

The joint effect of board characteristics on financial performance

Empirical evidence from Egypt

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Abstract

Purpose – This paper aims to investigate the joint effect of board characteristics on financial performance. Most of the existing literature implicitly assumes that the relationship between either board composition, or board leadership structure and financial performance is direct.

Design/methodology/approach – The generalized least squares method was performed as a panel data analysis on a sample of 40 Egyptian listed firms during the period from 2008 to 2010.

Findings – The results demonstrated that under board leadership structure that assigns the duties of the CEO and chairman to the same person, increasing the proportion of non-executive members to the total number of directors has a negative impact on firm financial performance.

Practical implications – First, corporate governance structures do not operate in a vacuum, and therefore, corporate governance mechanisms must be considered and assessed altogether. Second, failure to understand the underlying interdependency among corporate governance mechanisms may result in arguments that blame some corporate governance designs for poor financial performance. Third, there is no single board governance mechanism that can be considered ideal, but there are combinations of these mechanisms that are preferred.

Originality/value – The paper adds to the corporate governance literature by providing empirical evidence from the emerging market of Egypt. The evidence shows that the relationship between board characteristics and financial performance is not a monotonic relationship. Consequently, these findings imply that existing evidence explaining the relationship between board characteristics and financial performance needs to be interpreted with some caution.

Keywords Corporate governance, Developing countries, Financial performance, Panel data, Agency theory, Board of directors

Paper type Research paper

1. Introduction

Separation of ownership and management as well as ownership dispersion in modern organizations have led to different arguments regarding the relationship between the principal and the agent. Jensen and Meckling (1976) articulated this scenario as an agency relationship and argued that the agent (i.e. CEO) will be a self-interested optimizer. Therefore, monitoring mechanisms must be implemented to diminish conflicts of interests between shareholders and the management (Fama and Jensen, 1983).

The corporate governance literature has proposed various internal and external mechanisms to resolve these conflicts of interest between shareholders and the



management. By representing the interests of shareholders, it is argued that a board of directors is an important instrument that helps regulate in governing the CEO decision-making (Monks and Minow, 1995). This is more likely to happen when the board of directors is responsible for certain activities, such as hiring, firing, compensating and monitoring the CEO. Additional responsibilities include providing the CEO with needed advice, as well as helping the organization to access more external resources (Johnson *et al.*, 1996; Wahba and Elsayed, 2010).

In the corporate governance literature, the ability of a board of directors to fulfill these duties is linked to certain characteristics, namely, its composition and leadership structure. Board composition refers to the degree to which a board is composed of non-executive (or independent) members who have no relationship with the firm and whose main responsibilities include CEO oversight (Davidson *et al.*, 2005; Dalton and Dalton, 2011). Board leadership structure refers to whether the firm has one person executing the roles of both CEO and chairman (i.e. CEO duality), or if it assigns these positions to different individuals (i.e. CEO non-duality) (Abdullah, 2004; Elsayed and Wahba, 2013).

Although different theories have been used in the literature to explain the main roles of the board, agency theory (Jensen and Meckling, 1976) and stewardship theory (Donaldson and Davis, 1991) are considered the most prominent perspectives. The underlying premise of the agency theory is that when boards emphasize the separation of decision management from decision control, an increase in decision efficiency tends to result due in part to more robust discussions. Reduced agency costs are realized and problems associated with managerial entrenchment are also lessened (Levy, 1981; Dayton, 1984). Conversely, advocates of the stewardship theory argue that it would be better if decision control were in the hands of the management. It is argued that CEO non-duality offers more time response to external events, clearer direction and unity of command, faster and more effective decision-making and more complete information about day-to-day operations (Donaldson and Davis, 1991; Elsayed, 2010).

In this context, prior studies have tried to establish a link between various financial issues and board characteristics (Daily and Dalton, 1994; Feldmann and Schwarzkopf, 2003; Fernando and Xu, 2012), but contradictory arguments from the agency theory and the stewardship theory are reflected in their empirical evidence. One area that unfortunately yields inconsistent evidence is the relationship between board characteristics and financial performance. Specifically, the results of prior work showed that the impact of board composition (Chaganti *et al.*, 1985; Hermalin and Weisbach, 1991; Pearce and Zahra, 1992; Adams and Mehran, 2012; Berthelot *et al.*, 2012) or board leadership structure (Berg and Smith, 1978; Baliga *et al.*, 1996; Brickley *et al.*, 1997; Davidson *et al.*, 2005; Ramdani and Witteloostuijn, 2010; Carty and Weiss, 2012; Guillet *et al.*, 2012) on financial performance is a positive one, while others conclude that the relationship is a negative one and still others claim that there is no impact at all. Thus, the net effect of board characteristics on financial performance is an open question that needs further investigation.

In fact, most of the existing literature has not only focused extensively on presenting evidence from developed countries but has also implicitly assumed that the relationship between either board composition or board leadership structure and financial performance is direct. There are two key reasons behind this simple and perhaps unrealistic assumption. First, supporters of both the agency theory and the stewardship

theory do not consider the other side of the coin: the potential disadvantages and/or costs of the recommended board structure. For instance, while the advocates of the agency theory do not recognize that because the CEO frequently chooses outside directors, and therefore those chosen may be more aligned with his interests than with the shareholders' interests, the supporters of the stewardship theory also do not notice that this clearly holds true for those inside directors whose careers are tied to the CEO's (Hermalin and Weisbach, 1991). Advocates of the agency theory do not consider that a CEO non-duality structure may also increase costs due to increased oversight needed for the chairman, poor communication between the CEO and chairman, compensation for an outside chairman and inconsistency in the decision-making process. In addition, promoters of the stewardship theory do not appreciate the potential costs of CEO duality, such as the high probability of managerial entrenchment, weak board monitoring of the CEO, potential increased conflict between the management and shareholders and substandard decision-making by the CEO (Elsayed, 2010).

