“Executive compensation and firm performance: a non-linear relationship”

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EXECUTIVE COMPENSATION AND FIRM PERFORMANCE: A NON-LINEAR RELATIONSHIP

Abstract

In order to ensure profitability for shareholders, optimal contracting recommends the alignment between executive compensation and company performance. Large organizations have therefore adopted executives remuneration systems in order to induce positive market reaction and motivate executives. Complex compensation schemes are designed by Boards of Directors using strong pay-performance incentives that explain high levels of executive pay along with company size, demand for management skills and executive influence. However, the literature remains inconclusive on the pay-performance relationship owing to the various empirical methods used by researchers. Additionally, there has been little effort in the literature to compare methodologies on the pay-performance relationship.

Using the dominant agency theory framework, the purpose of this study is to establish and examine the relationship between firm performance and executive pay. In addition, it intends to assess the characteristic of model specifications commonly adopted. To this aim, a quantitative analysis consisting of three complementary methods was performed on panel data from South African listed companies. The results of the main unrestricted first difference model indicate a strong non-linear relationship where the impact of current and previous firm performance on executive pay can be observed over 2 to 4-year period providing support to the optimal contracting theoretical perspective in the South African business context. In addition, CEO pay is more sensitive to firm performance as compared to Director pay. Lastly, although it affects executive pay levels, company size is not found to improve the pay-performance relationship.

Keywords executive pay, performance, optimal contract, South Africa

JEL Classification M12

INTRODUCTION

By the 1980s, the corporate ideology that the professional managerial class should replace paternalistic management was well-established in organizations. Therefore, in order to align executives' interests to theirs and ensure profitability, shareholders opted to develop complex executive financial incentives organized around company performance indicators (Abowd & Kaplan, 1999). Particularly, optimal pay contracts are commonly viewed as the mean to address the principal agent problem that emerge with separation of ownership and control of the company (Jensen & Meckling, 1976; Hall, 2003, Bebchuk & Fried, 2004). De facto, some studies have evidenced the positive response from markets following the implementation of incentives for executives (Tehranian & Waegelein, 1985). In South Africa, the relationship between executive pay and company performance is advocated by the King III Code and Report on Governance.

The issue of executive compensation is of central importance as executive incentive misalignment has been advanced as one driver of the financial crisis of 2007–2008 (Gordon, 2010), although Kaplan (2013) argues that, despite high, executive pay levels have been constrained

to less than 1% of company earnings for the period from 1993 to 2011. In addition, the effect of executive pay on market performance has declined since the financial crisis of 2008 in South Africa (Bussin & Modau, 2015).

Despite a large literature, the global empirical evidence on the existence and strength of the relationship between firm performance and executive pay is inconclusive (Frydman & Jenter, 2010). The mixed findings are attributed to the variety of methodologies used by researchers (Callan & Thomas, 2014) and the lack of consensus on the most applicable theoretical perspective (Frydman & Jenter, 2010). Given this insight, the purpose of the study is to establish and examine the executive pay-firm performance relationship using and comparing three complementary methods on panel data from South African listed companies.

The paper is structured as follows. The first part reviews the existing literature on executive pay and firm performance, and the existing approaches. The methodology is presented in the second part. Lastly, the results of the study are presented and discussed.

1. LITERATURE REVIEW

1.1. Executive compensation composition

Before 1960, executive compensation was traditionally composed of basic salary and annual bonus. However, over the years, organizations have opted to design executive pay around equity-based pay as these models were favored by shareholders. In fact, the higher proportion of equity-based pay was used by companies to reduce fixed costs (Balkin & Gomez-Mejia, 1987). Indeed, these incentives, either cash or equity-based pay, were often tied to financial indicators, either short or long-term (Sigler et al., 2011). Between 1993 and 2001, for the top 23 wealthiest countries, equity-based pay increased from 6% to 22% and was associated with a sharp rise of executive pay (Hall, 2003). Kaplan (2013) noted that American CEOs earned 200 times the income of the average household and that executive pay levels have increased by almost 500% in the last 30 years.

1.2. Executive compensation determinants and theoretical perspectives

Optimal contracting implies that incentives are linked to performance so that executives bear the costs and rewards of their decisions, and executives and shareholders' interests are aligned. Remuneration committees that might involve the Board of Directors are tasked to design executive packages (Jensen & Murphy, 1990; Bizjak, Lemmon, & Naveen, 2008; Cho, Huang, & Padmanabhan, 2014). As suggested by optimal contracting theory, these committees rely on benchmarking and consultants advice in order to attract and retain talented executives (Baker et al., 1988; Bebchuk & Grinstein, 2005; Bizjak, Lemmon, & Nguyen, 2011; Shin, 2013).

This "market" approach has been criticized, as it results in executive's bargaining power influencing executive pay (O'Reilly & Main, 2010; Bivens & Mishel, 2013). First, labor markets impose constraints to pay levels that can be negotiated between executives and the Board of Directors (Bebchuk & Fried, 2004). According to managerial contract theory, executives are able to exert influence on the Board of Directors or the remuneration committee in order to benefit from favorable pay packages (Anabtawi, 2005). To that end, CEOs and executives use four types of power: structural power, ownership power, expert power and prestige power (Finkelstein, 1992). In addition, benchmarking might result in compensation packages that are not related to the firm performance (Bebchuk & Fried, 2003).

Additionally, Bebchuk and Grinstein (2005) found that stakeholders' dissatisfaction with executive pay levels had an influence on executive pay levels. Therefore, critics view executives' pay design as a characteristic of failure of corporate governance in organizations. Following these developments, restricted shares rather than options are now incorporated in equity-based pay in order to mitigate motivation and loyalty to the company.

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Company characteristics are indicated as having an influence on executive pay settings (Frydman & Jenter, 2010). Large companies allocate a higher proportion of equity-based pay in executive total pay (Benston, 1985). The stability of pay-size elasticity in some sectors also indicates an executive pay designed on sales growth rather than the fluctuations of the market performance (Coughlan & Schmidt, 1985). Lastly, the size and life cycle of the company are found to have an influence on executive pay. For instance, equity-based pay is generally designed in companies during their growth stage. In contrast, companies at a maturing stage favor fixed pay (Balkin & Gomez-Mejia, 1987).

1.3. The relationship between executive pay and company performance

A significant amount of research has been devoted to the relationship between executive pay and firm performance, particularly following the corporate scandals in the 2000s that were preceded with soaring levels of executive pay (Bebchuk et al., 2003). Early economic researchers assume that pay is critical in performance, as both variables are associated and markets react positively to incentive pay contracts (Raviv, 1985). Although contested, a large part of literature proposes a small positive association between executive pay and firm performance (Frydman & Saks, 2010; Pepper & Gore, 2014; Bussin & Modau, 2015).

