

Managerial Compensation and Firm Performance: the Moderating Role of Managerial Ownership and Other Governance Factors

ABSTRACT

This study looks at how executive compensation affects firm value and the extent to which this relationship is sensitive to managerial ownership and corporate governance factors. We use data from UK FTSE 100 firms for the period 2007-2012, generating a total of 578 firm-year observations. Consistent with optimal compensation theory, we find that the managerial compensation –firm value is more sensitive to executives’ ownership levels and other corporate governance indicators. Our results remain robust to alternative econometric models. We contribute to the literature on corporate governance and firm value (e.g., Ntim et al., 2019; Haque and Ntim, 2020; Chu *et al.*, 2020; Ozkan, 2011; Conyon and Murphy, 2000). While the paper builds on the executive bonus compensation literature, it also furthers our understanding on the extent to which managerial ownership, institutional ownership, board size and non-executive ownership matter in the executive bonus compensation – corporate value relationship with specific emphasis on UK FTSE 100 firms. Our second contribution is related to the moderating role of managerial (executive) ownership. We show that as executives residual interests go up, managers become more conscious of the firm’s idiosyncratic risk, and hence lessen their aggressive investment and financing strategies culminating in lower firm value.

Key words: managerial compensation; firm performance; ownership

1. INTRODUCTION

The substantial pay packages of company executives have aroused the attention of both academics and non-academics. Concerns on corporate executives' compensation policy, widening pay inequality and poor corporate performances which were revealed by the 2007/2008 global financial crisis alerted shareholders and regulators on how to design pay compensation to influence managerial quality decision. It is therefore not surprising that shareholders' votes on executive compensation have been introduced in several European countries (see e.g., Ferri and Maber, 2013). Academic studies suggest that shareholders can use compensation as a tool to align their interests with corporate executives (Ntim et al., 2019; Ozkan, 2011; Kaplan and Rauh, 2010; Ortiz-Molina, 2007). Thus, efficient bonus compensation policies could induce corporate executives to employ costly effort to enhance the future growth opportunities of the firm and achieve shareholder value maximization. Accordingly, the differing interests between managers and shareholders are minimized through efficient compensation design (Ntim et al. 2019; Ortiz-Molina, 2007). Despite the growing surge in research interests (both theoretical and empirical) on these subjects, our understanding of the implications of executive bonus compensation on firm value is still far from complete.

Evidence from prior studies have been mixed (Malmendier & Tate, 2009; Cooper et al., 2013; Balafas & Florackis, 2014; Ntim et al., 2019). Most prior studies have employed panel data regression framework and found evidence of a decreasing relationship between executive compensation and firm value. However, Ntim et al. (2019) employed a robust technique (i.e., systems of equations modelling) on South African datasets and reported positive relationship between them. We adopt a similar technique on our panel data of 575 firm-year observation of UK FTSE 100 firms for the period 2007-2012 to analyse the influence of executive bonus compensation on firm value. This examination is important because it provides an insight into how top management incentives induce corporate value post 2008 financial crisis. Most prior studies on this issue (e.g., Conyon *et al.*, 1995; Core *et al.*, 1999; Conyon and Murphy, 2000) were conducted before the crisis, leaving an obvious gap in the literature on the impacts of the financial crisis on the 'compensation-firm value' debate. Furthermore, previous British studies (e.g., Conyon and Murphy, 2000) on this topic used lagged values to deal with endogeneity

concerns, we bolstered our empirical findings with a more sophisticated techniques in dealing with endogeneity by using a three-stage least squares technique in a simultaneous equation modelling framework.

Although the UK has made a series of corporate governance reforms pre-financial crisis to curb the lofty executive bonus pay (Cho *et al.*, 2019; Conyon *et al.*, 2001; Greenbury Report, 1995), recent research shows that excessive executive bonus pay is regarded as one of the key factors that led to the collapse of many UK institutions during the 2007-2008 financial crisis (see von Ehrlich and Radulescu, 2017). To the end, we seek to understand the extent to which the ‘compensation- firm value’ debate has been influenced by corporate governance mechanisms such as managerial stock ownership, institutional ownership, board size and non-executive ownership in the UK. Recent findings from the High Pay Commission (HPC, 2012) also indicates that the remuneration of some top British executives has increased by more than 3000% in the last 30 years¹. This makes the UK a preferred market to conduct our litmus test on how executive bonus compensation drives firm value.

By way of preview, the evidence obtained in this study shows that executive bonus compensation positively affects firm value. This suggests that executives adopt appropriate policies to increase firm value as their incentives in the form of bonuses go up. Thus, through optimal compensation, risk-averse executives are motivated to embark on appropriate investment and financing policies to enhance corporate value. We also find that firms with higher executive or managerial ownership stakes experience lower firm value as executives’ bonus compensation increases. This signalled managerial entrenchment effect (Weisbach, 2007; Bebchuk & Fried, 2003) where executives become more risk averse to undertake risky investment and financing policies which ultimately determine corporate value. That is, as executives’ ownership increases, they become less motivated to borrow to finance investment projects because such project failure may affect their personal and economic benefits (Grossman and Hart, 1982; Brailsford *et al.*, 2002). Further, we observe that board size matters in the ‘compensation-firm value’ debate. Executives in firms with small board size tend to experience lower corporate value as their bonus pay increases but those in large board size firms tend to increase firm value. This finding supports the monitoring role of large boards

¹ See, the recent report of the ‘High Pay Commission’ available at: <http://highpaycentre.org/pubs/the-state-of-pay-one-year-on-from-the-high-pay-commission>.

(e.g., Ntim et al., 2019). Finally, we find that low non-executives ownership is associated with low corporate value given executive bonus compensation.

We conduct further tests to ascertain the robustness of our results. First, we measure our dependent variable by using alternative proxy (Tobin's Q). Second, in addition to OLS estimations, we use the fixed effects model to deal with firm fixed effect and time-invariant covariates. Finally, we address the issue of endogeneity and reverse causality by estimating simultaneous equation model using a three-stage least squares (3SLS) estimator. Consistently, our results remain robust to all these analyses.