Second, both theories not only fail to recognize that the effectiveness of the board of directors may depend on some contextual variables and the power of key internal and external actors (Huse, 2005), but also ignore interdependency among corporate governance mechanisms (Aguilera, 2005; Huse, 2005; Elsayed and Wahba, 2013). This may explain why discussion of the impact of board characteristics' joint effect on financial performance is scant in the literature. Therefore, a perspective that this paper stresses is that while board composition and CEO duality each, when viewed in isolation, can be good for financial performance, their interaction may have a negative impact on financial performance. This argument is in line with the observation of Berthelot *et al.* (2012, p. 340), who have encouraged future research to address "the potential interrelationships between the corporate governance practices and the contextual variables".

Accordingly, this paper seeks to achieve two goals. The first goal is to present empirical evidence regarding the role of board leadership structure on the relationship between board composition and financial performance. This relationship is expected to explain the divergence and mixed findings in the literature. The second goal of this paper is to demonstrate how the board of directors works in the Egyptian context. In fact, getting evidence from various contexts helps in understanding the dynamics of boards of directors, as national institutions may differently allocate power within firms (Aguilera, 2005).

The rest of this paper is structured as follows. The theoretical background and empirical evidence regarding the relationship between board characteristics and financial performance are presented in the second part. Hypothesis development is introduced in the third part. Board of directors in the Egyptian context is illustrated in the fourth part. Sample and variable measurements are found in the fifth part. Empirical findings are presented in the sixth part, and the conclusion and discussion of the main findings are in the final part.

2. Theoretical background and empirical evidence

2.1. Board composition

The effect of non-executive (independent) members of the board of directors is broadly examined in the corporate governance literature. In the spirit of the agency theory, boards that have a greater proportion of independent directors are likely to be more

effective monitors. As a consequence of their independence from the firm's management, non-executive members can confront any self-interested actions or opportunistic behavior by managers, and hence, agency cost is reduced (Fama, 1980; Fama and Jensen, 1983). Therefore, the underlying theme of this argument is that the relationship between the proportion of non-executive directors and financial performance is positive.

Opposite to the agency theory, advocates of the stewardship theory suggest that performance can be enhanced if monitoring responsibility is centralized in the hands of inside-directors because they are familiar with day-to-day operations (Donaldson and Davis, 1991), and can facilitate the succession process (Mace, 1971). This is likely to occur if inside directors have a strong incentive to get involved and are committed to conducting their fiduciary responsibilities (Shen, 2005).

Empirically, the results of prior studies are conflicting and rather inconclusive. In the context of firms in the USA, Chaganti *et al.* (1985) found insignificant differences in the per cent of outside directors employed by both failed and non-failed firms. Hermalin and Weisbach (1991) did not detect a significant effect of board independence on financial performance measured by Tobin's q. Pearce and Zahra (1992) revealed that outside directors and future measurement of firm financial performance are positively correlated. Adams and Mehran (2012) noted that board independence is not related to financial performance.

In the UK, while Weir and Laing (2001) did not find a decisive relationship between board composition and financial performance, Osma (2008) indicated that independent directors efficiently constrain opportunistic R&D spending. Dehaene *et al.* (2001), in Belgium, showed that the relationship between the number of outside directors and return on equity is positive and significant. A finding consistent with Davidson *et al.* (2005) using a sample of Australian firms demonstrated that a majority of non-executive directors on the board are significantly associated with a lower likelihood of earnings management. However, the Canadian evidence, as presented in Berthelot *et al.* (2012), supported the negative association between board independence and either a firm's net book value or income. Other studies, such as Bermig and Frick (2010) in Germany and Rashid *et al.* (2010) in Bangladesh, were not able to identify a consistent and significant relationship between board independence and financial performance. This was the conclusion also reported by Dalton *et al.* (1998) in their meta-analytic reviews.

Empirical findings from Asian countries were also conflicting. In Malaysia, Abdullah (2004) did not find a significant relationship between board independence and firm performance, whereas Ameer *et al.* (2010) showed that performance was correlated with boards with a high representation of outside and foreign directors compared to those with a majority of inside executives. This conclusion was also supported by the results of Chiang and Lin (2011) using a sample of Taiwanese firms.

2.2. Board leadership structure

Different theoretical arguments have been introduced to support either CEO duality structure or CEO non-duality structure. Drawing on the agency theory, advocates of CEO non-duality suggest that CEO duality diminishes the monitoring role of the board of directors over the executive manager, which may in turn have a negative effect on financial performance. In other words, as Alchian and Demsetz (1972, p. 782) state, "who monitors the monitor?" In contrast, activists of CEO duality argue that CEO duality

enhances financial performance, as the CEO will have access to complete information as well as authority over his organization.

Empirical evidence regarding the impact of CEO duality on financial performance is not only inconclusive but also heavily weighted toward the US experience. Authors such as [Rechner and Dalton \(1991\)](#) provided empirical evidence that CEO duality leads to inferior shareholders' value. Alternatively, [Donaldson and Davis \(1991\)](#) demonstrated that CEO duality improves firm performance. [Sridharan and Marsinko \(1997\)](#) found that CEO duality affects a firm's market value positively. Likewise, [Guillet *et al.* \(2012\)](#) reported that CEO duality contributes to restaurants' improving performance, whereas [Carty and Weiss \(2012\)](#) did not find a correlation between bank failure and CEO duality. Additionally, scholars such as [Chaganti *et al.* \(1985\)](#), [Rechner and Dalton \(1989\)](#) and [Baliga *et al.* \(1996\)](#) could not find a significant relationship between CEO duality and financial performance.

Inconclusive evidence is also documented in some European countries. Particularly in the UK, [Dahya *et al.* \(1996\)](#) found that CEO non-duality positively affects share price, whereas [Weir and Laing \(2001\)](#) did not detect a clear relationship between board leadership structure and financial performance. However, [Dehaene *et al.* \(2001\)](#), in Belgium, revealed that CEO duality and return on assets are correlated positively.

Evidence from Asia is also mixed. In China, some authors ([Peng *et al.*, 2007](#)) reported that duality firms outperform non-duality firms. The positive effect of CEO non-duality on firm performance is documented in [Lin \(2005\)](#) using a sample of Taiwanese firms and in [Ramdani and Witteloostuijn \(2010\)](#) using a sample of four Asian countries (i.e. Indonesia, Malaysia, South Korea and Thailand). However, the results of [Lam and Lee \(2008\)](#) showed that the effect of CEO duality on firm performance varies with the degree of family control in Hong Kong. Moreover, [Abdullah \(2004\)](#) used a sample of Malaysian firms and concluded that board leadership structure and financial performance are not correlated.

In other contexts, [Davidson *et al.* \(2005\)](#) examined a sample of Australian firms and did find a significant association between board leadership structure and earnings management. Recently, [Rashid \(2010\)](#), in Bangladesh, found that there is no significant relationship between CEO duality and agency cost. Furthermore, [Rhoades *et al.* \(2001\)](#) performed a meta-analysis study based on 22 independent samples across 5,751 firms and showed that CEO non-duality has a positive impact on corporate performance, but this impact varies with the context of the study.

3. Board of directors in Egypt

While the USA and the UK share an Anglo-American common law system, the Egyptian corporate law system is fundamentally influenced by French civil law. However, concepts of the Anglo-American common law system are well-established in the capital market and central depository laws. Specifically, while the Company Law (No. 159/1981) governs joint stock companies, the Capital Market Law (No. 95/1992) legalizes the capital market and sets up the structure and custody of the Egyptian Stock Exchange (EGX) and market intermediates. Furthermore, the Central Depository and Registry Law (No. 93/2000) regulates the central registration for shareholders' records, clearance, settlement and depositing (for more details, review [Fawzy, 2003](#)). In this context, although the Egyptian legal system does not prohibit CEO duality, it specifies that the

board of directors for any company should be constituted according to capital distribution, and be nominated to represent shareholders (Elsayed and Wahba, 2013).

On the contrary to the USA/UK, where the level of individual share ownership has decreased and the proportion of institutional investors has increased (Mallin, 2002), many Egyptian companies are held by relatively few shareholders due to tax laws that encourage listing (ROSC, 2004). Moreover, the Egyptian market is dominated by retail investors who account for 50-60 per cent of the total equity in the market, for which foreign investment and domestic institutional investors are relatively small (Abdel Shahid, 2003; ROSC, 2004; Wahba and Elsayed, 2010).

The Egyptian corporate governance reform has started in 2001 with change in legislation that regulates the Egyptian capital market to increase disclosure and corporate governance requirements for quoted firms. Moreover, some initiatives have been launched to boost corporate governance practices in Egypt. For instance, in 2005, the Egyptian Institute of Directors launched a code, guidelines and standards of corporate governance to be followed by the Egyptian corporations (Wahba and Elsayed, 2010). In 2007, the Egyptian Corporate Responsibility Center prepared and published the S&P/EGX Index for corporate social responsibility and governance (ESG Egypt), which determines annually the ranking of 30 best Egyptian firms according to their environmental, social and governance activities.

In Egypt, many companies are owned by family groups or individuals, making it difficult for managers to practice independence, flexibility and objectivity. This, in fact, leads to a system in which the rights of minority shareholders are often neglected. Moreover, most shares are controlled by strategic investors, and implementation of an effective corporate governance system at the firm level is still too costly to be considered by Egyptian companies, as many of them are small- or medium-sized enterprises (MENA, 2003; Wahba and Elsayed, 2010):

Egyptian companies have single tier boards comprised of an odd number of members, with a minimum of three. Two “experts” may be appointed to the board; they are full members of the board, and they vote. Directors must be shareholders or represent companies who are shareholders. An employee cannot be appointed before having served at least two years with the company [...] There is a significant difference in the level of compensation of executive and non-executive directors. The remuneration of non-executive board members consists of sitting fees and travel expenses. Executive directors receive an annual share of profits of 10 per cent of net income (ROSC, 2004, pp. 12-13).

Empirical work that has examined board characteristics in the Egyptian context is limited. Elsayed (2007) showed that the impact of CEO duality on firm performance varies across industries, and CEO duality attracts a positive and significant coefficient only when firm performance is low. Elsayed (2010) pointed out that board leadership structure varies with firm size, age and ownership structure. Wahba and Elsayed (2010) revealed that firm complexity exerts a positive and significant coefficient on board size when the firm adopts a leadership structure that separates the roles of CEO and chairman. Likewise, Elsayed (2011) found that the relationship between board size and firm performance is more likely to be confounded by board leadership structure. Elsayed and Wahba (2013) found that institutional ownership affects inventory management positively (negatively) when CEO duality (non-duality) is in place, or board size is large (small). Wahba and Elsayed (2014) examined the relationship between board size and financial performance over firm life cycle and concluded that

while board size affects financial performance negatively in the inception stage, it has exerted a positive and significant coefficient on financial performance for those firms that are in the expansion stage, the maturity stage or the revival stage.

4. Hypothesis development

Contrary to the underlying assumptions of both the agency theory and the stewardship theory, which imply that the effect of either board composition or board leadership structure on financial performance can be depicted independently, it is argued here that financial performance can also be affected by board composition – leadership structure interaction. Moreover, it is argued that the type and outcome of this interaction vary according to the role that the CEO expects the board of directors to practice.

The potential moderating effect of board leadership structure on the relationship between board composition and financial performance is more likely to be valid for several reasons. First, the underlying interdependence among corporate governance mechanisms implies that rational firms often design their corporate governance systems to minimize their total cost (Wahba and Elsayed, 2010). In other words, “the overall governance of the company could be optimised by very different board structures” (Donnelly and Kelly, 2005, p. 730). Regrettably:

[r]esearch so far has focused almost exclusively on the board of directors and ignored the potential interaction effect of other control devices. However, because different corporate governance methods may substitute for or complement each other, the results of the impact of any one mechanism could potentially be biased (Bozec and Dia, 2007, p. 1,735).

For instance, a CEO duality structure may not only weaken the board of directors’ effectiveness due to the relative power of the CEO in controlling information flow (Brickley *et al.*, 1997; Elsayed and Wahba, 2013), but may also hamper outside directors from practicing their role in monitoring management (Lorsch and MacIver, 1989).

Second, “there is not one best design of corporate governance, but various designs are not equally good” (Huse, 2005, p. 67). Rather, the optimal combination of governance mechanisms is more likely to vary as the related costs and benefits differ across firm characteristics (Ahmed and Duellman, 2007), industries (Elsayed, 2007; Huse, 2005) and countries (Ahmed *et al.*, 2006; Van Veen and Marsman, 2008). Unfortunately, advocates of either the agency theory or the stewardship theory have focused only on a part of the whole picture. For instance:

[...] shareholder activists, in their argument, disregard important costs associated with CEO non-duality. These costs comprise the cost of monitoring the performance of the non-CEO chairman, the cost of incomplete information flow between the CEO and chairman, the cost of changing the succession process, the cost of inconsistency in the decision-making process, and the cost of extra compensations for the outside chairman (Elsayed, 2010, p. 82).

In addition, advocates of inside directors on the board overlooked that there are:

[...] reasons to think that outside directors will exhibit some independence from top management. First, directors have certain legal obligations to the shareholders and they can be held liable for damages if they fail to meet these obligations. Second, directors will have some desire to maintain or establish reputations as good monitors and competent business people (Hermalin and Weisbach, 1991, p. 103).

Third, national institutions may not only facilitate some corporate governance mechanisms while hindering others, but they may also differentially distribute power within firms (Aguilera, 2005). For instance, although the USA and the UK have a common law system, each country has decided to address corporate governance initiatives differently (Aguilera, 2005; Huse, 2005; Elsayed and Wahba, 2013).

Thus, if the above assertion holds true, then we can distinguish between two possible interactions: “*accommodative interaction*” and “*contested interaction*”. Separating the CEO and chairman positions imposes a sufficient constraint on the CEO’s decisions (Faleye, 2007), which in turn weakens the CEO’s power and domination (Aguilera, 2005; Huse, 2005). Other sources of existing power (i.e. chairman) in the organization may force the CEO to adopt an “*accommodative interaction*” in dealing with non-executive members, which in turn offers them an opportunity to exercise their monitoring role effectively. Accordingly, under the “*accommodative interaction*” scenario, increasing the proportion of non-executive directors is expected to affect financial performance positively.

In contrast, “*contested interaction*” may occur in firms that assign the duties of the CEO and chairman to one person. The appointment of non-executive members to the board by external stakeholders (e.g. banks) may cause the CEO to perceive that the role of the board is largely oriented toward monitoring and controlling activities (i.e. “we are here to watch you”). Therefore, the CEO is likely to take all possible actions that may impede the board’s effectiveness. By having access to more detailed information, the CEO has the advantage over non-executive members and can more effectively exert his “*informational power*” over the board. This implies that the costs of increasing board size by adding more non-executive directors (composed of free-rider problems, intra-group incoherence, communication and coordination difficulties, diffused monitoring processes and CEO domination) are expected to outweigh its benefits (Jensen, 1993; Lipton and Lorsch, 1992; Yermack, 1996). Therefore, under the “*contested interaction*” scenario, increasing the proportion of non-executive members is expected to affect financial performance negatively as a result of increased agency costs and information-sharing costs (the sharing of information not only between the CEO and members of the board but also between the members of the board themselves).

Overall, the preceding discussion indicates that while board composition and CEO duality each, when viewed in isolation, can be good for firm performance, their interaction may have a negative impact on firm performance. This assertion is consistent not only with the results of some prior studies that examined both board composition and CEO duality (Dehaene *et al.*, 2001; Davidson *et al.*, 2005), but also with Egyptian evidence, which showed that CEO duality structure does not “encourage non-executive directors to play a role in the director nomination process” (ROSC, 2009, p. 18). This discussion leads us to develop and test empirically the following hypothesis:

- H1. Under CEO duality, increasing the proportion of non-executive members in relation to executive directors has a negative impact on firm financial performance.