In addition to the mixed results, there is no consensus on the adapted methodology which varies from regressions, fixed effects, first difference to lagged dependent variable, nor model specifications for measuring the relationship between the firm performance and executive pay (Allison, 1994).

Some cross-sectional studies indicate that 10% increase in market performance is associated with executive pay increases comprised between 2.2% and 4.8% (Hall & Murphy, 2002). However, Bruce, Skovoroda, Fattorusso, and Buck (2007) find a lack of significance of the pay-performance relationship among 350 FTSE companies for the period 2002–2003, and rather suggest the influence of managerial power on executive pay. The results from these cross-sectional studies have consistently indicated a pay-size elasticity range between 0.2 to 0.4 across time and business sectors (Baker et al., 1988; Frydman & Saks, 2010). Size is also found to be an important factor in explaining pay levels (Murphy, 2012). However, the restriction of cross-sectional models to the current firm performance results in a systemic bias as pay contracts are often tied to long-term incentives (Frydman & Jenter, 2010).

Fixed effects models are dynamic and based on panel data manipulation and variation of some of the control variables, besides time and company size. Time series models use lagged performance in order to eliminate the effect of pay on performance (Bebchuk & Grinstein, 2005). Overall, these models that relate current pay to lagged performance seem to indicate a weak pay-performance relationship, but a strong influence of current performance on current executive pay. Hall and Liebmann (1998) argue that salary is not strongly linked to performance as compared to bonus pay. They conclude that relative performance is not the basis for executives' pay. Comparing industries, Chhaochharia and Grinstein (2009) find that Return on Assets (ROA) does not impact equity-based pay. In addition, the study found that tenure has no significant impact on equity-based pay. Bertrand and Mullainathan (2001) conclude that executives of oil companies are paid for luck and that pay for luck is higher in organizations dotted with weak corporate governance structures. Gabaix, Landier, and Sauvagnat (2014) find that the increase in executive pay is explained by size growth in the largest companies of the top US 1000. They argue that executive compensation is determined by the value put by shareholders on their companies. The inclusion of company size results in a stronger pay-performance relationship. Murphy's (1985) study indicates that a 10% increase in returns increases executive pay by 11%. Time-series models, based on linear estimators, find that executive pay is associated with market and accounting indicators. However, critics have argued that fixed effects models result in biased estimates when control variables that are correlated to the independent or dependent variables are omitted (Liker et al., 1985). In addition, the need to control for several variables in fixed effects models poses analytical challenges at various levels (Allison, 1994).

First difference models are used to predict the consequences of repeated events improving the accuracy of a basic cross-sectional model. It reduces and eliminates the effect of several unchanging variables (Allison, 1994). The model is appropriate to measure significant variations in the explanatory variables (Liker et al., 1985). Although weak, Jensen and Murphy (1990) evidence the pay-performance relationship when firm size is not included. Similarly, Kato and Kubo (2006) found that 10% increase of Return on Assets (ROA) increases CEO cash pay by 14.2% when size is not a strong mediator. However, unmeasured factors that change significantly and that may impact the analysis are not eliminated (Liker et al., 1985).

Lagged Dependent Variable (LDV) models are also used on panel data manipulation. The models assume that the current dependent variable is related to its lagged value (Liker et al., 1985) and allows to remove autocorrelation. The model predictions are generally lower than fixed effects and first difference models predictions that exclude lagged pay. Hambrik and Finkelstein (1995) find that 10% increase in ROE would increase CEO total pay by 2%.

Lastly, long-term models are used to determine the long-term impact of performance on pay. It assumes a geometric decay in the response of pay to performance. These models find a relationship between market and accounting returns to executive pay (Canarella & Nourayi, 2008). Boschen, Duru, Gordon, and Smith (2003) use a vector autoregression (VAR) model that allows to capture simultaneous movements undetected by simple linear model specifications. The three-variables VAR model presented by Boschen et al. (2003) includes company size, market returns and ROA. It is estimated using standard linear, instrumental variable (IV) estimators and Monte Carlo simulations and indicates that 10% increase in returns increases CEO total pay by 5% and 10% increase in ROA decreases pay by 0.6% in the long term. They conclude that executives that increase accounting returns in the short run are negatively affected in the long run. Other studies indicate that the pay-performance relationship is non-linear and that executive contracts are designed to encourage risk taking in accounting measures and risk avoidance in market measures accordingly to agency theory (Canarella & Nourayi, 2008).

The diversity of the factors studied in the literature might have resulted in the mixed findings. In addition, the strength of the pay-performance relationship varies according to the underlying specification. Additionally, the variety of empirical models has resulted in a difficulty in comparing the results. Given the mixed results on the pay-performance relationship, the change of structure of executive pay towards shares over years (Bebchuk et al., 2003), and the stability of the ratio of executive pay to company profits, the purpose of the study is to establish and explore the relationship between executive pay and firm performance using panel data from South African listed companies with three complementary methods.

2. RESEARCH METHODOLOGY

2.1. Research design

In order to establish the positive relationship between executive pay and company performance, three methods were used. The first method uses descriptive statistics to compare pay to earnings ratio in order to provide an initial indication of a potential link pay-performance. The second method is a multivariate analysis based on a restricted first difference model. Finally, the third method relies on an unrestricted first difference model. The model was tested on longitudinal data from listed companies and controls for the differences in individuals pay contracts over 11-year period. The individual relationships are aggregated in order to estimate a moderated relationship in order to reduce the effect of outliers.

2.2. Population and sample

The population of the study was companies listed on the Johannesburg Stock Exchange (JSE). It was assumed that in these large companies, the agency perspective could be used to explore the issue of separation of ownership and control as described by Jensen et al. (1976). In addition, large companies tend to provide executives with shares more frequently than small companies (Frydman & Saks, 2010). Therefore, the study is able to evaluate the pay-performance relationship based on cash pay and total pay in line with the literature. Cash pay includes the yearly basic salary and cash

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incentives. It includes short-term incentives based on 1-year performance, as well as long-term incentives based on multi-year performance. Total pay includes cash pay and equity-based pay, which is comprised of options and restricted shares (Bebchuk & Fried, 2004).