We make contributions to the literature in the following ways. First, we contribute to the literature on corporate governance and firm value (e.g., Ntim et al., 2019; Haque and Ntim, 2020; Chu *et al.*, 2020; Ozkan, 2011; Conyon and Murphy, 2000). While the paper builds on the executive bonus compensation literature, it also furthers our understanding on the extent to which managerial ownership, institutional ownership, board size and non-executive ownership matter in the executive bonus compensation – corporate value relationship with specific emphasis on UK FTSE 100 firms. Our second contribution is related to the moderating role of managerial (executive) ownership. Here, we demonstrate the significant role of managerial ownership in the executive bonus compensation-firm value relationship. Thus, we show that as executives residual interests go up, managers become more conscious of the firm's idiosyncratic risk, and hence lessen their aggressive investment and financing strategies culminating in lower firm value. Our third contribution is linked to the monitoring role of board size. We demonstrate that board size is crucial in achieving shareholder value maximization policy.

The remainder of the article is structured along these lines: section 2 reviews related literature and develop testable hypothesis. Section 3 considers data and empirical methods. Section 4 presents and discusses results, and, finally, section 5 concludes.

2. LITERATURE REVIEW AND HYPOTHESES

2.1 Managerial compensation and performance

In modern establishments, board of directors (on behalf of shareholders) appoint top managers to oversee the day-to-day activities of the firm. One of the main fiduciary responsibilities of

the executives is to make risky corporate decisions relating to investment and financing which ultimately determine the firm value. However, because managers are known to be self-interested and risk averse (Fama, 1980), they may prefer to adopt policies that suit their interests to the detriment of the shareholders' value aspiration. A classic agency conflict explains the relationship where opportunistic managers are assumed to have a higher tendency to operate against shareholders' interests (see Jensen and Meckling, 1976; Fama 1980; Jensen and Murphy, 1990; Core *et al.* 1999). That is, the resulting risk-incentive problem of executives may have valued implications for optimal corporate decisions and firm value. For example, risk-averse and utility maximizing executives may forgo investing in risky but positive net present value (NPV) projects because such projects may exacerbate the firm's idiosyncratic risk as well as their personal and economic risk exposures (Holmstrom, 1989).

In minimizing this, different views have been offered by the literature including incentive pay alignment and monitoring mechanisms (Ntim *et al.*, 2019; Morse *et al.*, 2011; Pepper *et al.*, 2013; Cadbury, 1992; Jensen and Meckling, 1976). The incentive pay alignment argument suggests aligning both owners and executive's interests by efficiently designing pay packages to influence managers value-critical decisions and this idea has led to most executive pay and governance reforms worldwide (e.g., Cadbury 1992; King committee, 1994, 2002). Evidence on the incentive alignment has been mixed raising concerns on the effectiveness of pay incentives in resolving the principal(s) – agent(s) conflict (see Van Essen *et al.*, 2015; Chen *et al.*, 2011). Theoretically, the literature offers two contrasting views: optimal contracting theory - OCT and managerial power hypothesis – MPH (see Ntim *et al.*, 2019; Balafas & Florackis, 2014; Ozkan, 2011; Bebchuk and Fried, 2003, 2004; Jensen and Murphy, 1990; Jensen and Meckling, 1976). The OCT views executive pay packages as efficient negotiation between strong corporate boards and executive, leading to common alignment of shareholders - managers interests (Jensen and Murphy, 1990; Ozkan, 2011). The theory suggests a tight link between executive pay and corporate performance. The MPH argues that executives' involvement in the appointment of board members makes it easy for them to influence the board for higher pay thereby undermining the efficiency of incentive alignment (Bebchuk & Fried, 2003, 2004; Sapp, 2008). Thus, MPH sees executive compensation as further worsening agency conflict.

Following these differing views, past studies have found evidence to suggest that shareholders (through the board of directors) may efficiently design compensation to influence executives to select activities that increase firm performance. Supporting this view, some empirical studies show a strong relationship between executive pay and firm performance (e.g., Jensen & Murphy, 1990; Conyon & Murphy, 2000; Conyon & He, 2011; Ozkan, 2011; Cho et al., 2013; Ding et al., 2015; Ntim et al., 2019). For instance, Conyon & Murphy (2000) using one year sample of both the UK and the US, find evidence to suggest a higher pay-performance sensitivity particularly for those firm executives in the US. Jensen & Murphy (1990) and Ozkan (2011) share similar sentiments by showing an increasing relationship between executives' pay incentive and performance.

In contrast, other studies provide evidence consistent with the managerial power theory (e.g., Cooper et al., 2013; Balafas & Florackis, 2014). Using UK datasets, Gregg et al. (2006) reports low correlation among executive cash compensation – performance whilst Balafas & Florackis (2014) find a strong negative relationship between them. In addition, Cooper et al. (2013) also observed a negative relationship like Malmendier & Tate (2009) using US data. Similarly, Brick et al. (2006) provide evidence in support of cronyism hypothesis (i.e., executive excessive compensation leads to lower shareholder return) when they employed Canadian data. Others have shown that the nature of compensation incentives induce managerial corporate policy selections on investment and financing activities (Crocchi and Petzemas, 2015; Nguyen, 2018; Adu-Ameyaw et al., 2021; Adu-Ameyaw et al., 2022). For instance, Adu-Ameyaw et al. (2022) show that executive with cash bonus-motivated compensation tends to increase fixed intangible assets investment while those stock-motivated one's lower such activity. Regarding financing decisions, Adu-Ameyaw et al. (2021) find that stock-based incentive induces more firm borrowings while those cash bonus one's lower firm's borrowings. Mainly, this stream of research views compensation incentives as a crucial element in influencing managerial selection of optimal corporate activities which ultimately determines the value of the firm.

Thus, despite the growing literature on executive compensation, our understanding on how executive compensation affects firm performance is still inconclusive. For instance, researchers that concentrated on managerial compensation determinants (see Ding et al. 2015; Ozkan, 2011; Conyon & He, 2012; Firth et al. 2005; Conyon & Murphy, 2000) reported small positive

return but others including Balafas & Florackis (2014), Cooper et al. (2013), Brick et al. (2006), Malmendier and Tate (2009), Core et al. (1999) documented a negative effect of compensation on firm return. These studies mainly adopted a panel-data regression framework and the lack of consensus in the literature can be attributed to possible endogeneities problem. For instance, Balafas & Florackis (2014), Cooper et al. (2013) and Conyon & He (2012) used lagged values in their panel regression analysis but failed to account for joint determination of pay incentives and other monitoring mechanisms by corporations. Thus, firms with weak governance structures may face greater agency problem because opportunistic executives are likely to engage in rent extraction (Core et al. 1999). Given these observed limitations, particularly among British studies, we employ a relatively more sophisticated technique to deal with this methodological issue. That is, our base model is that the board of directors (on behalf of shareholders) set firm executives performance targets and appropriately design compensation to induce them to achieve the set targets.

