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The Impact of Board Characteristics on Firms Financial Performance - Evidence from the Egyptian listed companies

Marwa Anis[α], Amon Chizema[σ], Xiahui Lui [ρ] & Hadia Fakhreldin[ω]

Abstract- Board characteristics considered in this study include board size, presence of outside directors, CEO–Chairman duality and gender diversity on the board. Firm performance is measured by return on assets (ROA) and Tobin's Q. This study includes firm age, firm size and industry type as control variables. The author tests the hypotheses on longitudinal sample of 70 firms over six-year period from 2005 until 2010. The sample includes the most active firms (EGX 100) on the Egyptian stock exchange. Empirical analysis is undertaken using pooled OLS and FGLS regressions after adopting the prerequisite tests and after detecting the absence of endogeneity between the variables.

This study makes a number of contributions to the existing literature. First, it provides a better understanding of the overall picture of Egypt's internal governance mechanisms. The findings also contribute to our understanding of how corporate governance in Arab countries is practised in general and in Egypt in particular. Second, an important finding about Egyptian firms is that in the presence of the non-mandatory code, the board of directors is not effective in implementing proper corporate governance practices. This view is supported by the low level of compliance and the weak legal system. Governance in Egyptian-listed firms is achieved spontaneously through other factors, such as ownership

I. Introduction

Boards of directors are a key important instrument (Hau and Mat Zin, 2007) and a central institution in the internal governance mechanisms of a company (Lefort and Urzua, 2007; Arosa, Iturralde, and Maseda, 2010). Moreover, the board of directors is crucial in reducing the agency problem that ascend from the separation of ownership and control (Fama 1980; Shleifer and Vishny, 1997). The contemporary board of directors is in charge to monitor the performance of top management to ensure that they act according to the best interests of the owners (O'Connell and Cramer, 2010).

In these terms, many studies show interest to examine the relationship between board characteristics and firm's performance. Some studies based their studies on data about USA (e.g. Rosenstein and Wyatt, 1990; 1993; Cheng, 2008; Coles et al., 2008). Other studies are concerned with European countries (e.g. Campbell et al., 2008; O'Connell and Cramer, 2010; Arosal et al., 2010). There are also abundant studies on Asian countries (e.g. Ye et al., 2002; Haniffa and Cooke, 2005; Mak and Kusnadi, 2005). In contrast, it is only recently that attention has been paid to less developed countries. However, these studies yield relatively conflicting findings. This inconsistent international evidence may partly be explained by the fact that prior studies use different measurement for the independent variables, performance proxies, different hypothesis, sample periods, control variables and estimation techniques. However, it may be explained by country and contextual differences. Accordingly, Arosa et al. (2010) call for more studies on different countries to provide results on a broader scale.

Egypt arguably offers an interesting research context where the association between corporate governance and financial performance can be empirically examined. Egyptian companies differ from those of the developed or Asian countries context. Unlike most of the developed countries, Egypt has the following characteristics: First, the corporate legal system in Egypt largely follows the civil law system, but one can reasonably argue that the relation between legal origin and financial arrangements reflects the influence of the role of the state or the nature of the political system and its national governance. Second, the economy is characterised by having a relatively closed and highly concentrated political system with weak national governance. The majority of firms are either government- or family-owned with stock markets still in a rudimentary stage. Third, Egypt has a distinct corporate governance regulatory environment relative to developed countries. For instance, the principle of good corporate governance regulations and best practice recommendations are in direct contrast with the rule-based regime in the United States. Corporate governance in Egypt is not mandatory but US regulatory bodies insist on applying the legal structures of the Securities and Exchange Commission's compulsory rules. Hence, it is expected that this may affect the level of compliance with the code which in response may impact on the relationship between corporate governance and firm financial performance.

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Moreover, a formal Egyptian Corporate Governance Code (ECGC) was introduced in 2005. This code has not gone through any process of amendment or improvement. Also, a review of literature shows that there is a lack of research that relates firm financial performance to certain corporate governance attributes such as gender diversity in the Egyptian context.

A few methodological issues in previous studies need to be addressed. First, the Ordinary Least Square (OLS) and the two-stage linear simultaneous (2SLS) regressions models have been the most widely applied econometric estimation methods used by previous empirical studies. However, these two methods are employed without any prior tests (such as endogeneity and heterogeneity) concerning the characteristics of the data set. That is why this choice of estimation model is questionable. There is a possibility that the results generated by the OLS and the 2SLS regression methods could be misleading and unreliable.

As for the independent variables, previous studies are concerned with examining the impact of board size, board leadership and independent directorship on firm performance but they potentially ignore other important dimension such as gender diversity. In these terms, there have been a number of valuable studies that focus on women's under-representation on boards or as a top executive and the issue of the glass ceiling effect but little has been written about the impact on performance of gender diversity on boards.

II. Board Characteristics and Empirical Hypotheses

a) Board Size

From the agency problem perspective, large boards are not recommended while small boards are preferred to improve performance (Lipton and Lorsch, 1992; Yermark, 1996). In these terms, Kim and Nofsinger (2007) argue that small boards are better than large ones as they avoid the free-rider problem that might appear among board members, meaning each board member may feel inclined to exert more effort than s/he would have otherwise. The contrary view to the agency and resource-based perspective is that larger boards are associated with diversity in skills, business contacts and experience (Haniffa and Haudaib, 2006). Similarly, larger boards secure access to critical resources such as finance and raw materials (Goodstein et al., 1994).

Regarding the board of director's size-performance relationship, one of the main reliable empirical associations is that board size is associated negatively with the performance of the firm (Hermalin and Weisback, 2003). Statistically, it has been found by Yermack (1996) that there is a significant negative association between the performance of an organization and the board size as calculated by Tobin's Q by taking a sample of 452 huge U.S. industrial companies for the period from 1984 to 1991. In the same research, it has also been exhibited that corporations with small boards have highly favourable standards for financial ratios.

In the same way, Wells, Eisenberg and Sundgren (1998) exhibit that there is a negative relationship between a firm's board size and its performance calculated by the ROA (return on assets) using a sample of 879 small private concerns in Finland. The study by Barhart and Rosenstein, conducted during 1998, exposed that organizations with fewer members on the board have greater performance compared to the firms with large boards. The study by Conyon and Peck (1998) covers the period from 1992 to 1995 and it was carried out for five countries — France, UK, Italy, Denmark and Netherlands — which also proved that there is negative relationship between financial performance and the board size for each country.

The study by Loderer and Peyer (2002) revealed negative collision of size of the board on the Tobin'Q for Switzerland. The negative association between the size of the board and the performance of the firm for Japanese firms has been concluded in the study by Bonn, Yoshikawa and Phan (2004) but the same research failed to discover the same result the Australian firms. Lasfer (2004) has shown a significant negative impact of size on board on the Tobin's Q for 1424 UK firms. The same results were found for the Malaysian firms in both the studies made by Haniffa and Hudaib (2006) and Mak and Kusnadi (2005). With respect to firm value, Coles, Daniel & Naveen (2008) support the notion those restrictions on the board size and management representation on the board necessarily enhance firm value. The idea of small boards is supported as small boards will lead to more cohesiveness, more productive, effective monitoring and still against the idea of large boards due to the problems that come up from social loafing and coordination costs (Lipton and Lorsch, 1992; Yermark, 1996). Collectively, these and similar studies imply that small boards are better.

From the previously reviewed literature, the author has suggested the following hypotheses related to board size based on the agency theory and resource-based theory:

H_1: There is an inverse relationship between board size and firm performance (ROA).

