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**The Impact of Ownership Structure on CEO Compensation.
Evidence from the UK**

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Abstract

This paper investigates the impact of institutional ownership on the CEO compensation level for 386 UK listed firms for period 2009-2014. This study documented that institutional ownership has significant negative impact on the level of total CEO compensation and cash compensation, which represents the presence of active monitoring of institutional investors. Our evidence indicated that ownership structure is an important determinant of CEO compensation. Furthermore, this paper investigated the impact of other governance- and CEO-specific determinants on the CEO compensation level for UK listed firms. Surprisingly, none of these variables explain the variation in CEO's compensation. These insignificant findings show that there are maybe some other different factors of CEO compensation. In addition, we have found that CEO compensation is higher among larger firms and firms with higher growth opportunities, which can be interpreted as reflecting demand for higher quality CEO talent. Moreover, obtained results showed that the level of CEO compensation is lower when the institutional ownership concentrated.

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1. Introduction

Chief Executive Officers (CEO) compensation has been a widespread public debate for a long period. The level, structure and the role of CEO compensation are still subjected to debate among public, politicians, academia and media in the most industrialized countries (Duffhues and Kabir 2008). This political, social, as well as academic disquiet, also takes place in the United Kingdom. The central topic in the United Kingdom (UK) debate is whether CEO compensation is sufficiently connected to the performance. Early research has shown that connecting compensation to the firm's stock price performance better aligns the interests of managers and shareholders, which mitigates these agency problems (Jensen and Meckling, 1976; Holmstrom, 1979; Shavell, 1979). Beginning with Jensen and Murphy (1990) many financial researchers have examined the relationship between compensation and firm performance and generally agreed that the compensation can be an effective mechanism for reduction of agency problems (Kaplan, 1994; Hall and Liebman, 1998; Murphy, 1999; Zhou, 2000). On the other hand, much of the evidence assembled so far documented that compensation is not adequately tied to the performance (Gregg et al., 1993; Conyon, Gregg and Machin, 1995; Conyon and Peck, 1998). For instance, it has been shown that the level of compensation is still higher even if the performance is poor (Schram, 2017). This is one of the reasons why CEO compensation is still subjected to a widespread public debate (Crocì, Gonenc and Ozkan, 2012). Since there is evidence in the literature that compensation contracts offered to senior executives do not provide sufficient incentives for management to pursue long-term shareholder interests, then the role of the firm's ownership structure, depending on its level of monitoring, and compensating the senior executives assumes great importance (Ozkan, 2007; Conyon and Benito, 1999).

The purpose of this study to investigate the relationship between CEO compensation and ownership structure of firm to fill the gap indicated in the previous literature studying the ownership structure of the UK companies (Georgen and Renneboog, 2001; Stapledon, 1996; Ozkan, 2007). The previous research on CEO compensation has mainly focused on the United States and European countries. Thus, little prior research has focused on the relationship between the ownership structure and CEO compensation in the UK. Furthermore, corporate ownership in the UK, with its aggregate size of institutional ownership, differs from those in Continental Europe, where the family held firms are more common (Crocì et al., 2012; Ozkan, 2007). Additionally, few studies (Georgen and Renneboog, 2001; Stapledon, 1996; Ozkan, 2007) concerning institutional ownership structures of UK have shown inconclusive results. Studies of Georgen and Renneboog (2001) and Stapledon (1996) have revealed that institutional investors in the UK do not provide effective monitoring and disciplining the firm's management. On the other hand, contrary to that literature, Ozkan (2007) indicated that institutional investors in the UK provide monitoring and they are not passive. It has been shown that the institutional

ownership has a significant and negative effect on the CEO compensation (Ozkan,2007). In line with these mixed results of literature, it is important to continue the research about the effect of the ownership structure of firms on the level of CEO compensation to add new knowledge in this realm.

This study differs from previous works on compensation in several ways. First, it focuses on the level rather than the structure of CEO compensation. Second, it examines CEO compensation in the context of the firm's ownership structure, in particular, institutional ownership. Third, the sample used in this empirical study covers a period from 2010 to 2014 which is not investigated by the literature yet.

Thus, to analyze the influence of ownership structure on executive compensation the following research question is formulated:

what is the impact of ownership structure on CEO compensation?

Findings of this paper have shown that institutional ownership has significant negative impact on the level of total CEO compensation and cash compensation, which represents the presence of active monitoring of institutional investors. This finding is in line with Ozkan (2007) for the UK and it is contrary to the findings of previous European-based studies (e.g. Croci et al., 2012) which documented the positive relationship between institutional investors and CEO compensation. In addition, this paper investigated the impact of other governance- and CEO-specific determinants on the CEO compensation level for UK listed firms. Surprisingly, none of these variables explain the variation in CEO's compensation. Furthermore, it has been observed that the level of monitoring of institutional investors is based on equity positions held by of institutional investors. Accordingly, this study report that CEO compensation is lower when the institutional ownership is more concentrated rather than dispersed.

The findings of this study contribute to the literature in the following ways. Firstly, it contributes to the literature on agency problem, corporate governance, ownership structure and managerial incentives (e.g. Shleifer and Vishny, 1986; Bushee, 1998). Combining the agency theory arguments, previous empirical studies mainly investigated the link between ownership structure and firm performance. However, little attention has been given to the relationship between ownership structure and the level of CEO compensation.

Secondly, this study adds to the literature on institutional investors. Prior studies reported the active involvement of institutional investors in different aspects of corporate decision-making, for example: M&As and capital expenditures (Croci et al., 2012; Ferreira et al., 2010; Ferreira and Matos, 2008; Aggarwal et al., 2011). This work provides evidence that the institutional investors also play a crucial role in determining CEO compensation. Moreover, by examining the impact of different levels of

monitoring of institutional ownership on the level of CEO compensation, this paper offers evidence that the design of the ownership structure is important to companies.

Thirdly, from the point of practical relevance, this study will bring a great contribution to investors, academics, policy makers, regulators and companies in having a better understanding of how the CEO compensation related to the ownership can affect the company's performance in the future, thus giving insight in how the ownership structure of a firm can act as a means to tackle agency problems.

The rest of this paper is organized as follows. In section 2, a literature review and hypotheses are presented. Then, section 3 describes the sample, data, and variable used in this study. After that, section 4 discusses the empirical strategy following results and discussions in section 5. Finally, section 6 concludes and discusses the limitations of this study.

2. Literature review and Hypotheses development

This paper studies whether ownership structure of the firm can impact on the level of CEO compensation. In particular, the relationship between institutional ownership and CEO compensation will be examined. Therefore, this chapter divides the literature into several sections: Section 2.1 discusses reviews the literature that examines agency theory. 2.2 discusses the literature related to executive remuneration and ownership structure in section 2.3. Section 2.4 provides a review of the empirical evidence regarding the relation between institutional ownership and CEO compensation, and Section 2.5 presents some other factors that may impact on the level of CEO compensation.