Indeed, existing theoretical and empirical literature on managerial power hypothesis report value-destroying evidence for executives with excessive compensation incentives (e.g., Malmendier & Tate, 2009; Bebchuk et al., 2011; Cooper et al., 2013; Balafas & Florackis, 2014). For example, Cooper et al. (2013) use a comprehensive US data and find that underperforming firms excessively reward their executives while Malmendier & Tate (2009) find poor performing firms reward their superstar CEOs with generous pay packages. Therefore, given that the existing evidence on executive compensation and performance is broadly consistent with managerial power hypothesis predictions, our first hypothesis is stated as follows:

H1 There is a negative relationship between managerial compensation and performance.

Furthermore, the literature further suggests that corporate governance system affects the structure and the level of managerial compensation (Ozkan, 2011; Balafas & Florackis, 2014). For example, while Ozkan (2011) suggests that shareholders are likely to use less compensation packages to align their incentive with managers particularly in firms with large block-shareholders; others contend that block-shareholders can easily influence managerial pay

(Ryan and Wiggins, 2002; Ntim et al., 2019). With this, we further argue that the existence of effective governance system will affect how managerial compensation affect firm performance.

2.2. Managerial bonus compensation and firm performance – the role of managerial ownership

The main idea of this study is that through efficient bonus compensation package, executives are motivated to choose value-critical policies to increase firm value. That is, shareholders' and executives' interests are aligned via efficient compensation design (Jensen & Murphy, 1990). Further, it has been suggested that shareholders may use less compensation incentives to align their interests with executives particularly in firms where they (executives) hold large ownership (Hartzell and Starks, 2003; Ozkan, 2007; Janakirman *et al.*, 2010). Others also contend that executives with large ownership holdings are likely to be more entrenched in the firm. With their entrenchment power, they can easily influence the board for higher bonus incentives (Bebchuk and Fried, 2003; Weisbach, 2007) and pursue policies that suit their interests (Gormley and Matsa, 2016; Conyon & He, 2011; Brick et al., 2006). For instance, Gormley and Matsa (2016) argue that executive may have an incentive to forgo risky but positive net present value (NPV) projects when they hold large stakes in the firm. Given that the risky policies (those relating to investment and financing) of executives determine the firm value, it is quite plausible that executive compensation in firms where executives hold large ownership stakes is likely to be inefficient in influencing value-critical decisions. With this argument, we predict that executive bonus compensation – firm value relationship is likely to be affected by the executive's ownership holdings. Thus, we state our second prediction as follows:

H2: The relationship between executive compensation and performance is likely to be accentuated by executive ownership.

2.3. Managerial bonus compensation and firm performance – the role of institutional ownership

Compared to individual investors, institutional investors often hold a large ownership stake in their invested companies. With their large holdings stake, they may be able to restrain top

executives from any expropriation behaviour through consumption of perquisites, awarding themselves bumper pay bonuses and other forms of misbehaviour that may affect corporate value (Ntim et al., 2019). For instance, in the UK, the Cadbury Report (1992) makes recommendation on the responsibilities of institutional investors as an important powerhouse to restrain managerial misbehaviour. Following this, the UK institutional investors have become very important as their share ownership has increased and they have become more active in their ownership role (Solomon, 2010). According to the ONS (2012)² as of December 2012, institutional investors owned around 86.5% of UK shares compared to 30% in 1963. Empirically, while some studies have found evidence to suggest effective monitoring role of institutional and block-holder shareholders on executives' compensation (Hartzell and Starks, 2003; Ozkan, 2007; Sapp, 2008), others have shown no such evidence (e.g., Conyon and Leech, 1994). Noting from the above argument, we reason that an efficient executive compensation scheme is likely to be designed particularly for those firms that have a large institutional shareholder. Thus, large institutional shareholders can influence efficient design of executive compensation, which may ultimately affect firm value (Ding et al., 2015). In contrast, others including Conyon & He, (2011, 2012) suggest that large shareholders and executives may connive to engage in activities to the detriment of minority shareholders. Based on these, we further argue that executive compensation in firms with large institutional shareholders are likely to be affected. Thus, we conjecture that executive compensation – performance is likely to be affected by the level of institutional shareholdings.

H3: Executive compensation and performance is likely to moderated or accentuated by institutional ownership.

2.4. Managerial bonus compensation and firm performance – the role of board size

The board of directors on behalf of shareholders monitor and design management compensation incentives. Such role has implications for effective monitoring of management through compensation scheme and the ultimate firm value (Cole *et al.*, 2008; Ozkan, 2007). Prior studies show that the shareholders (via the board) in firms with large board size use more compensation incentives to motivate top executives (Ozkan, 2007). In contrast, others report

² See, Office for National Statistics (2012). Available from: <http://www.ons.gov.uk/ons/rel/pnfc1/share-ownership---share-register-survey-report/2012/stb-share-ownership-2012.html#tab-Key-Points>.

that larger boards have minimal effects on managerial compensation design (Ozdemir and Upneja, 2012). The authors argue that larger boards are less effective in coordinating and monitoring managerial activities. Given that the boards can influence executive compensation design, it is likely that executives in firms with large boards may efficiently design compensation to influence managers to increase firm's value. Thus, in this section, we further examine the extent to which board size affects executive bonus compensation–firm value relationship. We make our fourth prediction:

H4: Executive compensation and performance is likely to be moderated by board size.

2.5. Managerial bonus compensation and firm performance – the role of non-executive board

Non-executive directors play a crucial role in influencing executives' pay and the ultimate managerial value-enhancing corporate decisions (Mehran, 1995). In the UK, the Hampel Report (1998) highlights the responsibilities of non-executive directors in influencing managers' decisions to achieve shareholders value maximization. For instance, Mehran (1995) argues that outsider (non-executives) dominated boards are more aligned with shareholders' interests. That is, the outsiders through efficient compensation design can induce managers to select value-maximizing activities. Based on the above discussions, we further predict that non-executive directors may be able to influence managerial activities thereby increase corporate value.