H_2: There is an inverse relationship between board size and firm value (Tobin's Q).

b) Non-Executive director/Outside director

In the corporate governance literature, there is great debate regarding whether the composition of boards in the manner of presentation of non-executive directors leads to economic worth to organizations (Kesner et al., 1986, Weisbach and Hermalin, 2003; Peta, 2005). Studies, for instance, by Kaplan and

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Reishus (1990); Byrd and Hickman (1992); Brickley et al. (1994); Beasley (1996); McCabe and Nowak (2008); Dermirbas and Yukhanaev (2011); Joh and Jung (2012) establish a positive influence from employing outside independent directors on the board. Several studies, such as Schellenger et al. (1989), Dalton and Daily (1992), Lau and Tian (2001) and Tang and Luan (2007), establish that boards comprising further outside independent directors improves the economic performance of the firm.

The agency theory, with respect to the composition of the board, proposed that a better amount of outside directors will be capable of monitoring the actions made by the managers on any self-interest and so can reduce the costs of the agency (Fama, 1980; Jensen and Fama, 1983). Conversely, the stewardship's theory proponents argue that better corporate performance is associated with a greater proportion of inside directors as they work to increase income of stockholders (Donaldson, 1990; Donaldson and Davis, 1991). Stewardship theory opponents argue that corporate boards dominated by NED may impact performance negatively (Baysinger et al., 1990; Bozec, 2005).

From the perspective of resource dependency theory, the board is an essential association among the external resources and organisation that is required to enlarge the performance or presentation (Zald, 1969; Pfeffer, 1972; Salancik and Pfeffer, 1978). Management scholars, by way of creating the resource-based view (RBV) of the organization (Wernerfelt, 1984; Barney, 1991), view the board as probably a significant source for organization, specifically in associating the organisation with external resources (example, Paetzold, Hillman and Cannella, 2000). So, these previous studies support the idea of having more non-executive directors with outside connections to have better access to external resources.

Prior empirical evidence regarding the relationship between percentage of NED and firm financial performance is mixed. A number of empirical studies report that boards dominated by NED deliver high performance (e.g. Berle & Means, 1933; Dahya & McConnell, 2005; Lawler & Finegold, 2006). By contrast another group of studies reports a negative relationship between NED and firm performance (e.g. Yermark, 1996; Agrwal and Knoeber, 1996; Bozec , 2005; Sanda et al., 2005). These studies believe that too much NED may also stifle managerial initiatives through excessive monitoring. A third stream of empirical studies found that NED has no impact on performance. Research on firms in the U.S. revealed no association between the amount of the outside directors and the performance of the firm (for instance, the surveys by Hermalin and Weisbach, 2003; Haniffa and Haudaib, 2006).

The author has suggested the following hypotheses based on the agency theory and resource-based theory:

H_3: There is positive relationship between the presence of outside directors and firm performance (ROA).

H_4: There is positive relationship between the presence of outside directors and firm value (Tobin's Q).

c) Leadership structure

Another essential dimension of board structure is what is called *board duality* or *board leadership*. It is argued by the theorists of agency that the same individual must not hold the position of Chairman and CEO simultaneously, since this may decrease the efficiency of the monitoring of the board (Finkelstein and D'Aveni, 1994). Yermack (1996) states that firms become comparatively more valuable as the positions of Chairperson and CEO become separated. Where the Chairman and the CEO are efficient leaders in handling conflicts as per interest as well as problems of agency (Brickley et al., 1997), this offers more preference to those where the CEO becomes separated from Chairmanship. However, it is argued by the stewardship theorists that however an individual in both the positions may increase the performance of the firm, as such an arrangement clears any external and internal ambiguity concerning the accountability for the processes of organisation and results (Donaldson, 1990 D'Aveni and Finkelstein, 1994).

Empirically, the evidence regarding the relationship between board leadership and firm performance is mixed (e.g. Rechner and Dalton, 1991; Brickley et al., 1997). Rechner and Dalton (1991) state that companies having CEO duality attain stronger financial performance as against other companies. Haniffa and Hudaib (2006) report that company has better ROA than those firms with combined role. This indicates that the monitoring role of board improves when the role of Chairman and CEO are split. By contrast, a group of researchers report that board duality has positive impact on performance (Donaldson and Davis, 1991). This is consistent with the view that board duality enhances decision making by permitting a proper focus on the company objectives. A third stream of empirical studies suggests that board duality has no impact on firm performance (Bozec et al., 2005). Moreover, Hanifa and Hudaib (2006) reports insignificant relationship with Tobin's Q and other supports their findings (Brickley et al., 1997; Vafaes et al., 1998). These studies suggest that board duality does not affect investors' decisions.

The author suggests the following hypotheses based on agency theory:

H_5: There is an inverse relationship between board duality and firm performance (ROA).

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H_6: There is an inverse relationship between board duality and firm value (Tobin's Q).

d) Gender Diversity

For the empirical literature, Adams and Ferrira (2009) find evidence that gender composition on boards is positively related to board effectiveness measures. Also, Carter et al. 2003) find positive association between gender diversity and Tobin's Q as a proxy for market-based performance measures. However, Dalton and Dalton (2010) state that greater gender diversity may affect performance negatively due to the fact that women are known to be risk averse and because of the high cost associated with their high turnover and absenteeism rate (Dalton and Dalton, 2010). Also, a high proportion of gender diversity on the board may lead to identification with the opinion expressed by the directors of the same gender (Campbell, 2008). Shrader et al. (1997) find a negative association between gender diversity and firm performance. The study justified this association because the view of women may be marginalized although they are still paid. This impacts negatively the firm performance. A third stream of studies found no relationship between gender diversity and firm performance (e.g. Rose, 2007).

Accordingly, the author suggests the following hypothesis:

H_7: There is a positive relationship between female presence on the board and firm performance (ROA).

H_8: There is a positive relationship between female presence on the board and firm value (Tobin's Q).

