etc.

***Insert Table 4. Results of Three-stage least squares (3SLS) regressions.***

Getting on with our analysis of the leadership structure of boards of directors, we observe once again that there are no powerful indications leading to the relation, either positive or negative, of the specific variable, with the firm performance. Important are also the findings from the analysis of the exogenous variables under the specific equation. The leadership structure equation reveals an interesting interdependency between corporate governance mechanisms. More specifically, dual leadership structure is negatively related with board size. In addition to that, we observe that there is a reverse causality between these two variables because the same observation also exists in the board size equation. Finally, the exogenous variable which refers to the ownership percentages of the Chief Executive Officer presents a positive and statistically important relation (99%) with leadership structure. This makes sense because in most companies where the Chief Executive Officer also acts as Chairman, he is also usually the founder of

the firm and holds the biggest ownership percentages. On the contrary, the leadership structure is in no way related to the size of the firm, as this is expressed by the *ln\_sales* variable.

The theory that has been developed in relation with the leadership structure in boards of directors supports the distinction of the roles of CEO and Chairman of the board. The same is suggested by most codes on corporate governance. On the other hand, the empirical results on the specific issue are conflicting. There are papers which prove that there is no relation [Chaganti *et al.*, 1985; Baliga *et al.*, 1996;] and others whose findings support the existence of a positive correlation between performance and distinct roles [Rechner and Dalton, 1991; Pi and Timme, 1993]. Moreover, Donaldson and Davis, (1991) and Brickley *et al.* (1997) support the view that CEO duality increases the performance of the firm. As a general conclusion, we may stress that the findings of our analysis do not concretely prove the existence of a relation between the two variables.

Finally, regarding whether there is a correlation between the board size and performance, the results are more consistent. More specifically, the relation between the two variables is intensely negative. Most importantly, we observe that a reverse causality exists. In the board size equation, we found that the coefficient estimate of the firm performance variable was negative while in the firm performance equation, the coefficient estimate of board size was again negative. Commenting on the exogenous variables of the board size equation, we should emphasize that there is no correlation between the ownership percentages of the board members and its size. On the contrary, the relation between the size of the firm (*ln\_assets*) and the size of the board is positive.

Comparing the results of our analysis with those of previous researchers we conclude that there is absolute identification. Approximately all papers conclude that there is a negative relationship between the size of the board and firm performance and recommend small boards. The only exception is the study carried out by Beiner *et al.* (2004) who found no correlation.

### **Robustness Tests**

Finally, we test the robustness of our results, whereby regressions are run for each sample-year. In other words, we examine the relationship between board variables and firm performance for each year of the sample and we rerun the system of equations. Therefore, we create seven sub samples from the initial sample. Results obtained give no reason to alter the conclusions about the relationship between board characteristic variables and firm performance. Tables 5 through 11 in the Appendix clearly indicate that the conclusions derived from these tests are similar with those derived when using the full sample. More specifically, we observe an inverse relation between firm performance and board size and no relation between board independence and leadership structure with the performance of the firm. A second test is run to check for the robustness of our results. We estimate the system of equations (1)-(4) by using return on assets (roa) as the measure of firm performance in place of Tobin's Q (q). The central findings of this study are again similar with the initial ones. The results from these tests are available from the authors upon request.

## CONCLUSIONS

The failure to address endogeneity of the variables in previous studies constitutes a point of strong criticism for the more recent papers on the issues under examination. However, similar if not greater, is the inability of more recent papers to focus their research on a sample covering only one period of time. Having gained the experience of econometric analysis, we comprehend that the use of only one sample in the case of simultaneous equation systems cannot guarantee robust conclusions. On the contrary, we deem that addressing the endogeneity of variables through an equations system may constitute the first step in the research on corporate governance issues. Research should nevertheless be accompanied by samples covering various periods, in order to decisively treat the problem of the simultaneous equations methods sensitivity. The present paper is distinct from all recent papers treating the endogeneity of variables in that it uses a sample that contains observations for 7 subsequent years. Such a sample allows us to test for dynamic responses to board characteristics. Moreover, the extensive sample is an important factor for the model specification. Through the tests of the 7 subsequent sample-years, we chose the most suitable instrumental variables for our system.

