Board Structure and Corporate Performance

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This paper attempts to analyze the impact of board structure attributes on their accounting and stock market performance. Our analyses are built on an emerging market, Turkey for the period between 1995 and 2006. We conduct our analyses through binary logistic methodology. Our findings show that, while board ownership does not have any impact on the accounting performance, it has a fairly positive influence on the stock market performance of firms during the crisis period. Similarly, the situation when the CEO of a firm is also the chairman of the board is not found to have any impact on the corporate performance of firms, although its negative impact is present during the crisis period. Moreover, board independence is found to not to have an effect on accounting performance, yet the stock market perceives board independence positively, both in general and in the crisis periods. Finally, board size has a positive impact , both on the accounting and on the stock market performance of firms, yet the impact on the corporate performance reverts to adverse during the crisis period.

Key Words: board size, board independence, ROA, Tobin's *Q*
JEL *Classification:* G14, G20

Introduction

The main purpose of this study is to examine the impact of board attributes on corporate performance in an emerging market, Turkey. Therefore we examine whether a significant difference exists between board size, board independence, board ownership and their accounting and stock market valuation performance measures, specifically return on assets (ROA), and Tobin's *Q*.

This study contributes to the limited existing body of literature regarding the emerging markets from various aspects. First, it provides additional evidence for determination of the direction of the relationship

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between board structure and firm performance in an emerging market context. Due to the limited number of studies in this field and the contradictory results obtained, there is still not a consensus on whether board structure improves firm performance in emerging markets. Moreover, most empirical research studying the relationship between board structure and corporate performance uses data from the us or other developed economies and provides mixed results.[1] However, the ability to generalize these results regarding the board structure-performance relationship may not extend across national boundaries. While the assumption of a utility maximizing agent is universal, each country's regulatory and economic environment, the strength of capital markets, and current governance practices are different. As a result, the importance and value of various governance structures should be separately examined in each country. Furthermore, this study presents evidence from an emerging market and a civil law country which possesses relatively different characteristics to those of the common law and developed countries that have been extensively studied by the majority of the existing studies in the corporate governance literature.

There have only been a few studies addressing Turkey related with this topic. As compared with the contents of previous studies, this study is the most detailed one that is directed towards examing the performance effects of board structure in Turkey. Moreover, having elaborated an emerging market, one must also take into consideration the fluctuations in the market. Therefore we also study the role of the board attributes during the economic constriction periods in Turkey.

We study the period between 1995 and 2006 on a total of 999 firm level observations and we conduct our analyses through logistic regressions. Despite the finding of Selekler-Goksen and Karatas (2008) that board structure does not have a significant impact on performance, our in–depth analyses goes beyond this finding. Firstly, our findings indicate that while board ownership does not have any impact on the accounting performance, it has a fairly positive influence on the stock market performance of firms during the crisis period. Similarly, the situation when the ceo of a firm is also the chairman of the board is not found to have any influence on corporate performance of firms, however its negative impact is observed only during the crisis period. Moreover, board independence is found not to have an affect on accounting performance, yet the stock market perceives board independence positively, not only in general but also during the crisis periods. Finally, our most interesting

results are related to the board size. Generally, board size has a positive impact on both the accounting and the stock market performance of firms. Nevertheless, the impact of board size on the corporate performance reverts to adverse during the crisis period.

The remainder of the paper proceeds as follows. Section two reviews the related literature and builds hypotheses. Section three explains briefly the data and methodology, and section four reports the results of the analyses of performance measures for the each of the attributes of the board structure. Finally, section five concludes the paper.

Literature Review and Hypothesis Development

The finance literature covers a vast array of research concerning the relationship between board structure and firm performance. In other words, the main two tasks of the board are advising and monitoring the activities of management. The better these activities are accomplished the more improvement in corporate performance will be achieved. Therefore this section summarizes the literature and builds the hypotheses.