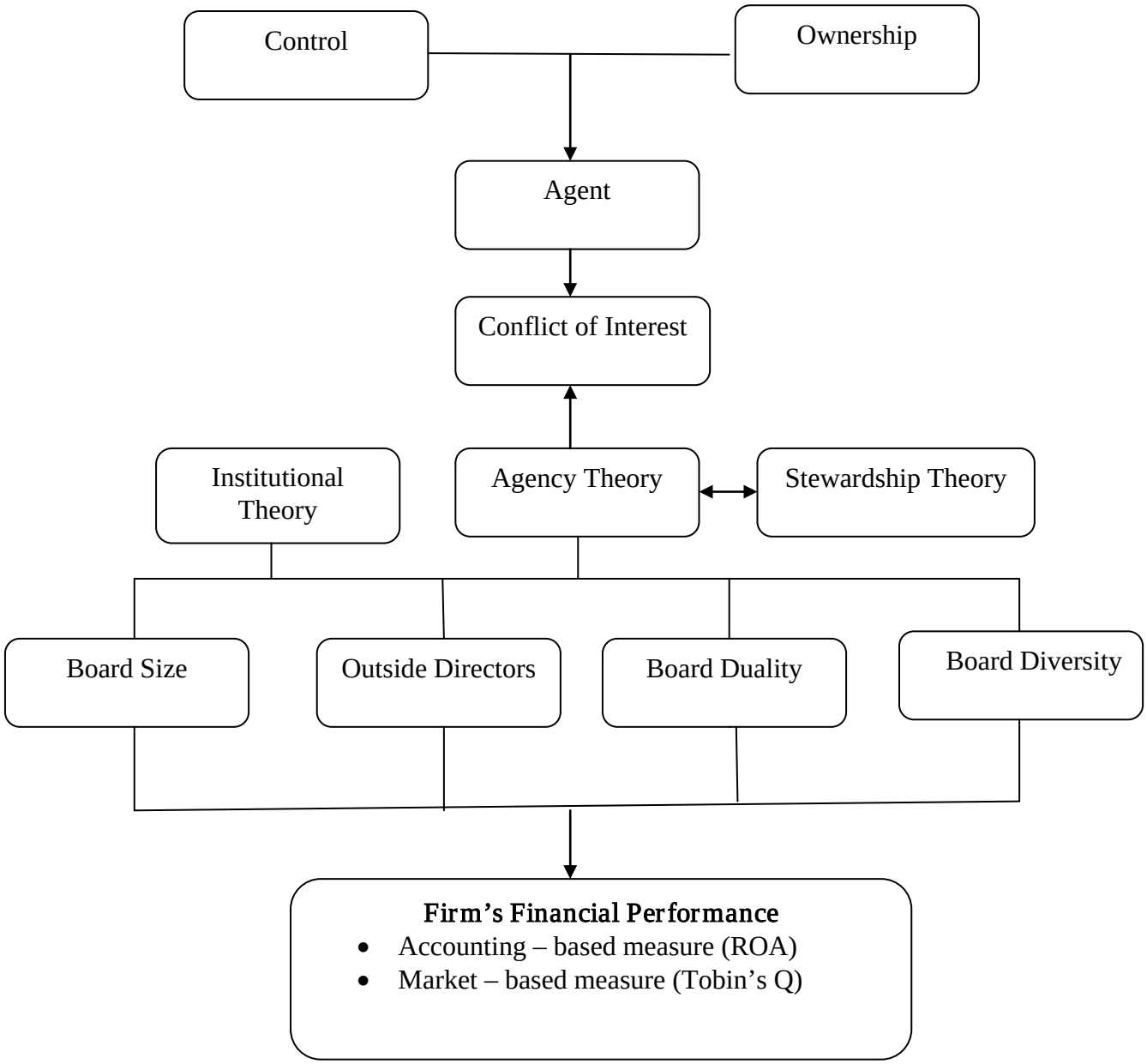

Figure 1: Theoretical Framework

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III. Sample, Variables and Econometric Model

a) Data

The sample firms used in examining the internal governance mechanisms and financial performance are drawn from the companies listed on the Egyptian Stock Exchange (CASE). The sample consists of the most active 100 companies (EGX 100). All relevant data is collected from 2005 to 2010.

The sample period of this study starts from 2005 because it is the year in which the Egyptian code of corporate governance was issued. Thus, the changes that have occurred in the Egyptian-listed companies since the code was issued can be traced. Data after 2010 have not been included because of the Egyptian revolution, known as the "Arab Spring", in 2011, which in turn, may lead to different conclusions. The political and economic outlook of much of the MENA region, of which Egypt is part, remains uncertain. Accordingly, it is expected that Egypt may register low economic growth after 2011 given the substantial levels of political and social uncertainty, the cancellation or suspension of investments and the temporary shutdown of some banks, stock market…etc. (World Bank, 2013, World Bank, 2011). To underpin proper economic and political reform, it will be essential to understand the situations that led to severe problems in Egypt. Understanding the challenges that existed in the context before 2011 is essential as it will help practitioners and policy makers to take them into consideration to develop a more transparent and effective governance to unleash the region's economic development. Yet, six years after this dramatic change, it is still unclear to what extent this political turmoil has affected Egyptian-listed firms as it is likely that stock prices will be accompanied with great deal of uncertainty and adjusted negatively during the unrest (Chau et al., 2014).

Even in studies carried out after 2011, researchers always divide their sample into before and after 2011 (e.g. Chekit and Diwan, 2013) or they concentrate on only one of them, such as Wahaba (2014) who based her study on the period before 2011. All the sectors are investigated with no companies excluded except for those which refused to provide the researcher with any information and do not disclose any relevant data to this research. The board of directors' variables are extracted from the annual reports of the sampled companies, disclosure book that is issued annually by the Egyptian stock exchange. Some annual reports are obtained from company websites. Company annual stock market and financial accounting performance variables are collected from several sources, such as the companies' annual reports and disclosure books. Information is also obtained from databases such as Bank Scope, Reuters and Coface Egypt.

A considerable amount of effort has been put in to manage the sample size as much as possible. As a result, for companies with particular year's annual report missing or not available in the other sources, they are directly contacted via phone or e-mail as recommended by Dess and Robinson (1984). It is regarded as acceptable to depend on reliable informants from within the company if the archival data is absent. According to the presented procedures above regarding the data collection process, a total of 70 Egyptian-listed companies are ready for statistical analysis; companies with incomplete data for six consecutive years are rejected. A detailed description for the sampled data is provided in Appendix A.

IV. Variable and Statistics

Board Size is defined in this study as the total number of board members. ***Outside director*** is proxied by the number of non-executive directors divided by the total number of directors on the board. ***The leadership structure*** in the form of a dummy variable denoted 1 if the roles of the CEO and Chairman are combined and 0 otherwise. *The gender diversity* is calculated by dividing the total number of women in board by the total number of board members.

The two performance measures are ROA and Tobin's Q. ROA is defined as the measure of the capacity of assets of a firm to generate profits and is considered to be a key factor in determining the future investment of the firm; therefore it is used as an indicator of a firm profitability (Arosa et al., 2010). Similarly Lindenberg and Ross (1981) have described that the ratio of the market value of the organizational assets to the replacement cost of the assets of firm's is known as Tobin's Q. A summary for the above mentioned variables are mentioned in figure 1.

a) Econometric Model

Panel data analysis is adopted in most studies that are related to corporate governance. Many previous studies have observed a number of companies for several years (e.g. Garcia Meca et al., 2011).

Generally, there are two types of panel estimator approaches that can be employed: fixed effect models and random effect (Bollen and Brand, 2008; Park, 2011; Schmidheiny, 2012).

Fixed effects are tested by the F-test while random effect is examined by the Lagrange multiplier (LM) test. The F-test compares the fixed effect model and OLS to identify which one of them will improve the goodness of fit, the null hypothesis is that all dummy variables except for the one dropped are all zero, H0 :$\mu 1 = \ldots . \mu n\text{-}1 = 0$. The alternative hypothesis is that at least one dummy parameter is not zero. If the null hypothesis is rejected this indicates that the fixed effect model is better than the pooled OLS. The Breusch and Pagan Lagrange multiplier for random effect test (LM)

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test contrasts the random effect model with the OLS. This test indicates whether OLS regression is appropriate or not. H0: OLS regression is appropriate. The result of this test obeys the chi-square distribution. If the null hypothesis is rejected this indicates that there is a random effect in the panel data, and that the random effect model is able to deal with heterogeneity better than the pooled OLS (Park, 2011). Accordingly, if the null hypothesis is not rejected in either test, then the pooled OLS regression is favoured. Once these two tests are implemented then the model is determined as shown in Table 1.

Table1: Fixed effect and random effect models

Fixed Effect (F test)	Random effect (Breuch-Pagan LM test)	The Model
H_0 is not rejected (no fixed effect)	H_0 is not rejected (no random effect)	Data are poolable = Pooled OLS
H_0 is rejected (fixed effect)	H_0 is not rejected (no random effect)	Fixed Effect Model
H_0 is not rejected (no fixed effect)	H_0 is rejected (random effect)	Random Effect Model
H_0 is rejected (fixed effect)	H_0 is rejected (random effect)	Choose one depending on the results of Hausman test

Source: (Park, 2011)

To decide which technique is appropriate for panel data, the Hausman Test is employed. The null hypothesis of Hausman test is that the random effect model is more suitable, and the alternative hypothesis is that the fixed model is more suitable. The results of the Hausman test obey the chi-square distribution; if it is lower than the critical value, the null hypothesis will be rejected.

b) Endogeneity Test

A further step suggested by Larcher and Risticus (2008) involves conducting an exogeneity test in key explanatory variables to ascertain whether it is actually endogenous or not. This step is done following many corporate governance studies (e.g.; Li, 1994; Hermalin and Weibach, 1998; O'Connell and Cramer, 2010). If the coefficient resulting from the tests is significant, then the relationship between corporate governance variables and firm performance tends to be endogenous. This suggests that the researcher should be directed towards using the instrumental variable regression (IV).