H5: The number of non-executives' directors will moderate executive compensation-performance linkage.

3. RESEARCH METHOD

This study utilizes FTSE 100 companies listed on the London Stock Exchange (LSE) for the period of 2007-2012. Our analysis was limited to FTSE100 for these reasons: it represents top-listed UK firms, and the firms provide comprehensive data on managerial compensation, governance indicators and other firm characteristics data. More specifically, the data for the

study were collected from variety of sources. Data for executive or managerial pay packages, corporate governance and ownership characteristics were taken from Bloomberg database³ while the financial data and other firm specific characteristics were collected from the FAME⁴ database. Based on the ‘Global Industrial Classification’ (GIC), a total of 575 firm-year observations were used in the analyses. Thus, Table 2 shows the sample size and number of observation years for each sector over the period under investigation. The definitions and measurement of variables can be found in Table 1.

3.1. Model specification

The empirical model to establish the link between executive bonus compensation and firm performance is stated below. We use Ordinary Least Square (OLS) regression estimator.

$$ROA_{i,t} = a_i + \beta_1 TVP_{it} + \beta_2 X_{it} + \varepsilon_{i,t} \dots \dots \dots (1)$$

We use Fixed Effects (FE) as an alternative specification.

$$ROA_t = \alpha + \beta_1 TVP_{it} + \beta_2 X_{it} + \theta_i + \delta_t + \mu_{it} \dots \dots \dots (2)$$

In equation (1), *ROA* is the return on assets (performance), *TVP* are executives’ total variable compensation and *X_{it}* is a vector of control variables respectively. All variables are defined in Table I. For robustness checks, we use Tobin’s Q as our alternative dependent variable. We also adopt a simultaneous system of equations (using 3SLS) technique to account for possible endogeneity issues (Ntim et al., 2019).

Our simultaneous equations model is presented as follows:

$$TVP_{i,t} = \alpha + \beta ROA_{i,t} + \beta IV_{i,t} + \beta X_{i,t} + \varepsilon_{i,t} \dots \dots \dots (3i)$$

$$ROA_{i,t} = \alpha TVP_t + \beta X_{i,t} + \varepsilon_{i,t} \dots \dots \dots (3ii)$$

In the first stage, equations (3i), we include return on assets (*ROA*), instrumental variable (*IV*) for the bonus model (*TVP_{it}* - industry-median total variable pay) together with other controls. Thus, we regress total variable pay (*TVP_{it}*) on the determinants to obtain the predicted values for the pay component (αTVP) which is then included in the *ROA* equation (3ii).

³The *Bloomberg database* is an investment trading tool and a source for academic research concerning financial performance data of companies and containing a good package of information on company boards and individual directors.

⁴ *FAME* is a database which contains comprehensive information on companies in the UK and Ireland. It’s used to research individual companies, search for companies with specific profiles and for analysis.

4. RESULTS AND DISCUSSION

4.1. Summary statistics and bivariate correlations

Table 2 presents the descriptive statistics for the variables in the study. The average value of return on assets (*ROA*) is 6.75 and has a standard deviation of 8.56 while that of Tobin's Q (*TQ*) is 1.77 with a standard deviation of 1.11. The variables have a minimum value of -56.98 and a 95th percentile of 18.44 for *ROA* while *TQ* showed 0.73 and 3.66 respectively, signifying a high degree of variability for *ROA* compared to *TQ* measure. The average value of executives' total variable pay (*TVP*) is 16.94 with a standard deviation of 1.31. The minimum and 95th values of this variable are 13.25 and 19.37 respectively, signifying a fair degree of heterogeneity. The mean value of executive total fixed pay (*TFP*) is 6.44, with a standard deviation of 0.31. Also, the average values (standard deviation) of managerial ownership (*MO*), institutional ownership (*IO*), non-executive members (*NE*) and board size (*BS*) are *MO* 6.08 (0.89), *IO* 7.75 (2.30), *NE* 7.18 (2.33) and *BS* 10.49 (2.61) respectively.

Table 3 shows the correlation matrix results. A few things worth pointing out: return on assets (*ROA*) shows a positive sign with total variable pay – *TVP* and managerial ownership-*MO* but negative sign with institutional ownership – *IO* and board size – *BS*. Thus, managerial ownership induces better performance whiles *IO* and *BS* decrease value. This evidence from the correlation matrix and the descriptive statistics, show no serious issues such as multicollinearity and limited variation in the data.

[Tables 2 & 3 about here]

4.3. The effect of managerial bonus compensation on firm performance

Table 4 presents the empirical results of our baseline regression model of the effect of bonus compensation (*TVP*) on performance (*ROA*). The model is estimated using OLS estimator and our main result is reported in fully specified model 2, while models 4, 5 & 6 show alternative specification and alternative dependent variable measure (*Tobin Q*) regression. Specifically, Model 2 shows that the relationship between bonus compensation (*TVP*) and performance (*ROA*) is positive and statistically significant at the 1% level. The coefficient estimate for *TVP* variable is 1.751 and has a t-statistics of 5.10, implying that an increase in managerial bonus compensation is associated with higher firm's value. Thus, corporate managers with bonus incentives are motivated to increase firm value by appropriately selecting value-critical investment and financing policies. This finding is consistent with prior works (e.g., Conyon, 1997; Conyon and Peck, 1998; Rashid, 2013; Ntim et al., 2019) but contrary to that of Conyon et al. (2000), Cooper et al. (2013), and Balafas & Florackis (2014) who reported negative relationship. In model 4, our Fixed Effects (FE) estimator still shows bonus compensation (*TVP*) to be positive and significant which further collaborate what is already reported in model 2. On the control variables, executive total fixed pay (*TFP*) is negative and insignificant, suggesting that executives with this compensation component feel less motivated to increase value. This is unsurprising because *TFP* forms the base pay upon which variable compensation depends and it is paid to executives whether the firm does well or not. Firm size (*SZ*), debt (*DE*), growth (*GR*) and board size (*BS*) are negative and significant whilst managerial ownership (*MO*), age (*AGE*) and gender (*GDR*) are all positive and statistically significant.