5. Sample and variables measurement

The sample of the current study comes from a list of the 50 most active firms published by the EGX in July 2011 covering the past three financial years from 2008 to 2010. De facto, data after 2010 have not been included because of the occurrence of the Egyptian

Revolution in January 2011, which, in turn, may lead to different conclusions. Firms that belonged to financial industries are excluded from these lists, as they are subject to unique governmental regulations and their operations are quite different. The necessary data were found to be available for 40 firms covering 11 different industrial sectors. Table I presents the distribution of firms according to their industrial sectors.

It may be argued that a sample size of 40 firms may limit the representativeness of the sample and over-generalize the findings. Upon reflection, different tests were conducted to evaluate the internal and external validity of the sample. First, the sample not only represents 18.9 per cent of the total listed firms in 2010 (the total number of listed firms in the EGX was 212 firms in 2010) but also includes those firms that constitute the main index of the Egypt exchange (EGX30). Thus, the proportion of the sample size to the overall population is comparable to previous research in the Egyptian context (Wahba, 2008; Elsayed and Wahba, 2013). Second, the average of the total market capitalization during 2008-2010 for all companies listed in the EGX, as well as for those firms constituting the sample, is computed. The average for all listed firms was LE 487.13 billion and was LE 216.14 billion for the sample. Given that the sample accounted for 44.3 per cent of the total market capitalization of the entire market during 2008-2010, it can be argued that the sample does represent the population (i.e. all firms listed in the EGX). This is also comparable with prior work such as Abdel Shahid (2003), who used a sample that consisted of the 90 most active firms in the Egyptian context. Abdel Shahid revealed that the sample represented 44 per cent of the total market capitalization and accounted for 87 per cent of the total deals. Third, the Kruskal–Wallis test was conducted to determine if there is a significant amount of variation among the industrial sectors. According to the results reported in Table II, the χ^2 -statistic is significant in all cases. For instance, return on equity and Tobin’s q have a χ^2 -statistic of 29.635 ($p < 0.001$) and 19.12 ($p < 0.01$), respectively. Moreover, board composition and board leadership structure have a χ^2 -statistic of 42.499 ($p < 0.001$) and 20.231 ($p < 0.05$), correspondingly.

Board composition (BCO) is exemplified by the ratio of the number of non-executive directors to the total number of directors (Ameer *et al.*, 2010). Board leadership structure (DUL) is expressed as a binary variable that takes a value of one if it is found that the

Table I.
Distribution of the
sample according to
industrial sectors

Sector	Firms (2008-2010)	
	N	%
Basic resources	1	3
Chemicals	1	3
Construction and building materials	6	15
Food and beverage	4	10
Household goods and textiles	3	8
Industrial services, products and cars	6	15
Leisure and entertainment	2	5
Media	1	3
Real estates	12	30
Telecommunication	3	8
Utilities	2	5
	40	100

Variables	χ^2
ROE	29.635***
Q	19.12**
BCO	42.499***
DUL	20.231*
SIZ	23.84**
AGE	36.66***
LVR	30.93***
CAP	70.34***

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ROE: return on equity; Q: Tobin's q ; BCO: board composition; DUL: CEO duality; SIZ: firm size (log of total assets); AGE: firm age; LVR: financial leverage; CAP: capital intensity

Table II.
Kruskal–Wallis rank test of variables across industrial sectors

CEO also serves as the chairman (i.e. CEO duality) and a value of zero otherwise (Abdullah, 2004). Pre-empting the results of our analysis below, descriptive statistics (Table III) indicate that the average (median) board composition is 71.9 per cent (77.8 per cent). Thus, board composition is, to some extent, close to the figures reported in the US and the UK studies. For instance, Adams and Mehran (2012) reported an average of 69 per cent in the US context. Weir and Laing (2001) reported an average of 47 per cent using the UK data set. Furthermore, classification of firms according to their board leadership structure (i.e. CEO duality or CEO non-duality) showed that the same person holds the posts of CEO and chairman (i.e. CEO duality) in approximately 63 per cent of the sample. Comparable figures are reported in prior works. For instance, in the USA, it is 62 per cent in Boone *et al.* (2007) and 58.3 per cent in Linck *et al.* (2008). However, the CEO duality ratio is not consistent with findings in the UK, where approximately 22 per cent and 16 per cent of firms do not split the roles of CEO and chairman, as reported in Lasfer (2006) and Osmá (2008), respectively.

Financial performance (PER) is the key dependent variable in this study. There is significant literature published on the appropriate measurement of performance, which has led to little consensus on the best approach to take. Thus, two alternative measures of performance are considered in this study: a profitability-based and a market-based measure (e.g. Tobin's q ratio) because:

Variables	Mean	SD	Median
ROE	0.158	0.165	0.114
Q	4.381	4.748	2.788
BCO	0.719	0.195	0.778
DUL	0.65	0.479	1
SIZ	13.85	1.99	13.51
AGE	33.4	25.76	26.5
LVR	45.49	31.23	76.02
CAP	0.295	0.380	0.225

Notes: ROE: return on equity; Q: Tobin's q ; BCO: board composition; DUL: CEO duality; SIZ: firm size (log of total assets); AGE: firm age; LVR: financial leverage; CAP: capital intensity

Table III.
Descriptive statistics

[...] q and profitability measures should be regarded as complements rather than substitutes. Both contain information about market power, and there is no compelling reason to think that either type of measure dominates the other (Martin, 1993, p. 516).