This paper centers on the departure from a basic model of the owner-manager firm and approach to the separation of ownership from control. In this paper we concentrate on the concept which leads to the agency problem (Jensen and Meckling, 1976). The information advantage of controller over owners creates potential for opportunistic behavior. Therefore, we hypothesize that, as the ownership level of board members increases, the corporate performance of firms rises in turn, owing to diminished agency problem. At first, Morck, Shleifer, and Vishny (1988) find no robust link between the amount of equity owned by members of the board and firm value. However, through using accounting data, Bhagat, Carey and Elson (1999) show a significant correlation between stock owned by outside directors and company performance. Moreover, Bagnani et al (1994) report a positive relationship between bond returns and the ownership level, whereas Guest, Gosh, Hughes (2006) find in uk firms that board ownership has a strong positive impact on long run share returns and a weak positive impact on operating performance. Finally Coles, Lemmon and Wang (2008) concludes that ownership does not have any explanatory power on the firm performance measured by Tobin's *Q*.

Chairs are special board members who have the job of overseeing the entire board's activity. However when a manager of a firm is also chairman of the board in the same firm, then the board is not assumed to

be independent in monitoring and advising activities, because the objectivity in judgment of the performance of the company is likely to be impaired. When the board is independent it can serve as a balance to tip the scales in favor of better corporate performance. Rosenstein and Wyatt (1997) find that independent directors cause stock market investors to give a positive response and increase the market value of the firm. Westphal (1999) emphasizes that CEO's intervention on the board, or even taking up the chairman position, may end up in diminished involvement and effectiveness of board members by reducing their tendency to control management decision making. Finally, Millstein and Macavoy (1998) find a significant correlation between board independence and superior economic profit.

As for Turkey, Küçükçolak and Özer (2007) show that 10.4 percent of all the ISE members have separated the responsibilities of CEO and chairman. Furthermore, Kula (2005) studies mostly small and non-listed companies in Turkey and finds that separation of chairman and general manager positions has a significant positive effect on firm performance. Nevertheless, through studying both accounting and stock market data, Bhagat and Black (1999) do not obtain evidence that greater independence results from higher performance. In accord with this, Nickell (1995) states that non-executive directors may not have adequate incentives to remove managers when the stock market performance of the firm declines.

Board size is the most elaborated board structure in the corporate finance literature, and in general the relationship between board size and corporate performance is found to be inversely related. Using both Tobin's Q and ROA as the performance measures, Yermack (1996) confirms a negative association between board size and firm value because benefits of monitoring from enlarging boards are outweighed by problems associated with the increased asymmetric information and deteriorated communication issues. This result is rooted in the finding of Jensen (1993), which suggests that there is a likelihood that the gap between ownership and control expands as the boards gets bigger. As the size of boards increases the percentage of independent directors, who have no or very low ownership in firm, is expected to increase as well.[2] A recent study by Cheng (2008) also concludes that board size has a negative impact on both the accounting and the stock market performance of the board size. Finally, Coles, Daniels and Navrees (2008) find that there is a U-shaped relationship between the firm size and corporate performance.[3]

Data and Methodology

This study is built on non-financial firms listed on Istanbul Stock Exchange (ISE). We have a balanced panel including 999 observations. Our study period is between the years 1995 and 2006. Therefore we are able to study the role of the crisis period on the board structure–corporate performance relationship as well. We collect financial data directly from the ISE website (www.imkb.gov.tr), whereas the ownership data are gathered from the *Yearbook of Firms,* which is issued annually by the ISE.

Our aim is also to investigate how the relationship between board structure and corporate performance is affected during the crisis years. Therefore we interact every board attribute with a crisis dummy in the regressions. Turkey was adversely affected by the Russian debt default in the year 1998 due to the contagion effect. Moreover Turkey was severely hit by a domestic financial crisis, which reflected its influence during the years 2001 and 2002. Therefore the crisis dummy takes the value of unity if the observation years coincide with the years 1998, 2001 and 2002, and zero otherwise.[4]

We use logistic regression methodology for conducting our analyses. Our estimation technique allows for a binary dependent variable, which rules out the usual regression analysis, including the linear probability model. The probabilities in our model are bounded by zero and unity, hence linear functions are inappropriate for our models given that they are inherently unbounded. In specific, our logit model contains a two state dependent variable, namely: State 1 = High Corporate Performance and State 0 = Low Corporate Performance. Put differently, we assume that the dependent variable is a dummy variable which takes the value of unity if a firm is reported to have a high corporate performance, and zero otherwise. A firm is accepted to have a high (low) corporate performance if the value of its Tobin's Q (ROA) is ranked at the top (bottom) 25 percent of the sample. We exclude all the observations falling between the top and bottom quartiles of the sample in order to eliminate the shadow variables. Finally the total number of observations falling into the top (bottom) quartile is 500 (499).