[Table V about here]

4.4. Robustness checks

The results reported in Table 4 show that bonus compensation (*TVP*) significantly affects firm value (*ROA*). We further test if our results are robust to alternative dependent variable measure and alternative econometric specification i.e., simultaneous equation models using three-stage least squares (3SLS) estimator. Specifically, we measure our alternative dependent variable (*Tobin Q*) as the ratio of the market value of the firm to the replacement cost of the assets. We re-estimate our models (OLS and FE) using the *Tobin Q* proxy as the dependent variable. As shown, the bonus compensation (*TVP*) sign is still positive and significant confirming our main

results. Furthermore, so far in our analysis, we use lagged value of bonus compensation (*TVP*) to minimize endogeneity problem. Despite this attempt to deal with the endogeneity concern, the issue of direct causation remains a concern, as it has been suggested that shareholders of profitable firms may reward their executives with more bonuses (Ryan and Wiggins, 2001; Core et al., 1999; Ntim et al., 2019). Thus, these studies concentrate on the determinants of managerial compensation. On the other hand, our current study argues that the shareholders optimal compensation package induces executives to select value-enhancing decisions, hence the ultimate firm value. Given these intuitive arguments, it is possible that the relationship between firm value (*ROA*) and bonus compensation (*TVP*) is more complex than we assume. Thus, there could be a bi-directional effect existing among them and that there is no absolute direct causation of executives' bonus compensation on firm value without accounting for the reverse linkage. To further account for the possibility that firm value (*ROA*) can be a determinant of executive compensation, we use simultaneous equation models in which the jointly determined variables – *ROA* and bonus compensations (*TVP*) – are simultaneously estimated. In the simultaneous equation model, the first-stage equation, where bonus compensation variable (*TVP*), is regressed on *ROA*, instrument, and other determinants (controls defined in Table I) to obtain the predicted values of bonus compensations (*TVP*), which is then included in the second-stage equation (firm value – *ROA* model). Like prior studies, we use contemporaneous values of bonus compensation variable instead of lagged *TVP* values (e.g., Adu-Ameyaw et al., 2021; Coles *et al.*, 2006). The reported results in Table 5 (simultaneous equation models – 3SLS) show coefficient estimate for *TVP* to be qualitatively like the main results in Table 4. Overall, the 3SLS result suggests that our earlier findings are not affected by endogeneity issue and that our main results reported in Table 4 are robust to an alternative econometric specification.

[Tables VI & VII about here]

4.5. Managerial bonus compensation and firm performance – the role of managerial ownership

The main thesis in this study is that through efficient bonus compensation package, executives are motivated to choose value-critical activities to increase firm value (e.g., Jensen & Murphy,

1990). In this section, we further examine the extent to which managerial ownership affects the executive bonus compensation – performance relationship.

To achieve this aim, we use the stock ownership held by executive's (*MO*) (Adu-Ameyaw et al., 2021; Florackis and Ozkan, 2009). Thus, executives with ownership stakes above the top one-third quantile are marked as high ownership (*MO75*), whilst those with ownership at the bottom one-third quantile are marked as low ownership (*MO25*). We use dummies for High (*MO75*) equal to one (1) for executive share ownership in the top one-third quantile and zero (0) otherwise while those with Low ownership (*MO25*) is equal to one (1) and zero (0) otherwise. We multiple these dummies (*MO75*) and (*MO25*) with our key independent variable to get the interaction terms ($TVP \times MO25$, $TVP \times MO75$). We separately include the interaction term in the respective models and the results are presented in Models 1 & 2 of Table 6. Specifically, we find the coefficient estimate for $TVP \times MO25$ to be positive but insignificant, whilst coefficient on $TVP \times MO75$ is negative (-1.227) and statistically significant in Model 2. This implies that bonus-incentivised executives with larger ownership holdings are more likely to reduce firm value. This is not surprising because at high ownership holdings, executives may become more risk-averse and may forgo risky but positive net present value activities. This evidence is suggestive of managerial entrenchment effects (Gormley and Matsa, 2016; Brick, Palmon and Wald, 2012).

4.6. Managerial bonus compensation and firm performance – the role of institutional ownership

Next, we test our third hypothesis (*H3*) to see whether institutional ownership affects compensation – performance linkage. To test this, we use the share ownership held by institutional investors (*IO*) (Adu-Ameyaw et al., 2021) and it is measured as a log number of shares and arranged in descending order. Specifically, institutional ownership above the top one-third quantile is marked as large ownership (*IO75*), whilst those with ownership at the bottom one-third quantile are marked as low ownership (*IO25*). We represent these (*IO75*, *IO25*) with dummies for large (*IO75*) equal to one (1) for institutional share ownership in the top one-third quantile and zero (0) otherwise while those with Low ownership (*IO25*) is equal to one (1) and zero (0) otherwise. We interact these dummies (*IO75*) and (*IO25*) with the independent variable to get the interaction terms ($TVP \times IO25$, $TVP \times IO75$). We include each

interaction term together with the dummy variable in the respective models (3 & 4) and the results are presented in Table 6. Specifically, we find the estimate for $TVP \times IO25$ to be negative, while that of $TVP \times IO75$ is positive but are both statistically insignificant in Models 3 & 4. These suggest that firms with institutional shareholders are ineffective in using their power (through efficient bonus compensation design) to influence managerial value-critical decisions. These results could possibly suggest a case where executives and institutional shareholders connive to exploit minority shareholders. The implications of these results is that the Cadbury Report (1992) recommendation seeks to have a minimal effect on managerial compensation design and the ultimate value.

4.7. Managerial bonus compensation and firm performance – the role of board size

Our fourth hypothesis ($H4$) posits that board size affects managerial compensation design and the ultimate firm value. With this, we further test the extent to which board size affects executive bonus compensation–firm value relationship.

We use the number of board of directors as our measure of board size. Specifically, board size above the top one-third quantile is marked as large size (BS75), whilst those at the bottom one-third quantile are marked as small size (BS25). We represent these (BS75, BS25) with dummies for large (BS75) equal to one (1) for board size in the top one-third quantile and zero (0) otherwise while those with small size (BS25) is equal to one (1) and zero (0) otherwise. We interact these dummies (BS75) and (BS25) with the independent variable to get the interaction terms ($TVP \times BS25$, $TVP \times BS75$) and each interaction term together with the dummy variable are included in the respective models (5 & 6). Table 6 shows that the coefficient on $TVP \times BS25$ is negative and significant, implying that in firms with small board size, executives with bonus compensation does not increase firm value. Further, the coefficient on $TVP \times BS75$ is positive and statistically significant in Model 6. This suggests that bonus-incentivised executives in firms with larger boards are more likely to increase firm value. Thus, compared to small boards, large boards are able to design appropriate bonus compensation to induce executives to increase value.