With regard to the relation between the characteristics of the board of directors and the performance-value of the firm, our results confirm to a great extent the findings reported in the respective literature. This result is important when one considers that it is the first time that such a research is conducted for Greek listed companies. Moreover, our study contributes to this literature by including, in an equation system, the three most important characteristics of the board of directors along with performance. The results of

our analysis did not prove the existence of a relation between the independence of the board of directors and performance. The addition of independent non-executive members does not seem to lead to an increase in the firm performance.

By examining the second characteristic of the board of directors, we discovered that the leadership structure does not affect the performance of the firm. On the contrary, the relationship between the size of the board of directors and the firm performance is explicit. The results of the empirical analysis proved that there is a negative relationship between the two variables, confirming both the respective conclusions in international literature, and theory. An increased board size leads to a decrease in the firm's performance. This is most probably the result of communication problems between the members, different goals, etc.

In summary, the test of how corporate governance affects firm's performance in an institutional environment that differs systematically from those of other developed countries is considered as the major contribution of this study. According to Shleifer and Vishny (1997) most of the empirical evidence comes from the United States, Germany and Japan. In testing well documented interlinks between qualitative variables and firm value in the Greek capital market, we understand how these institutional differences affect corporate governance. We observe that the results of the present paper agree with the respective ones of international literature. We consider that the implementation of the law on corporate governance enforced in 2003 and the relevant proposals by the Hellenic Capital Market Commission drawn up in 1999 contributed to the convergence of the Greek characteristics of boards of directors with the respective ones in developed markets.

Given the compulsory legal framework on corporate governance for the Greek listed companies, we believe that the Greek capital market could be a benchmark for the corporate governance research. Greece is a small open economy with an institutional environment totally different from that of Anglo-Saxon corporate systems. The interrelationship between ownership structure and board characteristics is a very interesting area for future research. Another interesting issue that can be explored is the possible relationship between board committees and firm performance.

## Notes

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<sup>1</sup> Especially in European countries there are Corporate Governance Codes with best practices instead of a compulsory legal framework. The only country in Europe with legislation in corporate governance matters is Greece.

<sup>2</sup> According to Karathanasis and Drakos (2004) insider ownership exceeds 70 % for the Greek capital market whilst the respective percentages for the US and UK vary between 9% and 13%. Moreover, institutional investor shareholdings are remarkably low and vary between 3% and 4%. This is trivial compared to the shareholding of peer groups of the US and UK, where the institutional ownership varies between 37% and 52% and are higher than 15%, respectively.

<sup>3</sup> According to most codes on corporate governance it is deemed better for firms that these roles be distinct. In Greece the recent law regulating Corporate Governance issues makes no reference to the question, although the Recommendations of the Hellenic Capital Market Commission of 1999 encouraged the dissociation of the roles.

<sup>4</sup> According to Law 3016/2002 for corporate governance there are 3 categories of board members: 1) The executive members who are top executives of the company responsible for its management, 2) Non-executive members who are persons with particular professional experience and social status, and with proven objective judgment and 3) Independent non-executive directors who are defined in article 4, as follows: "Independent non-executive board members should not hold more than 0.5% of the company's ordinary shares and should not have any 'dependency' relationship with the company or with affiliated members". "Dependency" relationships exist when a board member:

- Has a business relationship with the company or its subsidiaries/affiliated firms (e.g. important supplier or customer).
- Is the Chairman/CEO of the company or is the Chairman/CEO/executive director of a subsidiary/affiliated company or is an employee of the company or its subsidiaries/affiliated firms.
- Is an immediate or more distant family member of an executive director, a senior manager or the largest shareholder of the company or its subsidiaries/affiliated firms.