Thus, return on equity (ROE), a commonly used profitability-based measure of financial performance, is used and measured by the ratio of net profit to total equity (Dalton *et al.*, 1998; Abdullah, 2004). In fact, experimenting by using either return on assets or return on sales does not alter the key results reported in this paper. Moreover, following other researchers (Wahba, 2008), the Chung and Pruitt's (1994) simple approximation of Tobin's q (Q), presented by Lee and Tompkins (1999), is used as an alternative measure of financial performance.

Following previous work, firm size, firm age, financial leverage, capital intensity, time effect and industry effect are included in the models as control variables that may confound the relationship between board characteristics and financial performance. Firm size (SIZ) is measured by the book value of total assets to account for economies of scale (Elsayed and Wahba, 2013). The natural logarithm is used to transform the book value of total assets, as the Shapiro–Wilk W test for normality is significant ($z = 8.56$, $p < 0.001$). Firm age (AGE) is expressed by the time-period from the incorporation date to the year of analysis (Eisenberg *et al.*, 1998). Financial leverage (LVR) is exemplified by the ratio of total debt to total assets (Baliga *et al.*, 1996). Capital intensity (CAP) is measured by the ratio of net fixed assets to total assets (Geletkanycz *et al.*, 2001). A year effect (TIM) is accounted for by including a dummy variable for the effect of each year (Elsayed, 2007). In addition, industry heterogeneity (SIC) is captured by the inclusion of dummy variables using the two-digit standard industrial classification code (Wahba, 2014). Table III introduces descriptive statistics of all variables.

6. Econometric analysis

The main suggested hypothesis in this study was tested by using the following model of analysis:

$$PER_{it} = \gamma + \psi_1 BCO_{it} + \psi_2 DUL_{it} + \psi_3 BCO_{it} * DUL_{it} + \psi_4 SIZ_{it} + \psi_5 AGE_{it} + \psi_6 LVR_{it} + \psi_7 CAP_{it} + \psi_8 TIM_{it} + \psi_9 SIC_{it} + \eta_i + \varepsilon_{it}$$

Where, (γ) is a constant, and (ψ_1 : ψ_9) are the parameters for the explanatory variables. The subscript (i) refers to the firm number and the subscript (t) denotes the time period. (η) is the unobservable individual heterogeneity, and (ε) is the remainder disturbance or the usual disturbance in the regression model that varies with individual units and time.

The above-stated model of analysis was estimated using panel data regression. By using panel data analysis, researchers will be able to control for unobservable firm-specific effects, and consequently, a much more powerful evidence base can be obtained (Baltagi, 1995). The F -test and the Breusch and Pagan (1980) Lagrange Multiplier test (B-P) were performed to decide between pooled regression and the alternatives of panel data (i.e. fixed and random effects, respectively). According to the results reported under Model 1 in Tables IV and V, both tests are significant (when financial performance is measured by either ROE or Tobin's q). The implication of these results is that the fixed-effects model and the random-effects model are preferred to the pooled model. Thus, the Hausman (1978) specification test was conducted to decide between the fixed-effects model and the random-effects model. The Hausman test, as

Dependent variable: ROE	Model 1	Model 2	Model 3
BCO	0.149** (0.049)	0.608*** (0.133)	0.616*** (0.133)
DUL	0.082*** (0.015)	0.498*** (0.108)	0.504*** (0.107)
BCO × DUL		-0.572*** (0.142)	-0.585*** (0.139)
SIZ	0.007 (0.004)	0.010* (0.003)	0.10** (0.003)
AGE	0.001*** (0.0004)	0.002*** (0.0004)	0.001*** (0.00004)
LVR	0.00008 (0.0001)	0.00001 (0.0001)	
CAP	0.047* (0.022)	0.024 (0.018)	
Time effect (χ^2)	17.74***	16.08***	16.93***
Industry effect (χ^2)	144.41***	147.72***	154.94***
Wald (χ^2)	241.19***	213.74***	229.55***
F-test	2.79***		
B-P LM test (χ^2)	13.78***		
Hausman (χ^2)	8.89		
Panel heteroscedasticity test (χ^2)	1.1e ⁺⁰⁵ ***		
Serial correlation test (χ^2)	16.05***		
LR test (χ^2)		13.06***	
AIC	-125.50	-136.56	
BIC	-72.85	-81.15	

Notes: $N = 40$ firms; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; figures in brackets are standard errors; Wald is the Wald test (χ^2) for model goodness-of-fit; F-test provides a test of the pooled ordinary least-squares (OLS) model against the fixed-effects model based on the OLS residuals; B-P LM test is the Breusch and Pagan's (1980) Lagrange Multiplier statistic that provides a test of the pooled OLS model against the random-effects model based on the OLS residuals; Hausman (1978) is the Hausman specification test for fixed effects over random effects; panel heteroscedasticity test is the modified Wald statistic for group-wise heteroscedasticity (Greene, 2003); serial correlation test is the Wooldridge test for autocorrelation in panel-data models (Wooldridge, 2002); LR test is the likelihood ratio test of each of restricted models against the unrestricted model; AIC and BIC are the standard information criteria for model selection, as a lower figure means a better-specified model (Greene, 2003); ROE: return on equity; BCO: board composition; DUL: CEO duality; SIZ: firm size (log of total assets); AGE: firm age; LVR: financial leverage; CAP: capital intensity

Table IV.
The joint effect of board characteristics on return on equity using GLS estimates

reported in Tables IV and V, is insignificant in any case, which implies that the random-effects model is preferred to the fixed-effects model under any case (Baltagi, 1995; Greene, 2003).