4.8. Managerial bonus compensation and firm performance – the role of non-executive board

Our fifth hypothesis (H5) suggests that non-executive directors play a crucial role in influencing executives' pay and the ultimate firm value (Mehran, 1995). As mandated by the Hampel Report (1998), UK non-executive directors are expected to protect shareholders' interests including by monitoring executive compensation decisions. We test the extent to which non-executive directors' presence may influence compensation – performance relation.

In achieving this, we use the number of independent board members who are non-executive as our measure. Specifically, the number of independent board members above the top one-third quantile is marked as independent board (NE75), whilst those at the bottom one-third quantile are marked as less independent board (NE25). We represent the dummies for independent board (NE75) equal to one (1) for independent board members in the top one-third quantile and zero (0) otherwise while those with less independent board (NE25) is equal to one (1) and zero (0) otherwise. We interact these dummies (NE75) and (NE25) with the independent variable to get the interaction terms ($TVP \times NE25$, $TVP \times NE75$) and each interaction term together with the dummy variable is included in the respective models (7 & 8). Thus, Table 6 reports the results, and it shows the coefficient on $TVP \times NE25$ is negative and significant, suggesting that in firms with less independent board, executives with bonus compensation decrease firm value. However, the coefficient estimates on $TVP \times NE75$ is positive but insignificant. Overall, this evidence partly supports the view that managers may pursue own policies particularly in firms with less independent board. This is because, in such firms' managers may find it easy to influence fewer independent board numbers appointed to the board.

5. CONCLUSION AND IMPLICATIONS

This paper examines how managerial (executives) bonus compensation affects firm performance and the extent to which this relationship is conditional on managerial ownership, institutional ownership, board size and non-executive ownership. We find that executives' bonus compensation has a positive effect on firm value, consistent with optimal compensation theory (Conyon *et al.*, 2000; Jensen & Murphy, 1990). This finding is robust to all our adopted econometric specifications, including three-stage least squares (3SLS), which accounts for the simultaneous determination of executive compensation and the firm value. Theoretically, this

result offers support for the incentive alignment argument under the optimal compensation theory (Canyon *et al.*, 2000; Chahine and Goergen, 2014; Ntim *et al.*, 2019). Our study further shows that managerial ownership, board size and non-executive ownership matter in the bonus compensation–firm value relationship (Haque and Ntim, 2020; Ntim *et al.*, 2019). That is, we observe a negative link between bonus compensation – corporate value for those firms with large managerial ownership. We also show that the bonus compensation – firm value linkage is negative for small board size but positive for firms with large boards. Further, while we find no strong evidence for the moderating role of institutional ownership in the bonus compensation – firm value linkage, we observe a negative impact for those firms with small non-executive ownership. From both theoretical and empirical perspectives, the results show that ‘bonus executives’ become more risk averse particularly when they hold large ownership stake causing them to take less risky investment and financing decisions which could ultimately lead to lower firm value. Thus, our finding shows that board of directors (on behalf of shareholders) should be conscious of managerial ownership stake when designing executive compensation. Also, the board size is important in the bonus compensation – firm value relation. This finding is particularly crucial for firms with smaller board to increase the size of the board.

Notwithstanding these important findings, there are a few limitations worth pointing out. First, our dataset is based on UK FTSE 100 firms, and this limits the generalisation of the findings. Thus, the existing institutional differences across developed and developing countries offer an opportunity to replicate this study in different settings. Future studies can offer further insight by extending our findings to both emerging and developed economies. Our study does not consider executives retirement plans (pension entitlement) in the bonus compensation package, future studies can look at how executive pension entitlement affects corporate value.

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Table 1: Definitions of Variables

TFP	Total fixed pay (Basic salary) paid to board executives – defined as log total value of the executive base salary.
TVP	Total variable paid to board executives (annual bonuses and share options) – defined as the log total value.
TOBIN Q (TQ)	Ratio of the market value of the firm to the replacement cost of their average total asset.
DE	Measured by the firms' total debt to equity ratio.
LQ	Measured as current ratio
RD	Log value of the firm's total investment in research and development.
MO	Number of shares held by company executives i.e., managerial ownership.
IO	Log of total number of shares held by institutional investors.
BS	Total number of board members on the board.
NE	Proportion of independent non-executive directors on the board
AGE	Average age for board room executives
TEN	Time period for CEOs'/CFOs and other board executives holding their current boardroom roles
GDR %	Percentage of female representation on the board.

Table 1B: FTSE 100 Companies by Sector Classifications 2007-2012

GIC Industrial Classification	Number of firms in the sample	Observed firm years
Basic Materials	11	65
Consumer Goods	9	54
Consumer Services	16	94
Financial	25	132
Health Care	4	24
Industrial Goods & Services	11	63
Oil & Gas	8	49
Technology	2	4
Telecommunication	4	19
Utilities	6	36
Total	96	575

Table 2: Summary statistics

	Mean	St. Dev.	Min	25%	50%	75%	95%	N
ROA	6.75	8.56	-56.98	2.17	5.83	10.24	18.44	575
TQ	1.77	1.11	0.73	1.06	1.40	2.09	3.66	575
TVP	16.94	1.31	13.25	16.19	16.88	17.71	19.37	567
TFP	6.44	0.31	5.32	6.26	6.40	6.58	7.05	575
SZ	4.06	0.80	2.19	3.49	3.92	4.48	5.55	575
SUB	541.54	799.90	0.00	138.00	292.00	541.00	2550.00	575
DE	1.70	0.73	-2.27	1.53	1.77	2.07	2.65	575
GR	22.39	68.87	-255.00	10.30	14.60	20.19	38.75	575
LQ	1.32	1.01	0.05	0.78	1.12	1.48	3.59	575
RD	3.06	3.88	0.00	0.00	0.00	7.40	8.92	575
MO	6.08	0.89	0.00	5.57	6.02	6.49	7.93	575
IO	7.75	2.30	0.00	7.90	8.31	8.71	9.27	575
NE	7.18	2.33	0.00	5.00	7.00	9.00	12.00	575
BS	10.89	2.61	5.00	9.00	11.00	12.00	16.00	575
AGE	56.64	2.91	46.50	54.77	57.00	58.70	60.80	575
TEN	5.32	4.06	0.00	2.58	4.17	7.07	13.54	575
GDR	1.43	0.99	0.00	1.00	1.00	2.00	3.00	575
N	575							