Due to the difficulty of obtaining executive pay data, the study was limited to a small sample. Data constraints require the study to focus on either one sector or similar sectors in order to ensure validity for one sector (Florin, Hallock, & Webber, 2010). The sample for the study consisted of companies belonging to the Consumer Goods and Consumer and Services under the ICB system. Indeed, there is a correlation of 0.99, 0.90 and 0.83 for these sectors returns over a 1, 5 and 10-year period, respectively, under the ICB system ("Selecting Sector Benchmarks", 2015). The assumption behind this strategy is that the pay structure of these companies is comparable.

The analytical period from 2005 to 2016 provided 960 Directors-years based on 44 companies composed of 14 small (sales < R5 billion), 12 medium (R5 billion < sales < R15 billion) and 18 large (> R15 billion) size. In addition, the sample represented about 80% of the companies belonging to two sectors.

Three samples per company were obtained through panel data manipulation as follows. Sample 1 was obtained from 2005 to 2009, Sample 2 from 2006 to 2010 and Sample 3 from 2012 to 2016. Samples were treated as unrelated in this process.

CEOs and Directors' cash and total pay data, and company size were manually extracted from annual reports. Performance measures such as return on Assets (ROA), Return on Equity (ROE) and markets returns (share price performance) were obtained from McGregor BFA and were again validated from annual reports.

2.3. Research instrument

The model in this study addresses most of the limitations of empirical models in this research domain. It is developed from basic fixed effects model. The predictor variables include ROA, ROE and market returns.

The main model for the study is the unrestricted first difference model (Joskow & Rose, 1994) which is simplified for the study into:

$$\begin{aligned}\ln\left(\Delta Pay_{it}\right) &= \Delta\alpha_{it} + \beta_0\left(X_{it} - X_{it-1}\right) + \\ &+\beta_1\left(X_{it-1} - X_{it-2}\right) + \beta_2\left(X_{it-2} - X_{it-3}\right) + \\ &+\beta_3\left(X_{it-3} - X_{it-4}\right) + \beta_4 X_{it-4} + \varepsilon_{it},\end{aligned} \quad (1)$$

where t represents time, i represents executive, α_t is a constant which represents non-performance related pay, β_0 is the response of pay to performance at each period, X_{it} represents performance, and ε_{it} represents a random error term (Joskow & Rose, 1994).

The model can include company size, which provides a strong causal link between pay and performance, as indicated in the following equation (2):

$$\begin{aligned}\ln\left(\Delta Pay_{it}\right) &= \Delta\alpha_{it} + \beta_0\left(X_{it} - X_{it-1}\right) + \\ &+\beta_1\left(X_{it-1} - X_{it-2}\right) + \beta_2\left(X_{it-2} - X_{it-3}\right) + \\ &+\beta_3\left(X_{it-3} - X_{it-4}\right) + \ln\left(\Delta Z_{it}\right) + \varepsilon_{it},\end{aligned} \quad (2)$$

where Z is company size.

The restricted model is a simple first difference model as follows:

$$\begin{aligned}\ln\left(\Delta Pay_{it}\right) &= \Delta\alpha_{it} + \beta_0\Delta X_{it} + \\ &+\ln\left(\Delta Z_{it}\right) + \varepsilon_{it},\end{aligned} \quad (3)$$

by assuming that $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4$.

2.4. Data analysis and interpretation

The study used a standard linear estimator to evaluate the response of both cash and total pay to a change in predictor variables such as ROA, ROE and market returns. The restricted first-difference model as described in equation (3) was used to compare the data with previous studies. This model was used to determine the causal link between pay and performance (Liker et al., 1985).

The nested model described by equation (2) served as the main instrument for the study and allowed for the potential non-linear relationship. The *p*-values and *F*-statistics were used to test whether the

estimated responses were significantly different from zero (Stock & Watson, 2001). The cumulative influence of a change in performance on executive pay is represented by the sum of the responses β_0 to β_3, where only statistical significant responses are considered.

2.5. Limitations of the study

Due to significant constraints on readily executive pay data, the study was limited to a smaller dataset which affects the predictive power of the study (Florin et al., 2010). In addition, the use of first difference models implies that several factors are differenced out contrary to fixed effects models. However, it is assumed that despite these factors, the results will not be significantly biased. Lastly, the focus on Consumer Goods and Service companies only might result in systematic bias if there is limited variation in some of the measures used (Liker et al., 1985).

2.6. Validity and reliability

Although the results cannot directly be generalized to the entire population of JSE listed companies, the sample group constitutes two major sectors of the JSE listed companies. The sample represents about 80% of the companies in these sectors.

The results and the predicted responses are compared with results from international studies. This allows the findings to be generalized to some degree to the larger population.

To ensure reliability, both forms of pay cash and total pay were used to ensure the robustness of the results (Florin et al., 2010). In addition, various accounting and market performance measures, namely ROA, ROE and market returns, were used to validate the pay-performance response.

The first difference model allows better estimates than fixed effects models where correlation is an issue and is an effective approach for determining a causal link. Potential autocorrelation in the residuals was assessed using Durbin-Watson statistics.

3. RESULTS AND DISCUSSION

3.1. Descriptive statistics

The distribution of pay is highly skewed and this is more evident in larger companies. Therefore, average and median pay measures are considered for the analysis. The descriptive statistics presents the composition of executives' pay from 2005 to 2016 according to the company size. Long-term incentives (LTI) account for almost 50% of executive pay in large companies and just under 40% in medium companies similarly to Bebchuk and Fried (2004) and Frydman and Saks (2010) who find that long-term incentives are significant in total pay. Short-term incentives (STI) range from 17% to 25% in executives' pay in large and medium companies. Fixed pay (salary) accounts for more than 50% of executive pay in small companies (Figure 1). The results suggest that executive pay in larger com-