V. Results

Endogeneity between board structure variables and ROA and between board structure and Tobin's Q have been revealed by system exogenity tests (Table 2 and table 3) respectively. Thus, there is no reverse causation running between board structure and any of the firm performance measures (ROA and TQ). So, endogeneity problem is not needed to be addressed in the analysis.

Table 2: Endogeneity test between board structure and ROA

Variable	*P-Value*	*Endogeneity Test*
Board Size	0.8994	0.016
Duality	0.4337	0.613
Board Diversity(female)	0.8842	0.021
Outside directors	0.2873	1.132

Table 3: Endogeneity test between board structure and Tobin's Q

Variable	*P-Value*	*Endogeneity Test*
Board Size	0.5184	0.417
Duality	0.1153	2.069
Board Diversity(female)	0.1773	1.820
Outside directors	0.2873	1.132

Accordingly, F-test for fixed effect and Breusch-Pagan Lagrange multiplier for random effect test are employed to allow the researcher to choose between fixed effect, random effect and pooled OLS regression (Park, 2011). The LM test examines if individuals (or time) specific variance components are zero (Park,

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2011). The result of this test obeys the chi-square distribution. If the null hypothesis is rejected in the test, then there is a significant random effect in the panel data, and the random effect model can deal with heterogeneity better than the pooled OLS (Park, 2011). For the relationship between board characteristics parameters and ROA the chi-square is 89.88 and for the relationship between board characteristics parameters and Tobin's Q the chi-square is 1.73. From the results of the LM tests, the relationship between the board characteristics and ROA is examined through the random effect models. The relationship between the board characteristics and Tobin's Q is examined through the pooled OLS regression. The results of the LM test are summarised in Table 4.

Table 4: Summary for the Breusch-Pagan Lagrange multiplier (LM) for random effect test

	Board characteristics and ROA	Board Characteristics and Tobin's Q
Chi(2)	89.99	1.73
Prob> Chi(2)	0.00	0.094
Hypothesis testing	Rejected	Fail to reject
Type of regression	Random effect model	Pooled OLS regression

Table 5: The relationship between board structure and ROA (results of FGLS regression)

Independent Variables	Coefficient	Standard Error	P Value
Board size	0.002	0.003	0.455
Leadership structure (CEO and Chairman Duality)	-0.021	0.006	0.001***
Gender diversity (% of females on boards)	-0.014	0.027	0.606
% of outside directors	0.054	0.026	0.034**
Control variables			
Food and Beverage	**-0.078**	**0.012**	**0.000*** **
Financial services and banks	**-0.153**	**0.012**	**0.000*** **
Building and Construction material	**-0.077**	**0.012**	**0.000*** **
Basic Resources	**-0.044**	**0.028**	**0.117**
Personal and Household Products	**-0.133**	**0.012**	**0.000*** **
Utilities	**-0.116**	**0.041**	**0.004*** **
Telecommunication	**-0.117**	**0.012**	**0.000*** **
Entertainment	**-0.136**	**0.017**	**0.000*** **
Real estate	**-0.090**	**0.011**	**0.000*** **
Firm's age	0.000	0.000	0.365
Firm's size	**0.004**	**0.002**	**0.020** **
_cons	0.076	0.028	0.006
Wald Chi^2	307.53		0.000

*Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.*

Table 5 contains the Feasible Generalised Least Square (FGLS) regression results for the extent of the relationship between variables determining the board's characteristics and accounting-based financial measure ROA. This table reports the results of the regression of ROA and the control variables considered are: the size of the firm, the age of the firm and industry type.

The coefficients on the board size and the percentage of outside directors are positively associated with firm performance. However, only the positive association between outside directors and performance is statistically significant. The finding is contrary to the expectation as predicted in Hypostudy1 but it lends empirical support to Hypostudy3. The coefficient on CEO duality (Leadership structure) shows negative association with ROA; this association is statistically significant and correctly signed. This finding supports Hypostudy5. The coefficient of females on boards is found to be insignificant. Therefore, Hypostudy7 is not supported.

The control variables are also included in the model. The size of the firm is positively associated with ROA and this relationship is statistically significant. Also, with respect to the industry type there is a statistically

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significant association with all industry types except for Basic Resources. However, the age of the firm shows positive insignificant association. All these main findings are discussed in more detail in the discussion section later.

Table 6: The relationship between board structure and Tobin's Q (results pooled OLS)

Independent Variables	Coefficient	Standard Error	P Value
Board size	-0.002	0.001	0.118
Leadership structure (CEO and Chairman Duality)	-0.009	0.004	**0.005*** **
Gender diversity (% of females on boards)	-0.034	0.017	**0.048** **
% of outside directors	0.036	0.014	**0.007*** **
Control Variables			
Food and Beverage	-0.013	0.007	**0.074***
Financial services and banks	-0.031	0.006	**0.000*** **
Building and Construction material	-0.011	0.006	**0.070***
Basic Resources	-0.005	0.010	0.608
Personal and Household Products	-0.018	0.007	**0.009*** **
Utilities	-0.002	0.009	0.782
Telecommunication	-0.019	0.008	**0.021** **
Entertainment	-0.036	0.009	**0.000*** **
Real estate	-0.019	0.006	**0.003*** **
Firm's age	0.000	7.13E-05	**0.052***
Firm's size	-0.000	0.001	0.497
_cons	0.079	0.016	0.000
Adjusted R^2	**0.11**		

*Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.*

Table 6 contains OLS regression results based on the market-based performance measure Tobin's Q. Table 8.13 contains OLS regression results based on the market-based performance measure Tobin's Q. The variables investigated are the four variables determining the board characteristics.

As is evident in the table 6, the adjusted R2 is approximately 11%. This means at least 11% of the variations in the sampled firms' market return (Tobin's Q) can be explained jointly by the variables of the board of directors' characteristics parameters. The coefficients on the presence of outside directors and board duality are both significant and correctly signed. These findings support hypotheses 4 and 6. By contrast, board diversity as measured by % of females on boards is found to be significant but with a sign contrary to expectations as predicted in Hypostudy8. Board Size is found to be insignificant. Therefore, Hypostudy2 is not supported.

As for the control variables in this regression model, they are all statistically significant except for firm's size and two types of industries (Basic Resources and Utilities).

Each of these main findings will be discussed in more detail in the discussion section below.

VI. Discussion of the Findings

a) Board size

As discussed above in the literature review, the argument about board size is mainly related to the issues of coordination and communication in a group. It is continuously suggested in the literature (e.g. Lipton and Lorch, 1992; Jensen 1993) that firms should not appoint too many directors on the board. This main argument is based on the idea that large boards, as in any formal group, tends to involve less meaningful discussions which consume time and lead to difficulties to achieve cohesiveness. In return, it will be less effective in decision making, is more risk averse, and creates a problem of free riders. Large boards also lead to problems of coordination. It was advised that board size should be a maximum of 8 to 9 directors. They argue that board size that exceeds 10 directors adds to additional costs.