The table presents the summary statistics of all the variables used in our analysis. Variable definitions are provided in Table 1

Table 3: Correlation matrix

	1	2	3	4	5	6	6	7	8	9	10	11	12	13	14	15	16
ROA	1.00																
TQ	0.59*	1.00															
TVP	0.03	0.03	1.00														
TFP	-0.20*	-0.23*	0.39*	1.00													
SZ	-0.37*	-0.47*	0.40*	0.55*	1.00												
SUB	-0.21*	-0.20*	0.15*	0.20*	0.57*	1.00											
DE	-0.32*	-0.40*	0.12*	0.21*	0.39*	0.10	1.00										
GR	-0.05	0.06	-0.06	-0.05	-0.10	-0.05	0.01	1.00									
LQ	0.19*	0.23*	-0.17*	-0.20*	-0.30*	-0.16*	-0.39*	0.02	1.00								
RD	0.06	-0.02	0.19*	0.17*	0.07	-0.18*	0.02	-0.09	-0.02	1.00							
MO	0.16*	0.18*	-0.10	-0.03	-0.04	0.13*	-0.31*	0.03	0.15*	-0.21*	1.00						
IO	-0.05	-0.02	0.03	0.05	0.13*	0.10	-0.11	0.03	0.08	0.03	0.04	1.00					
NE	-0.19*	-0.17*	0.43*	0.50*	0.66*	0.32*	0.18*	-0.10	-0.18*	0.24*	-0.13*	0.14*	1.00				
BS	-0.24*	-0.24*	0.40*	0.60*	0.66*	0.37*	0.23*	-0.08	-0.29*	0.17*	-0.04	0.09	0.79*	1.00			
AGE	0.01	-0.09	0.20*	0.16*	0.31*	0.22*	0.09	-0.07	0.05	0.27*	-0.06	0.09	0.38*	0.27*	1.00		

TEN	0.10	0.18*	-0.09	0.02	-0.25*	-0.03	-0.15*	0.07	0.02	-0.05	0.32*	0.03	-0.12*	-0.04	-0.04	1.00	
GDR	-0.07	-0.05	0.24*	0.34*	0.36*	0.14*	0.19*	-0.08	-0.29*	0.08	-0.06	-0.03	0.44*	0.43*	0.12*	-0.04	1.00

The table provides the correlation coefficient between the variables. All variables are described in Table 1. * indicates significance at 1%

Table 4: Managerial bonus compensation and firm performance

	(OLS 1)	(OLS 2)	(FE 3)	(FE 4)	(OLS 5)	(FE 6)
	ROA	ROA	ROA	ROA	Tobin Q	Tobin Q
TVP	0.512* (1.63)	1.751*** (5.10)	0.657 (1.40)	0.801* (1.71)	0.209*** (6.16)	0.108*** (2.98)
TFP		-1.447 (-0.92)		-1.804 (-1.03)	0.039 (0.25)	-0.184 (-1.35)
SZ		-3.739*** (-4.20)		-13.160*** (-3.17)	-0.871*** (-6.28)	0.139 (0.43)
SUB		-0.001 (-1.13)		0.000 (0.78)	0.000 (0.98)	0.001 (.)
DE		-1.493** (-2.23)		-2.326*** (-2.64)	-0.228** (-2.17)	-0.117* (-1.70)
GR		-0.009*** (-3.65)		-0.007 (-1.55)	0.001 (0.62)	0.001** (2.48)
LQ		-0.036 (-0.08)		-0.195 (-0.34)	0.055 (0.90)	0.044 (0.98)
RD		0.061 (0.76)		-2.008*** (-2.86)	-0.007 (-0.64)	-0.033 (-0.60)
MO		1.407** (2.08)		-0.149 (-0.19)	0.205** (1.98)	0.036 (0.60)
IO		-0.087 (-0.95)		-0.221 (-0.95)	-0.003 (-0.26)	-0.011 (-0.58)
NE		0.174 (0.65)		-1.103*** (-3.09)	0.111** (2.53)	-0.008 (-0.29)
BS		-0.472** (-2.00)		0.267 (0.86)	-0.063 (-1.53)	0.026 (1.09)
AGE		0.351*** (2.96)		0.094 (0.55)	0.003 (0.16)	0.004 (0.33)
TEN		-0.005 (-0.04)		-0.036 (-0.27)	-0.003 (-0.13)	-0.011 (-1.05)
GDR		0.787* (1.85)		-0.509 (-0.92)	0.139*** (3.19)	-0.005 (-0.12)
_Cons	-1.266 (-0.21)	-19.62* (-1.70)	-6.649 (-0.83)	69.310*** (2.99)	0.284 (0.21)	0.016 (0.01)
Year Effect	YES	YES	YES	YES	YES	YES
Industry Effect	YES	YES	NO	NO	YES	NO
<i>N</i>	473	473	473	473	473	473
<i>R</i> ²	0.063	0.313	0.064	0.175	0.407	0.136

This table shows the estimation results of the effects of variable compensation bonus (TVP) on firm performance (ROA). Our main OLS results is reported in Model 2 and the fully specified Models 4, 5 & 6 are used for robustness. Model 4 shows Fixed Effects (FE) and Models

5 & 6 are for alternative measure of firm performance (Tobin Q). All variable definitions are described in Table I. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 5: Managerial bonus compensation and firm performance
Simultaneous Equation Model (using 3SLS)

	(2 nd Stage) ROA	(1 st Stage) TVP
TVP	1.540*** (5.69)	
TFP	-0.451 (-0.34)	
SZ	-4.093*** (-5.62)	0.0000 (0.17)
SUB	-0.0004 (-0.78)	1.61e-11 (0.17)
DE	-1.376*** (-2.66)	7.48e-08 (0.23)
GR	-0.0096** (-2.17)	9.56e-10 (0.42)
LQ	0.0014 (0.00)	2.77e-09 (0.10)
RD	0.144* (1.63)	-1.35e-08 (-0.40)
MO	1.456*** (3.63)	-1.90e-08 (-0.06)
IO	-0.0555 (-0.41)	1.20e-08* (1.73)
NE	-0.0446 (-0.18)	-9.44e-09 (-0.44)
BS	-0.266 (-1.18)	1.00e-10 (0.01)
AGE	0.349*** (2.87)	-3.05e-09 (-0.04)
TEN	-0.0660 (-0.78)	-5.90e-09 (-0.34)
GDR	0.666* (1.82)	-1.14e-08 (-0.07)
ROA		2.84e.08 (0.12)
IND_TVP		1.001*** (28.25)
_Cons	-18.130* (-1.68)	-8.45e-08 (-0.02)
<i>N</i>	567	567
<i>R</i> ²	0.30	0.28