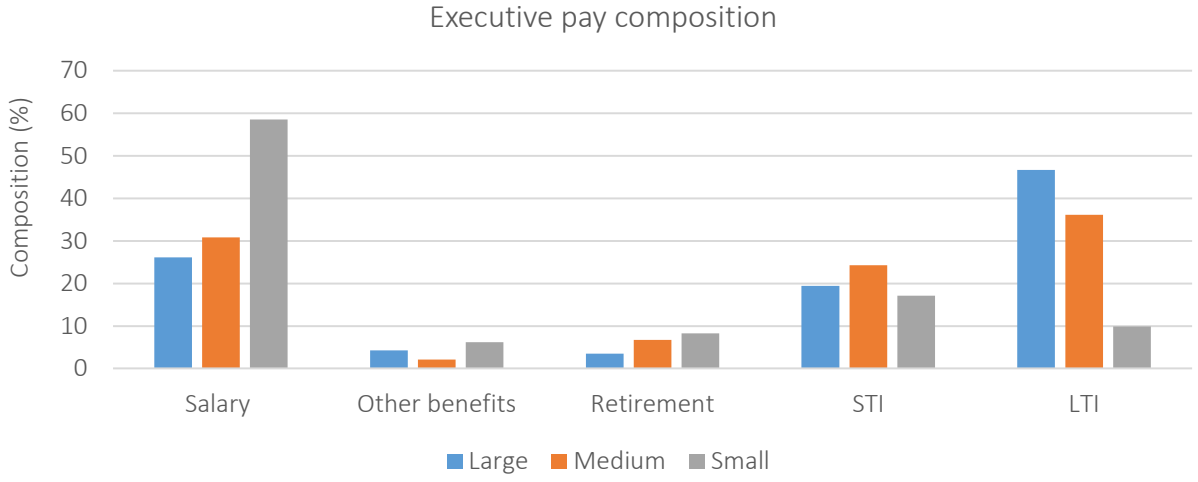

Figure 1. Executive pay composition

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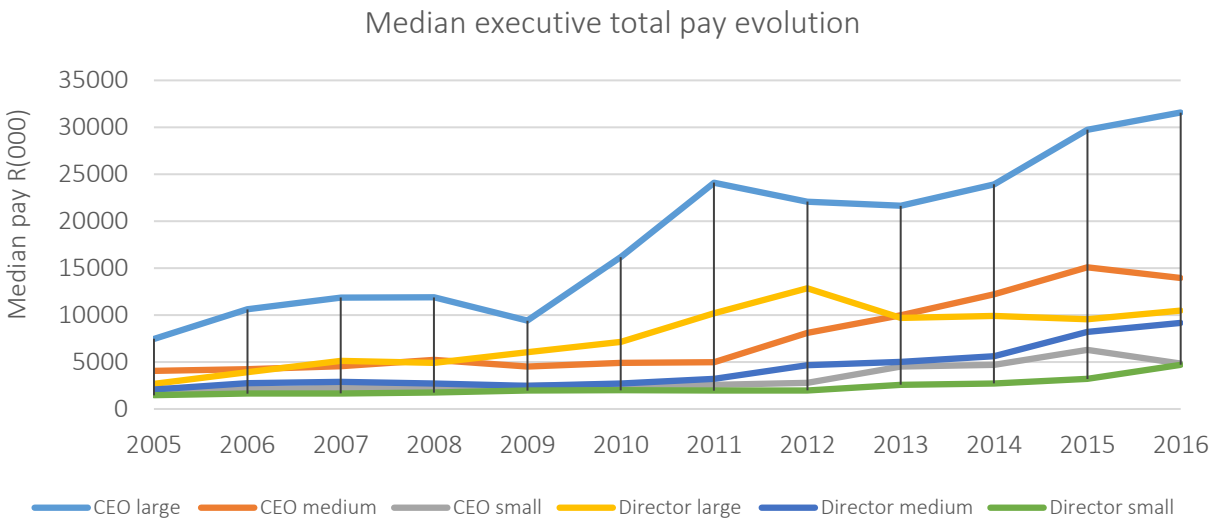

Figure 2. Evolution of median executive total pay

panies is highly tied to the gains and losses from market returns.

Figure 2 indicates that larger companies offer higher pay levels than medium and small companies. An overall significant growth occurred in median executive pay for all companies. Average growth median pay for CEOs and Directors of large companies was, respectively, 328% and 343% between 2005 and 2016. For CEOs and Directors of medium companies, the growth was 260% and 447%. For CEOs and Directors of small companies, the growth was 160% and 215% (Table 1). Therefore, large size companies experienced higher pay growth rates between 2005 and 2009 and medium size companies between 2009 and 2016. However, it should be noted that CEO pay in large size companies is constrained between 0.7% to 1.2% of company earnings similarly to Kaplan's (2013) study ratios.

CEOs pay growth rate in medium companies from 2011 is higher that most Directors pay levels in large size companies (Table 1). Although size can initially explain pay levels, other factors influence pay levels. Directors have experienced higher pay growth rates in relative terms than CEOs.

3.2. Pay to earnings ratio

The pay to earnings ratio increases with decreasing company size (Figures 3, 4 and 5). It is computed using median values owing to significant variations. Indeed, earnings in large companies are not comparable with earnings in small companies. The ratios for CEOs in medium size companies were between 1 and 2% until 2011, when they significantly increased until 2012, and decreased gradually to 2.5% in 2016. There is a 1-year lag in the progression between 2005 to 2012, however, the ratios are moderately aligned from 2012 onwards. Overall, although differing in magnitudes, the increase or decrease of ratios for Directors follows CEOs pay movements over the entire period. This is in line with Carpenter and Sanders (2002) argument for an align-

Table 1. Executive pay growth 2005–2016

Growth in executive pay	Average 2005–2016	Median 2005–2016	Average 2009–2016	Median 2009–2016
CEO large	328%	352%	187%	227%
Director large	343%	296%	100%	67%
CEO medium	260%	312%	229%	245%
Director medium	447%	372%	238%	234%
CEO small	160%	130%	110%	57%
Director small	215%	209%	147%	170%

ment of top pays to achieve better performance. During the period from 2011 to 2015, both CEOs and Directors benefited from higher gains. The fact that these ratios are confined under limits might indicate that there is an adjustment between executive pay and company performance in the long term. The CEO pay to earnings ratio in large size companies is similar in magnitude to the ratio of about 1% for large US companies in Kaplan (2013).