<sup>5</sup> Mak and Li (2001) use a binary variable to denote the kind of the leadership structure. More specifically, where chairman is also the CEO, affiliate director or grey director equals to 0 and 1 otherwise.

<sup>6</sup> We employ also the method of Two Stages Least Squares (2SLS) to control for the problem of joint endogeneity and the results are similar with the 3SLS method.

<sup>7</sup> Bhagat and Black (2000) used the three-stage least squares analysis (3SLS), Barnhart and Rosenstein (1998) conducted a sensitivity analysis of Equations' Methods and Beiner *et al.* (2004) mostly treated the Size of the Board.

<sup>8</sup> Yermack (1996) reported that the mean size of the boards for U.S public corporations is 12.25 and the median is 12. Similar are the results derived from Bhagat and Black (2001) who found that U.S. boards have 11 members on average.

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**Tables**  
**Table 1.**

Definition of Variables

VARIABLE	DEFINITION	SOURCE
<b>Endogenous Variables</b>		
outdir	<b>Board Independence.</b> Outdir is defined as the ratio of the Number of independent outside directors on the board divided by the total number of directors.	Annual Reports
ceo_chair	<b>Leadership Structure.</b> Equals to 1 where Chairman is also the CEO and 0 otherwise.	Annual Reports
bod_size	<b>Board Size.</b> Total number of Directors on board	Annual Reports
Q	<b>Firm Performance</b> Tobin's Q approximation = (TMV+DEBT) / TA. TMV, is the year and total market value of the firm, comprising the market value of the common and the preferred stocks. DEBT, the year and book value of the firm's debt. TA, the firm's year and book value of total assets.	Datastream
<b>Exogenous Variables</b>		
Divp	Dividend Payout Ratio. The annual dividends per share divided by the Earnings per Share.	Datastream
Growth	Growth of Sales	Datastream
ln_sales	Log of Total Sales	Datastream
ln_assets	Log of Total Assets	Datastream
roa	Return on Assets. ROA is defined as the ratio of net income to total assets	Datastream
Debtoas	Total Liabilities over Total Assets	Datastream
ceo_own	Percentage of shares held by the CEO.	Annual Reports
bod_own	Percentage of shares held by the Board of Directors.	Annual Reports

**Table 2. Descriptive statistics for study variables**

	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
<b>bod_size</b>	7.18	7	2.18	3	16
<b>Outdir</b>	0.31	0.33	0.18	0.3	0.73
<b>Insiders</b>	3.84	4	1.58	1	9
<b>Outsiders</b>	2.36	2	2.04	0	15
<b>Ind. Outsiders</b>	2.22	2	0.68	1	7
<b>bod_own</b>	38.70	41.64	27.84	0	92.7
<b>ceo_own</b>	20.23	15.22	21.90	0	84.12
<b>ceo_chair</b>	0.45	0	0.50	0	1
<b>Roa</b>	0.05	0.04	0.08	-0.53	0.41
<b>Divp</b>	0.08	0.04	0.17	0	2.6
<b>Debtoas</b>	0.48	0.49	0.21	0.01	2.05
<b>Q</b>	1.28	0.98	1.44	0.12	30.15
<b>ln_assets</b>	11.27	11.15	1.20	8.04	15.44
<b>ln_sales</b>	10.84	10.81	1.33	6.02	15.26
<b>Growth</b>	0.20	0.10	1.10	-1.00	28.37

Board Size (bod\_size) is the total number of Directors on board. Outdir is the ratio of the number of independent outside directors on the board divided by the total number of directors. Insiders are the total number of executive directors. Outsiders are the total number of non-executive directors. Independent Outsiders are the total number of Independent non-executive directors. Board Ownership (Bod\_Own) is the percentage of shares owned by the Board of Directors. CEO Ownership (ceo\_own) is the proportion of shares held by the CEO. Leadership Structure (ceo\_chair) equals to 1 where Chairman is also the CEO and 0 otherwise. Return on Assets (ROA) is defined as the ratio of net income to total assets. Dividend Payout Ratio (DIVP) is the ratio of the annual dividends per share divided by the Earnings per Share. Debtoas is the proportion of Total Liabilities to Total Assets. Tobin's Q (q) measures the firm performance. The Tobin's Q approximation  $[(TMV+DEBT) / TA]$  is the sum of the total market value of the firm (TMV), comprising the market value of the common and the preferred stocks and the year and book value of the firm's debt (DEBT), divided to the firm's year and book value of total assets (TA). Log of Total Assets (ln\_assets). Log of Total Sales (ln\_sales). Growth is Growth of Sales.

**Table 3. CEO Duality in Greek listed firms**

	FIRMS	SAME CEO- CHAIRMAN	%	DIFFERENT CEO- CHAIRMAN	%
2006	232	101	43,5	131	56,5
2005	223	98	43,9	125	56,1
2004	216	96	44,8	120	55,2
2003	207	95	45,9	112	54,1
2002	197	89	45,2	108	54,8
2001	186	85	45,7	101	54,3
2000	146	82	56,2	64	43,8

**Table 4.**

Simultaneous equations estimations

	(outdir)'		(ceo_chair)'		(bod_size)'		(Q)'	
C	-0.04	0.83	-0.48	0.42	-0.35	0.88	5.96	0.00
(outdir)'			1.72	0.33	5.24	0.12	-3.78	0.10
(ceo_chair)'	0.15	0.43			<b>-2.81(***)</b>	<b>0.00</b>	-0.94	0.17
(bod_size)'	0.04	0.11	<b>-0.10 (**)</b>	<b>0.02</b>			<b>-0.32(**)</b>	<b>0.01</b>
(Q)'	0.07	0.16	0.05	0.58	<b>-0.39(**)</b>	<b>0.01</b>		
(divp)'	0.12	0.37						
(growth)'			0.02	0.64			-3.82	0.21
(ln_sales)'			0.05	0.15				
(debtoas)'	0.03	0.65						
(roa)'					3.84	0.34	<b>0.46(*)</b>	<b>0.07</b>
(ceo_own)'			<b>0.79 (***)</b>	<b>0.00</b>				
(bod_own)'					0.35	0.49		
(ln_assets)'	<b>-0.86 (**)</b>	<b>0.02</b>			<b>0.59(***)</b>	<b>0.00</b>	<b>2.59(**)</b>	<b>0.01</b>
SCC		0.28		0.37		0.18		-0.52
Partial R2		0.34		0.44		0.14		-0.60

Results of Three-stage least squares (3SLS) regressions of Average Board Independence (outdir)', Average Board Size (bod\_size)', Average Leadership Structure (ceo\_chair)' and Average Firm Performance (Q)' on Dividend Payout Ratio (divp)', Growth (growth)', Log of Total Sales (ln\_sales)', Total Liabilities over to Total Assets (debtoas)', Return on Assets (roa)', CEO Ownership (ceo\_own)', Board ownership (bod\_own)' and Log of total assets (ln\_assets)' for the full 966 firm sample. Variable definitions are given in Table 1. SCC is the squared correlation coefficient. Partial R2 is a test statistic due to Shea (1997) for testing the quality of all instruments with respect to the (outdir)', (ceo\_chair)', (bod\_size)' and (Q)' variables. P-values are given in parentheses. (\*\*\*) denotes statistical significant at 99% confidence level. (\*\*) denotes statistical significant at 95% confidence level and (\*) denotes statistical significant at 90% confidence level.

## Appendix

**Table 5.**  
Simultaneous equations estimations

	outdir		ceo_chair		bod_size		Q	
C	0.11	0.37	-0.27	0.51	-2.16	0.27	12.15	0.00
outdir			<b>2.00(*)</b>	<b>0.07</b>	6.29	0.16	-9.57	0.13
ceo_chair	0.13	0.44			<b>-1.88(***)</b>	<b>0.00</b>	0.03	0.97
bod_size	0.03	0.32	<b>-0.03 (**)</b>	<b>0.01</b>			<b>-0.55 (*)</b>	<b>0.06</b>
Q	0.00	0.83	0.03	0.17	<b>-0.03(*)</b>	<b>0.09</b>		
divp	0.10	0.19						
Growth			0.05	0.29			-1.73	0.64
ln_sales			-0.01	0.76				
debtoas	0.01	0.87						
roa					1.55	0.05	<b>0.71(*)</b>	<b>0.06</b>
ceo_own			<b>0.94(***)</b>	<b>0.00</b>				
bod_own					0.02	0.97		
ln_assets	<b>-0.58(*)</b>	<b>0.08</b>			<b>0.70(***)</b>	<b>0.00</b>	2.05	0.13
SCC		0.04		0.79		0.16		-0.71
Partial R2		0.09		0.89		0.12		-0.81

Results of Three-stage least squares (3SLS) regressions of Board Independence (outdir), Board Size (bod\_size), Leadership Structure (ceo\_chair) and Firm Performance (Q) on Dividend Payout Ratio (divp), Growth (growth), Log of Total Sales (ln\_sales), Total Liabilities over to Total Assets (debtoas), Return on Assets (roa), CEO Ownership (ceo\_own), Board ownership (bod\_own) and Log of total assets (ln\_assets) for the year 2000 (N=146). Variable definitions are given in Table 1. SCC is the squared correlation coefficient. Partial R2 is a test statistic due to Shea (1997) for testing the quality of all instruments with respect to the (outdir), (ceo\_chair), (bod\_size) and (Q) variables. P-values are given in parentheses. (\*\*\*) denotes statistical significant at 99% confidence level. (\*\*) denotes statistical significant at 95% confidence level and (\*) denotes statistical significant at 90% confidence level.

**Table 6.**  
Simultaneous equations estimations

	outdir		ceo_chair		bod_size		Q	
C	0.25	0.19	-0.14	0.76	0.89	0.80	6.40	0.00
outdir			1.59	0.23	4.63	0.44	-5.50	0.32
ceo_chair	0.06	0.33			<b>-2.05(***)</b>	<b>0.00</b>	-0.54	0.27
bod_size	0.02	0.31	<b>-0.09(**)</b>	<b>0.03</b>			<b>-0.33(**)</b>	<b>0.01</b>
Q	-0.02	0.59	-0.00	0.94	<b>-0.40(**)</b>	<b>0.04</b>		
divp	0.15	0.10						
growth			0.00	0.98			-1.71	0.33
ln_sales			0.03	0.35				
debtoas	0.02	0.72						
roa					<b>2.24(*)</b>	<b>0.09</b>	0.28	0.32
ceo_own			<b>0.89(***)</b>	<b>0.00</b>				
bod_own					0.27	0.70		
ln_assets	<b>-0.27 (**)</b>	<b>0.01</b>			<b>0.51(***)</b>	<b>0.00</b>	<b>2.22(***)</b>	<b>0.00</b>
SCC		0.01		-0.31		0.15		-1.28
Partial R2		0.04		-0.37		0.11		-1.38

Results of Three-stage least squares (3SLS) regressions of Board Independence (outdir), Board Size (bod\_size), Leadership Structure (ceo\_chair) and Firm Performance (Q) on Dividend Payout Ratio (divp), Growth (growth), Log of Total Sales (ln\_sales), Total Liabilities over to Total Assets (debtoas), Return on Assets (roa), CEO Ownership (ceo\_own), Board ownership (bod\_own) and Log of total assets (ln\_assets) for the year 2001 (N=187). Variable definitions are given in Table 1. SCC is the squared correlation coefficient. Partial R2 is a test statistic due to Shea (1997) for testing the quality of all instruments with respect to the (outdir), (ceo\_chair), (bod\_size) and (Q) variables. P-values are given in parentheses. (\*\*\*) denotes statistical significant at 99% confidence level. (\*\*) denotes statistical significant at 95% confidence level and (\*) denotes statistical significant at 90% confidence level.