A common representation of the logit model used in our estimation is as follows;

$$P_t^i = f(X_{t-1}^i, E_{t-1}), \tag{1}$$

where P_t^i takes the value of 1, if i is found to have a high Tobin's Q (ROA)

in year t and takes the value of zero if otherwise. Vector X_{t-1}^i represents board characteristics of the firm. Vector E_{t-1} represents other attributes of the firm such as the financial attributes. More explicitly, the probability of having a high corporate performance is a random event and unknown, but can be estimated. The probability of having a high corporate performance is:

$$P[Y^i = 1] = p_0. \tag{2}$$

Furthermore, the probability of having a low corporate performance is:

$$P[Y^i = 0] = 1 - p_0. \tag{3}$$

The probabilities are determined by some firm specific variables and X_i are assumed to come from a logistic distribution function. Then, we can write the probability of having a high corporate performance as a function of X as follows:

$$P[Y^i = 1|X] = \frac{1}{1 + \exp\left(\sum_j X_j^i \beta_1\right)}. \tag{4}$$

Finally, the probability of having low corporate performance would be:

$$P[Y^i = 0|X] = \frac{\exp\left(\sum_j X_j^i \beta_1\right)}{1 + \exp\left(\sum_j X_j^i \beta_1\right)}. \tag{5}$$

We concentrate on the odds ratios while interpreting the regression results. The coefficients of the model are estimated by the maximum likelihood method. Furthermore, we include the following control variables into the model; age , size, debt maturity structure, leverage and cash holding behavior of the firm.

Results

As seen from table 1, our first results provide the descriptive statistics on the variables. The average board ownership is found to be only 9.6 percent. Moreover, the average of persons on the board is 5.7. *Chairman* is a dummy variable taking the value of 1 if the manager of the firm is also the chairman of the board, and zero otherwise. Our results show that in most firms managers do not simultaneously work as a chairman on the board. *Board Independ.* represents board independency and is a dummy

TABLE 1   Descriptive statistics

Variables	Mean	Median	Std. Dev.	Minimum	Maximum
Board Own.	9.601	0.120	17.494	0.000	83.320
Board Size	5.708	6	28.810	2	45
Chairman	0.085	0	0.279	0	1
Board Independ.	0.400	0	0.490	0	1
Age	26.692	29	13.087	1	95
Size	17.556	17.575	1.904	0	22.885
Debt Maturity	0.746	0.788	0.183	0	1
Leverage	0.478	0.479	0.211	0	0.984
Cash	0.070	0.029	0.097	0.000	0.850
MV/BV	2.292	1.657	2.116	0.000	14.585
ROA	0.057	0.051	0.120	−1.253	0.854

NOTES   This table presents descriptive statistics for the whole sample. *Board Own.* represents total ownership percentages of the board members in the firm. *Board Size* is the total number of members on the board. *Chairman* is a dummy variable taking the value of 1 if the manger of the firm is also the chairman of the board, and zero otherwise. *Board Independ.* represents board independence and is a dummy variable taking the value of 1 if the manager is also a board member, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Maturity* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets. MV/BV is calculated as [(*Book Value of Assets − Book Value of Equity + Market Value of Equity*)]/*Book Value of Assets*. Finally, *Return on Assets* (ROA) is estimated as net profits scaled by total assets.

variable taking the value of 1 if the manager is also a board member, and zero otherwise. On average, managers are not found to be a member on boards, since the average value of the dummy variable is 0.4. Generally, firms in our sample are found to be young yet large in size. Firms on average hold short maturity of debt and have a fair leverage yet low cash holdings. Finally, firms in the sample have on average high growth opportunities and a positive return on assets.

Table 2 presents the Pearson Correlation matrix across the variables. We are assured that we have no threat of multicollinearity since the correlation coeffcient does not exceed 0.50 for any of our variables.

BOARD OWNERSHIP

We firstly look at the association between ownership levels of board members and the stock market performance of firms. Table 3 demon-

TABLE 2   Pearson correlation matrix

Variables	Board Own.	Board Size	Chairman	Board Ind.	Age	Size	Debt Mat.	Leverage	Cash
Board Own.	1								
Board Size	-0.203^*	1							
Chairman	0.209^*	-0.137^*	1						
Board Ind.	-0.010	0.036	0.098	1					
Age	-0.165^*	-0.208^*	-0.021	0.062	1				
Size	-0.143^*	0.169^*	-0.048	0.039	0.151^*	1			
Debt Mat.	0.060	-0.053	-0.002	0.081	-0.095	-0.171^*	1		
Leverage	-0.007	-0.201^*	0.069	0.017	-0.067	-0.043	-0.029	1	
Cash	-0.016	0.134^*	0.050	0.056	0.020	0.161^*	0.037	-0.186^*	1

NOTES   This table presents Pearson's Correlation matrix for the main variables used in our analysis. *Board Own.* represents total ownership percentages of the board members in the firm. *Board Size* is the total number of members on the board. *Chairman* is a dummy variable taking the value of 1 if the manger of the firm is also the chairman of the board, and zero otherwise. *Board Ind.* Represents board independency and is a dummy variable taking the value of 1 if the manager is also a board member, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets. MV/BV is calculated as [(*Book Value of Assets − Book Value of Equity + Market Value of Equity*)]/*Book Value of Assets.* Finally, *Return on Assets* (ROA) is estimated as net profits scaled by total assets. * Indicates that correlation is significant at the 5% level (two-tailed).

TABLE 3   Board Ownership and the Stock Market Performance

Variables	Coefficient	Std. Error	Wald	*p*-value	Odds
Intercept	3.205	0.868	13.653	0.000	
Board Own.	0.006	0.005	1.429	0.232	0.994
Board Own.*Crisis	0.022	0.009	6.481	0.011	0.979
Age	0.022	0.006	15.514	0.000	1.023
Size	−0.355	0.045	62.652	0.000	0.701
Cash	5.139	0.868	35.072	0.000	170.579
Maturity	0.322	0.398	0.655	0.418	1.380
Leverage	4.021	0.366	120.886	0.000	55.783

Goodness of fit tests	Value	*p*-value
Cox and Snell – R^2	0.204	n/a
Nagelkerke – R^2	0.273	n/a
−2log likelihood	1156.46	0.000
No. of observations	999	

NOTES   This table presents the results of the logistic regression, while the independent variable is MV/BV, which is calculated as [(*Book Value of Assets – Book Value of Equity + Market Value of Equity*)]/*Book Value of Assets*. The independent variable is a binary one which takes the value of 1 if the MV/BV of that company is situated at the top 25 percent of the sample and zero if it is situated at the bottom 25 percent of the sample. *Board Own.* represnts total ownership percentages of the board members in the firm. *Board Own.*Crisis* is an interaction between *Board Own.* and the crisis years.*Crisis* is a dummy variable taking the value of 1if the observation is at the years 1998, 2001 and 2002 and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets.

strates the regression results, where our dependent variable is the dummy variable which takes the value of unity (zero) if the value of Tobin's *Q* of the firm is situated at the top (bottom) quartile of the sample.

In general, board ownership is not found to have any influence on the stock market performance of firms. However, we see that board ownership has a positive influence during the crisis period. Specifically, a 1 percent increase in the ownership level of board members is likely to have a 21 percent increase in the stock market performance of that firm. We conclude that investors opt for the firms having owner members on boards during the economic constriction periods.

When the control variables in the regression are examined, it is firstly

TABLE 4   Board Ownership and the Accounting Performance

Variables	Coefficient	Std. Error	Wald	p-value	Odds
Intercept	3.977	0.856	21.607	0.000	
Board Own.	0.007	0.005	2.153	0.142	0.993
Board Own.*Crisis	0.005	0.009	0.304	0.995	0.978
Age	0.005	0.005	0.684	0.408	1.005
Size	−0.216	0.042	26.602	0.000	0.806
Cash	8.004	1.062	56.797	0.000	2993.418
Maturity	1.300	0.424	9.400	0.002	3.668
Leverage	−3.871	0.373	107.923	0.000	0.000

Goodness of fit tests	Value	p-value
Cox and Snell – R^2	0.271	n/a
Nagelkerke – R^2	0.362	n/a
−2log likelihood	1069.857	0.000
No. of observations	999	