3.3. The relationship between executive pay and firm performance

3.3.1. Multivariate analysis: restricted first difference model

The model is based in first difference specification and the set of explanatory variables include ROE, ROA and market returns represented by

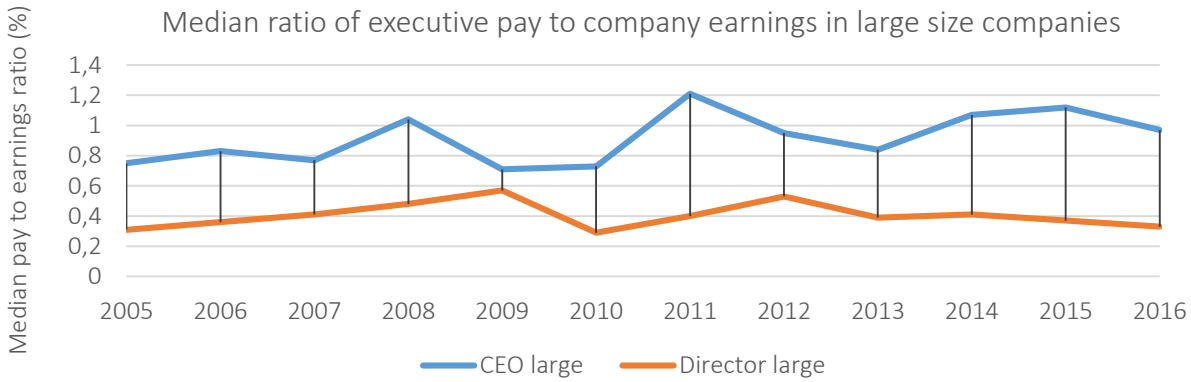

Figure 3. Pay to earnings ratio in large companies

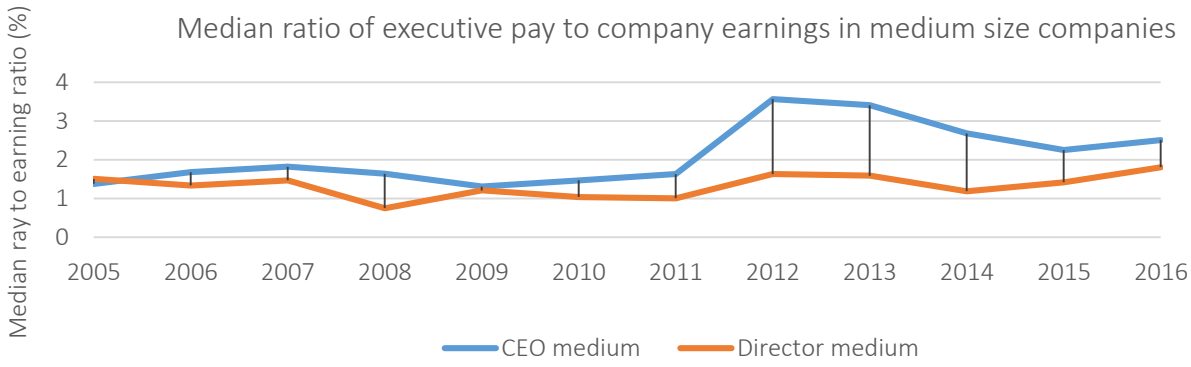

Figure 4. Pay to earnings ratio in medium companies

Figure 5. Pay to earnings ratio in small companies

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ΔRE, ΔRA and ΔMR, respectively. Company size ΔZ is included as an additional variable. The analysis confirms a strong linear pay-performance relationship based on ROA only. The multivariate analysis of CEO pay-performance alignment shows that a %10 change in ROA changes CEO cash and total pay by 8.1% and 12.8% (95% confidence level). This is in accordance with Kato and Kubo (2006) findings where CEO pay is strongly linked to ROA. However, for ROE, the pay-performance link is weak. In addition, although there is a potential link to market returns, the relationship is not significant at 95% confidence level.

Regarding Director pay, the results indicate that Director pay is linked to ROA and market returns. The responses indicate that a 10% change in ROA and market returns changes Director cash and total pay by 8.4% and 2.1%, respectively, at 95% confidence level.

Table 2. Results of the multivariate analysis for CEO pay

Parameter estimates – CEO pay and company performance

Dependent variable	Parameter	β	Std. error	t	Sig.	95% confidence interval	
						Lower bound	Upper bound
CEO ΔIn cash pay	Intercept	0.093	0.023	4.114	0.000	0.048	0.137
	ΔRE_t	0.051	0.103	0.492	0.623	–0.152	0.253
	ΔRA_t	0.813	0.361	2.251	0.025	0.010	1.523
	ΔMR_t	0.001	0.038	0.022	0.982	–0.075	0.077
	ΔInZ	0.178	0.137	1.303	0.194	–0.091	0.447
CEO ΔIn total pay	Intercept	0.084	0.041	2.048	0.041	0.003	0.165
	ΔRE_t	–0.001	0.187	–0.006	0.995	–0.369	0.367
	ΔRA_t	1.277	0.656	1.947	0.052	–0.013	2.567
	ΔMR_t	0.107	0.070	1.536	0.125	–0.030	0.245
	ΔInZ	0.342	0.248	1.376	0.170	–0.147	0.831

Bootstrap for parameter estimates

Dependent variable	Parameter	β	Bias	Std. error	Sig. (2-tailed)	95% confidence interval	
						Lower	Upper
CEO ΔIn cash pay	Intercept	0.093	0.001	0.020	0.001	0.054	0.134
	ΔRE_t	0.051	0.065	0.218	0.402	–0.247	0.723
	ΔRA_t	0.813	–0.710	0.328	0.011	0.010	1.355
	ΔMR_t	0.001	0.000	0.031	0.974	–0.059	0.061
	ΔInZ	0.178	–0.004	0.115	0.110	–0.049	0.410
CEO ΔIn total pay	Intercept	0.084	0.001	0.036	0.017	0.010	0.155
	ΔRE_t	–0.001	–0.028	0.215	0.975	–0.609	0.434
	ΔRA_t	1.277	0.016	0.595	0.028	0.211	2.593
	ΔMR_t	0.107	0.001	0.057	0.052	–0.005	0.217
	ΔInZ	0.342	0.003	0.191	0.083	–0.023	0.730

Note: a – unless otherwise noted, bootstrap results are based on 1,000 stratified bootstrap samples.

Therefore, based on the CEO and Director pay responses to ROA and market returns, the hypothesis of the pay-performance relationship cannot be rejected. The results from the multivariate analysis are consistent with studies that use fixed effects models and first difference models (Bertrand & Mullainathan, 2001; Kato & Kubo, 2006). It should be noted that company size is not a statistically significant factor to explain changes in pay. The CEO pay-size elasticity of 0.3 is consistent with findings from Baker et al. (1988).

The findings of this model are consistent with the literature when considering the weak link to market returns and non-existing link to ROE and the strong relationship between ROA and executive pay. Indeed, this model and fixed effects models, which are mostly used in this research domain, predict comparable mixed results pointing out the most evident link within the sample that is with ROA. Indeed, ROE and market returns are indirectly linked to company earnings.