2.1. Agency problem

According to Jensen and Meckling (1976, p. 5), the agency relationship is "a contract which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent." This relationship can occur in different form of situation. For instance, there can be a principal-agent relationship between shareholder and manager, an employee and an employer, or between the state and the government (Ross, 1973). The principal-agent relationship can also be seen as a relationship between a shareholder and a CEO, where the CEO is given some authority to act in the best interest of the shareholder.

Furthermore, there are two assumptions of agency theory: opportunism and asymmetric information. Agency theory postulates that both the principal and the agent focus maximizing their own utilities and it may arise a conflict of interests between these two parties. In other words, the agent might pursue an agenda at the principal's expense, (e.g. when the CEO may be tempted to act in his own advantages which are not aligned with the interest of the shareholder) (Holmstrom, 1979). This is known as opportunism.

Under the asymmetric information, the agent and the principal have access to different information. In general, the agent (CEO) has more access to the information than the principal (shareholder). For instance, CEO has more information about the firm and knows which decisions he is going to take, while the shareholder is unable to monitor or control the decision-making. As a result, the agent can use this information asymmetry to his own advantage, instead of pursuing the objectives of the principal.

In addition, Jensen and Meckling (1976) argued that alignment of the interest between the agent and the principal arises agency costs. They have found that agency costs consist of three components, including monitoring expenditures by the principal, bonding expenditures by the agent and the residual loss form

the agency costs (Jensen and Meckling, 1976). Accordingly, one of the concerns of agency theory is to find a solution that will help to reduce these agency costs.

Literature suggested different optimal mechanisms as a solution for the principal-agent problem (Jensen and Meckling, 1976). For instance, agency problem can be minimized by ownership structure (Jensen and Meckling, 1976; Fama and Jensen, 1983), the executive remuneration contracts (Jensen and Murphy 1990; Lambert et al., 1991) and financial structure of the firm (Easterbrook, 1984; Jensen, 1986).

2.2 Executive remuneration

According to Shavell (1979), various forms of compensation provide different incentive effects on CEOs. The relationship between agency problem and CEO compensation can be explained by two different theories: optimal contract theory and managerial power of theory (Bebchuk and Fried, 2003; Core and Larcker, 2002). Under the optimal contract theory (OCT), CEO compensation can be seen as a remedy to the agency problem. OCT suggests that boards, working in shareholders' interest, try to provide efficient incentives to managers through their designed compensation schemes that eventually will help them to maximize shareholder value. Under the managerial power of theory, managers have more power than the boards, and thus, they have greater ability to extract higher compensation. Although there are different forms of CEO remuneration, the existing literature states that the compensation contract of CEO commonly comprises in itself cash-based compensation (salary and annual bonus) and equity-based compensation (stock-based and option-based compensation) (Gray and Cannella, 1997). Finance literature considered these types of compensation as efficient incentive components to managers and thereby, both cash- and equity-based compensation are viewed as short-term and long-term compensation contracts, respectively (Guidry et al., 1999; Arya et al., 2004). Empirical studies which have examined the link between firm performance and CEO pay stated that the structure of CEO compensation differs from company to company (Murphy, 1999; Arya and Huey-Lian, 2004). Murphy (1999) documented that every profit-oriented company provides performance-based bonus payments paid annually in cash. His findings suggested that if the CEO meets the performance target, the CEO will receive the bonus which is usually determined as a given percentage of his salary (Murphy, 1999).

Various empirical studies have investigated this relationship (i.e. the relationship between executive compensation and agency theory) (Lambert et al., 1991; Gray and Cannella, 1997; Chowdhury and Wang, 2009). Empirical evidence argued that there is a reduction of the agency problem when the compensation of the manager is tied to the stock price (Lambert et al., 1991). In addition, Gray and Cannella (1997) found that incentive compensation can be considered as a tool that aligns the interest of both the principal and agent. Chowdhury and Wang (2009) reported similar findings. They reported

that the CEO compensation, combined with incentive pay and non-incentive pay, is positively related to the interests of owners and CEOs (Chowdhury and Wang, 2009). To sum up all, in line with existing theory, findings of empirical studies suggested that the compensation contract is a useful mechanism for resolving of agency problem and a sign of them.

2.3 Ownership structure: Institutional investors

Another mechanism that can mitigate agency problems between managers and shareholders is the ownership structure of the firm (Fama and Jensen, 1983; Jensen and Meckling, 1976). Ownership structure is one of the elements of corporate governance systems and is determined by other country-level corporate governance characteristics (e.g. the stock market environment, legal framework and other) (La Porta et al., 1998). Accordingly, firm's ownership structure varies from country to country. For instance, corporate structure, in Continental Europe, is more associated with high ownership concentration where the family held firms are prevalent; while in countries like UK and US, it is more associated with dispersed ownership structure, so-called market-oriented system. According to the ONS (2015) as of December 2014, about 85% of UK equity market is held by institutional owners.

Institutional investors are defined as a diverse set of organizations, including banks and trusts, insurance companies, investment advisors and are often characterized as “large” shareholders (Crocì et al., 2012; Hope, 2013). The literature documents three distinct groups of institutions: transient, dedicated, and quasi-indexers (Bushee, 1998). All these groups differ from each other regarding their objectives and information needs (Bushee, 1998; Hope, 2013). The main distinctions of “transient” institutions from other groups are their high portfolio turnover and highly diversified portfolio holdings. In addition, this group of investors focus more on the short-term investments and thereby they have little incentive to gather information for long-run value (Bushee, 1998).

On the other hand, “dedicated” investors and “quasi-indexers” are more focused on long-term value of the company and thereby prefer to do investment in long term-projects. Both of them generally holds large shares in a limited number of firms and thus provide stable ownership to companies (Hope, 2013). In addition, they are actively involved in the firm management and thereby directly monitor their managers to ensure that they are acting in the best interest of the firm.

Literature suggests that there are several reasons for institutional investors to take proactive actions in the firm performance (Shleifer and Vishny, 1986; Holderness, 2003; Ozkan, 2007). One reason is that these investment professionals collect and invest “other people’s money” and thereby it implies strong incentives on institutions to monitor and control (Ozkan et al., 2007). Another reason is the benefit that

institutions, as large shareholders, could receive from their monitoring activities are more likely to exceed the cost that they bear (Shleifer and Vishny, 1986). Accordingly, existing theoretical literature generally views the large institutional investors as an efficient form of corporate governance.

2.4 Empirical findings and hypothesis CEO compensation and institutional ownership

The empirical literature about the institutional investors and CEO compensation has received substantial interest and has resulted in mixed findings. Croci et al. (2012) have reported a significant positive association between institutional investors and CEO compensation. In particular, they have indicated that institutional investors have positive impact on equity - based compensation. This positive relation has represented the link between CEO compensation and performance (Croci et al., 2012). This result is consistent with Fernandes et al. (2012), which documented that institutional ownership positively effects on the level of CEO pay and equity-based compensation. Their result suggested that institutional investors tend to increase the level of CEO pay. Furthermore, it has been found that foreign institutional firms offer larger CEO compensation (Fernandes et al., 2012). In line with this premise, Khan et al. (2005) have also investigated the role of institutional ownership in determining CEO compensation. In particular, they have examined how institutional ownership concentration and dispersion influence on levels of CEO compensation (Khan et al., 2005). It has been found that institutional ownership dispersion is positively related to the levels of compensation. On the other hand, institutional ownership concentration has shown a negative relationship with the levels of compensation, and it suggests that institutional ownership concentration provides better monitoring because of the presence of large institutional investors (Khan et al., 2005).