NOTES   This table presents the results of the logistic regression, while the independent variable is ROA, which is defined as the return on assets and estimated as net profits scaled by total assets. The independent variable is a binary, one which takes the value of 1 if the ROA of that company is situated at the top 25 percent of the sample, and zero if it is situated at the bottom 25 percent of the sample. *Board Own.* represents total ownership percentages of the board members in the firm. *Board Own.*Crisis* is an interaction between *Board Own.* and the crisis years. *Crisis* is a dummy variable taking the value of 1 if the observation is at the years 1998, 2001 and 2002, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets.

seen that, firm age is found to be positively related to Tobin's Q, whereas firm size is associated with a low stock market performance. As confirmed by the finding of Arslan, Florackis, and Ozkan (2006) firms with high growth opportunities are found here to hoard a high level of cash. However, despite the highlighted reasoning of a negative association between long term debt and growth opportunities by Myers (1977), we do not find any significant relationship between the variables in this regression.

Our next set of results as presented in table 4 reveals the relationship between the board ownership and the accounting performance of a firm. Here dependent variable is the dummy variable which takes the value of unity (zero) if the value of the ROA of the firm is situated at the top

(bottom) quartile of the sample. Interestingly, we find no relationship between board ownership and the ROA of firms. Even the interaction with the crisis period yields an insignificant relationship. Therefore we conclude that ownership of board members does not play a significant role in reducing agency costs and asymmetric information problems in firms.

Regarding the results on the control variables, firm age is not found to have a significant impact on the accounting performance of firms. Firm size has a negative impact on the accounting performance since a one percent increase in firm size reduces the ROA by almost 20 percent. Profitable firms are likely to have a higher level of cash flow, and the positive and significant coefficient of the cash–holding variable confirms our reasoning. Profitable firms are found to hold a higher level of short term debt relative to the long term debt. Finally leverage and profitability are found to be negatively related. This finding confirms the pecking order theory of Myers and Majluf (1984) in the sense that profitable firms firstly resort to their internal funds for financing.

MANAGER AS A CHAIRMAN OF THE BOARD

Here we investigate the situation when a CEO of a firm also acts as chairman of the board. Table 5 provides the results on the relationship of the separation between the manger and chairman positions in a firm and its stock market performance.

The separation is not found to have any impact on the stock market performance of firms. However the interaction with the crisis dummy shows us that the market perceives the situation when such a separation is not fulfilled in a firm as being a bad signal during the crisis period. Therefore, a one percent increase in the occurrence of an event of non-separation of a managerial and a chairman position in a firm is likely to decrease its stock market performance by 66 percent. The results on the relationship between the control variables and the stock market performance go hand in hand with those reported in table 3.

When we move to the impact of the degree of separation between the manager and chairman roles on the accounting performance of firms, we regard the results reported in table 6.

Interestingly we can not find a statistically significant relationship between the *Chairman* dummy and the accounting performance, neither in general nor specifically in the crisis period. Therefore we conclude that the non-separation between the CEO and chairman positions in a firm is

TABLE 5   Manager as the Chairman of the Board and the stock market performance

Variables	Coefficient	Std. Error	Wald	p-value	Odds
Intercept	2.698	0.883	9.323	0.002	
Chairman	0.112	0.286	0.152	0.697	1.118
Chairman*Crisis	−1.070	0.532	4.039	0.044	0.343
Age	0.024	0.006	18.663	0.000	1.025
Size	−0.339	0.044	58.884	0.000	0.713
Cash	5.242	0.872	36.173	0.000	188.965
Maturity	0.307	0.396	0.598	0.439	1.359
Leverage	3.991	0.363	120.711	0.000	54.128
Goodness of fit tests	Value	p-value			
Cox and Snell – R^2	0.199	n/a			
Nagelkerke – R^2	0.265	n/a			
−2log likelihood	1163.62	0.000			
No. of observations	999				

NOTES   This table presents the results of the logistic regression, while the independent variable is mv/bv, which is calculated as [(*Book Value of Assets – Book Value of Equity + Market Value of Equity*)]/*Book Value of Assets.* The independent variable is a binary one, which takes the value of 1 if the mv/bv of that company is situated at the top 25 percent of the sample, and zero if it is situated at the bottom 25 percent of the sample. *Chairman* is a dummy variable taking the value of 1 if manager of the firm is also the chairman of the board, and zero otherwise. *Chairman*Crisis* is an interaction between *Chairman* and the crisis years. *Crisis* is a dummy variable taking the value of 1 if the observation is at the years 1998, 2001 and 2002, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets.

not found to be as hazardous as expected for the accounting performance of firms. In other words, managers, who also hold chairman position in a firm, are not likely to transfer wealth to their benefit at the expense of the shareholders. The results on the control variables align with those reported in table 4.