Table 3. Results of the multivariate analysis for Director pay

Parameter estimates – Director pay and company performance

Dependent variable	Parameter	β	Std. error	t	Sig.	95% confidence interval	
						Lower bound	Upper bound
ΔIn cash pay Director	Intercept	0.144	0.021	6.849	0.000	0.103	0.185
	ΔREt	0.097	0.120	0.806	0.421	–0.139	0.333
	ΔRAt	0.771	0.336	2.296	0.022	0.111	1.431
	ΔMRt	0.077	0.034	2.294	0.022	0.011	0.143
	ΔInZ	–0.078	0.127	–0.613	0.540	–0.327	0.172
ΔIn total pay Director	Intercept	0.161	0.035	4.647	0.000	0.093	0.230
	ΔREt	0.036	0.199	0.183	0.855	–0.354	0.427
	ΔRAt	0.809	0.555	1.458	0.145	–0.281	1.899
	ΔMRt	0.211	0.055	3.804	0.000	0.102	0.320
	ΔInZ	0.085	0.210	0.404	0.687	–0.328	0.497

Bootstrap for parameter estimates

Bootstrap[a]

Dependent variable	Parameter	β	Bias	Std. error	Sig. (2-tailed)	95% confidence interval	
						Lower	Upper
ΔIn cash pay director	Intercept	0.144	–0.001	0.025	0.001	0.093	0.194
	ΔREt	0.097	0.106	0.208	0.289	0.018	0.731
	ΔRAt	0.771	–0.104	0.285	0.007	0.068	1.185
	ΔMRt	0.077	–0.001	0.029	0.011	0.019	0.137
	ΔInZ	–0.078	0.004	0.158	0.620	–0.413	0.214
ΔIn total pay director	Intercept	0.161	–0.001	0.033	0.001	0.091	0.223
	ΔREt	0.036	–0.007	0.191	0.608	–0.474	0.462
	ΔRAt	0.809	–0.018	0.438	0.057	–0.100	1.642
	ΔMRt	0.211	0.000	0.055	0.001	0.110	0.328
	ΔInZ	0.085	0.005	0.194	0.674	–0.294	0.499

Note: a – unless otherwise noted, bootstrap results are based on 1,000 stratified bootstrap samples.

3.3.2. Unrestricted first difference model for the pay-performance relationship

The unrestricted first difference model assumes a more complex relationship that can only be observed by studying the interaction of pay and performance over a long period. The model shows that current pay levels are determined by current and previous levels of performance. ROE impacts CEO cash pay in the short and long term due to the cumulative response. The study indicates that 10% change in ROE changes CEO pay cash by 9.5% in the long run that can be decomposed as 4.3%, 3.3% and 1.9% from current, 1-year lagged and 3-year lagged response, respectively. Over time, the impact of a change in ROE on CEO cash pay decays. The cumulative response is larger than the short-term response (*p*-value of 0.008, *F*-statistic significant, Durbin-Watson statistics of 2.1). The squared correlation of this non-linear relationship is low and consistent with Joskow and Rose (1994) unrestricted model statistics. The results generally support the notion that CEO pay is linked to shareholders' returns according to optimal contracting theory.

ROA impacts CEO cash pay in the short term at 95% confidence level. 10% change in ROA would change CEO cash pay by 9.1% (20.2% in medium size companies) in the short term. A change of 10% in ROA changes CEO total pay by 34.8% in the short term and 54.8% in the long term owing to a positive 3-year lagged response of 22%. The unrestricted model is statistically significant for medium size companies (95% confidence level for CEO cash pay in the short term only). The negative 2-year lagged response of –2.4% on CEO cash pay is not statistically significant. The *p*-value 0.06 for *F*-statistic not significant at 95% level. This high pay-performance relationship with ROA explains the growth of CEO total pay for the period from 2011 to 2015.

CEO total pay responds to market returns in the short and the long term at 95% confidence level.

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Table 4. Summary of the cumulative effect of a 10% change in performance on pay

CEO pay					
	ROE		**ROA**		**ROA**
CEO cash pay	4.3% (ST)	CEO cash pay	9.1% (ST)	CEO cash pay	20.1% (ST)
Total sample	9.5%(LT)	Total sample		Medium companies	
	ROE		**ROA**		**ROA**
CEO total pay	Insignificant	CEO total pay	14.9% (ST)	CEO total pay	34.8% (ST)
Total sample		Total sample		Medium companies	56.8% (LT)
	Market returns		**Market returns**		**Market returns**
CEO total pay	3.2% (ST)	CEO total pay	6.9% (ST)	CEO total pay	4.6% (ST)
Total sample	7.4% (LT)	Large companies	14.9% (LT)	Medium companies	14.5% (LT)
Director pay					
	ROE		**ROA**		**ROA**
Director cash pay	Insignificant	Director cash pay	8.8% (ST)	Director cash pay	19.0% (ST)
Total sample		Total sample	3.3% (LT)	Medium companies	2.3% (LT)
	ROE		**ROA**		**ROA**
Director total pay	Insignificant	Director total pay	10.7% (ST)	Director total pay	25.6% (ST)
Total sample		Total sample		Medium companies	4.9%(LT)
	Market returns		**Market returns**		**Market returns**
Director total pay	2.5% (ST)	Director total pay	6.6% (ST)	Director total pay	6.1% (ST)
Total sample	7.4% (LT)	Large companies	16.1% (LT)	Medium companies	15.1% (LT)
CEO and Director pay					
	ROE		**ROA**		**ROA**
C&D cash pay	3.2% (ST)	C&D cash pay	8.9% (ST)	C&D total pay	12.2% (ST)
Total sample	5.1% (LT)	Total sample	4.6% (LT)	Total sample	
	ROA		**Market returns**		**Market returns**
C&D total pay	29.5% (ST)	C&D total pay	3.4% (ST)	C&D total pay	6.6% (ST)
Medium companies	44.3% (LT)	Total sample	7.9% (LT)	Large companies	16.5% (LT)
	Market returns		**Market returns**		
C&D total pay	5.6% (ST)	C&D total pay	1.1% (ST)		
Medium companies	15.6% (LT)	Small companies	2.6% (LT)		

Ten percent change in market returns changes CEO total pay by 7.4% decomposed of 3.2% and 4.2% from the current and 1-year lagged response, respectively. The response increases after 1 year and decays after two years similarly to Joskow and Rose (1994) results. In large companies, 10% change in market returns changes CEO total pay by 15%, including 6.9% and 8.1% from the current and 1-year lagged response. The cumulative impact of change in market returns on CEO total pay is similar in both medium and large size companies.