Some researchers also reported a negative relationship between institutional ownership and CEO compensation. Among those, Hartzell and Starks (2003) documented that firms with more concentrated institutional ownership reward their CEOs with lower compensation. Their result suggested that institutional investors by acting as controlling governance mechanism play a crucial role in mitigating the agency problem between shareholders and managers (Hartzell and Starks, 2003). David et al. (1998) found similar results and reported that institutional investors are more likely to influence CEO compensation in accordance with shareholder preferences. Ozkan (2007) documented that institutional ownership has a significant and negative effect on the CEO compensation. These results suggest that institutional investors in the UK provide monitoring for CEO compensation. In addition, this finding was consistent with findings of Smith (1996) who highlighted the active monitoring role of institutional investors. Furthermore, other studies suggested that institutions, as large block holders, can potentially influence on the determination of corporate incentive structures, including the patterns of hiring, firing

and remunerating of both executive and non-executive directors (Cosh et al., 1989; Core, Holthausen, and Larcker, 1999). Based on the existing theoretical insights and empirical findings, it is hypothesized that institutional investors as "large" shareholders have a greater influence on corporate decision-making, including CEO compensation arrangements. Accordingly, it leads to the following hypothesis:

H1: The institutional ownership is negatively associated with CEO total cash compensation.

2.5 Other factors

While in literature the framework between executive compensation and ownership structure has been firmly established, the effect of specific CEO and other governance characteristics on this relationship is less clear. However, different governance and CEO characteristics have been identified in the literature that are associated with executive compensation. These attributes are CEO duality, CEO age, and CEO gender.

CEO Duality:

There are two types of corporate structure system: one-tier board and two-tier board systems. Under one-tier board system, the firm is governed by one corporate body consisting of executive and non-executive directors while in the case of two-tier board, there are two separate bodies which operate independently: the managerial board and a supervisory board (Jungmann, 2007). The main task of the supervisory board, under the two-tier board system, is to monitor the actions of management. Accordingly, all actions of the CEO will also be monitored regardless of the fact that this CEO also serves as Chairman of the board. Therefore, literature associates the concept of CEO duality with a one-tier board since there is a high probability that insiders will behave opportunistically due to the lack of a two-tier leadership structure (Cadbury, 1992).¹ This viewpoint is supported by previous empirical studies (Cyert et al., 2002; Core et al., 1999; Hallock, 1997). Hallock (1997) and Core et al. (1999) documented that a lack of independence of outside directors is associated with higher executive compensation. For instance, by looking at compensation contracts of CEOs of large firms between 1982 and 1984, Core et al. (1999) found that there is a positive relationship between CEO duality and compensation. Additionally, they indicated that the reward is relatively higher when a CEO has more influence over the selection of the board members. Similar results have shown by Cyert et al. (2002) and Grinstein et al. (2004). Overall, the existing academic literature on corporate governance mechanism

¹ CEO duality is when the CEO also serves as the chairman of the board (Bebchuk et al., 2002; Bebchuk and Fried, 2003; Core et al., 1999)

had frequently suggested when the CEO is head of their boards (CEO/Chair duality) he has significant power over the board and thereby he is more prone to enhance his level of compensation (Bebchuk et al., 2002; Bebchuk and Fried, 2003; Core et al., 1999; Shin and Seo, 2011; Ozdemir et al., 2012; Angbazo and Narayanan, 1997). In light of the above-mentioned discussion the following hypothesis is formulated:

H2: The CEO serves as the chairman of the board is positively associated with CEO total cash compensation.

CEO Age:

Concerning CEO characteristics, there is a large body of evidence that relates CEO age to the compensation (Mehran, 1995; Ryan and Wiggins, 2001; Conyon and Murphy, 2000; Murphy, 1986; Links et al., 2008; Florackis and Ozkan, 2009; Alves et al., 2016). Notably, this relationship is extensively discussed in previous literature. In general, empirical findings documented a significant positive association between CEO age and compensation (Alves et al., 2016; Conyon and Murphy, 2000). This positive relation can be explained by the horizon problem which takes place due to several reasons, such as CEOs near retirement, career and reputational concerns of the young manager (Narayanan, 1985; Ryan and Wiggins, 2001; Hirshleifer, 1993).² Gibbons and Murphy (1992) indicated that managers become more short-term oriented when they approach retirement. This view is supported by other studies (Sundaram and Yermack, 2007; Dechow and Sloan, 1991; Mehran, 1995). Additionally, there is a high likelihood of the presence of agency conflict when the manager's horizon is shorter than the firm's investment horizon. Consistent with previous studies Dechow and Sloan (1991) established that CEO's career concern and compensation schemes are main determinants of the managerial horizon hypothesis. Furthermore, Alves et al. (2016) and Ryan et al. (2001) documented a linear relationship between CEO age and compensation. Their findings are consistent with the existing theory which suggests that CEOs who get older become more experienced and thus enhance their managerial talent (Finkelstein et al., 2000). Eventually, it becomes difficult for firms to replace such CEOs and thereby it will lead to an increase in CEO compensations (Alves et al. 2016). This view is also supported by Blaug (1976) and Schultz (1961). In light of the above-mentioned discussion the following hypothesis is formulated:

H3: CEO age is positively associated with CEO total cash compensation.

² To enhance their position in the labor market, youngest managers tend to build their reputations through projects that will pay off in the short-term (See Narayanan, 1985)

CEO Gender:

CEO gender is another CEO-specific characteristic which also plays a role in determining the level of CEO compensation. There are relatively few studies that examined the relationship between CEO compensation and gender (Bertrand et al., 2001; Lam et al., 2012; Munoz-Bullon, 2010). The probability of becoming a CEO is higher for men than women (Gayle et al., 2012). Consequently, CEO compensation is often associated in literature mainly with a male phenomenon. Existing empirical studies documented that male CEOs receive higher remuneration compared to their female counterparts (Black et al., 2008; Munoz-Bullon, 2010; Bertrand et al., 2001; Lam et al., 2012). By analyzing gender differences among top executives in U.S. public corporations for the years 1992-1997, Bertrand and Hallock (2001) indicated that female executives receive less compensation than their male peers. This finding is in line with the empirical study of Bell (2005) which reported the negative association between women executives and compensation. In addition, consistent with results of Chen et al. (2011) and Lam et al. (2012) have shown that female CEOs in Chinese-listed firms get lower compensation than male CEOs. Existing literature suggests that this difference on compensation can be explained by background factors of gender such as work experience, education, and age (Black et al., 2008). Hence, giving this line of thinking, with this fourth hypothesis, it is tested whether CEO gender is an issue in determining CEO compensation levels.