In these terms, Bonn et al. (2008) state that board size is positively related to measures of the private benefits available to insiders (agents/managers), however it is negatively related to proxies for the cost of monitoring insiders. According to the above perspectives the hypotheses developed are:

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H_1: There is an inverse relationship between board size and firm performance (ROA).

H_2: There is an inverse relationship between board size and firm value (Tobin's Q).

The validity of these hypotheses has been tested but shows no evidence of a negative association of board size and firms' financial performance (ROA and Tobin's Q). Overall the results of the current study are contrary to what is suggested in the corporate governance literature; this means companies with small boards do not outperform companies with large boards.

The findings of this study are consistent with Bonn et al. (2004) who find insignificant association between board size and firm performance. They recognised that board size is only a factual number of directors but it does not necessarily reflect what is happening between board members. At least this finding indicates that the current average board size in Egyptian-listed forms is not an origin for any kind of coordination or communication problems between board members. Moreover, it shows that it is not always a good reason to choose a minimum or maximum board size for Egyptian-listed companies as with previous studies (e.g. Guest, 2009 and Lipton and Lorch, 1992). The right number of directors is a trade off between the benefits of having sufficient competencies represented and the cost of free-riding among members on the board. Accordingly, the author suggests considering in future research some diversity factors such as diversity of knowledge and educational background.

Moreover, although in US- and European-listed companies' studies it is found that board size influences the performance of the firm, the presented results indicate that in Egyptian-listed companies, board size does not affect firm performance. These findings do not lend empirical support to the previous studies that find negative association between board size and performance (e.g. Eisenberg, Sundgren and Wells, 1998; Lipton and Lorch, 1992; Kim and Nofsinger, 2007; Yermack, 1996; Jensen, 1993). Hence, the relationship between board size and performance may differ due to a firm's specific characteristics and the national institutional characteristics. Egypt has a different institutional setting than that of the US and European countries (as highlighted in the introduction); that is why the board size–performance relationship differs.

Another possible explanation for this phenomenon may be related to the nomination of board members. For instance, board size may result from the owner's preference to include certain or additional members on the board regardless of their skills and qualifications. There may be pressure to include family members or more outside directors such as bank officers. This will enhance board size but not necessarily enhance firm performance. Thus, board size does not necessarily affect the performance of Egyptian-listed companies.

b) Outside directors

The literature review mentions that in a modern corporation, the board of directors is responsible for monitoring the administration (Berle and Means, 1933). Specifically, this is related to the presence of outside directors who are arguably independent from management. It is argued that boards comprising of outside directors can provide a counter-balance so that inside directors do not take advantage of their positions and sacrifice shareholders' wealth. The presence of independent directors will enhance the flow of information and hence protect the firm resources and reduce uncertainty. Correspondingly, outside directors are predicted to be connected with the improved performance and valuation of the corporation. The hypotheses developed are:

H_3: There is a positive relationship between the presence of outside directors and firm performance (ROA).

H_4: There is a positive relationship between the presence of outside directors and firm value (Tobin's Q).

As per the current study, there is a positive relationship between the presence of outside directors and firm accounting performance (ROA) and this relationship is found to be statistically significant. This indicates that the presence of outside directors/non-executive directors is essential to achieve firm accounting-based performance. Empirically, this finding lends empirical support to the results of previous studies that report a positive association between outside directors and high firm performance (e.g. Brickley et al. (1994); Kaplan and Reishus (1990); Beasley (1996); Byrd and Hickman (1992); Joh and Jung (2012); Dermirbas and Yukhanaev (2011); McCabe and Nowak (2008)). This finding is also consistent with many corporation governance codes that consider outside directors as a means of good corporate governance (e.g. Lawler and Finegold, 2006) and improvement of decisions (e.g. Dahaya and McConnell, 2005).

Previous studies (e.g. PCSU, 2000; World Bank, 2009; Samaha et al., 2012) has highlighted that independence is rare or non-existent in Egyptian boards. According to these findings, outside directors on Egyptian boards are supposed to be ineffective in the monitoring function. However, this is not the case and a positive significant relation is found. The finding can be explained through the nature of ownership structure. The Egyptian-listed firms have high concentrated ownership in the hands of large families or the state. Generally, family-owned businesses have their own interests that can hinder governance practices (Gamal Eldin, 2008). The assumption of independence

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does not exist in Egyptian-listed companies. In the case of concentrated family ownership, mostly board members are either family members or have an affiliated relationship with the company. Hence, outside directors are perceived as insiders in the social network of management and they have access to vital information. Although there are formal rules (regulative pillars) of institution in the Egyptian context, e.g. the listing and delisting rules of stock exchange, the nature of ownership and crony capitalism still lead to some key information being passed on informally through personal ties.

Outside directors, in the Egyptian context, have strong personal ties with management. As a consequence, the problem of information asymmetry will be reduced. They are in the information loop which makes their function more effective. It is clear that outside directors are keen to keep this relation with management and it is really a challenge to motivate them to keep an independent relation with management. So, it is clear that the outside directors are not concerned about carrying out their monitoring role. As a consequence, the agency problem is transferred from being principle-agent to the side of being principal-principal.

Furthermore, the study has found that there is a positive relationship between the presence of outside directors and firm market-based performance (Tobin's Q) and the result is statistically significant. The presence of outside directors affects investors' decisions. This confirms the findings of previous studies that having outside directors reflects the presence of quality management to outside investors (Heenetigala, 2011) and good corporate governance (Lawler and Finegold, 2006; Black and Kim, 2012) and this in return enhances investors' perception towards firms and that outside directors' representations are capable of making better decisions.

The relationship between the presence of outside directors and the two performance measures are interrelated. This confirms the presence of validity as in the relationship between board size and the two performance measures.

c) Board duality

It is argued by agency theorists (Jensen and Meckling, 1976) that the same individual must not occupy the position of Chairman and CEO simultaneously, since this may decrease the efficiency of the monitoring of the board (e.g. Finketstein and D'Aveni, 1994; Brickley et al., 1999, Coulson-Thomas, 1993; Yermack, 1996).

H_5: There is an inverse relationship between board duality and firm performance (ROA).

H_6: There is an inverse relationship between board duality and firm value (Tobin's Q).

The current study proves that there is a negative relationship between board duality and firm accounting-based performance measure (ROA). The study also indicates that there is a negative relationship between board duality and firm market-based performance (Tobin's Q). The results of the two performance measures are statistically significant. This indicates that separating the position of Chairman and CEO plays an important role with respect to firm financial performance and value. These findings generally support the argument of Yermack (1996) and Fama and Jensen (1983) that separating the role of Chairman and CEO can be expected to improve board monitoring by providing independent monitoring of the CEO's work.

The significant relationship with both ROA and Tobin's Q indicates that monitoring by the board improves when the roles of the Chairman and the CEO are split. The significant relationship with Tobin's Q suggests that investors value the presence of an independent Chairman on the board. The market perceives the leadership structure as an important sign of proper monitoring even in the absence of independent directors (Coles et al., 2000).

In spite of the importance of splitting the two roles and its significant association with performance measures, it is still not very common in Egyptian-listed companies. The Average board duality accounts for 69% in Egyptian-listed companies and this indicates that companies are not complying with the Egyptian corporate governance code.

The discussion of the board duality findings does not differ from that of outside directors. Both board duality and outside directors are proxies for board independence. So, with the nature of ownership in Egyptian-listed companies, the governance practices are shaped according to their preferences.