The inclusion of size in the relationship testing does not improve the pay-performance alignment contrary to the results of fixed effect models. The pay-size elasticity of about 0.2, although statistically insignificant, is consistent with the literature for cash pay. Therefore, changes in CEO pay are mostly determined by company performance. Thus, the results indicate that there is a non-linear relationship between CEO pay and company performance measures.

The unrestricted first difference model indicates that ROE has no impact on Director cash pay despite a positive relationship, which decays over time. In addition, the results indicate a positive decaying response of Director total pay to ROE despite not statistically significant relationship at 95% confidence level.

Director cash pay responds to changes in ROA in the short term and potentially in the long term owing to the bootstrap coefficient, which

makes the 2-year lagged response significant, albeit its *p*-value of 0.043 is high. 10% change in ROA changes Director cash pay by 8.8% (*p*-value = 0.01) in the current year and by –5.4% (*p*-value = 0.043) for the 2-year lagged response. In medium size companies, 10% change in ROA only changes Director cash pay by 2.2% (19% for the current year, –16.8% for the 2-year lagged response). These findings are consistent with Boschen et al.'s (2003) VAR model, which indicates that a significant increase in ROA is associated with negative responses in subsequent periods.

Ten percent change in ROA changes Director total pay by 10.7% in the short term (higher sensitivity of 25.5% for medium size companies). There is a small negative 2-year lagged response of 15.1% (*p*-value = 0.732) (20.7% for medium size companies *p*-value = 0.028). This positive short-term and negative 2-year lagged response to ROA is similar to Boschen et al. (2003). The *p*-value of 0.15 for the *F*-statistics indicates the restricted model sufficiently specified at the business sector level as supported by *p*-value of 0.49.

Ten percent change in market returns changes Director total pay by 7.4% owing to 3.5%, 2.4% and 1.5% from the current, 1-year lagged and 2-year lagged response, respectively (Figures 9 and 10). However, the response of Director pay to market returns decays from the outset and as opposed to the CEO response, which starts to decay after 2 years.