H4: Female CEO is negatively associated with CEO total cash compensation

3. Empirical Strategy

The objective of this study is to investigate the influence of ownership structure on the level of CEO compensation. To empirically test the hypotheses presented in the previous section, this study employs the following regression model (the similar approach is also followed in Ozkan, 2007; Croci et al., 2012):

$$\begin{aligned} \text{LnCashcompensation}_{it} &= \beta_0 + \beta_1 \text{Institutionalownership}_{it} + \beta_2 \text{CEOduality}_{it} + \beta_3 \text{CEOAge}_{it} \\ &+ \beta_4 \text{CEOGender}_{it} + \beta_5 \text{Tobin's } Q_{i(t-1)} + \beta_6 \text{LnSize}_{i(t-1)} + \varepsilon_{it} \end{aligned} \quad (1)$$

LnCashcompensation is the dependent variable measuring total cash compensation of the CEO by the sum of the base salary and bonus at firm *i* during year *t*. The logarithmic transformation of compensation is used in order to reduce the influence of observations on tail and size distribution. This has been used extensively by the literature studying CEO compensation (Croci et al., 2012; Boye et al., 2017; Alves et al., 2016).

The independent variables include CEO and governance specific characteristics that have been widely used in early empirical studies (Croci et al., 2012; Brick et al., 2006; Ozkan, 2007; Conyon and Murphy, 2000; Alves et al. 2016). *Institutional ownership* is one of the main independent variables that represents the equity position held by all institutional investors in the firm (Ozkan 2007; Croci et al., 2012; Khan et al., 2005). Governance specific variable, *CEO duality* is dummy variable that takes a value of one if the CEO is also the chairman of the board and zero otherwise (Ozdemir et al., 2012; Brick et al., 2006; Alves et al., 2016; Bebchuk, Fried, and Walker, 2002; Grinstein and Hribar, 2004).

Concerning CEO characteristics, *CEOAge*, is the age in the years of the CEO as of the end of the fiscal year (Links et al., 2008; Alves et al., 2016; Croci et al., 2012; Gibbons and Murphy, 1993; Brick et al., 2006). *CEOGender* is dummy variable that equals one if CEO is female and zero in case CEO is male (Brick et al., 2006; Alves et al., 2016).

Previous researches have shown that there is evidence of a relation between CEO compensation and some firm-specific variables, such as firm size and growth opportunities (Wright et al., 1996; Gomez-Mejia, 1994). Previous studies document that the larger firms and firms with higher growth opportunities have more resources to pay their CEOs higher compensation (Conyon et al., 2011; Fernandes et al., 2012; Ozkan, 2007). Accordingly, as control variables, this paper included *Tobin's Q* and natural logarithm of total assets (*LnSIZE*) as a proxy for growth opportunities and for firm size, respectively

(Crocì et al., 2012; Ozkan, 2007; Brick et al., 2006; Khan et al., 2005; Rosen, 1982; Smith and Watts, 1992; Cosh, 1975).

Since the data set contains both cross-sectional and time-series observations (5 years over 386 firms), the regressions estimated will be based on fixed effect model.³ By controlling any firm-specific effects, fixed effect model is able to explain the difference across time (Brick et al., 2006). For instance, “if a particular firm required unique management skills, the firm-specific intercept in the fixed effect regression would capture the additional compensation needed to employ a CEO with such skills” (Brick et al., 2006, p.410). In addition, following Santiago-Castro and Brown (2007), Breusch-Pagan test for heteroscedasticity is used. Obtained results indicated the presence of heteroscedasticity, and thereby a robust regression model is used.⁴

Furthermore, sector dummy variables are added to control for compensation similarities within sectors, which can be considered as fixed effect at the sector level. Additionally, year-specific dummies, which control for year-specific shocks that are common to all firms are included (Crocì et al., 2012). In order to minimize endogeneity problem, the firm-specific control variables are lagged one year (Hartzell and Starks, 2003; Crocì et al., 2012; Ozkan 2007; Brick et al., 2006).

Table 1
The definition of all variables used in the study and provides the data sources

Variable name	Variable descriptions	Sources
<u>Dependent variable</u>		
LnCashCompensation	Natural logarithm of total CEO cash compensation measured by the sum of the base salary and bonus	BoardEx
<u>Independent variables</u>		
Institutional Ownership	Variable represents the equity position held by all institutional investors	ThomsonOne Datastream/Eikon
<u>Corporate Governance characteristics</u>		
CEO duality	A dummy variable that equals one if CEO and Chairman is the same person and zero otherwise.	BoardEx
<u>CEO characteristics</u>		
CEO age	The age in years of the CEO as of the end of the fiscal year	BoardEx
CEO gender	A dummy variable that equals one if CEO is female and zero otherwise	BoardEx
<u>Firm-specific control variables</u>		
Tobin's Q	The sum of book value of assets plus market value of common stock minus book value of common stock divided by book value of total assets	Datastream/Eikon
Size	Natural logarithm of total assets	Datastream/Eikon

³ Although, the data set contains of panel data, for the accuracy of the estimation strategy Breusch-Pagan Lagrange multiplier (LM) test was executed, to check whether there is a significant difference across units (i.e. panel effect). Obtained results were significant and stated that our longitudinal data consists panel effect. A Hausman test rejects the random effect model.

⁴ The presence of heteroscedasticity indicates that the variance of the residual is not constant(not homogeneous). Thus, in order to correct heteroscedasticity of residuals, the option for estimating robust standard errors is used. This method allows to control estimated coefficients. Additionally, p-values will be more accurate(Santiago-Castro and Brown, 2007).

4. Sample and Data

The data used for the empirical analysis comes from three data sources: BoardEx, Thomson One, and Datastream/Eikon. Data were collected from 2009 to 2014. Information about CEO-specific characteristics was collected from BoardEx, a leading business networking service which is commonly used the database in various research (Crocì et al., 2012; Balafas and Florackis, 2014; Fernandes et al., 2012). BoardEx provides information about executive and supervisory directors in every firm in the sample. For every director in a firm, BoardEx provides information on age, the number of board positions, compensation, wealth, director role and years of experience. Information about ownership and firm characteristics have been obtained from the Thomson database and Datastream/Eikon. It was required companies with compensation data from Boardex to have available ownership data and financial data from Thomson database and Datastream/Eikon. In some cases, information about ownership was available from Thomson and Datastream/Eikon data set itself. However, in the case of missing values, alternative sources were also checked such as firms' websites. Firms with unidentifiable ownership were excluded from the sample. The final sample consists of an unbalanced panel data covering 5 years across 386 UK listed companies. To remove the influence of outliers, winstorization took place. Winsorizing means that the outliers, which might produce spurious results are eliminated by bringing it down to a specified value. A similar result can be achieved with square root. However, it might significantly decrease the observations in the data due to the negative values. By using winstorization, data is normalized, without losing too many observations. After careful examination of the data, it has been shown that only firm specific variable (*Tobin's Q*) are needed to be winsorized. Accordingly, *Tobin's Q* is winsorized at the 1% and 99% levels to remove any effect of outliers on the results (Billett, King, and Mauer, 2007).