**Table 7.**  
Simultaneous equations estimations

	outdir		ceo_chair		bod_size		Q	
C	0.61	0.00	-0.74	0.24	-1.19	0.79	5.88	0.00
outdir			1.61	0.13	3.81	0.52	<b>-5.88 (***)</b>	<b>0.00</b>
ceo_chair	-0.01	0.79			<b>-1.56 (***)</b>	<b>0.00</b>	-0.21	0.55
bod_size	-0.01	0.47	<b>-0.06 (*)</b>	<b>0.06</b>			<b>-0.28 (***)</b>	<b>0.00</b>
Q	<b>-0.07 (*)</b>	<b>0.06</b>	0.08	0.37	<b>-0.34 (*)</b>	<b>0.06</b>		
divp	0.27	0.11						
growth			0.02	0.07			-0.26	0.75
ln_sales			0.05	0.19				
debtoas	0.01	0.64						
roa					3.39	0.27	-0.02	0.89
ceo_own			<b>1.06 (***)</b>	<b>0.00</b>				
bod_own					0.81	0.17		
ln_assets	<b>-0.10 (*)</b>	<b>0.09</b>			<b>0.69 (***)</b>	<b>0.00</b>	<b>2.70 (***)</b>	<b>0.00</b>
SCC		0.15		-0.22		0.20		-1.71
Partial R2		0.19		-0.26		0.17		-1.81

Results of Three-stage least squares (3SLS) regressions of Board Independence (outdir), Board Size (bod\_size), Leadership Structure (ceo\_chair) and Firm Performance (Q) on Dividend Payout Ratio (divp), Growth (growth), Log of Total Sales (ln\_sales), Total Liabilities over to Total Assets (debtoas), Return on Assets (roa), CEO Ownership (ceo\_own), Board ownership (bod\_own) and Log of total assets (ln\_assets) for the year 2002 (N=198). Variable definitions are given in Table 1. SCC is the squared correlation coefficient. Partial R2 is a test statistic due to Shea (1997) for testing the quality of all instruments with respect to the (outdir), (ceo\_chair), (bod\_size) and (Q) variables. P-values are given in parentheses. (\*\*\*) denotes statistical significant at 99% confidence level. (\*\*) denotes statistical significant at 95% confidence level and (\*) denotes statistical significant at 90% confidence level.

**Table 8.**  
Simultaneous equations estimations

	outdir		ceo_chair		bod_size		Q	
C	0.50	0.00	0.46	0.38	-3.45	0.28	5.63	0.00
outdir			0.25	0.74	5.15	0.17	-1.02	0.60
ceo_chair	-0.05	0.25			<b>-1.99(***)</b>	<b>0.00</b>	<b>-0.67(**)</b>	<b>0.04</b>
bod_size	0.00	0.94	<b>-0.11(**)</b>	<b>0.01</b>			<b>-0.41(***)</b>	<b>0.00</b>
Q	-0.01	0.64	-0.10	0.26	-0.18	0.61		
divp	-0.05	0.65						
growth			0.09	0.51			-4.03	0.21
ln_sales			0.05	0.13				
debtoas	0.06	0.26						
roa					<b>2.43(**)</b>	<b>0.01</b>	<b>0.15(*)</b>	<b>0.06</b>
ceo_own			<b>0.85(***)</b>	<b>0.00</b>				
bod_own					0.61	0.25		
ln_assets	-0.03	0.88			<b>0.83(***)</b>	<b>0.00</b>	<b>1.50(**)</b>	<b>0.02</b>
SCC		0.00		0.20		0.13		-0.38
Partial R2		-0.02		0.17		0.10		-0.43

Results of Three-stage least squares (3SLS) regressions of Board Independence (outdir), Board Size (bod\_size), Leadership Structure (ceo\_chair) and Firm Performance (Q) on Dividend Payout Ratio (divp), Growth (growth), Log of Total Sales (ln\_sales), Total Liabilities over to Total Assets (debtoas), Return on Assets (roa), CEO Ownership (ceo\_own), Board ownership (bod\_own) and Log of total assets (ln\_assets) for the year 2003 (N=207). Variable definitions are given in Table 1. SCC is the squared correlation coefficient. Partial R2 is a test statistic due to Shea (1997) for testing the quality of all instruments with respect to the (outdir), (ceo\_chair), (bod\_size) and (Q) variables. P-values are given in parentheses. (\*\*\*) denotes statistical significant at 99% confidence level. (\*\*) denotes statistical significant at 95% confidence level and (\*) denotes statistical significant at 90% confidence level.

**Table 9.**  
Simultaneous equations estimations

	outdir		ceo_chair		bod_size		Q	
C	0.26	0.07	0.32	0.50	-0.48	0.90	2.06	0.00
outdir			0.27	0.74	0.94	0.87	-1.27	0.35
ceo_chair	-0.00	0.92			-0.10	0.84	0.09	0.62
bod_size	0.01	0.19	<b>-0.03 (**)</b>	<b>0.02</b>			-0.07	0.11
Q	0.10	0.18	-0.01	0.90	<b>-1.06 (**)</b>	<b>0.03</b>		
divp	0.05	0.52						
growth			<b>-0.35 (***)</b>	<b>0.00</b>			-0.54	0.57
ln_sales			0.00	0.83				
debtoas	0.03	0.56						
roa					2.19	0.21	0.20	0.63
ceo_own			<b>1.02 (***)</b>	<b>0.00</b>				
bod_own					-0.50	0.38		
ln_assets	<b>-0.78 (**)</b>	<b>0.02</b>			<b>0.74 (***)</b>	<b>0.00</b>	<b>0.73 (**)</b>	<b>0.02</b>
SCC		0.00		0.30		0.35		-0.06
Partial R2		-0.02		0.28		0.33		-0.10

Results of Three-stage least squares (3SLS) regressions of Board Independence (outdir), Board Size (bod\_size), Leadership Structure (ceo\_chair) and Firm Performance (Q) on Dividend Payout Ratio (divp), Growth (growth), Log of Total Sales (ln\_sales), Total Liabilities over to Total Assets (debtoas), Return on Assets (roa), CEO Ownership (ceo\_own), Board ownership (bod\_own) and Log of total assets (ln\_assets) for the year 2004 (N=216). Variable definitions are given in Table 1. SCC is the squared correlation coefficient. Partial R2 is a test statistic due to Shea (1997) for testing the quality of all instruments with respect to the (outdir), (ceo\_chair), (bod\_size) and (Q) variables. P-values are given in parentheses. (\*\*\*) denotes statistical significant at 99% confidence level. (\*\*) denotes statistical significant at 95% confidence level and (\*) denotes statistical significant at 90% confidence level.

**Table 10.**  
Simultaneous equations estimations

	outdir		ceo_chair		bod_size		Q	
C	0.35	0.25	0.15	0.65	0.78	0.82	3.58	0.18
outdir			1.42	0.19	4.55	0.48	-2.89	0.29
ceo_chair	0.14	0.26			<b>-2.85(*)</b>	<b>0.05</b>	-0.45	0.32
bod_size	0.04	0.29	<b>-0.08(**)</b>	<b>0.02</b>			<b>-0.29(**)</b>	<b>0.01</b>
Q	0.04	0.63	-0.05	0.85	<b>-0.52(**)</b>	<b>0.03</b>		
divp	0.25	0.11						
growth			0.02	0.86			-1.68	0.27
ln_sales			0.04	0.25				
debtoas	0.03	0.64						
roa					<b>2.58(*)</b>	<b>0.06</b>	0.30	0.29
ceo_own			<b>0.75(***)</b>	<b>0.00</b>				
bod_own					0.25	0.49		
ln_assets	<b>-0.32 (**)</b>	<b>0.02</b>			<b>0.48(***)</b>	<b>0.00</b>	<b>2.32(***)</b>	<b>0.00</b>
SCC		0.01		0.34		0.10		-1.02
Partial R2		0.04		0.32		0.10		-1.17

Results of Three-stage least squares (3SLS) regressions of Board Independence (outdir), Board Size (bod\_size), Leadership Structure (ceo\_chair) and Firm Performance (Q) on Dividend Payout Ratio (divp), Growth (growth), Log of Total Sales (ln\_sales), Total Liabilities over to Total Assets (debtoas), Return on Assets (roa), CEO Ownership (ceo\_own), Board ownership (bod\_own) and Log of total assets (ln\_assets) for the year 2005 (N=223). Variable definitions are given in Table 1. SCC is the squared correlation coefficient. Partial R2 is a test statistic due to Shea (1997) for testing the quality of all instruments with respect to the (outdir), (ceo\_chair), (bod\_size) and (Q) variables. P-values are given in parentheses. (\*\*\*) denotes statistical significant at 99% confidence level. (\*\*) denotes statistical significant at 95% confidence level and (\*) denotes statistical significant at 90% confidence level.

**Table 11.**  
Simultaneous equations estimations

	outdir		ceo_chair		bod_size		Q	
C	0.58	0.03	0.87	0.18	-1.08	0.74	5.42	0.15
outdir			1.86	0.15	3.75	0.48	<b>-7.53(***)</b>	<b>0.00</b>
ceo_chair	-0.02	0.59			<b>-1.28(***)</b>	<b>0.00</b>	-0.19	0.44
bod_size	-0.23	0.38	<b>-0.08(*)</b>	<b>0.05</b>			<b>-0.37(***)</b>	<b>0.00</b>
Q	<b>-0.15(*)</b>	<b>0.05</b>	0.07	0.48	<b>-0.43(*)</b>	<b>0.05</b>		
divp	0.18	0.20						
growth			0.15	0.06			-0.31	0.86
ln_sales			0.25	0.23				
debtoas	0.12	0.58						
roa					3.29	0.34	-0.12	0.91
ceo_own			<b>1.21(***)</b>	<b>0.00</b>				
bod_own					0.87	0.23		
ln_assets	<b>-0.12(*)</b>	<b>0.08</b>			<b>0.59(***)</b>	<b>0.00</b>	<b>3.89(***)</b>	<b>0.00</b>
SCC		0.14		0.16		0.21		-1.65
Partial R2		0.18		0.22		0.18		-1.78

Results of Three-stage least squares (3SLS) regressions of Board Independence (outdir), Board Size (bod\_size), Leadership Structure (ceo\_chair) and Firm Performance (Q) on Dividend Payout Ratio (divp), Growth (growth), Log of Total Sales (ln\_sales), Total Liabilities over to Total Assets (debtoas), Return on Assets (roa), CEO Ownership (ceo\_own), Board ownership (bod\_own) and Log of total assets (ln\_assets) for the year 2006 (N=232). Variable definitions are given in Table 1. SCC is the squared correlation coefficient. Partial R2 is a test statistic due to Shea (1997) for testing the quality of all instruments with respect to the (outdir), (ceo\_chair), (bod\_size) and (Q) variables. P-values are given in parentheses. (\*\*\*) denotes statistical significant at 99% confidence level. (\*\*) denotes statistical significant at 95% confidence level and (\*) denotes statistical significant at 90% confidence level.