The relationship between the duality of the two roles and the two performance measures is interrelated. This confirms the presence of validity as in the relationship between board size and presence of outside directors and the two performance measures.

d) Gender diversity

H_7: There is a positive relationship between a female presence on boards and firm performance (ROA)

H_8: There is a positive relationship between a female presence on boards and firm value (Tobin's Q)

Hypotheses 7 and 8 predict that the number of women directors on boards is positively associated with firm financial performance measures (ROA and Tobin's Q). The current study indicates no effect of gender on the accounting-based performance measure of the Egyptian-listed companies. This is consistent with the finding of Rose (2007).

The study also proves that there exists a negative relationship between the presence of female

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directors and firm market-based performance (Tobin's Q) and this relationship is statistically significant. The negative association between gender diversity and firm financial performance lends empirical support to the findings of previous studies (see Adler, 2001; Adams and Ferreira, 2009; Dalton and Dalton, 2010). Hence, it can be inferred that the presence of a female director may reduce the firm's market value. A typical investor will reduce holdings in firms that appoint female directors.

The findings of the current study are inconsistent for the two performance measures. It is expected that there will be different results as each performance measure captures different aspects. However, these inconsistent findings can be justified.

For the relationship between gender diversity and ROA, the finding may be because women members on boards do not have the required education and skills (Rose, 2007) or be due to the strong socialisation process (Rose, 2007). Moreover, when members of minority groups rise in an occupation, they face expectations that may adversely affect their performance. For instance, the threat of stereotyping may appear when the status of a minority group is primed; members may underperform because they feel that they are being judged as a member of the group not as an individual (Dobbin and Jung, 2010). Majority group members may marginalise them and underestimate their contribution (Shrader et al., 1997). These reasons lead to female directors having no impact on ROA.

On the other hand, the negative impact on firm value may be due to social norms and how they are restricted for women, having its effect on the investors' perception (Agarwal, 2010). In certain societies, investors may believe that women lack the competency needed for the job (Kiamba, 2008). Also, the findings of the current study lend empirical support to Dalton and Dalton (2010) who believe that gender diversity may affect performance negatively due to woman being risk averse and due to the costs associated with high turnover and absenteeism rates.

Considering the above, the inconsistent findings between the two performance measures ROA and Tobin's Q in Egyptian-listed companies with respect to the presence of gender diversity on boards can be justified by the following. For the ROA–performance relationship: first the nomination of women on boards may be related to owners' preferences (large-family- or state-owned) especially if it is within a family business and may not be related to qualifications. There might be pressure to hire women from family members without considering the skills and the qualifications required; second, this can be explained by the fact that female representation in the Egyptian boardroom is very low as is shown above in the descriptive statistics. Despite the fact that the number of well-educated qualified Egyptian women is increasing, they are underrepresented due to the deep-rooted cultural norms that undermine the roles and capabilities of women, not only in managerial positions but generally in the business and political communities. This low female representation may fail to achieve sufficient diversification in boardrooms; third, there may be no significant difference between the performance of men and women, for instance they both have the same ethical values. A fourth explanation for this phenomenon is the barriers that women face to succeed in such positions. These factors are more apparent in Egypt than in other developed countries such as the UK and US. Hence the findings of the current study with respect to the relationship between gender diversity and ROA are inconsistent with previous studies.

The Tobin's Q–performance relationship is not only about policymaking: some societal and cultural issues need to be taken into consideration. Board diversity relates to the extent of the equal treatment of men and women in society (Rose, 2007). In Egyptian society, being part of the MENA region, generally the society has less favourable views about women in top management positions and is characterized by a male-dominated culture. These diverse social and cultural norms can disadvantage women in many areas. It appears that the board seats of firms are almost completely restricted to men. Women have societal constraints with respect to seats on boards. So, the findings of the current study indicate that investors' perception about women is that they are not capable of handling such a position.

The above discussion explains why the results of the two performance measures are different with respect to their relationship with the board of directors variables.

VII. Control Variables

Firm size is found to be statistically significant with ROA. This indicates that firm size is a factor in improving the accounting-based performance measure of Egyptian-listed companies. This finding is expected to some extent and it is consistent with many previous studies (e.g. Yang et al., 2009; Demsetz and Villalonga, 2001; Ferick and Bermig, 2009; Lannotta and Nocera and Sironi, 2007). Whenever firm size increases, this implies that the firm has complex operations and diversifies across industries. It is expected that firm size may also affect board characteristics but this is beyond the scope of this study. For instance, Klein (1998) and Kole and Lehn (1998) argue that by conventional wisdom larger organisations possess bigger boards of directors since the organisations are more complex and need more diverse expertise on the board.

The age of the firm is found to be statistically significant with the market-based performance measure

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Tobin's Q. This indicates that the age of the firm is an important factor that is considered by investors when they are taking investment decisions. Investors may believe that old firms are well established and more stable than newly established ones. This result is consistent with some previous studies (e.g. Gregory, Rutherford, Oswald and Gardiner, 2005; Boone et al., 2007).

VIII. Discussion of Findings From an Institutional Perspective

Considering the above findings, at the first sight it appears that they can be interpreted exclusively from the agency perspective. However, after considering the indications presented from the current study, it becomes essential to integrate the institutional theory to better explain the nature of the agency problem in the Egyptian context. This integration shows the relative importance of internal and external environmental factors in shaping the governance mechanisms.

Those who are in favour of more non-executive/outside directors on boards base their arguments on the agency theory. Under the tenets of agency theory, the literature review suggests that appointment of inside directors to the board would generally be seen as potentially harmful to shareholders' interests. Further, the review also states that external control mechanisms prevent scandals by linking the interests of the owners with the interests of the CEOs, i.e. by acting on behalf of absent firm owners. The current study reiterates that by proving that there is a positive relationship between the presence of outside directors with both firm accounting performance (ROA) and firm market-based performance (Tobin's Q).

Moreover, as per the literature review, agency theory predicts that when the CEO also holds the dual role of Chair, then the interests of owners will be affected and there will be a managerial opportunism and agency loss (e.g. Health and Norman, 2004). The current study finds that there exists a negative relationship between board duality and firm accounting performance (ROA). The study also agrees that there is an inverse relationship between board duality and firm market-based performance (Tobin's Q). This implies that agency theory explains the finding of the current study with respect to the relationship between board duality and performance. However, this is in total contrast to what is recommended by stewardship theory in the literature review in unifying the role of the CEO and the Chairman so as to reduce the agency costs and to have greater role as stewards in the organisation (Abdullah and Valentine, 2009).

However, the nature of ownership structure being a family ownership and the presence of family members in management and the board has turned the role of the board of directors weak. Family business becomes the substitute for the absence of a real acting board. Using institutional theory, it is clear from the previous analysis and the thorough literature review that, in Egypt, boards are structured as a ceremonial adoption of dominant rather than as an actual embrace of the agency theory perspective. This can explain the reason why the strict listing and delisting rules of the Egyptian stock exchange do not made a noticeable change in the governance of listed firms.

According to the institutional theory, organisations tend to become isomorphic to each other to gain legitimacy in the external environment (DiMaggio and Powell, 1983) and this isomorphism arises from three pillars: coercive, mimetic, and normative. The coercive pressure comes from both the laws and regulation and the regulatory agencies. In Egypt, the coercive pressure mainly comes from the listing and delisting rules. It becomes mandatory for the board to prepare an annual report about adherence and commitment to standards of corporate governance. Firms are forced to adhere to these rules. Here also comes the role of the Egyptian institutions such as the Egyptian Financial Supervisory Authority (EFSA) and Egyptian institute of directors to guarantee the enforcement of these regulations.