4.1 Univariate analysis: Descriptive statistics

In this section, the results of descriptive statistics are discussed. Table 2, reports the descriptive statistics for the whole sample of 386 UK listed firms over the years 2009-2014.

Table 2
Descriptive statistics for whole sample for the period 2009-2014

	Observation	Mean	Standard deviation	Minimum	Maximum
Panel A. Dependent Variable					
<i>Cash compensation(GB£000)</i>	2233	£407.043	£439.553	£0	£5.000.000
<i>LnCash compensation</i>	2170	5.6049	1.0132	0.6931	8.5171
Panel B. Explanatory variables					
<i>Institutional ownership</i>	2 233	22.6041	24.7900	0	91.36
<i>CEO duality</i>	2 237	0.0594	0.2365	0	1
<i>CEOAge</i>	2 237	51.8010	7.0996	31	74
<i>CEOgender</i>	2 237	0.0321	0.1765	0	1
<i>Control variable</i>					
<i>Tobin's Q</i>	2 237	0.4595	0.2527	0.02327	1.3275
<i>LnSIZE</i>	2 237	11.4293	2.0646	4.6913	19.9422

See Table 1 for variable definitions.

Table 2, Panel A presents descriptive statistics on compensation structure for our sample of 386 UK listed firms. The average annual total cash (salary plus bonus) compensation yields £407,043. However, mean of log compensation is equal to 5.60.

Table 2, Panel B, shows descriptive statistics for CEO, governance and firm-specific characteristics for period 2009-2014. The mean institutional ownership is 22.6% and ranges from 0 to 91% of outstanding shares. The result is similar to comparable UK studies (e.g. Ozkan, 2007), but slightly higher than Croci et al. (2012) who report a mean institutional ownership of 18.9% for Continental European firms.⁵ With respect to CEO characteristic variables, consistent with Gregory-Smith et al. (2014), it is worth nothing that on average only 3% of CEOs are female. This small percentage of female CEOs suggests that there are some female executives specific characteristics which differ from those of male executives (Gayle et al., 2012). The mean value of CEO age is equal to 51 and ranges from 31 to 74. Other studies yielded relatively same mean values for CEO age (Gregory-Smith, 2012; Conyon and Murphy, 2000; Alves et al., 2015; Ryan and Wiggins, 2001). Moreover, about 6 % of the cases, the CEO is also acted as the chair of the board of directors. Overall, a mean CEO duality is relatively consistent with the findings of

⁵ This difference could be explained by the fact that Continental European countries are characterized by its high level of ownership concentration, mainly by family owners; thus fewer shares are available for institutional investors (Croci et al., 2012).

other studies (Gregory-Smith, 2012; Conyon and Murphy, 2000).⁶ According to the descriptive results of Conyon and Murphy (2000), only 18 % of UK sample firms had combined CEOs/chairman while for US sample firms, a mean value was equal to 66%.⁷ In addition, Florackis and Ozkan (2009) had observed a decrease in the proportion of firms in which CEO serves as Chairman, from 10.08% in 1999 to 5.79% in 2005.⁸ Regarding firm-specific control variable characteristics, the mean of log of total assets (i.e. size) is 11.42 with a maximum 19.94 and a minimum of 4.69. On average Tobin's Q is 0.4595 and ranges from 0.2327 to 1.3275 and has the standard deviation of 0.2527. Firms with above average Tobin's Q indicate more growth opportunities. Moreover, we expect that the level of total CEO cash compensation in such firms would be higher than firms with fewer growth opportunities.

Table 3, Panel A
Descriptive statistics of both dependent and control variables for each sector

	Observations	Total Cash compensation		LnSIZE		Tobin's Q	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
1 Aerospace & Defence	24	369.625	423.885	13.486	1.476	0.519	0.155
2 Automobiles & Parts	12	409.416	130.069	10.402	0.686	0.475	0.287
3 Banks	6	429.666	106.577	13.618	0.432	0.937	0.010
4 Beverages	12	570.083	370.822	12.434	1.478	0.670	0.322
5 Business Services	280	427.857	331.120	11.724	1.822	0.560	0.210
6 Chemicals	42	332.309	260.101	10.231	2.265	0.445	0.287
7 Clothing, Leisure and Personal Products	23	194.913	150.932	10.571	1.268	0.369	0.174
8 Construction & Building Materials	93	555.956	531.149	12.329	2.144	0.491	0.187
9 Consumer Services	6	468.666	137.425	11.261	0.155	0.791	0.114
10 Containers & Packaging	24	342.458	224.071	11.349	1.988	0.604	0.235
11 Diversified Industrials	6	654.166	125.319	12.267	0.126	0.265	0.283
12 Electricity	16	452.375	479.205	12.140	2.116	0.249	0.189
13 Electronic & Electrical Equipment	94	330.287	309.425	10.714	2.086	0.449	0.171
14 Engineering & Machinery	123	257.357	184.891	11.039	1.483	0.450	0.165
15 Food & Drug Retailers	11	424.500	214.409	12.204	0.710	0.649	0.247
16 Food Producers & Processors	39	346.974	244.036	11.704	1.938	0.535	0.232
17 Forestry & Paper	12	737.333	635.090	13.137	2.430	0.578	0.051
18 General Retailers	107	596.075	559.249	12.755	1.545	0.587	0.265
19 Health	64	229.515	145.253	10.225	1.378	0.331	0.201
20 Household Products	40	296.675	135.100	10.916	0.915	0.481	0.175
21 Information Technology Hardware	41	450.926	452.843	11.425	1.305	0.298	0.178
22 Insurance	11	296.181	111.083	12.650	2.109	0.547	0.276
23 Investment Companies	23	243.782	257.154	11.525	2.202	0.253	0.204
24 Leisure & Hotels	55	551.818	410.016	13.549	2.355	0.664	0.249
25 Life Assurance	11	565.545	300.655	14.725	2.956	1.005	0.149
26 Media & Entertainment	141	361.886	349.485	10.936	1.862	0.472	0.198
27 Mining	135	213.155	254.070	10.573	1.894	0.298	0.258
28 Oil & Gas	94	384.989	357.911	11.290	1.696	0.275	0.233
29 Pharmaceuticals and Biotechnology	93	393.139	297.175	10.730	2.094	0.315	0.220
30 Real Estate	98	493.459	430.248	12.562	2.020	0.405	0.214
31 Renewable Energy	28	339.25	154.675	10.565	0.674	0.278	0.143
32 Software & Computer Services	179	288.798	405.497	10.224	1.386	0.430	0.221
33 Speciality & Other Finance	170	536.929	654.296	11.386	2.478	0.470	0.301
34 Steel & Other Metals	6	1488	84.961	15.571	0.260	0.391	0.151
35 Telecommunication Services	46	340.869	246.070	11.080	2.035	0.527	0.270
36 Transport	54	896.129	1103.07	12.570	1.671	0.611	0.257
37 Utilities - Other	18	286.388	447.942	12.504	2.658	0.403	0.338

Table 3, Panel A, presents the summary statistics for each sector. There are 280 observations that belong to the business service sector, 179 observations that relate to the software and computer services, 170

⁶ The small differences can be explained by the total number of firms and observation periods.