This table shows the simultaneous equations models regression of firm performance (ROA) and variable compensation (TVP) results. The first stage regression is where each endogenous variable: variable compensation (TVP) is regressed on ROA, controls and instrument (industry median_IND_TVP). The coefficients on the variable of interests: TVP is shown in the ROA model. The models included fixed

effects in all estimations. The reported t-statistics based on robust standard errors. Variable definitions are described in Table I. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 6: Managerial bonus compensation and firm performance: the role of managerial ownership, institutional ownership, board size and non-executive ownership.

.	(OLS 1)	(OLS 2)	(OLS 3)	(OLS 4)	(OLS 5)	(OLS 6)	(OLS 7)	(OLS 8)
	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA
TVP	1.685*** (4.09)	2.055*** (4.92)	1.862*** (5.14)	1.502*** (4.83)	2.205*** (4.94)	1.254*** (3.78)	1.967*** (4.94)	1.639*** (3.93)
TFP	-1.366 (-0.86)	-1.328 (-0.86)	-1.761 (-1.11)	-1.220 (-0.79)	-1.527 (-0.98)	-1.387 (-0.90)	-1.424 (-0.92)	-1.424 (-0.93)
SZ	-3.582*** (-3.97)	-3.723*** (-4.23)	-3.431*** (-4.00)	-3.801*** (-4.14)	-3.720*** (-4.20)	-3.789*** (-4.27)	-3.587*** (-4.01)	-4.163*** (-4.88)
SUB	-0.001 (-1.29)	-0.001 (-0.60)	-0.001 (-1.41)	-0.001 (-1.10)	-0.001 (-1.15)	-0.001 (-1.00)	-0.001 (-1.16)	-0.000 (-0.70)
DE	-1.453** (-2.15)	-1.432** (-2.16)	-1.338** (-2.06)	-1.452** (-2.23)	-1.575** (-2.27)	-1.473** (-2.21)	-1.721** (-2.36)	-1.564** (-2.32)
GR	-0.009*** (-3.87)	-0.008*** (-3.27)	-0.007*** (-2.99)	-0.009*** (-3.44)	-0.009*** (-4.03)	-0.009*** (-3.93)	-0.009*** (-3.34)	-0.009*** (-3.47)
LQ	-0.014 (-0.03)	0.120 (0.27)	-0.145 (-0.31)	-0.045 (-0.10)	-0.098 (-0.22)	-0.075 (-0.17)	-0.016 (-0.04)	-0.023 (-0.05)
RD	0.041 (0.49)	0.067 (0.85)	0.105 (1.26)	0.076 (0.91)	0.068 (0.84)	0.059 (0.73)	0.062 (0.76)	0.0239 (0.31)
MO	1.808** (2.20)	1.985** (2.04)	1.828** (2.50)	1.432** (2.13)	1.386** (2.09)	1.363** (2.07)	1.198* (1.84)	1.282* (1.95)
IO	-0.113 (-1.17)	-0.074 (-0.73)	0.350** (2.22)	-0.088 (-1.01)	-0.116 (-1.20)	-0.110 (-1.14)	-0.124 (-1.24)	-0.131 (-1.34)
NE	0.127 (0.48)	0.159 (0.61)	0.237 (0.91)	0.209 (0.80)	0.149 (0.56)	0.164 (0.61)	0.301 (1.13)	-0.489 (-1.28)
BS	-0.412* (-1.79)	-0.421* (-1.86)	-0.510** (-2.18)	-0.535** (-2.21)	-0.472* (-1.67)	-0.627** (-2.06)	-0.476** (-2.01)	-0.385* (-1.65)
AGE	0.336*** (2.71)	0.296** (2.48)	0.332*** (2.74)	0.344*** (2.81)	0.339*** (2.90)	0.334*** (2.86)	0.310*** (2.63)	0.326*** (2.79)
TEN	0.010 (0.09)	0.031 (0.28)	-0.059 (-0.54)	-0.016 (-0.15)	-0.004 (-0.03)	-0.009 (-0.08)	0.000 (0.00)	-0.007 (-0.06)
GDR	0.760* (1.77)	0.851** (2.01)	0.926** (2.19)	0.826* (1.93)	0.893** (2.13)	0.836** (2.08)	0.915** (2.17)	0.978** (2.33)
MO25	-0.421 (-0.04)							
MO25 *TVP	0.107 (0.18)							

MO75		18.72**						
		(2.14)						
MO75		-1.227**						
*TVP		(-2.48)						
IO25			6.624					
			(0.35)					
IO25*			-0.161					
TVP			(-0.14)					
IO75				-13.26				
				(-1.05)				
IO75*				0.780				
TVP				(1.11)				
BS25					24.62**			
					(2.43)			
BS25*					-1.466**			
TVP					(-2.40)			
BS75						-20.38*		
						(-1.64)		
BS75*						1.241*		
TVP						(1.77)		
NE25							23.17**	
							(1.98)	
NE25*							-1.321*	
TVP							(-1.87)	
NE75								-5.560
								(-0.61)
NE75*								0.552
TVP								(1.08)
_Cons	-21.62*	-27.13**	-26.51**	-16.00	-25.64**	-8.790	-21.44*	-11.23
	(-1.76)	(-2.22)	(-2.25)	(-1.32)	(-2.19)	(-0.71)	(-1.88)	(-0.93)
Year	YES	YES	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES	YES	YES
N	473	473	473	473	473	473	473	473
R²	0.315	0.324	0.334	0.316	0.323	0.321	0.322	0.328

This table shows the OLS estimation results of the moderating role of managerial ownership (MO), institutional ownership (IO), board size (BS) and non-executive ownership (NE). All variable definitions are described in Table I. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively

