Investigating the associations between Executive Compensation and Firm Performance: Agency Theory or Tournament Theory

Abstract

Purpose - While there have been extensive empirical investigations of pay-performance sensitivity, the perspective of performance-pay has received less attention to date. While executive compensation is sensitive to firm performance, firm performance is also likely to be affected by executive compensation. Adopting multiple theoretical perspectives, the authors examine whether executive compensation has a greater influence on firm performance or whether the latter has a greater influence on compensation.

Design/methodology/approach - Using data from a five-year period (2010-2014) for Financial Times and Stock Exchange (FTSE 350) companies, the authors employ a set of simultaneous equation modelling to jointly investigate the mutual association of executive compensation and firm performance by employing data available for four control variables (board size, non-executive directors, leverage and boardroom ownership).

Findings - The authors find strong evidence for the greater influence of executive compensation on firm performance than the pay-performance framework. This finding supports the stewardship and/or tournament theories compared with the agency perspective.

Practical implications - The study results provide evidence that using the tournament perspective by remuneration committees as a guide for deciding executive compensation helps in achieving better performance. This helps in developing appropriate mechanisms for setting executive remuneration.

Originality/value – This paper combines an empirical investigation of the frameworks of pay-performance and performance-pay and develops a system of six simultaneous equations to examine the associations between executive compensation and firm performance.

Key words: Executive Compensation, Firm Performance, FTSE 350, Simultaneous Equations Modelling**.**

Paper Type: Research paper.

1. Introduction

The controversial topic of executive compensation has recently captured the attention of shareholders, regulators, the media and the general public. It has generated heated debate because of the increasing number of high-profile corporate failures (Brown and Caylor, 2009; Coles et al., 2012). This has led to questioning the appropriateness of the corporate structure that determines executive compensation and the linkages between executive compensation packages and firm performance. Moreover, firm performance has attracted ever-increasing attention, especially after the reverberations of the financial crisis of 2007-2009. This crisis had a number of underlying causes, including distorted financial positions and poor lending decisions accompanied by excessive management optimism and the disclosure of misleading information (Turner, 2009; Walker, 2009).

Two main, contrasting but interlinked, frameworks have been introduced to explain the association between executive compensation and firm performance. The first is the pay-performance framework. The main focus of the literature related to this framework has been derived from agency theory (Berle and Means, 1932), which contemplates a positive association between an agency-based contract and firm performance. However, the managerial hegemony perspective (Bebchuk et al., 2002) suggests a negative association, in which executive directors have significant influence over the setting of their contracts. Agency-based contracts propose that executives will only obtain high rewards when certain firm performance targets are reached, whereas managerial hegemony suggests that high rewards may largely be obtained irrespective of firm performance.

The second framework is the performance-pay framework that has shifted the emphasis away from incentivisation, per se, toward a more direct link between firm performance and executive compensation. This link might not be related to managerial performance alone but instead to a whole range of environmental and institutional factors impacting firm performance. These interactions may be complex and with exceptions (e.g., Conyon and Sadler, 2001; Devers et al., 2007; Falato et al., 2011). There has been limited research performed in this area in comparison with that investigated in other paradigms. Notions of performance-pay are more linked to the underlying perspectives offered by stewardship theory (Davis et al., 1997) and tournament theory (Lazear, 1981). The emphasis has been on the manner by which boardroom executives are motivated through a sufficient set of incentives regarding their managerial talents and

experience. The emphasis has also been on the ambition of lower-level executives to advance their career to achieve the rewards obtainable at higher positions in the corporate ladder.

As executive compensation is performance sensitive, firm performance might be pay sensitive as well. Therefore, it is essential to extend the understanding beyond whether there is a mutual link between executive compensation packages and firm performance to investigate the robustness of this association (Conyon and Sadler, 2001). In this paper, this question is addressed by means of a positivist study. Using data of compensation and performance for UK FTSE 350 companies over a time period from 2010-2014, research hypotheses are tested by simultaneous equations modelling.

This study develops a system of six simultaneous equations to examine the associations between executive compensation and firm performance. This methodological approach attempts to overcome econometric issues related to the inherent endogeneity of corporate governance mechanisms, which influence the ability to correctly interpret associations observed among variables. This approach treats firm performance as well as corporate governance mechanisms, including executive compensation, as endogenous, and allows each of them to affect all other variables, aiming to capture possible substitution effects. The analysis is guided by a number of diverse but interrelated theoretical perspectives. These perspectives are used to normatively establish appropriate mechanisms for setting executive remuneration or to explain how the existing mechanisms are developed.

The remainder of the paper is organised as follows. The next section reviews background literature on the linkage between executive compensation and firm performance. The third section highlights the implications of the adopted theoretical perspectives on pay-performance and performance-pay frameworks. The fourth section discusses the research design that includes the development of research hypotheses, data collection and preparation, as well as the examination model. The fifth section reports the empirical results, including the results of the descriptive statistics and the results of the dual sensitivity analysis. The final section provides discussion, implications and conclusions.

2. Compensation and Performance Mutual Association

Across the spectrum of empirical studies of the association between executive compensation and firm performance, the results have, overall, been mixed. There is a dichotomy. Some studies report direct association (Aggarwal and Samwick, 1999; Conyon et al., 2005), and others have found a weak association or none at all (Conyon and Peck, 1998; Conyon and Sadler, 2001; Elsila et al., 2013), when other interconnected indicators (such as corporate size, mechanisms of governance and ownership, etc.) were taken into account. The empirical research on executive compensation is not only inconclusive but is also disproportionately concentrated in the UK and US (Tang, 2012; Tian, 2013; Elsila et al., 2013).

The majority of the empirical studies in the UK on executive compensation and firm performance find a weak association. For example, Gregg et al. (1993) report a weak sensitivity in pay-for-performance association for 288 firms. Later on, Gregg et al. (2011) find that the cash-plus-bonus pay-performance sensitivity at financial institutions is not significantly higher than non-financial firms for 415 UK companies, including 59 financial institutions, over the period 1994 to 2006. Moreover, Conyon et al. (1995) report that the pay-for-performance link was neither strong nor consistent by providing an example of one UK company. Additionally, Conyon and Peck (1998) find that, from a sample of 94 FTSE 100 companies, the link between top executive compensation and firm performance is weak in companies that do not have remuneration committees. Conyon and Sadler (2001) find a weak link between compensation and performance for 532 executives within 100 large UK listed companies. In contrast, Cosh and Hughes (1997) conclude that executive compensation is positively associated with both performance factors (profitability and share returns) and corporate size.

To date, few UK empirical studies have investigated the performance-pay phenomenon. However, as noted above, Conyon and Sadler (2001) extended their pay-performance approach toward a performance-pay basic framework by reviewing the evidence on tournament theory; they did not carry out an empirical investigation.

Although the results of the research in the UK have been mixed and inconclusive, research in the US suggests, in general, a better understanding of the link between executive compensation and firm performance. For instance, Hall and Liebman (1998) find a significant link between compensation measured by changes in the value of CEO holdings of stock and options and

performance for a 15-year panel data set of CEOs in 478 large US companies. Moreover, Aggarwal and Samwick (1999) find a positive link between total compensation for the top five executives and performance at 1500 of the largest US publicly traded corporations. In contrast, few studies have reported either no or weak association in the US context. For example, Jensen and Murphy (1990) report no association between pay and performance for a sample of 2,213 US CEOs from 1,400 companies. In the same vein, Attaway (2000) finds a weak association between compensation (salary plus bonus) and return on equity (ROE) for 215 US CEOs from 42 firms.

US studies document a relatively stronger pay and performance sensitivity than their UK counterparts (Conyon and Murphy, 2000; Sapp, 2008). A growing body of research has investigated the influence of executive compensation on firm performance via conceptualising remuneration as a promotion tool (Devers et al., 2007). For example, Falato et al. (2011) empirically examine the link between CEOs' productive abilities and their compensation. They conclude that the total compensation of CEOs is positively associated with their talents for a sample of 2,195 US CEOs. Moreover, Leonard (1990) examines the effect of executive compensation policy on firm performance and reports a strong significant link between long-term incentives of executives and ROE for a sample of 439 large US companies. Furthermore, Lee el al. (2008) examine the performance-pay framework for the listed US firms and reports a positive and robust association between firm performance and the dispersion of executive compensation.

Academic literature using data from countries other than the UK and US (e.g. Kaplan, 1994a; Kato, 1997 in Japan; Zhou, 2000; Sapp, 2008 in Canada; Kaplan, 1994b in Germany; Matolcsy, 2000 in Australia) suggest a mixed association between boardroom compensation and firm performance. For example, Kaplan (1994a) finds a negative link between compensation and performance for 119 large Japanese companies, while Kato (1997) finds a positive association between CEO compensation of 154 large Japanese firms and ROA. Furthermore, Zhou (2000) reports a positive and robust association between executive compensation and firm performance from a sample of 775 Canadian companies. Sapp (2008) demonstrates a direct link between higher executives' compensation and firm performance for 416 Canadian companies over the years 2000-2005. In Germany, Kaplan (1994b) reaches similar findings in a Japan context. Matolcsy (2000) reports that executive directors' bonuses in major Australian companies were

based mainly on the accounting performance measures rather than the market indicators. No significant association between cash compensation and firm performance were found during the periods of economic downturn; however, positive associations did exist during the periods of economic growth from a sample of 100 Australian companies.

Overall, the prior literature attempts to test the associations between executive compensation and firm performance in isolation and/or considering both corporate governance mechanisms and firm characteristics using a single equation approach. The findings, therefore, represent partial associations. They did not reveal any casual associations, as they did not appropriately address the endogeneity problem that influences most empirical governance studies. Moreover, the existing literature has focused mostly on cash-based rather than equity-based executive compensation, which may explain the weak findings of previous research. Therefore, this paper seeks to address the perceived gap in the existing literature in the UK by focusing on addressing the endogeneity issue and using the total compensation. Unlike single equation modelling, our research design allows simultaneous interdependencies to exist among executive pay, performance and the corporate governance mechanisms by permitting each mechanism to simultaneously affect executive pay. The paper provides evidence from a large scale quantitative study, which encompasses both pay-performance and performance-pay frameworks. The paper helps to determine whether executive compensation has the greater influence on firm performance or whether the latter has a greater influence on the former.

3. Theoretical Framework and the Endogeneity Problem

The association between executive compensation and firm performance has frequently been a key axis of debates in corporate governance research (Core et al., 1999; Lee et al., 2008; Coles et al., 2012). The last two decades have witnessed intensification of academic investigation of this association. Clearly, executive compensation and its determination are only one aspect of a wider governance framework. In the examination of pay-performance and performance-pay frameworks, it is important to control the effect of different corporate governance mechanisms in explaining the variability in such frameworks and practice.

Over the years, a number of diverse but interrelated theoretical structures have been developed to normatively establish appropriate mechanisms for setting senior executive remuneration.

However, their implications to the association between executive compensation and firm performance are not clear.

Agency theory emphasises the contradictory motivations of executive directors (the agents), who are hypothesised to seek high rewards while minimising their effort, and the owners (the principals), whose ambition is to maximise their returns from ownership. It suggests the most direct association between compensation and performance, where better firm performance is expected to lead to higher executive compensation. This is supported theoretically by Jensen and Meckling (1976) and empirically by Jensen and Murphy (1990).

The managerial hegemony perspective focuses on the power and influence exerted directly and indirectly by executive directors on their compensation packages. This perspective suggests that there is an association between managerial power and compensation structures. This is supported theoretically by Bebchuk et al. (2002) and Bebchuk and Fried (2004). Executive directors utilise their power in influencing their own compensation packages but not necessarily in a manner that has positive connotations with respect to the association between compensation and performance.

Tournament theory does not identify a specific association between compensation and performance. It offers a general framework supporting the concept that paying high rewards to executive directors encourages performance at all levels within the firm (Lazear and Rosen, 1981; Rosen, 1986; and Conyon and Sadler, 2001). Although this might seem counter-intuitive, the argument is that advanced knowledge leads to superior rewards, which will motivate junior employees. In consequence, they will work harder towards achieving the entity's objectives. In this manner, executive compensation will be aligned with firm performance.

In the same vein, stewardship theory perceives senior managers to act collectively and to be trustworthy enough not to allow personal motivations to override their role in managing the assets of the entity for the benefit of owners and other stakeholders. In turn, this greatly reduces the need to align their pay packages with firm performance. Therefore, stewardship theory welcomes the reallocation of company control from principals to agents to enhance firm performance for the benefit of all stakeholders (Donaldson and Davis, 1991; and Davis et al, 1997).

In summary, while agency theory supports a pay-performance framework, the managerial hegemony perspective interposes significant intervening factors consistent with executive authority and control. In contrast, tournament and stewardship perspectives are directly related to the notion of performance-pay. While the incentives, according to the tournament theory, are primarily for those at the lower levels of the executive hierarchy to aspire them to the rewards achieved by those at the very highest level, stewardship perspective highlights the human capital aspects in terms of personnel knowledge and skills, qualifications and experience for boardroom members as a base for determining the incentives. Overall, the aforementioned theoretical perspectives are adopted to articulate the research hypotheses.

4. Research Design

4.1 Research Hypotheses

According to agency theory, the agent-principal perspective highlights the increasing conflict of interests between professional executives and owners. As Jensen and Meckling (1976) noted, this emerges due to the information asymmetry between executives and owners. This can be resolved by monitoring and providing appropriate remuneration based on firm performance (Jensen and Murphy, 1990). Therefore, the action of agents should be in the best interest of the principals to obtain high incentives. We expect a positive relationship between an agency-based contract and firm performance, rather than the possibility of a negative relationship in circumstances when executive directors have significant influence over the setting of their contracts.

(H1): *A higher level of firm performance is positively associated with CEO/executive compensation.*

On the contrary, the stewardship perspective indicates that higher CEO/executive compensation, which is based on the qualities of the boardroom members, may ultimately contribute to the wider goal of the company. As Hendry and Kiel (2004) highlight, considering human capital aspects in terms of skills, qualifications and experience is significant in enhancing firm performance. As a result, the focus should be on the appointment and retention of the most suitable executive members to make decisions that directly affect the future prospects of the firm. Furthermore, tournament theory calls for encouraging lower-level members of the boardroom to work harder to get a better compensation package as a reward (Lazear and Rosen, 1981; and Rosen, 1986). Consequently, the payment of high rewards to those at the top of the

ladder encourages performance at all levels within the firm (Main et al., 1993; and Conyon et al., 2001). This implies a direct association between compensation inequality in the top management layer and corporate performance.

(H2): *A higher level of CEO/executive compensation is positively associated with the level of firm performance.*

Figure 1 illustrates the research hypotheses and shows the possibility of two associations. Firstly, the effect of the firm's performance on CEO/executive compensation through adopting agency theory and managerial hegemony perspective. Secondly, the effect of the CEO/executive compensation on firm performance through adopting both tournament and stewardship theories.

Insert Figure 1 Here

In general, the associations between CEO/executive compensation and firm performance are basically derived from a number of contradictory but interrelated theoretical perspectives: agent-principal, managerial hegemony, stewardship and tournament. Accordingly, the central hypothesis of our study can be stated as follows:

(H3): *The CEO/executive compensation has a relatively greater influence on the levels of firm performance.*

4.2 Data Sample

The data sample is drawn from the constituent companies of the FTSE 350 index over the period of 2010-2014. The unavailability of a number of compensation and/or governance variables restricts the sample to an unbalanced panel of 1462 firm years. The sample size is considerably larger than those utilised in previous UK studies, which reported the pay-performance results. Table 1 presents a summary of the institutional sample selection for each sector by year.

Insert Table 1 Here

The reason behind choosing the FTSE 350 index is that the registered companies represent the top-listed UK companies in the stock exchange based on their market capitalisation. A significant reason underlying the choice of the 5-year period from 2010-2014 is that it enables an examination period of executive compensation after the effect of the recent financial crisis. Because of the diversity of data employed, a variety of different sources were utilised. Data for boardroom compensation packages, corporate governance, boardroom features and ownership

indicators have been extracted from the *BoardEx* database. Data related to firm performance and specific firm characteristics have been collected from the *DataStream* database.

4.3 Simultaneous Modelling and Variables

Empirical studies (Gregg et al., 1993; Cosh and Hughes, 1997; Conyon and Sadler, 2001; Gregg et al., 2011; Fadi et al., 2013) in the UK have considered a set of corporate governance mechanisms as controlling variables when examining the association between executive compensation and firm performance; however, they generally report weak sensitivity associations. The reason is the failure to properly address the possibility of endogeneity issues.

The findings of single equation models might lead to unreliable outcomes (Agrawal and Knoeber, 1996; Beiner et al., 2004, 2006). In this study, therefore, we attempt to address the criticism of prior studies by including six endogenous variables, namely: (1) total executive compensation, (2) board size, (3) non-executive directors, (4) boardroom ownership, (5) leverage and (6) firm performance. Moreover, a number of exogenous variables are included as described later in this section. Table 2 summarises all variables employed by the simultaneous equations model.

This study focuses on total executive remuneration, which is the sum of all pay components. In practice, previous studies (e.g., Jensen and Murphy, 1990; Lee et al., 2008; Fadi et al., 2013; Nitm et al., 2015; El-Sayed and Elbardan, 2016) note that total executive compensation is broadly comprised of two sums. First is the total cash remuneration (comprising the base salary, annual bonus, pension contribution, and other monetary pay, such as benefits-in-kind, car and accommodation allowances, other perks, and so on). Second is the total non-cash or equity-based remuneration (including the value of granted equity, value of awarded long-term incentive plans and options awarded either as intrinsic or estimated). In this study, remuneration components are captured directly from the directors' remuneration reports and therefore were computed on a before-tax basis. Inevitably, the tests largely abstract from the effect of taxation and tax clientele effects as they impact CEO and boardroom executive pay structure (Murphy, 1985).

Evidence about the association between the size and composition of the board, company performance and executive remuneration are mixed. For example, Ozkan's study (2007) using data from the UK finds no clear evidence of any association between the size of the board of directors and corporate performance; however, the study finds a positive association between the

number of directors and CEO remuneration. Abdullah and Page (2009) report that companies with larger boards had higher values of Tobin's Q but a weaker association in the later period, while they found a negative association between board size and ROA.

Similarly, mixed results were found in prior studies in the US and elsewhere (e.g., Adams and Mehran, 2005; Raheja, 2005; Belkhir, 2009; Nitm et al., 2015). This reflects various attempts to theorise the nature of the associations. Increasing board size may lead to inefficiency. For example, Jensen (1993) and Yermack (1996) discuss the decreasing proficiency of board members in administrative roles as they grow in size and as their control becomes inefficient. Pound (1995) considered that the smaller the corporate board of directors, the more likely it is to be reliable in monitoring business operations; however, the larger the board, the slower it reacts to decisions that require a direct and quick action. A review study by Hermalin and Weisbach (2000) concludes that previous empirical studies on board size have produced a number of consistent findings. For instance, Raheja (2005) finds that board size is negatively associated with the proxies of monitoring the costs of insiders. In this study, along with Jensen (1993), Bhaghat and Black (1999), it is expected that above a certain size, boards may become unwieldy and factional or even generate their own internal agency costs, leading to less efficient and appropriate decision making.

Specific theorising as to how non-executive directors contribute to improved corporate performance is limited, albeit an acceptance with some dissenting voices (e.g. for example, Franks et al., 2001), Spira, 2003); Spira and Bender, 2004; Gwilliam and Marnet, 2009). Benefits are normally seen to improve decision making at the board room level, in part because of the experience and knowledge that non-executives can bring to the boardroom discussion and in part because of their ability to stand at a distance compared to executive directors in terms of risk taking and personal involvement in the outcome of decision making. They are also seen as an important part of the wider monitoring mechanisms via their involvement in audit, nomination and remuneration committees. Consequently, non-executive directors are regarded as agents for monitoring and controlling executive actions and limiting their ability to indulge in opportunistic behaviour (Jensen and Meckling, 1976; Fama and Jensen, 1983; Rosenstein and Wyatt, 1990; Pettigrew and McNulty, 1995). Mehran (1995) and Leung and Horwitz (2004) emphasise that one aspect of controlling opportunistic behaviour is ensuring that excessive remuneration packages are not awarded to corporate executives. However, others have argued, for example

Fama and Jensen (1983), that non-executives should ensure that sufficient incentives are given to executive directors to maximise their efforts, and this is likely to result in higher remuneration packages. Ozkan (2007) reports that companies with more non-executive directors, as a percentage of board size, pay their CEOs more than companies with a lower number of non-executive directors.

It is expected that the absolute number and relative proportion of non-executive directors in the board is likely to be positively associated with measures of corporate performance (Fama and Jensen, 1983; Haniffa and Cooke, 2002; Mura, 2007). However, expectations related to any association with the level of executive compensation are not clear. At one level, non-executive directors may act to prevent self-seeking management, enriching themselves inappropriately, and at another, the implementation of appropriate incentive packages is likely to lead to better performance and associated higher payments to executive directors. This study takes this latter perspective, which is in line with the theorising of Fama and Jensen (1983) and the empirical findings of Ozkan (2007).

The principal-agent problem between directors and owners arises when the former holds a small part of corporate equity and has incentives to act in a manner that is sub-optimal from the perspective of the owners (Jensen and Meckling, 1976; Leftwich et al., 1981). The lower the levels of executive ownership, the higher the likelihood that agency issues will be significant. Conversely, a higher level of executive ownership will mitigate conflicts of interest and results in more appropriate corporate policies that are in line with the expectations of the shareholder body (Craswell and Taylor, 1992; Ang et al., 2000; Leung and Horwitz, 2004) and thereby enhance the company performance (Mehran, 1995; Agrawal and Knoeber, 1996; Loderer and Martin, 1997; Thomsen and Pedersen, 2000). Although the link with corporate performance is reasonably straightforward from a theoretical perspective, the link with compensation is more mixed. Prior studies (e.g., Murphy, 1999; Conyon and Murphy, 2000) distinguish between compensation per annum (including current value of LTIPs and options) and wealth effects, which refer to the change in value of these incentive plans and options. This study adopts Wealth Share Plans.

Albeit the limited and mixed empirical evidence, it is expected that a higher level of actual or potential share ownership by executive directors will be associated with enhanced corporate performance (consistent with Conyon and Sadler, 2001; Core and Larcker, 2002). With respect

to compensation packages, the theorising diverges suggest a positive association between insider ownership and remuneration, whether driven by improved performance or managerial power, whereas another would suggest that higher share ownership would reduce the reliance of executive directors on fixed components of remuneration to achieve their rewards.

Corporate leverage may affect executive compensation. Risk-averse managers prefer cash-based compensation rather than equity-based packages. Shareholders seek to align the level of corporate risk taking with their risk return pay-off via the setting of appropriate compensation packages. A variety of corporate leverage indicators are utilised as control variables in the prior literature. In this study, the basic leverage control variable used is debt leverage indicator. It provides a good indication of the long-term solvency of the firm (Fabozzi and Peterson, 2003). This indicates the use of debt to acquire additional assets in the capital structure for assessing how much business risk has been taken (Brigham, 1991). Bebchuk and Spamann (2009) note that the issuance of debts to maximise corporate funds is regarded as an important sign of the excessive risk-taking behaviour of corporate executives, a result of which company performance is influenced. Therefore, the expectation is that debt leverage is negatively associated with company performance, consistent with (Jensen, 1986; and Bebchuk and Spamann, 2009).

Adopting firm performance measures based on relevant accounting and finance indicators is more appropriate than the absolute market-base measures (Murphy, 1985). Lagged accounting-based measures of company performance have been widely utilised in the prior literature for two key reasons. First, boardroom executive compensation in any year is directly influenced by the achievement of good performance during the previous year (Perry and Zenner, 2001). Second, lagged performance indicators assist in avoiding the problem of reverse causality between company performance and executive compensation, which in turn assist in managing endogeneity problems of pay-performance and performance-pay frameworks (Hermalin and Wallace, 2001).

In this vein, this study focuses primarily on two key performance measures (ROA and Tobin's Q). ROA spans both the management of the company's assets and the delivery of added value to its clients. It is also significantly influenced by the manner in which corporate assets are financed (Fabozzi and Peterson, 2003). Many studies (Bhagat and Black, 1999; Core and Larcker, 2002; Dalton et al., 2003; Adams and Mehran, 2005; Belkhir, 2009; Gregg et al., 2011 and Coles et al., 2012) show the significance of ROA as an accounting-based indicator of financial performance

relevant to topics as corporate governance mechanisms, managerial ownership and executive compensation. ROA is regarded as a well proven metric for capturing aspects of the efficiency and profitability of company performance (Bull, 2008).

Tobin's Q is a commonly utilised metric in empirical accounting contexts that has been used frequently in prior studies (Agrawal and Knoeber, 1996; Himmelberg et al., 1999; Adams and Mehran, 2005; Habib and Ljungqvist, 2005; Belkhir, 2009 and Ozkan, 2007, 2011). Tobin's Q compares the market value of a company with the book value of its total assets (Fabozzi and Peterson, 2003). A high level of corporate Q ratio encourages institutional shareholders to invest more, as the company resources are worth more than the price paid for the underlying assets (Fabozzi and Peterson, 2003; Bull, 2008).

Insert Table 2 Here

A model of six simultaneous equations has been developed to examine the associations between executive compensation and firm performance. This is to allow for simultaneous interdependencies by employing data available on four control variables (comprising board size (*BS*), non-executive directors (*NXD*), leverage (*DA*) and boardroom ownership (*WSP*)), in addition to the indicators of firm performance (i.e., *ROA* and *Tobin's Q* separately) and total executive compensation (*TREM*) using simultaneous modelling. To meet the identification's restrictions, a set of instrumental variables is added for each endogenously determined variable that is associated with the dependant variable but is assumed to not be associated with the error term. The exogenous variables are not included in all equations, as the order-condition for identification states that the number of predetermined variables should be greater than or equal to the number of included endogenous variables minus one. Therefore, at least five of the instrumental variables should be included for any single equation to identify the system of equation.

This model aims to explore how total CEO/executive compensation influences firm performance through a set of governance mechanisms in which compensation and performance indicators are endogenous. This mechanism permits each governance variable not only to influence compensation/performance but also allows compensation and performance to be influenced by each governance variable. The following six equations describe the development process of pay-performance simultaneous modelling.

Total remuneration (*TREM)* for CEOs and boardroom executives is our main dependent variable in the first simultaneous equation to examine the associations between executive pay, firm performance and governance mechanisms (Mehran, 1995; Ozkan, 2011) while controlling for the exogenous variables. A higher performance is expected to lead to higher compensation. Higher leverage is expected to lead to higher pay (Fadi et al., 2013), as shareholders are willing to provide this for serving their own interests of higher levels of wealth (Dai et al., 2014), while a greater number of debt holders are expected to lead to lower executives' pay (John et al., 2010). Managerial ownership and board size are expected to lead to higher pay, while more nonexecutive directors in the board are assumed to lead to more monitoring and to have a negative influence on executive compensation packages (Nitm et al., 2015). In summary:

$$TREM_{i,t} = \beta_0 + \beta_1 BS_{i,t} + \beta_2 NXD_{i,t} + \beta_3 WSP_{i,t} + \beta_4 DA_{i,t} + \beta_5 ROA_{i,t} + \sum_{j=1}^{7} \beta_j Controls_{i,t} + v_{i,t} \quad (1)$$

Boardrooms perform a significant role in sufficiently reimbursing professional managers to align their interests with those of shareholders, according to the perspective of agencies (Fadi et al., 2013; Nitm et al., 2015; El-Sayed and Elbardan, 2016). Prior literature suggests that large-sized corporate boards compensate their CEOs more than small boards, which is consistent with Core et al. (1999) for US companies and Sapp (2008) for UK firms. Therefore, board size (*BS*) is considered a dependent variable in the second simultaneous equation.

We expect that corporate size (*TASS*) is positively associated with board size (Beiner et al., 2006; Abdullah and Page, 2009). As Agrawal and Knoeber (1996) and Nitm et al. (2015) note, larger companies have lower growth opportunities. This predicts that corporate change in total assets (*CTASS*) is negatively associated with board size. Therefore, we expect that executive age and tenure will be negatively associated with board size. Finally, it is expected that board size will vary across financial and non-financial companies (D_{reg}) and years (D_t). Accordingly, the second simultaneous equation includes ~~nine~~ six exogenous variables as follows:

$$BS_{i,t} = \beta_0 + \beta_1 TREM_{i,t} + \beta_2 NXD_{i,t} + \beta_3 WSP_{i,t} + \beta_4 DA_{i,t} + \beta_5 ~~TQ_i~~ROA_{i,t} + \sum_{j=1}^{6} \beta_j Exogenous_{i,t} + v_{i,t} \quad (2)$$

Non-executive directors have a role in monitoring executives' actions to prevent opportunistic behaviour (Jensen and Meckling, 1976; Fama and Jensen, 1983). Moreover, they have a duty to protect the interests of shareholders (Leung and Horwitz, 2004) by not awarding excessive remuneration packages to corporate executives (Mehran, 1995). According to Core et al. (1999) and Ozkan (2007), large boards of corporate non-executive directors compensate their CEOs more than their smaller counterparts (Fadi et al., 2013; Nitm et al., 2015; El-Sayed and Elbardan, 2016). Accordingly, non-executive directors (*NXD*) are considered a dependent variable in the third simultaneous equation.

This study suggests, consistent with Spira and Bender (2004), a positive link between the number of non-executive directors and corporate size (*TASS*), as they are highly desirable board characteristics. Therefore, large companies have more credibility and visibility to attract potential high quality executives. We also predict that corporate change in total assets (*CTASS*) is negatively associated with the number of non-executive directors. Therefore, it is hypothesised that the number of non-executive directors will be negatively associated with executive age and tenure. Finally, we hypothesise that the number of non-executive directors varies across financial and non-financial companies (D_{reg}) and years (D_t). In summary, the third simultaneous equation includes ~~eight~~ six exogenous variables as follows:

$$NXD_{i,t} = \beta_0 + \beta_1 TREM_{i,t} + \beta_2 BS_{i,t} + \beta_3 WSP_{i,t} + \beta_4 DA_{i,t} + \beta_5 ~~Q/~~ROA_{i,t} + \sum_{j=1}^{6} \beta_j Exogenous_{i,t} + v_{i,t} \quad (3)$$

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The principal-agent problem is likely to be more pressing when the directors hold a small part of corporate equity (Jensen and Meckling, 1976). Therefore, higher levels of executive ownership can be regarded as a sign of a governance mechanism, which may increase the pay package for executive directors (Fadi et al., 2013; Nitm et al., 2015). As a result, the designated component of executive ownership (*WSP*) is considered a dependent variable in this equation.

Agrawal and Knoeber (1996) and Nitm et al. (2015) proposes that companies with higher growth opportunities are more attractive to both executives and investors, are likely to be more profitable and are more likely to offer share-based compensation packages. This leads us to

expect that executive ownership is positively associated with corporate change in total assets (*CTASS*). Ang et al. (2000) and Leung and Horwitz (2004) suggest that when executives hold shares for long periods, the conflict of interest might be mitigated and result in more appropriate corporate policies in line with the expectations of the wider shareholder body, particularly in large companies. This leads to our tentative belief that executive ownership is negatively associated with corporate size (*TASS*). Therefore, we expect that executives' age and tenure will be positively associated with their ownership.

Finally, we expect that executive ownership holding proportions will vary across financial and non-financial companies (D_{reg}) and years (D_t). Consequently, the fourth simultaneous equation includes ~~nine~~ six exogenous variables as follows:

$$WSP_{i,t} = \beta_0 + \beta_1 TREM_{i,t} + \beta_2 BS_{i,t} + \beta_3 NXD_{i,t} + \beta_4 DA_{i,t} + \beta_5 \text{~~TQ~~}_i ROA_{i,t} + \sum_{j=1}^{6} \beta_j Exogenous_{i,t} + v_{i,t} \quad (4)$$

Using greater debt to mitigate agency costs means that leverage is regarded to be positively associated with corporate governance (Jensen, 1986; Lin et al., 2012). Conyon et al. (2009) note that risk-averse executives seek to trade-off company risk for higher compensation packages (Fadi et al., 2013; Nitm et al., 2015). Therefore, the company debt-to-assets (*DA*) ratio is considered as a dependent variable in the fifth simultaneous equation.

Prior research suggest that leverage is positively associated with corporate size (*TASS*) because large companies are more exposed to agency problems in terms of higher costs of managerial monitoring (Agrawal and Knoeber, 1996; Nitm et al., 2015). However, Jensen (1986) notes that increasing corporate debt levels will in turn lead to outside constraints, which will eventually limit the company's capacity to grow. Then, the hypothesis is that leverage is negatively associated with corporate change in total assets (*CTASS*). The final hypothesis is that leverage varies across financial and non-financial companies (D_{reg}) and years (D_t). This leads to the fifth simultaneous equation, which includes ~~five~~ seven exogenous variables as follows:

$$DA_{i,t} = \beta_0 + \beta_1 TREM_{i,t} + \beta_2 BS_{i,t} + \beta_3 NXD_{i,t} + \beta_4 WSP_{i,t} + \beta_5 \text{~~TQ~~}_i ROA_{i,t} + \sum_{j=1}^{7} \beta_j Exogenous_{i,t} + v_{i,t} \quad (5)$$

The final simultaneous equation brings into play ROA and Tobin's Q (*TQ*) separately as dependent variables to examine not only the associations between executive compensation and firm performance (Fadi et al., 2013; Nitm et al., 2015), but also the four other endogenous corporate governance variables and a set of exogenous variables that include boardroom features, firm characteristics and control variables. It is specified as follows:

$$ROA_{i,t} = \beta_0 + \beta_1 TREM_{i,t} + \beta_2 BS_{i,t} + \beta_3 NXD_{i,t} + \beta_4 WSP_{i,t} + \beta_5 DA_{i,t} + \sum_{j=1}^{7} \beta_j Controls_{i,t} + v_{i,t} \quad (6)$$

5. Empirical Results and Discussion

5.1 Descriptive Statistics

The descriptive statistics related to all endogenous and exogenous variables are presented in Table 3. The average CEO's total remuneration is £2,153,900, with a median of £1,370,000, while the average total compensation for board executives is £5,183,000, with a median of £3,422,000 over the investigated period from 2010-2014. For the indicators of company performance, ROA has a mean of 7.7 with a median of 6.8, while Tobin's Q ratio has a mean of 1.37 with a median of 0.87. Additionally, the results show that ROA ranges from -56.6% to 55.7%, whereas Tobin's Q ranges from 0.5% to 67.9%, indicating that the majority of sampled firms are profitable.

In terms of governance-related variables, the board size for FTSE 350 corporations has a mean of just under 10 members and a median of 9. This is lower than the corresponding number of 12 members noted by Yermack (1996) and the 13 reported by Core et al. (1999) for their samples of US corporations. However, a number of FTSE 350 companies have more than 20 members in their boardrooms. The statistical results also show that the number of managerial members in the boardroom ranges from 2 to 22, which is consistent with Ozkan (2007), who reports a range of 4

to 21 for UK firms' board size. The findings indicate that 5 to 6 members are non-executive directors. This illustrates a relatively high degree of compliance with the Higgs Report (2003) requirement that at least 50% of the board room members, excluding the chairman, should be non-executive directors. The ownership package variable shows on average relatively small proportions of boardroom share ownership. The ownership is largely derived from share plans obtained as part of compensation packages, with an average £440,832 and £1,133,890 provided to CEOs and board executives, respectively.

Characteristics of board members show a median age for CEOs of 52. This supports previous evidence that CEOs, on average, tend to be mature and experienced individuals (Ozkan, 2011). There is, however, quite a wide range of age and experience, with the youngest CEO in the sample being only 31 years old, whereas the oldest is 76. The median tenure of CEOs is only 3.5 years. Clearly, many companies have fresh-start CEOs, but the longest in post in the sample had been a CEO for 35 years, which thereby provides support for Ozkan's similar findings (2011). Corporate characteristics were measured by a number of variables. Time spent in the FTSE 350 was measured by series of dummy variables, the average length of time for a company to be in the index as a separate identity being between two and three years. The regulation dummy, as suggested by Koh and Liu (2012), acts to distinguish between financial and the non-financial companies and reflects the composition of the sample as containing 25% financial companies and 75% non-financial. According to the firms' characteristics, corporate assets leverage (DA) ranges from 0.01 to 167.24, with an average of 26%, whilst the ratio of debt to equity (DE) ranges from -12512.5 to 5670.2, with an average of 98%. Over this period, the individual firm's total asset averages about £19.27 billion, whereas the overall growth of FTSE 350 corporations is approximately £2.5 billion on average. Overall, all utilised variables show wide variation, suggesting that the sample is sufficiently composed of a mixture of small and large companies. Therefore, this adopted sample minimises any incidences of sample selection bias (Shen and Zhang, 2013).

Insert Table 3 Here

5.2 Firm Fixed-effects Analyses

In this section, the two-way relationships between total compensation and firm performance (ROA) are examined separately by utilising fixed-effect equations modelling. Table 4 (Panel A)

presents results of equation (1) relating to pay-performance association, while Table 4 (Panel B) reports findings of performance-pay relationship based on equation (6). The results of pay-performance and performance-pay associations show that there are positive and significant (at 5% level) relationships between CEO/executive compensation and firm performance in the UK. The findings, therefore, support the first and second hypotheses. Statistically, this is interpreted as the total compensation increase of 4.1% and 5.9% for CEOs and boardroom executives (Panel A) in response to a 100% increase in firm performance. This finding advocates the first hypothesis (H1), that CEOs and boardroom executives are seeking high rewards for their exertion to improve corporate performance within the pay-performance framework. However, firm performance increases by 5.3% or 7.6% (Panel B) as a result of an increase of 100% in the total compensation of CEOs or board executives, respectively. This finding supports the second hypothesis (H2), that CEOs and board executives enhance future performance when rewarded in accordance with sufficient level and structure of their compensation packages.

Insert Table 4 Here

The coefficients of pay-performance results are small, consistent with the findings of past studies, ranging from 0.041 for total CEO pay to 0.059 for total pay of board executives. Ozkan (2011) and Nitm et al. (2015), respectively, report share returns and CEO compensation sensitivity of 0.060 for UK index and 0.098 for samples of South Africa firms. The results also suggest that the association between ROA and CEO compensation appears to be stronger than that with executive compensation. This finding is consistent with Sapp (2008) for samples of Canadian companies. One explanation is that CEOs are compensated higher than lower-level executives for their performing strategic roles and holding great responsibilities to act in the best interests of the owners. It also aligns with tournament theory (Hendry and Kiel, 2004; and Lee et al., 2008), which suggests that the payment of a high compensation package to CEOs would encourage performance at all levels within the firm. On the other hand, the coefficients of the performance-pay results suggest a degree of coherence with that of the pay-performance framework. The sensitivity of ROA provides positive and significant relationship with total compensation of CEO and boardroom executives, consistent with Conyon and Sadler (2001).

The coefficients on most of the control variables also show the expected signs. Board size is positively and significantly related to executive compensation and ROA. This suggests that the

greater the number of members on the corporate board, the higher the level of executive pay and firm performance. There is a significant positive link between the number of non-executive directors and the total compensation of CEOs. This indicates the ambition of non-executives directors to motivate CEOs with appropriate incentive packages for the purpose of enhancing firm performance (Fama and Jensen, 1983; and Ozkan, 2007), or possibly even the weakness of non-executives' monitoring process of CEOs' pay, or perhaps reflecting the likelihood of personal contacts between the CEOs and the non-executives in the board. The associations between CEO ownership and total pay of CEOs and board executives are positive and significant. This suggests that executive directors with large-sized holdings are exercising their power in designing their compensation package, consistent with Ozkan (2007). Age and tenure are positively and directly associated with total pay of CEOs and board executives. This finding is consistent with Devers et al. (2007). Company size is positively and significantly related to the total compensation of CEOs and board executives. This finding would support the perspective that larger companies seek to hire talented board executives and for that endeavour provide appropriate incentive packages (Gregg et al., 1993; Sapp, 2008).

5.3 Simultaneous Equations Model

In this section, investigation of the associations between the total compensation of CEOs and boardroom executives and firm performance is extended further by developing a system of six simultaneous equations. Pay-performance sensitivity is represented in Table 5 by CEO compensation (Panel A) and boardroom executives (Panel B) with ROA. This is to allow for simultaneous interdependencies between executive compensation and firm performance by employing data available on four control variables (i.e., board size, non-executive directors, asset leverage, and boardroom ownership) using 3SLS.

A recent study by Ntim et al. (2015) reports that the results of the simultaneous equation model between total shareholder returns and CEO compensation are considerably improved compared with the single equation model, consistent with Main et al. (1996), Conyon (1997), Sapp (2008) and Lin et al. (2012). This supports the existence of possible simultaneous interdependencies among pay, performance and governance mechanisms, which result in an improvement in the executive pay and corporate performance elasticity. The 3SLS estimation technique permits not only executive compensation and firm performance to simultaneously affect each other and the

mechanism of four control variables, but also allows these control variables to influence each other as well as executive compensation and firm performance, consistent with Agrawal and Knoeber (1996). The OLS estimates are generally more efficient than ordinary 2SLS and 3SLS estimates, as long as they account for any endogeneity-based bias (Wooldridge, 2010).

We used the Durbin-Wu-Hausman test to evaluate the appropriateness of the 2SLS and 3SLS, with non-significant results, concluding that OLS estimates are unbiased and consistent in our sample. Tables 5 – 6 under panels A and B illustrate the results of the six simultaneous equations using OLS after testing for endogeneity with 2SLS, resulting in no significance with p-values (0.64, 0.97, 0.62, 0.81), respectively.

The authors found that the existence of simultaneous interdependencies among the adopted variables (i.e., total compensation, performance indicators and the mechanisms of corporate governance) results in a stronger statistical association for the sensitivity of executive compensation and firm performance. The results indicate significant interdependencies between all endogenous variables and thus provide support for the modelling approach employed. These results are discussed within a theoretical context and are also juxtaposed with previous empirical literature, in particular that relating to the UK.

Table 5 shows the results of a system of simultaneous equations that allows for possible simultaneous separate associations between the total compensation of CEOs and boardroom executives with ROA and four corporate governance indicators, compatible with a number of related control variables. ROA is an accounting-based performance indicator, the implications of which in academic literature are widely acknowledged, especially within executive compensation studies (see Mehran 1995; Adams and Mehran, 2005; Sapp 2008; Gregg et al., 2011; Coles et al., 2012). Overall, the signs on the coefficients in equations (1) to (6) show that the significance of their t-statistics vary for both CEOs and board executives. However, the results related to total CEO compensation show more significant links compared with their counterparts for the total compensation of boardroom executives.

Table 5 (Panel A) reports results relating to CEO pay, whereas Table 5 (Panel B) presents similar findings for boardroom executives. The results indicate that the coefficients on the total compensation of CEOs and boardroom executives reported in equation 1 in both tables remain

positive and statistically significant. Most importantly, the total compensation for CEOs and boardroom members has more influence on firm performance than firm performance has over the total compensation of CEOs and board executives. Statistically, this is interpreted as firm performance increasing by 31.4% (Panel A) or 62.5% (Panel B) as a result of an increase of 100% in the total compensation of CEOs or board executives, respectively. However, the total compensation increases by 4% for CEOs and boardroom executives (Panels A and B) in response to a 100% increase in firm performance. These statistical outcomes suggest that the compensation of CEOs and executives are more influential for firm performance than the performance-related pay framework. This supports the third hypothesis (H3), which is based on the stewardship and/or tournament theories, as these refer to how incentive packages are used to reward boardroom executives for better performance.

Insert Table 5 Here

The findings reported for equations (1) and (2) support overall positive associations between board size and the total compensation of board executives. This result is consistent with Core et al. (1999) and Ozkan (2011) because larger boards pay their executives significantly more, but it is contrary to the findings of Yermack (1996). The outcomes for equations (1) and (3) show that there is a positive association between the number of non-executives and CEO compensation. This could also be interpreted that the larger number of non-executive directors improves board independence and monitoring functions leading to enhanced performance-related compensation decisions, which is consistent with Franks et al. (2001), Ozkan (2007), and John et al. (2010). Outcomes from equations (1) and (4) indicate a positive link between total compensation and their ownership wealth. The positive association implies that either executive directors with large-sized ownerships exercised their power in designing their compensation package, as consistent with Ozkan (2007), or the agents' interests are possibly aligned with the interests of the principals (Ang et al., 2000; Leung and Horwitz, 2004). The results for equations (1) and (5) show a non-significant association between leverage and total compensation for CEOs. This suggests that greater debt usage leads to additional managerial monitoring by internal and external stakeholders (in accordance with John et al., 2010) and reduces the agency problem by opportunistic officers (in accordance with Jensen (1986)).

The findings for equation (6) show that board size, non-executive directors, leverage and ownership are positively and significantly associated with ROA. Our explanation for larger boards is that they seek to enhance firm performance by attracting sufficient financial resources (in line with Adams and Mehran (2005)). Another explanation is that an increased board size encourages lower-level executive members to move up, in line with the precepts of tournament theory (Rosen, 1986). The conventional agency theory perspective is that larger CEO ownership might improve firm performance. The interests of chief executives and shareholders are better aligned by the reduction in corporate conflicts of interest and the costs of managerial monitoring (Jensen and Meckling, 1976). The presence of non-executive directors improves board independence and monitors the determination of CEO compensation, according to the UK institutional and regulatory aspects (Greenbury, 1995, and Higgs Report, 2003), which in turn enhances firm performance. The significant link between ROA and debt usage is in line with the notion that greater corporate leverage maximises financial pressure and the institutional capability to benefit from growth opportunities, as consistent with Jensen (1986).