⁷ Conyon and Murphy (2000) analyzed differences in CEO pay and incentives in the United States and the United Kingdom for 1997.

⁸ Florackis and Ozkan (2009) empirically investigated the relationship between managerial entrenchment and agency costs for a large sample of UK firms over the period 1999–2005.

observations that belong to the specialty and other finance, and rest of the observations relate to other sectors. Several observations can be made from the table. First, firms in the steel and other metals sector have the largest average size (15.571). Second, the CEOs in the steel and other metals sector receive higher compensation than all other sectors. In particular, firms in such sectors as transport, forestry and paper, diversified industrials pay on average notably higher compensation to their CEOs compare to other sectors. Third, firms in the clothing, pleasure and personal products energy has relatively lower pay than firms in others. Fourth, the software and computer services have the lowest average firm size (10.224) while *LnSize* in the other firms is approximately 11.771⁹. Fifth, the life assurance sector has the highest average growth opportunities of 1.005 followed by banking sectors industries (0.937) and the consumer service sector (0.791) while the electricity sector has the lowest firm size of 0.249.

Table 3, Panel B

Descriptive statistics for total cash compensation(GB£000) by year for UK firms' CEO for the period 2009-2014

	2009	2010	2011	2012	2013	2014
Mean	330.144	401.261	408.150	410.384	432.631	445.168
Standard deviation	345.594	480.589	483.045	394.104	470.415	424.070
Minimum	0	0	0	0	0	0
Maximum	3085	4972	4900	2970	5000	3970
Observation	312	386	385	380	385	385

Total CEO cash compensation measured by the sum of the base salary and bonus(in British pound values)

Table 3, panel B, illustrates the evolution of CEO compensation level over the sample period. Similar to Conyon and Murphy (2000), it is observed that the mean CEO compensation has increased considerably from £330,144 in 2009 to £445,168 in 2014 for this (unbalanced) sample of firms. This represents an average (mean) annual growth in CEOs' remuneration of about 6 % in real terms. This annual increase of CEO compensation (mean) is comparable with descriptive results of existing literature (Conyon and Murphy, 2000; Cosh, 1975). To sum up all, it can be concluded that summary of descriptive statistics is in line with descriptive results of existing literature.

⁹ *LnSIZE* is a proxy for firm size (See Table 1)

4.2 Univariate analysis: Correlations

Table 4, panel A: Correlation matrix

	<i>LnCash compensation</i>	<i>Institutional ownership</i>	<i>CEODuality</i>	<i>CEOAge</i>	<i>CEOGender</i>	<i>Tobin's Q_{i(t-1)}</i>	<i>LnSize_{i(t-1)}</i>
	1	2	3	4	5	6	7
1. <i>LnCash compensation</i>	1						
2. <i>Institutional ownership</i>	-0.4591*	1					
3. <i>CEODuality</i>	-0.0751*	0.0015	1				
4. <i>CEOAge</i>	0.0205	-0.0327	0.3011*	1			
5. <i>CEOGender</i>	-0.0274	0.0171	0.0291	-0.0588*	1		
6. <i>Tobin's Q_{i(t-1)}</i>	0.1929*	-0.2296*	-0.0067	0.0423	-0.0548*	1	
7. <i>LnSize_{i(t-1)}</i>	0.5294*	-0.5329*	-0.1034*	0.0806*	-0.0276	0.3634*	1

This table reports correlations of the variables used in the regression analysis for a sample of 386 firms for the period 2009-2014. The dependent variable is Natural logarithm of total CEO cash compensation, LnCash compensation in this figure. The independent variables are Institutional Ownership, CEO duality, CEO age, CEO gender, Tobin's Q and Size. * shows that is significant at 5 % levels.

In Table 4, Panel A, the correlations between variables are reported. The significant correlation is shown with a * at a 5% significant level. The significant correlation means that it is unlikely that the correlation resulted by chance. We observe that there is significantly negative correlation (-0.45) between institutional ownership and CEO compensation, which is not surprising given the theoretical literature about the large shareholder; that is, institutional investors have a greater power when they have large shareholdings in firms (Ozkan, 2007; Bathala, 1996; Friend and Lang, 1988; Shleifer and Vishny, 1997). Accordingly, this negative association suggests that institutional ownership acts as governance mechanism and institutional shareholders provide monitoring for the CEOs' total cash compensation (Hartzell and Starks, 2003). When it comes to the CEO duality, which is one of our main independent variables for this study, it shows a significant negative relationship with compensation (-0.08). This is quite surprising and contrary to proposed expectations as well as to what the previous literature states (Core et al., 1999; Gregory-Smith, 2012; Conyon and Murphy, 2000). It will be expected that when CEO also serves as the chairman of the board, he extracts higher compensation since he has more power over the board, but the relationship is the inverse. Moreover, there is a significant positive correlation between CEO age and CEO Duality (0.30), which is in line with managerial entrenchment theory. In the case of the effects of firm-specific control variables to the independent variable, they are all highly correlated, meaning the increase of CEO compensation. For instance, significant positive correlation of size with compensation (0.52) indicates that larger firms have more resources to pay their CEOs a high level of compensation (Fernandes et al., 2012; Rosen, 1982; Smith and Watts, 1992). Overall, univariate results from correlation matrix are consistent with proposed hypotheses and prior studies. On the other

hand, from the obtained results we could not conclude that the multicollinearity is not a serious problem for this research. Hence, VIF tests are applied.

Table 4, panel B: Testing multicollinearity. The variance inflation factor

<i>Variable</i>	VIF	1/VIF
<i>Institutional ownership</i>	1.40	0.713098
<i>CEODuality</i>	1.13	0.883449
<i>CEOAge</i>	1.13	0.887227
<i>CEOGender</i>	1.01	0.991381
<i>Tobin's</i> $Q_{i(t-1)}$	1.16	0.865127
<i>LnSize</i> $_{i(t-1)}$	1.56	0.639461
Mean VIF	1.23	

Table 4, panel B, shows the VIF (Variance Inflation Factor) test results. In order to test for multicollinearity, the VIF is calculated for each independent variable. According to Myers (1990), the variance inflation factor (VIF) values should not exceed 10. The obtained results indicate that all of the independent variables have VIF values of less than 10. Therefore, it can be concluded that variables do not suffer from the multicollinearity.