According to the ECGC, firms should constitute their boards according to a set of given guidelines which requires having a majority of non-executive directors and split roles of Chairman and CEO. This code is non-mandatory. As a manifestation of the mimetic pressure is exerted, companies are compelled to adapt the recommendation in the code. Mimetic pressure is exerted on the companies as this is a global trend within Egyptian companies and in other countries. Consequently, constitution of the board becomes an important issue. Through the board's affairs (NED and board duality), the company succeeds in achieving legitimacy. From the institutional perspective, adoption of the corporate governance code creates social legitimisation and enhanced performance.

For gender diversity on boards, the inconsistency of results can be explained by the institutional theory. The presence of the cultural and social norms within the Egyptian context has shaped the governance practices with respect to gender diversity on boards. The effect of the presence of women on boards on performance can be explained through the barriers that women can face. Having a percentage of women on the board is partially related to the concentrated ownership structure in Egypt. The majority of women on boards are family members. Moreover, there was a global trend towards adopting principles of equity between men and women to the extent that some countries have included this issue as a principle in its corporate governance code. So, this can be explained through normative and mimetic pressures.

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With respect to firm age as a control variable, this significant finding plays an important role in shaping governance practices. Whenever the ages of the firm increases, this makes most of the activities routinized which in return increases the efficiency of the company and performance and it makes deinstitutionalism very slow to occur because of the deep rooted institutionalized patterns of behaviour.

From the results and discussions presented above, it is obvious that ownership structure plays an important role in determining board composition, especially in the presence of institutional obstacles such as immature capital market, poor national governance and weak regulatory system.

IX. Conclusions

To date, agency theory is predominant in corporate governance research in being used most extensively. However, it is argued that the agency theory presents a partial view of the world. This study uses an integration of agency theory with an institutional perspective to predict the impact of ownership structure and board characteristics on performance based on internal and external factors. The institutional theory highlights the relative importance of different contextual factors in shaping governance practices in one of the developing countries. Adopting a combination of these two theories (the agency and the institutional theory), this study extends existing literature by examining the top 100 Egyptian-listed companies (EGX 100). It is able to test the hypothesised link between board characteristics and firm performance expected under each theory.

In the line with the objective of this study, to determine the relationship between board characteristics and firm financial performance, the author firstly conducted a comprehensive literature review on the relationship between board characteristics and firms financial performance. This extensive review of empirical studies concerning the relationship between board characteristics and firm performance has revealed a research gap, namely that previous studies have focused on board size, level of independence and leadership structure. However, these studies show mixed results. More critically, it appears that a number of these empirical studies have employed a research strategy and research techniques that cannot guarantee the reliability and validity of the empirical results. This may be due to issues such as sample size, location, time frame, and appropriate econometric methods.

As a result, this research objective is to extend previous empirical findings to a developing country, Egypt, and enrich them by investigating the relationship between board characteristics and firm performance and by employing a rigorous research method in order to increase the reliability and validity of the research results.

With regard to the results of corporate board structure and ROA, for firms that want to increase their ROA, it would be advisable to have a high proportion of qualified outside directors on the board and avoid combining the roles of CEO and Chairman. Also, firms that want to improve investors' perception and market value should encourage having outside directors on the board and avoid combining the roles of CEO and Chairman. Thus, outside directors (non-executive) and non-duality should be strongly encouraged in order to improve the firm financial performance. This is consistent with the Egyptian code of governance (provision 3.4) that emphasises that the board should comprise of a majority of non-executive directors with technical or analytical skills to benefit the board and the company. Moreover, provision 3.6 of the code emphasises that the board is responsible for the appointment of the Chairman and the CEO and it is preferred that one person should not combine both positions (see guide of ECGC in Appendix 2).

However, gender diversity needs different consideration. From the result of the current study, the author was supposed to recommend avoiding gender diversity on boards. However, there are number of issues that are recommended in this study that may help in improving the investors' perception, increasing the level of awareness among society with respect to gender diversity on boards. The selection of board members should only be based on the skills and qualifications that are essential to perform the duties and responsibilities of the job. Also, fair compensation packages and avoiding discriminating between male and female directors should be ensured to encourage more qualified females to accept such positions.

The Egyptian capital market is still a developing market and it lacks rational investors. Therefore, Egypt needs institutions that take responsibility for creating more sophisticated investors in the market. Investors' education may be costly and time consuming but the government should still consider taking responsibility for providing professional training to support investors if it really plans for capital market development. Accordingly, much effort should be made by both local (Capital Market Authority, Egyptian Institute of Directors, Central bank of Egypt, and the Misr cleaning, settlement and central depository company (MCSD) and international organizations (IMF, World Bank, Trade Organizations) to help the corporate governance idea to become fully adopted and appropriately implemented in Egypt and other nations with similar social, economic, and political characteristics.

The limitations of this study concern the methodology used. The current study is only focused on one country, and this may limit the application of its findings and implications to other countries that are not similar to Egypt. The sample framework used in the

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current study is the EGX 100. Although, this sample is observed for six years, it is only representative for Egyptian-listed companies. Moreover, the data used are mainly quantitative, hence leaving out qualitative data that could inform the study to develop strong justifications of its quantitative findings. Finally, the study only chose one element of corporate governance, i.e. board characteristics, hence, the findings could exhibit some weakness due to exclusion of other elements of corporate governance as well as other control variables. With respect to corporate governance mechanisms, evaluation was extremely difficult to implement empirically due to the confidentiality of data.

For future research, this study recommends the use of different corporate governance factors that have not been considered in this study as highlighted in the previous section. However, if future studies were to use similar elements as those in this study, then it would be better to conduct the same study in another African state, especially an Arab state. This would help in strengthening the findings in this study. Moreover, this study did not consider primary qualitative data to justify the findings and make implications. Thus, in future studies, qualitative data should be considered instead of relying on qualitative data to justify quantitative findings in this line of study. On this note, the application of both quantitative data and qualitative data can offer strong and relevant findings and justifications.

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Appendix 1

Descriptive statistics for the sampled data

Table 1: Descriptive Statistics of variables – Board characteristics, firm financial performance and control variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Tobin's Q	412	2.342	5.761	-3.321	62.993
ROA	412	0.0790	0.126	-0.569	1.277
Board Size	412	8.920	2.687	4	17
Duality	412	0.694	0.461	0	1
Gender diversity	412	0.077	0.010	0	.4447
% Outside directors	412	0.620	0.262	.182	1.364
Firm's age	412	34.908	23.636	3	104
Firm's Size	412	14.184	1.743	10.493	18.369

Table 2: Descriptive Statistics: Profile of the sample

Industry	Freq.	Percent	Cum.
Basic Resources	12	2.91	2.91
Building and Construction materials	89	21.60	24.51
Chemicals	36	8.74	33.25
Entertainment	18	4.37	37.62
Financial services and banks	70	16.99	54.61
Food and Beverage	42	10.19	64.81
Personal and Household Products	47	11.41	76.21
Real Estate	56	13.59	89.81
Telecommunication	24	5.83	95.63
Utilities	18	4.37	100.00
Total	412	100.00	