The governance associations, as set out in the outcomes of equation (3) and the interaction with the total compensation of CEOs and board executives, show that the number of non-executive directors is significantly and positively linked to board size and ownership. Larger boards are expected to increase the number of non-executives. The negative association between leverage and ownership reflects the theory of managerial hegemony in setting packages and debt strategies to suit their own aspirations and agency theory as shareholders and other stakeholders seek to control the managers come into play. The negative association between board size and ownership is aligned with classic agency theory (Berle and Means, 1932).

The majority of the coefficients of the exogenous variables show the expected signs in terms of their associations with both CEOs' and board executives' compensation. Firm size is positively and significantly associated with the total remuneration of CEOs and board executives. This finding is entirely in line with previous literature (for example Conyon, 1997; Conyon and Murphy, 2000; John et al., 2010, etc.). Large-sized companies are more complex in structure, requiring higher qualified and talented members to make crucial decisions regarding their running (Core et al., 1999; Zhou, 2000, etc.). Corporate growth is positively and significantly associated with firm performance, which suggests that managers in faster growing firms adopt excessive risk-taking strategies as they seek to enhance their market shares, sales volume and

levels of profitability. In accordance with the expectation of age, the longer the time that a CEO or board executive member has served, the higher the compensation package will be, consistent with Devers et al. (2007). However, there is a negative association between the time-in-role of CEOs and board executives and total compensation. This suggests that the mechanism underlying the award and achievement of variable-base remuneration has different influences than those relating to fixed-base compensation. The year coefficient reports a positive and significant association with both CEOs' and board executives' compensation.

5.4 Additional Simultaneous Analysis

To determine the sensitivity of the findings revealed in relation to ROA, equations (1) to (6) were re-run using Tobin's Q. It is a commonly utilised metric in empirical accounting contexts, which has been frequently used in prior studies, such as Agrawal and Knoeber (1996), Adams and Mehran (2005) and Ozkan (2007, 2011). Table 6 shows the findings based on a system of simultaneous equation evaluation with Tobin's Q as the dependent variable; in which (Panel A) reports results relating to CEO compensation, whereas (Panel B) presents similar findings for board executives.

Although a number of minor differences are observed regarding the magnitude of some coefficients, the outcomes are virtually the same as their counterparts in Table 5 for ROA. This confirms the robustness of the findings. The associations between total compensation for both CEOs and board executives and Tobin's Q in equations 1 and 6 show that firm performance has risen by 3.8% (Panel A) or 43.2% (Panel B) as a result of a 100% increase in the total compensation of CEOs and board executives, respectively. However, the total compensation increases by 3% for CEOs and boardroom executives (Panels A and B) in response to a 100% increase in Tobin's Q. These results support the third hypothesis (H3). They refer to how the level and structure of executive compensation are utilised to enhance the levels of firm performance, consistent with stewardship and tournament perspectives.

The signs and significance levels of the coefficients of the governance mechanisms and exogenous variables reported in Table 6 remain virtually identical to those reported in Table 5. For example, board and non-executive sizes with ownership are significantly and positively associated with total compensation and firm performance. Leverage does have significant positive associations with firm performance. With respect to the exogenous variables, corporate

size remains significantly and positively associated with executive compensation, while it is negatively associated with firm performance.

Insert Table 6 Here

6. Conclusions and Implications

This paper aims to provide empirical evidence on the associations between executive compensation and firm performance in FTSE 350 companies over the period from 2010 to 2014, taking into account a number of corporate governance mechanisms within a simultaneous equation approach.

Findings, derived from the fixed-effect regression model, suggest positive and significant relationships between executive compensation and firm performance. The findings in relation to the framework of pay-performance are aligning with an agency theory approach whereby CEOs and boardroom executives are compensated for their intention to act in the best benefit of the owners based on the prior levels of corporate performance (Jensen and Meckling, 1976; Jensen and Murphy, 1990). However, the results in respect to the performance-pay framework lend support to notions of the tournament and/or stewardship whereby CEOs and board executive directors perform better in the future based on the prior amounts and structure of their compensation package (Lazear and Rosen, 1981), or their actual managerial talents (Hendry and Kiel, 2004).

Consistent with recent studies (Lin et al., 2012; Fadi et al., 2013; Nitm et al., 2015; El-Sayed and Elbardan, 2016), our findings are based on adopting simultaneous equation modelling that allows for simultaneous interdependencies. The results suggest the existence of significant simultaneous interdependencies among the compensation of CEOs and boardroom executives, corporate performance and governance mechanisms, including the existence of a reverse association between pay and performance indicators. By estimating the executive pay and corporate performance sensitivity, the results suggest that the compensation of CEOs and board executives are more influential on firm performance than the framework of performance-related pay. These findings support the stewardship and/or tournament theories compared with the agency theory. We also find that higher debt usage is associated with a lower compensation. This is consistent with the institutional role of reducing agency problems by extra managerial monitoring.

Furthermore, the results show that larger boards pay their executives significantly more, evidence that is consistent with larger boards being a sign of weak corporate governance in the form of poor communication, decision making and managerial monitoring.

Our results justify our research design and contribute to the extant literature, with particular regard to the UK. Our findings also have important implications relating to the stronger sensitivity link between the compensation of CEOs and boardroom executives and firm performance. They highlight the role of remuneration committees, particularly at large companies, in setting executive compensation packages, which reflect not only the reimbursement of previous-period performance, but also reasonable pay for prospective targets to keep boardroom members motivated over time to enhance firm performance. The members of remuneration committees should also take in their consideration the importance of linking the executive compensation not only with the overall firm performance, but also with the actual executive performance when they are determining and designing their pay packages. The reason behind this is that their recommendations are subject to approval by the full board and ultimately by the shareholder body who are increasingly keen to observe the relationship between what they are actually receiving in terms of returns and management compensation.

Inevitably, there are limitations in a wide-ranging study of this nature that could be addressed in future research. As with any empirical study utilising company data, there may be concerns regarding the effect of survivorship bias and the manner in which companies have reorganised themselves, if there is any, during the period under examination. There are also issues as to missing data and data availability.

Reflections on the overall outcomes of associations between executive compensation and firm performance indicate an interconnected temporal cycle between compensation and performance. An increase in firm performance leads to an increment in executive compensation, which in turn enhance the levels of company efficiency. However, the capability exists for this association to be affected by a range of external and internal interests.

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