5. Results and Discussions

Table 5, Panel A
Results of Fixed effect model, robust

Independent variables	Firm (1)	Ownership (2)	CEO Duality (3)	CEO Age (4)	CEO Gender (5)
$LnSize_{i(t-1)}$	0.840 (1.30)	0.068 (1.05)	0.062 (0.95)	0.046 (0.71)	0.045 (0.70)
$Tobin's Q_{i(t-1)}$	0.041 (0.27)	0.296 (0.20)	0.027 (0.18)	0.032 (0.21)	0.017 (0.11)
<i>Institutional ownership</i>		-0.011** (-3.80)	-0.011** (-3.82)	-0.011** (-3.81)	-0.011** (-3.80)
<i>CEO Duality</i>			-0.184 (-0.79)	-0.216 (-0.90)	-0.243 (-0.98)
<i>CEO Age</i>				0.014 (1.48)	0.014 (1.44)
<i>CEO Gender</i>					-0.175 (-0.54)
Model summary					
Year dummy	✓	✓	✓	✓	✓
Sector dummy	✓	✓	✓	✓	✓
Observations	1 816	1 816	1 816	1 816	1 816
Number of firms	386	386	386	386	386
R-squared:					
within	0.0112	0.0322	0.0333	0.0394	0.0401
between	0.3613	0.3869	0.3846	0.3380	0.3363
overall	0.2702	0.3036	0.3018	0.2684	0.2678

Notes: The dependent variable is LnCash compensation. The definitions for all variables are provided in Table 1. Heteroskedastic robust t-statistics in parentheses below the parameters. *, ** and *** refer to significance at 10%, 5% and 1% levels respectively.

In Table 5, Panel A, estimated results for total CEO cash compensation are documented. Five specifications are estimated, one for each set of factors presented in the hypotheses section. The first specification shows the results for the relationship between firm-specific control variables and CEO total cash compensation.

In specification (2) we introduce institutional ownership in the model. Particularly, it is found that institutional ownership, which is measured by the equity position of institutional investors, is negatively associated with higher levels of CEO cash compensation (if institutional ownership increases by 1%, the level of CEO total cash compensation decreases by 0.011%). Consequently, this result led us to accept Hypothesis 1. Consistent with previous empirical studies (e.g. Ozkan, 2007; Bathala, 1996; Friend and Lang, 1988; Shleifer and Vishny, 1997) the obtained results corroborate that institutional ownership decreases total cash compensation levels. Present result suggests that institutional ownership acts as governance mechanism and can help reduce potential agency costs (Hartzell and Starks, 2003). The finding is in line with the view of Ozkan (2007) where institutional shareholders provide monitoring for the CEOs' total cash compensation. This result suggests that ceteris paribus UK listed firms with institutional ownership pay less to their CEOs.

In specification (3) we add in the model another governance-specific variable that is *CEO duality*. With respect to the variable, it is found that the result is not statistically different from zero and the coefficient of the variable *CEO duality* is negative. This negative insignificant association is contrary to what was expected and to the existing empirical studies (Bebchuk, Fried, and Walker, 2002; Grinstein and Hribar, 2004; Ozdemir et al., 2012; Brick et al., 2006; Alves et al., 2016; Shin and Seo, 2011). Notably, recent empirical studies on UK listed firms do not provide any significant evidence regarding the association between CEO duality and corporate performance (e.g. Vafeas and Theodorou, 1998; Weir et al., 2002; Florackis, 2005).

In specification (4) we add in the model *CEO Age*. Obtained result is also not significant and the coefficient of the variable *CEO Age* is positive. Insignificant *CEO Age* variable is contrary to the results in previous empirical studies. Alves et al. (2016) found a significant positive relationship between CEO Age and CEO compensation. Their results are consistent with findings of Blaug (1976) and Schultz (1961) where older, more educated and experienced CEO are more difficult to replace and therefore more able to extract higher pay packages.

In specification (5) we add in the model another CEO-specific characteristic that is *CEO gender*. The result does not provide evidence that there is a significant association between *CEO gender* and CEO total cash compensation. The coefficient on *CEO gender* is insignificant and it is not consistent with prior empirical studies. Lam et al. (2012) and Munoz-Bullon (2010) have found a significant and negative results in which female CEOs earn lower compensation compared to male CEOs. Additionally, their results were in line with findings of Black et al. (2008) and Bertrand et al. (2001).

5.1 Two-sample t-test analysis

Moreover, following Ozkan (2007) several two-sample t-tests are conducted in order to check whether two population have equal or different means.¹⁰ First, we have done the analysis by separating a sample into a small sized and large sized firms based on the mean total assets values, to check whether the samples selected from large and small firms are heterogeneous.¹¹

Table 6, Panel A

Two-sample t-test: Large firms vs Small firms

Group	Observations	Mean	Standard error	Standard deviation	(95% Conf.Interval)	
Large firms	1 068	621. 2444	16. 417	536. 5119	539. 0311	653. 4576
Small firms	1 165	210. 6781	4. 717938	161. 0331	201. 4215	219. 9347
Combined	2 233	407. 0439	9. 301809	439. 5536	388. 8028	425. 285
Diff.		410. 5663	16. 47267		378. 2629	442. 8696
diff = mean (0) - mean (1)				t = 24. 9241		
Ho: diff = 0				degrees of freedom = 2231		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr (T < t) = 0.0000		Pr (T > t) = 0.0000		Pr (T > t) = 0.0000		

From Table 6, Panel A, it can be seen that the mean of total cash (salary plus bonus) compensation of large firms is £621,244 and for small firms is equal to £210,678. The results show that the impact of institutional investors on CEO compensation for large firms is statistically different from that of small firms. In other words, the mean of total cash (salary plus bonus) compensation for small firms is lower than large firms. Results are in line with existing empirical literature (Fernandes et al., 2012; Rosen, 1982; Smith and Watts, 1992).

¹⁰ Ozkan (2007) conducted two-sample t-test by separating the sample into the small sized and large sized firms. However, obtained results were not statistically significant, and the author did not demonstrate those results.

¹¹ Precisely, it is checked whether the influence of institutional investors on CEO compensation for small companies differs from that of large companies.

Table 6, Panel B

Two-sample t-test: Dispersed institutional ownership vs Concentrated institutional ownership

Group	Observations	Mean	Standard error	Standard deviation	(95% Conf.Interval)	
Dispersed institutional ownership	1 118	604. 3837	15. 7927	528. 0527	573. 397	635. 3704
Concentrated institutional ownership	1 115	209. 1731	5. 121568	171. 0174	199. 1241	219. 2221
Combined	2 233	407. 0439	9. 301809	439. 5536	388. 8028	425. 285
Diff.		395. 2106	16. 62049		362. 6174	427. 8039
diff = mean (0) - mean (1)				t = 23. 7785		
Ho: diff = 0				degrees of freedom = 2231		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr (T < t) = 0.0000		Pr (T > t) = 0.0000		Pr (T > t) = 0.0000		

Second, in order to test if the mean of total cash (salary plus bonus) compensation of firms with institutional ownership dispersion is significantly different from firms with institutional ownership concentration a T-test is conducted.¹² The results from the T-test are shown above in Table 6, Panel B. As it is shown the mean of total cash (salary plus bonus) compensation of firms with institutional ownership dispersion is equal to £604,383 and for firms with institutional ownership concentration is £209,173. The conclusion of this T-test is that the mean of total cash (salary plus bonus) compensation of firms with institutional ownership dispersion significantly differences from firms with institutional ownership concentration. Results are in line with previous studies (Bathala, 1996; Eisenhardt, 1989).