BOARD INDEPENDENCE

Table 7 presents the results of the estimation for a possible relationship between board independence and the stock market performance. Here, we are only interested in the situation in which a manager is only a member of the board, not a chairman. Therefore the results in this section are different in interpretation to those reported in the previous section.

TABLE 6 Manager as the Chairman of the Board and the accounting performance

Variables	Coefficient	Std. Error	Wald	*p*-value	Odds
Intercept	3.871	0.852	20.633	0.000	
Chairman	−0.082	0.305	0.073	0.787	0.921
Chairman*Crisis	−0.329	0.578	0.325	0.569	0.720
Age	0.006	0.005	1.414	0.234	1.006
Size	−0.217	0.042	26.966	0.000	0.805
Cash	7.989	1.064	56.392	0.000	2948.91
Maturity	1.307	0.424	9.492	0.002	3.695
Leverage	−3.865	0.372	107.832	0.000	0.000
Goodness of fit tests	Value	*p*-value			
Cox and Snell – R^2	0.269	n/a			
Nagelkerke – R^2	0.359	n/a			
−2log likelihood	1073.015	0.000			
No. of observations	999				

NOTES This table presents the results of the logistic regression, while the independent variable is ROA, which is defined as the return on assets and estimated as net profits scaled by total assets. The independent variable is a binary one, which takes the value of 1 if the ROA of that company is situated at the top 25 percent of the sample, and zero if it is situated at the bottom 25 percent of the sample. *Chairman* is a dummy variable, taking the value of 1 if manager of the firm is also the chairman of the board and zero otherwise. *Chairman*Crisis* is an interaction between *Chairman* and the crisis years. *Crisis* is a dummy variable, taking the value of 1 if the observation is at the years 1998, 2001 and 2002, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets.

Our results show that board independence is negatively related with Tobin's *Q* of a firm. A 1 percent increase in the board independence is expected to decrease the stock market performance by almost 74 percent. Similarly, board independence is also perceived as a bad signal during the crisis period. Observing a 1 percent increase in the board independence is likely to decrease the stock market performance by almost 63 percent. The results concerning the control variables are in accord with those previously reported.

Our next results are reported in table 7 and they demonstate the direction of the association between board independency and the accounting performance. We find no statistically significant role of board indepen-

TABLE 7   Board Independence and the Stock Market Performance

Variables	Coefficient	Std. Error	Wald	p-value	Odds
Intercept	2.800	0.882	10.021	0.002	
Board Independ.	−1.334	0.468	8.145	0.004	0.263
*Board Independ.*Crisis*	−0.976	0.268	13.260	0.000	0.377
Age	0.024	0.006	18.210	0.000	1.025
Size	−0.342	0.045	57.878	0.000	0.710
Cash	5.625	0.873	41.504	0.000	277.298
Maturity	0.268	0.401	0.508	0.476	1.331
Leverage	4.281	0.377	129.151	0.000	72.322
Goodness of fit tests	Value	p-value			
Cox and Snell – R^2	0.212	n/a			
Nagelkerke – R^2	0.283	n/a			
−2log likelihood	1146.68	0.000			
No. of observations	999				

NOTES   This table presents the results of the logistic regression, while the independent variable is MV/BV, which is calculated as [(*Book Value of Assets – Book Value of Equity + Market Value of Equity*)]/Book Value of Assets. The independent variable is a binary one, which takes the value of 1 if the MV/BV of that company is situated at the top 25 percent of the sample, and zero if it is situated at the bottom 25 percent of the sample. *Board Independ.* represents board independence and is a dummy variable taking the value of 1 if the manager is also a board member, and zero otherwise. *Board Independ.*Crisis* is an interaction between *Board Independ.* and the crisis years. *Crisis* is a dummy variable, taking the value of 1 if the observation is at the years 1998, 2001 and 2002, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets.

dence in the accounting performance of firms, not only in general but also within its interaction with the crisis period. Furthermore, the control variables are identical in sign and significance with the previous findings.

We conclude that board independence has an adverse impact on corporate performance in general. It is likely that independent board members in Turkish firms do not have sufficient incentives to monitor management, due to the following reasons. First of all, the executive and non-executive split may be non-artificial for Turkish firms. In other words, the benefits of board members may be informally parallel to those of the managers in expense at the shareholders. Furthermore, there may be an

TABLE 8   Board Independence and the Accounting Performance

Variables	Coefficient	Std. Error	Wald	p-value	Odds
Intercept	3.979	0.860	21.386	0.000	
Chairman	−0.156	0.166	0.887	0.346	0.856
Chairman*Crisis	−0.098	0.272	0.130	0.718	0.907
Age	0.007	0.005	1.509	0.219	1.007
Size	−0.220	0.042	27.518	0.000	0.802
Cash	7.929	1.062	55.754	0.000	2777.879
Maturity	1.314	0.424	9.594	0.002	3.720
Leverage	−3.880	0.374	107.845	0.000	0.000
Goodness of fit tests	Value	p-value			
Cox and Snell – R^2	0.270	n/a			
Nagelkerke – R^2	0.359	n/a			
−2log likelihood	1072.218	0.000			
No. of observations	999				

NOTES   This table presents the results of the logistic regression, while the independent variable is ROA, which is defined as the return on assets and estimated as net profits scaled by total assets. The independent variable is a binary one, which takes the value of 1 if the ROA of that company is situated at the top 25 percent of the sample, and zero if it is situated at the bottom 25 percent of the sample. *Board Independ.* represents board independence and is a dummy variable taking the value of 1 if the manager is also a board member, and zero otherwise. *Board Independ.*Crisis* is an interaction between *Board Independ* and the crisis years. *Crisis* is a dummy variable taking the value of 1 if the observation is at the years 1998, 2001 and 2002, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets.

asymmetry of information between non-executive and executive members on a board. Therefore, the quality of financial or strategic information divulged to non-executive members by the executive ones may be poor.

BOARD SIZE

Table 9 presents results on the relationship between board size and firm performance. In contrast to to the general findings in the literature, board size is found to have a positive impact on the stock market performance of firms. Specifically, a 1 percent increase in the size of a board is likely to increase the stock market performance of firms by 1.3 times. However board size is found to be negatively affecting the stock market

TABLE 9   Board Size and the Stock Market Performance

Variables	Coefficient	Std. Error	Wald	p-value	Odds
Intercept	2.270	0.889	6.524	0.011	
Board Size	0.295	0.046	40.327	0.000	1.343
Board Size*Crisis	−0.159	0.027	34.646	0.000	0.853
Age	0.017	0.006	8.458	0.004	1.017
Size	−0.413	0.048	73.179	0.000	0.661
Cash	5.622	0.887	40.174	0.000	276.503
Maturity	0.330	0.406	0.674	0.412	1.395
Leverage	4.749	0.397	143.313	0.000	115.493

Goodness of fit tests	Value	p-value			
Cox and Snell – R^2	0.246	n/a			
Nagelkerke – R^2	0.328	n/a			
−2log likelihood	1102.61	0.000			
No. of observations	999				

NOTES   This table presents the results of the logistic regression, while the independent variable is MV/BV, which is calculated as [(*Book Value of Assets – Book Value of Equity + Market Value of Equity*)]/*Book Value of Assets*. The independent variable is a binary one, which takes the value of 1 if the MV/BV of that company is situated at the top 25 percent of the sample, and zero if it is situated at the bottom 25 percent of the sample. *Board Size* is the total number of members on the board. *Board Size*Crisis* is an interaction between *Board Size* and the crisis years. *Crisis* is a dummy variable, taking the value of 1 if the observation is at the years 1998, 2001 and 2002, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets.

performance during the crisis period. A 1 percent increase in the board independence is likely to decrease the stock market performance by almost 15 percent. Control variables have similar sign and significance levels to those of the previous findings.