Heteroscedasticity and serial correlation are two serious problems that can affect the estimate of the random-effects model. The presence of these problems means that the standard errors associated with each regression coefficient will not be correct (Gujarati, 2003). Therefore, the modified Wald test (Greene, 2003) and the Wooldridge (2002) test were performed to check for heteroscedasticity and serial correlation, respectively, and the results are reported in Tables IV and V. The results show that heteroscedasticity and serial correlation are present in the ROE model and Tobin's q model. Therefore, the generalized least squares (GLS) method was used to correct for heteroscedasticity and serial correlation in both models (Hausman, 1978), and the results of the GLS estimates are presented under Model 1 in Tables IV and V.

Furthermore, following the suggestion of Davidson and MacKinnon (1993), the Durbin-Wu-Hausman test, as an augmented regression test, was performed to check

RAF 14,1		Dependent variable: Q	Model 1	Model 2	Model 3
		BCO	-2.163*** (0.523)	0.062 (0.736)	-0.031 (0.692)
		DUL	-0.102 (0.107)	2.475** (0.818)	2.479** (0.811)
		BCO × DUL		-3.618*** (1.100)	-3.507*** (1.078)
		SIZ	0.008 (0.039)	0.051 (0.040)	
		AGE	-0.004* (0.002)	-0.0009 (0.002)	
		LVR	-0.005*** (0.0006)	-0.005*** (0.0005)	-0.005*** (0.0006)
		CAP	-0.145 (0.188)	-0.169 (0.209)	
		Time effect (χ^2)	8.92*	7.49*	8.73*
		Industry effect (χ^2)	61.65***	79.87***	105.74***
		Wald (χ^2)	216.73***	245.78***	184.71***
		F-test	9.12***		
		B-P LM test (χ^2)	40.12***		
		Hausman (χ^2)	8.44		
		Panel heteroscedasticity test (χ^2)	3.8e ⁺³¹ ***		
		Serial correlation test (χ^2)	7.28**		
		LR test (χ^2)		5.16**	
		AIC	335.81	332.65	
		BIC	388.10	386.55	

Notes: $N = 40$ firms; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; figures in brackets are standard errors; Wald is the Wald test (χ^2) for model goodness-of-fit; F-test provides a test of the pooled OLS model against the fixed-effects model based on the OLS residuals; B-P LM test is the Breusch and Pagan (1980)'s Lagrange Multiplier statistic that provides a test of the pooled OLS model against the random-effects model based on the OLS residuals; Hausman (1978) is the Hausman specification test for fixed effects over random effects; panel heteroscedasticity test is the modified Wald statistic for group-wise heteroscedasticity (Greene, 2003); serial correlation test is the Wooldridge test for autocorrelation in panel-data models (Wooldridge, 2002); LR test is the likelihood ratio test of each of restricted models against the unrestricted model; AIC and BIC are the standard information criteria for model selection, as a lower figure means a better-specified model (Greene, 2003); Q: Tobin's q; BCO: board composition; DUL: CEO duality; SIZ: firm size (log of total assets); AGE: firm age; LVR: financial leverage; CAP: capital intensity

Table V.
The joint effect of board characteristics on Tobin's q using GLS estimates

for possible endogeneity between board characteristics and financial performance. The test was conducted by including the residuals of the endogenous right-hand-side variable (i.e. board composition) as a function of all exogenous variables. In fact, the Durbin-Wu-Hausman test shows no sign of possible endogeneity because the χ^2 test for the predicted residual values of financial performance is not significant under any case. For instance, when ROE is used as a proxy for financial performance, the χ^2 -statistic is 0.18 ($p = 0.8143$).

The results of the GLS restricted model, which omits the board composition-CEO duality interaction term (reported in Table IV, under Model 1), show that board composition (i.e. the ratio of non-executive directors), as well as CEO duality, exerts a positive and significant coefficient on ROE. Then, an unrestricted GLS model, which includes an interaction term between board composition and CEO duality, was estimated, and the results are reported in Table IV under Model 2. The results demonstrate that board composition has a negative and significant coefficient (-0.572 , $p < 0.001$) under a CEO duality structure. The overall goodness of fit of Model 2 was

tested using the Wald test, which has a χ^2 distribution under the null hypothesis that all the regressor coefficients are equal to zero. The overall significance of Model 2 is very high, as the Wald test yields a χ^2 value of 213.74 with a p value of 0.000. It is worth remembering that the R -square statistic in the GLS is not reported because when the parameters are estimated, the total sum of squares cannot be broken down as in an ordinary least squares regression, making the R -square less useful as a diagnostic tool for GLS regressions. Particularly, an R -square computed from the GLS sums of squares need not be bounded between zero and one and does not reflect the percentage of total variation in the dependent variable that is accounted for by the model. Furthermore, dropping or adding variables in a model does not always increase or decrease the computed value of R -square (Marques and Metcalf, 2008).

The likelihood ratio (LR) test of the restricted model against the unrestricted model was computed. The LR test was significant (13.06, $p < 0.001$), which means that the interaction term cannot be safely dropped. Further evidence comes from calculating the standard information criteria: the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) (also reported in Table IV). Noting that for both the AIC and BIC, a lower figure denotes a better-specified model (Greene, 2003), both criteria signify that the unrestricted model (Model 2) is superior to the restricted model (Model 1) with an AIC of -136.56 and a BIC of -81.15 .