¹² We classified institutional ownership as dispersed and concentrated based on held institutional shares. Following Bethel et al. (1998) institutional investors that possess 5 % and less of shares were classified as dispersed institutional ownership, and concentrated institutional ownership otherwise.

Table 6, Panel C

Two-sample t-test: Firms with high growth opportunities vs firms with low growth opportunities

Group	Observations	Mean	Standard error	Standard deviation	(95% Conf.Interval)	
Firms with high growth opportunities	1 041	481. 0307	13. 46482	434. 4361	454. 6094	507. 452
Firms with low growth opportunities	1 192	342. 4295	12. 569	433. 9493	317. 7697	367. 0894
Combined	2 233	407. 0439	9. 301809	439. 5536	388. 8028	425. 285
Diff.		138. 6012	18. 41819		102. 4826	174. 7198
diff = mean (0) - mean (1)				t = 7. 5252		
Ho: diff = 0				degrees of freedom = 2231		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr (T < t) = 1.0000		Pr (T > t) = 0.0000		Pr (T > t) = 0.0000		

Next, we have done the T-test analysis based on the mean firms' growth opportunities values. Table 6, Panel C, documents that the mean of total cash (salary plus bonus) compensation of firms with high growth opportunities is £481,030 and for firms with low growth opportunities is £342,429. The conclusion of this T-test is that the mean of total cash (salary plus bonus) compensation of firm with high growth opportunities significantly differences from firms with low growth opportunities. The results are consisted with findings of Wright et al. (1996).

5.2 Robustness check

Table 7, Panel A
Results of Fixed effect model, robust

Independent variables	Firm (1)	Ownership (2)	CEO Duality (3)	CEO Age (4)	CEO Gender (5)
$LnSize_{it(t-1)}$	0.084 (1.25)	0.0671 (1.06)	0.066 (1.04)	0.058 (0.92)	0.057 (0.92)
$Tobin's Q_{it(t-1)}$	0.315** (2.37)	0.316** (2.43)	0.316** (2.43)	0.317** (2.44)	0.313** (2.37)
<i>Institutional ownership</i>		-0.014** (-4.64)	-0.014** (-4.64)	-0.015** (-4.59)	-0.015** (-4.59)
<i>CEO Duality</i>			-0.021 (-0.21)	-0.034 (-0.34)	-0.041 (-0.41)
<i>CEO Age</i>				0.006 (1.01)	0.006 (0.97)
<i>CEO Gender</i>					-0.050 (-0.42)
Model summary					
Year dummy	✓	✓	✓	✓	✓
Sector dummy	✓	✓	✓	✓	✓
Observations	1 842	1 842	1 842	1 842	1 842
Number of firms	386	386	386	386	386
R-squared:					
within	0.0238	0.0636	0.0636	0.0648	0.0648
between	0.5459	0.5756	0.5760	0.5588	0.5596
overall	0.4331	0.4848	0.4852	0.4712	0.4720

Notes: In this table, we report the findings when Eq.(1) is re-estimated with a different measure for dependent variable. In this analysis, the dependent variable is LnTotal compensation. Total compensation is proxied as the sum of cash compensation and equity-based compensation. The definitions for all variables are provided in Table 1. Heteroskedastic robust t-statistics in parentheses below the parameters. *, ** and *** refer to significance at 10%,

Thus far, our analysis used the total cash compensation as the proxy for CEO compensation. In further regression, we use the sum of cash compensation and equity-based compensation.¹³ It is expected that predictions will be held after this regression in the dependent variable. Following Ozdemir et al. (2012) Eq. (1) is re-estimated with the new dependent variable. Regarding the estimation methods for robustness check, fixed effect model is employed due to the significance of Hausman test. The results of estimation are presented in Table 7, Panel A. *Institutional ownership* remain significant with the similar sign while rest of the results remain insignificant. On the other hand, *Tobin's Q* became significant.¹⁴ Ozdemir et al. (2012) and Mehran (1995) also found a significant positive relationship between firm performance and CEO compensation. This significant positive association can be explained by the fact that when the compensation includes equity-based compensation, managers put much effort to increase the performance of the firm (Ozdemir et al.,2012).

¹³ Information about total compensation (the sum of cash compensation and equity-based compensation) for the years 2009-2014, is obtained from BoardEx.

¹⁴ Tobin's Q proxy for growth opportunities (See Table 1)

6. Conclusion

There is evidence in the literature that compensation contracts offered to senior executives do not provide sufficient incentives for management to pursue long-term shareholder interests, then the role of the firm's ownership structure and compensating the senior executives assumes great importance (Ozkan, 2007; Conyon and Benito, 1999). Using a panel of UK listed firms, this paper examined the impact of institutional ownership on the CEO compensation level for period 2009-2014. Consistent with previous literature (Core et al., 1999) it is presented that ownership structure is an important determinant of CEO compensation. Precisely, this study documented that institutional ownership has significant negative impact on the level of total CEO compensation and cash compensation, which represents the presence of active monitoring institutional investors. Accordingly, the answer to the research question can be answered that institutional ownership reins the level of CEO compensation. These findings are in line with the recent findings of Ozkan (2007). Furthermore, this paper investigated the impact of other governance- and CEO-specific determinants on the CEO compensation level for UK listed firms. Surprisingly, none of these variables explain the variation in CEO's compensation.¹⁵ These findings are contrary to the findings of Conyon and Murphy (2000), Murphy (1986), Lam et al. (2012), Bebchuk et al. (2002). These insignificant findings show that there are maybe some other different factors of CEO compensation. Even though a similar approach as in previous research is used, this study is ended up with an insignificant relationship between CEO duality, CEO-specific characteristics and CEO compensation.

Additionally, consisted with empirical literature (Fernandes et al., 2012; Rosen, 1982; Smith and Watts, 1992), these findings also suggests that CEO compensation is higher among larger firms and firms with higher growth opportunities, which can be interpreted as reflecting demand for higher quality CEO talent. Moreover, obtained results showed that CEO compensation is lower when the institutional ownership concentrated.

This study has limitations. First, the sample period is small since this research covered the period from 2009 to 2014. Second, the findings were not always consistent with existing studies. Therefore, future researches might consider the effect of other corporate governance factors on the CEO compensation. For instance, the inclusion of board characteristics into this analysis is important. Prior studies (Ozdemir et al., 2012; Ozkan, 2007; Croci et al., 2012) have shown that board structure of firms is an important determinant of CEO compensation. In addition, country specific factors that could affect the determinants are not included in this study, since only one country is used.

¹⁵ *CEO duality, CEOAge, CEOGender*

In summary, this paper found both opposing and confirming results to the previous studies, further the need to continue conducting studies of UK firms. Regardless of some limitations, we treat our study as a starting point for further research, and it can be used as a comparison for future studies in order to assess whether the results will be the same when other factors are taken into account.

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