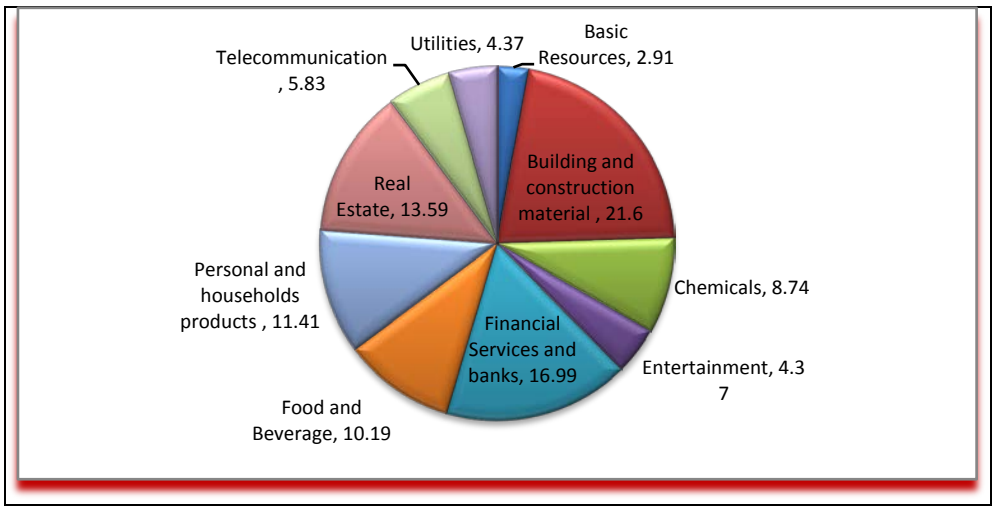

Figure 1: Descriptive statistics: Profile of the sample

Table 3: The variables means of all firms over years – Board Characteristics

Year	*Tobin's Q*	*ROA*	*Board Size*	*Duality (%)*	*% of Females*	*% of outside directors*
2005	3.484	.080	8.677	.646	.074	.617
2006	3.546	.064	8.866	.701	.084	.623
2007	2.436	.010	8.957	.743	.079	.619
2008	1.143	.079	8.986	.686	.077	.614
2009	2.001	.083	9.014	.7	.073	.629
2010	1.577	.067	9	.686	.075	.623
Total	*2.342*	*.079*	*8.920*	*.695*	*.077*	*.620*

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Table 4: The correlation matrix between Board characteristics variables and ROA

	ROA	Board Size	Duality	Females	Outside Directors	Chemicals	Food and Beverage	Finacial services	Building and construction materials	Basic Resources	Personel and House hold products	Utilities	Telecommunication	Entertainment	Real State	Firm's age	Firm's size
ROA	1																
BoardSize	0.23	1.00															
Duality	-0.10	-0.08	1.00														
Females	-0.05	0.15	0.14	1.00													
Outside director	0.23	0.90	-0.09	0.17	1.00												
Chemicals	0.23	0.02	0.21	0.27	0.04	1.00											
Food and Beverage	0.05	0.04	0.00	-0.10	0.02	-0.10	1.00										
Financial Services and banking	-0.14	0.15	-0.07	0.05	0.11	-0.14	-0.15	1.00									
Building and Construction	0.14	-0.13	-0.09	-0.21	-0.11	-0.16	-0.18	-0.24	1.00								
Basic resources	0.08	0.08	0.05	0.02	0.11	-0.05	-0.06	-0.08	-0.09	1.00							
Personnel and Household products	-0.07	-0.04	0.01	-0.12	-0.07	-0.11	-0.12	-0.16	-0.19	-0.06	1.00						
Utilities	-0.34	-0.19	0.14	0.14	-0.18	-0.07	-0.07	-0.10	-0.11	-0.04	-0.08	1.00					
Telecommunication	0.04	0.15	-0.01	0.03	0.17	-0.08	-0.08	-0.11	-0.13	-0.04	-0.09	-0.05	1.00				
Entertainment	-0.01	0.16	-0.22	0.13	0.18	-0.07	-0.07	-0.10	-0.11	-0.04	-0.08	-0.05	-0.05	1.00			
Realstate	-0.04	-0.14	0.05	-0.02	-0.13	-0.12	-0.13	-0.18	-0.19	-0.07	-0.14	-0.08	-0.10	-0.08	1.00		
Firm's age	-0.03	-0.22	0.23	0.00	-0.18	0.02	0.08	-0.17	-0.04	-0.17	0.24	0.03	-0.03	-0.17	0.12	1.00	
Firm's Size	0.19	0.24	-0.09	-0.21	0.17	-0.08	-0.21	0.24	0.09	-0.04	0.01	-0.27	0.30	-0.04	-0.12	-0.09	1.00

Table 5: The correlation matrix between Board characteristics variables and Tobin's Q

	Tobin Q	Board Size	Duality	Females	Outside Directors	Chemicals	Food and Beverage	Finacial services	Building and construction materials	Basic Resources	Personel and House hold products	Utilities	Telecommunication	Entertainment	Real State	Firm's age	Firm's size
Tobin Q	1.00																
BoardSize	-0.01	1.00															
Duality	-0.07	-0.08	1.00														
Females	-0.08	0.15	0.14	1.00													
Outside director	0.06	0.90	-0.09	0.17	1.00												
Chemicals	0.13	0.02	0.21	0.27	0.04	1.00											
Food and Beverage	0.07	0.04	0.00	-0.10	0.02	-0.10	1.00										
Financial Services and banking	-0.22	0.15	-0.07	0.05	0.11	-0.14	-0.15	1.00									
Building and Construction	0.10	-0.13	-0.09	-0.21	-0.11	-0.16	-0.18	-0.24	1.00								
Basic resources	0.06	0.08	0.05	0.02	0.11	-0.05	-0.06	-0.08	-0.09	1.00							
Personnel and Household products	0.00	-0.04	0.00	-0.12	-0.07	-0.11	-0.12	-0.16	-0.19	-0.06	1.00						
Utilities	0.05	-0.19	0.14	0.14	-0.18	-0.07	-0.07	-0.10	-0.11	-0.04	-0.08	1.00					
Telecommunication	-0.01	0.15	-0.01	0.02	0.17	-0.08	-0.08	-0.11	-0.13	-0.04	-0.09	-0.05	1.00				
Entertainment	-0.10	0.16	-0.22	0.13	0.18	-0.07	-0.07	-0.10	-0.11	-0.04	-0.08	-0.05	-0.05	1.00			
Realstate	-0.04	-0.14	0.05	-0.02	-0.13	-0.12	-0.13	-0.18	-0.19	-0.07	-0.14	-0.09	-0.10	-0.09	1.00		
Firm's age	0.09	-0.22	0.23	0.01	-0.18	0.02	0.08	-0.17	-0.04	-0.17	0.24	0.03	-0.03	-0.16	0.12	1.00	
Firm's Size	-0.08	0.24	-0.09	-0.21	0.17	-0.08	-0.21	0.24	0.09	-0.04	0.00	-0.27	0.30	-0.04	-0.12	-0.09	1.00

Table 6: The Multi-collinearity test between boards of directors' characteristics variables including control variables

Variable	VIF	1/VIF
Board Size	5.81	0.17
% of Outside directors	5.62	0.18
Building and construction materials	2.91	0.34
Financial services and Banks	2.56	0.39
Personnel and household products	2.23	0.45
Real state	2.21	0.45
Food and Beverage	2.12	0.47
Telecommunication	1.73	0.58
Entertainment	1.56	0.64
Firm's size	1.54	0.65
Utilities	1.49	0.67
Basic Resources	1.33	0.75
Gender diversity	1.32	0.76
Firm's age	1.28	0.78
Duality	1.19	0.84
Mean VIF	2.33	

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Appendix 2

The provisions of the Egyptian recommended codes of corporate governance that is referred to in the discussion section:

3-4 The board should comprise a majority of non-executive directors with the technical or analytical skills to benefit the board and the company. All of the non-executive directors should dedicate the time and attention necessary to fulfil their obligations to the company and not accept assignments that could be seen to be a conflict of interest.

3-6 The board appoints the Chairman and the chief executive officer. Preferably one person should not combine both positions. If deemed necessary, reasons should be stated in the annual report. In this case, the deputy Chairman should be non-executive.

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