Moreover, because ROE is a composite measure and many elements of a firm may impact this metric, insignificant control variables (i.e. financial leverage and capital intensity), reported in Model 2, are excluded from the estimated GLS model to check for the robustness of the major findings. The results reported in Table IV, under Model 3, provide strong support for the applicability of the key argument in this paper, as the coefficient of the board composition–CEO duality interaction term is negative and significant (-0.585 , $p < 0.001$).

Further analysis was performed using Tobin's q as a proxy for financial performance, and the results are also included in Table V. In fact, the results of Tobin's q confirmed the findings of the ROE model. Primarily, the results reported under Model 2 showed that board composition exerted a negative effect on Tobin's q (-3.618 , $p < 0.001$) under a CEO duality structure. This holds true even after dropping insignificant control variables, as it appears in Model 3 (-3.507 , $p < 0.001$). The LR test of the restricted model against the unrestricted model was significant (5.10, $p < 0.01$), which again means that the interaction term between board composition and CEO duality seems to add value in explaining financial performance. The overall significance of Model 2 is supported as the Wald test yields a χ^2 value of 245.78 with a p value of 0.000. Once again, the standard information criteria (AIC and BIC) validate that the unrestricted model (Model 2) is superior to the restricted model (Model 1), with an AIC of 332.65 and a BIC of 386.55.

The fact that the coefficients of BCO and DUL have different signs and significant levels in Table V under Models 1 and 2 is an interesting finding that supports the main argument of this paper, which is “different corporate governance methods may substitute for or complement each other”. Specifically, the results demonstrate that the significant effect of board composition is due to the interaction term with board leadership structure, consistent with the findings of Bozec and Dia (2007, p. 1,735), who concluded that “the results of the impact of any one [governance] mechanism could potentially be biased”.

On the whole, the results of the ROE model, as well as Tobin's q model, strongly support the applicability of the key hypothesis in this study. Specifically, both models confirmed that board leadership structure moderates the relationship between board composition and firm performance, with the relationship being negative in the presence of CEO duality. Furthermore, although empirical findings referred to the significance of most of the control variables, the results did not demonstrate a clear pattern, as it seems that the relationships between these variables and financial performance vary with the proxy used for financial performance. Furthermore, the validity of the industry effect as an important control variable was supported in all cases. The joint χ^2 -test for industry effect is significant under any model reported in [Tables IV](#) and [V](#), indicating that financial performance varies with industry type.

7. Conclusion and discussion

Examining the impact of either board composition or board leadership structure on financial performance reveals extremely diverse conclusions. Unfortunately, prior work focused mainly on evidence from developed countries and also did not pay enough attention to the interrelationship between board characteristics. Contrary to prior research, it is hypothesized in this paper that the relationship between board composition and financial performance is likely to be moderated by board leadership structure. Panel data analysis using a sample of 40 Egyptian listed firms provides strong evidence for the applicability of this hypothesis. Specifically, the results showed that under CEO duality, increasing the proportion of non-executive members has a negative impact on firm financial performance. This conclusion is robust to the use of different measures of financial performance, control variables and econometric models of analysis. Consequently, these findings imply that existing evidence that explains the relationship between board characteristics and financial performance needs to be interpreted with some caution.

In fact, to find that main board characteristics are, to some extent, similar to those figures reported in other countries such as the USA indicates that the results of this research can be generalized to other contexts. This paper has a limitation that is common to all prior work, as it draws conclusions based on the "usual suspects", such as board composition and board leadership structure. In other words, actual board behavior was not adequately examined. [Huse \(2005, p. 66\)](#) observed that "[f]ewer than one out of eight of the empirical board articles published in leading scientific management journals is about actual board behaviours".

For managers who are interested in designing, assessing and improving corporate governance structures, the results of this study have useful implications. First, it is shown that corporate governance structures do not work in a vacuum, and hence, corporate governance mechanisms must be considered and assessed as a whole. Second, failure to understand the underlying interdependency among corporate governance mechanisms may result in arguments that blame some corporate governance designs, such as CEO duality, for poor financial performance. Third, there is no one universal model of board governance; rather, each firm needs to strike the right balance between various board characteristics to minimize governance costs.

Moreover, the results of this paper provide a bridge for future research. First, to verify the findings of this study, researchers need to replicate and reinvestigate the argument introduced here in other contexts. Second, examining how the relationship

between board composition/leadership structure and financial performance varies with a firm's life cycle is another promising area for future research. This is an important issue, as corporate governance parameters may be related to strategic thresholds in the life cycle of firms. In addition, a successful transition from one threshold to the next may require a rebalancing in the structure of a firm's corporate governance (Filatotchev *et al.*, 2006). Third, future research is encouraged to explore the moderating role of board leadership structures on the relationship between board size and financial performance. This is expected to add to the existing literature, as theoretical and empirical studies that have been conducted so far revealed inconclusive evidence (Yermack, 1996). Fourth, investigating the relationship between debt and financial performance generally reveals mixed findings (Sarkar and Sarkar, 2008). Unfortunately, most of this research ignores the premise that the effectiveness of one corporate governance mechanism is likely to be contingent on the effect of other existing mechanisms (Le and O'Brien, 2010; Wahba, 2013). Thus, future studies may explore how the relationship between debt structure and financial performance might vary with a board's characteristics. Finally, because "the role of the board mostly developed for large and/or listed firms with dispersed ownership structures do not necessarily apply for [small and medium sized enterprises] SMEs" (Lappalainen and Niskanen, 2012, p. 1,105), future research is encouraged to examine the argument introduced here in the context of SMEs. Obtaining more evidence regarding this issue may help in understanding the dynamics of the boards of directors.

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