Results in table 10 show the relationship between board independence and the accounting performance. Similar to the previous findings, board size increases the accounting performance of firms. A 1 percent increase in the size of the board increases the accounting performance by almost 1.08 percent. In a similar fashion, board size has a negative influence on the ROA of firms. A 1 unit increase in the board size decreases the accounting performance of firms by almost 5 units. The significance and signs of the control variables align with those of the previous findings.

We derive from these results that board size has a generally positive

TABLE 10   Board Size and the Accounting Performance

Variables	Coefficient	Std. Error	Wald	*p*-value	Odds
Intercept	3.536	0.881	16.103	0.000	
Board Size	0.080	0.044	3.308	0.069	1.084
Board Size*Crisis	−0.049	0.027	3.302	0.069	0.952
Age	0.003	0.006	0.356	0.551	1.003
Size	−0.220	0.042	27.335	0.000	0.803
Cash	8.033	1.070	56.378	0.000	3081.806
Maturity	1.276	0.425	9.024	0.003	1.558
Leverage	−3.801	0.373	103.736	0.000	0.000
Goodness of fit tests	Value	*p*-value			
Cox and Snell – R^2	0.273	n/a			
Nagelkerke – R^2	0.364	n/a			
−2log likelihood	1067.856	0.000			
No. of observations	999				

NOTES   This table presents the results of the logistic regression, while the independent variable is ROA, which is defined as the return on assets and estimated as net profits scaled by total assets. The independent variable is a binary one, which takes the value of 1 if the ROA of that company is situated at the top 25 percent of the sample, and zero if it is situated at the bottom 25 percent of the sample. *Board Size* is the total number of members on the board. *Board Size*Crisis* is an interaction between *Board Size* and the crisis years. *Crisis* is a dummy variable, taking the value of 1 if the observation is at the years 1998, 2001 and 2002, and zero otherwise. *Age* is the number of years a firm has been operating. *Size* is the natural logarithm of total assets. *Debt Mat.* is the ratio of short term debt to total debt. *Leverage* is the ratio of total debt to total assets. *Cash* is the ratio of cash and marketable securities to total assets.

effect on the corporate performance through increasing effectiveness in advising the decision-making in a firm through the diversified experience and know-how of the various members. Similarly, the marginal costs of monitoring the managerial activity are observed to be decreasing as the board size increases. However the situation reverts during the crisis period, and board size becomes disadvantageous for the corporate performance of firms. It is likely that communication problems arise during the economic downturn times, hence the costs of the board size then outweigh its benefits.

Conclusion

The impact of the attributes of the board structure is not elaborated in detail in the corporate finance literature from an emerging market per-

spective. Therefore, this study shows the relationship between the corporate performance, namely the accounting and the stock market performance, and the board independence, separation of the tasks of management and chairman, board ownership and the board size. We build our analyses on the a total of 999 observations of Turkish non-financial listed firms for the period between 1995 and 2006. We conduct our analyses through logistic methodology by eliminating the shadow variables. We also study how the relationship is affected during the crisis periods.

Our findings indicate that, while board ownership does not have any impact on the accounting performance, it has a fairly positive influence on the stock market performance of firms during the crisis period. Similarly, the situation when the CEO of a firm is also the chairman of the board is not found to have any impact on the corporate performance of firms, although its negative impact is observed during the crisis period. Moreover, board independence is found not to have affect on accounting performance, yet the stock market perceives board independence positively both in general and in the crisis periods. Finally, our most interesting results are related to the board size. Generally, board size has a positive impact on both the accounting and the stock market performance of firms. Nevertheless, the impact of board size on the corporate performance reverts to adverse during the crisis period.

Notes

1 See among others Hermalin and Weisbach 1991; Agrawal and Knoeber 1996; Brickley, Coles, and Terry 1994.

2 In accord with this, Bhagat and Black (1996) find that the median ownership percentage of independent directors is 1 percent.

3 Following this finding we have checked the Turkish data, however our results do not confirm a noneconomic U-shape relationship between board size and both ROA and Tobin's *Q*. Therefore, in our analyses, we assume that the association is linear.

4 We also take the 1997 Asian crises into account, however the contagion effect of this incidence was midly felt in Turkey. Besides, our results do not change when we include the years 1997 as a unity dummy in our analyses.

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