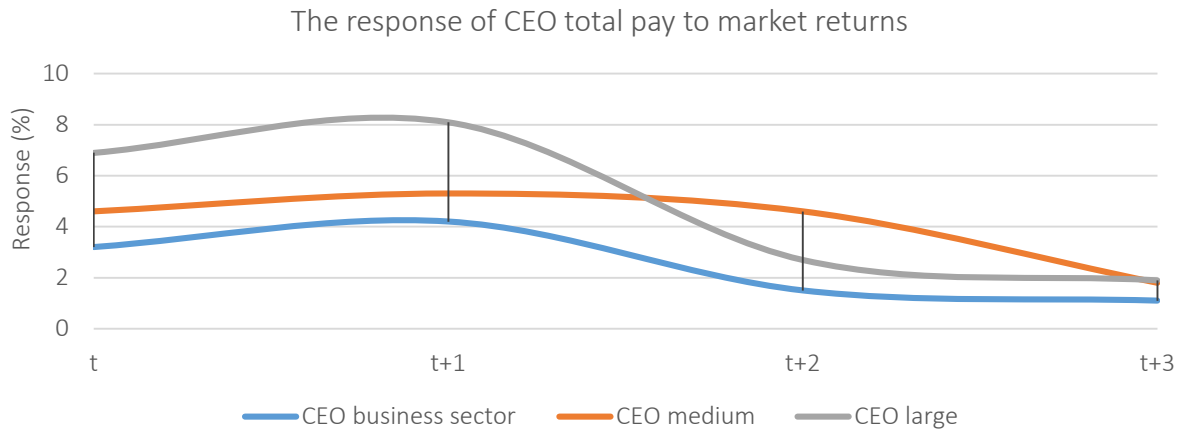

Figure 6. The response of CEO total pay to market returns

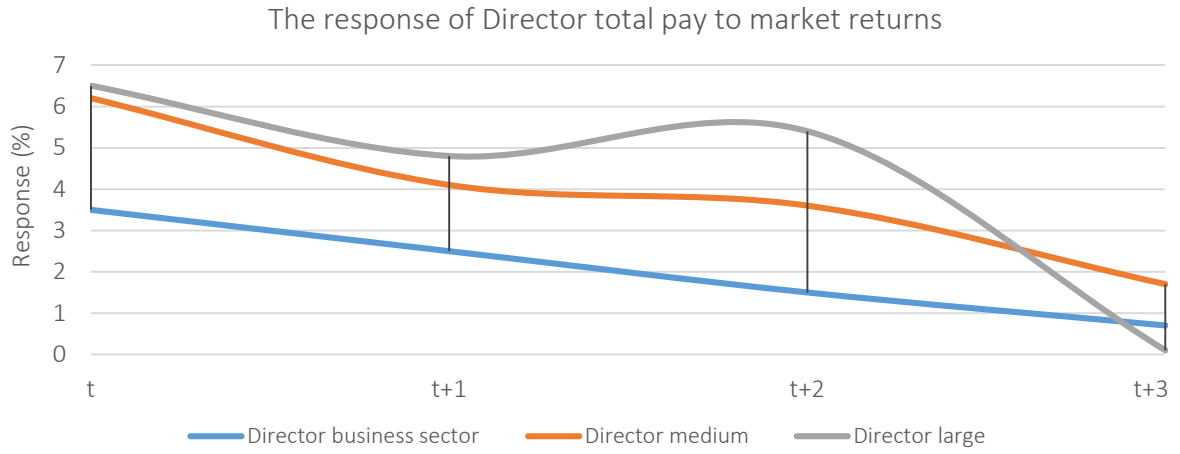

Figure 7. The response of Director total pay to market returns

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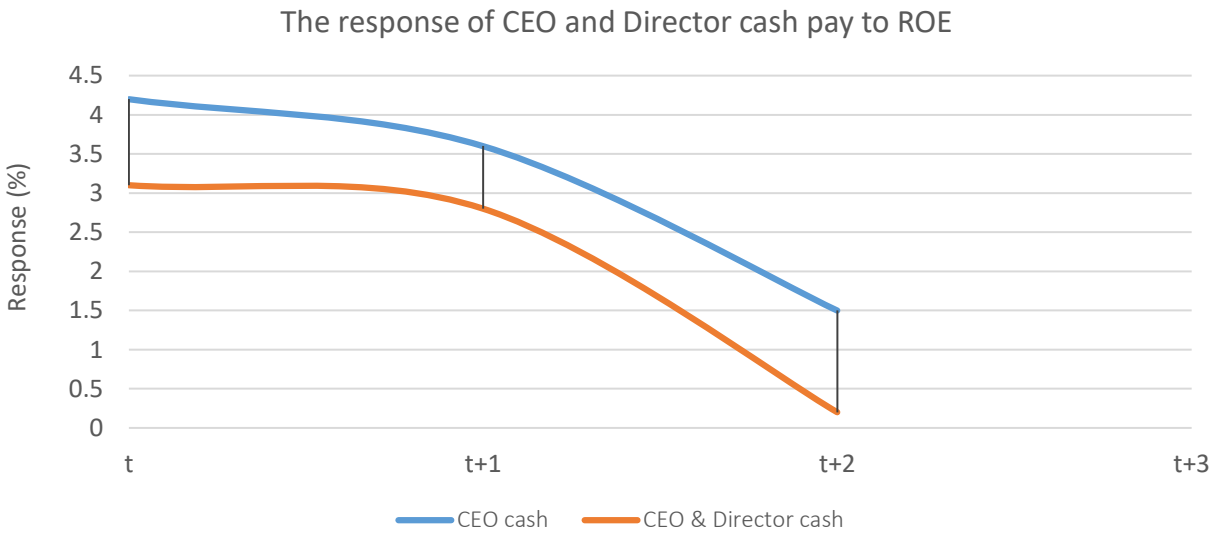

Figure 8. Response of CEO and Director cash pay to ROE

Particularly, in large companies, 10% change in market returns change Director total pay by 16.1% owing to 6.6%, 4.6% and 5.0% from the contemporaneous response, 1-year lagged and 2-year lagged response. Similarly, 10% change in market returns in medium size companies change Director total pay by 15.1% in the long run resulting from 6.1%, 4.1%, 3.5% and 1.4% from the contemporaneous response, 1-year lagged, 2-year lagged response, and 3-year lagged response, respectively.

These results support the application of the optimal contracting theory where executive pay levels are tied to shareholders' wealth.

3.3.3. CEO and directors pay-performance alignment

This subsection discusses the alignment of the CEOs and directors pay packages. The CEOs and Directors pay ratios are mostly aligned. The study indicates that in medium and small size companies, CEO pay and Director pay ratio average is around 1.5.

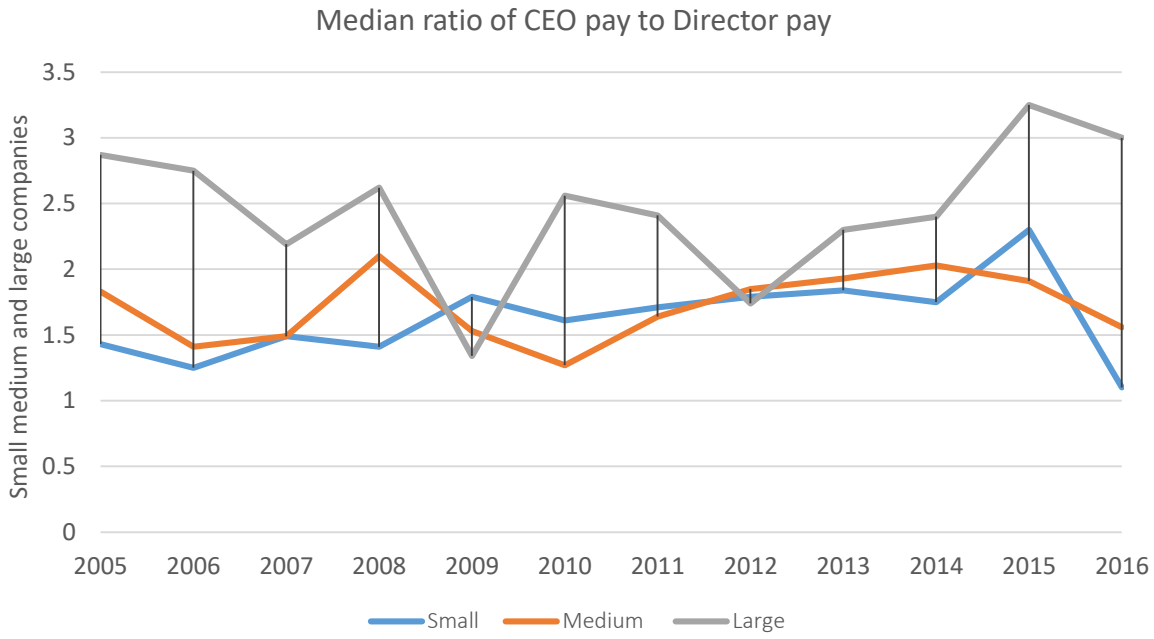

Figure 9. CEO pay to Director pay ratio

Table 5. CEO and Director cash pay to ROE

Bootstrap for coefficients							
Bootstrap[a]							
Model	Parameter	β	Bias	Std. error	Sig. (2-tailed)	95% confidence interval	
						Lower	Upper
1	(Constant)	0.131	–0.001	0.012	0.001	0.109	0.155
	ΔREt	0.317	0.028	0.140	0.009	0.111	0.702
	ΔREt–1	0.190	–0.023	0.099	0.039	–0.052	0.353
	ΔREt–2	0.013	–0.023	0.087	0.892	–0.186	0.150
	ΔREt–3	0.080	–0.001	0.082	0.349	–0.074	0.227

Note: a – unless otherwise noted, bootstrap results are based on 1,000 stratified bootstrap samples.

Table 6. CEO and Director cash pay to ROA

Bootstrap for coefficients							
Bootstrap[a]							
Model	Parameter	β	Bias	Std. error	Sig. (2-tailed)	95% confidence interval	
						Lower	Upper
1	(Constant)	0.127	0.000	0.012	0.001	0.102	0.149
	ΔRAt	0.891	0.007	0.199	0.001	0.508	1.300
	ΔRAt–1	0.122	0.010	0.228	0.586	–0.306	0.578
	ΔRAt–2	–0.435	–0.002	0.203	0.029	–0.604	–0.013
	ΔRAt–3	–0.098	0.006	0.160	0.554	–0.413	0.215

Note: a – unless otherwise noted, bootstrap results are based on 1,000 stratified bootstrap samples.

Table 7. CEO and Director total pay to ROA

Bootstrap for coefficients							
Bootstrap[a]							
Model	Parameter	β	Bias	Std. error	Sig. (2-tailed)	95% confidence interval	
						Lower	Upper
1	(Constant)	0.160	0.0000221	0.021	0.001	0.120	0.201
	ΔRAt	1.219	–0.005	0.313	0.001	0.554	1.839
	ΔRAt–1	0.287	–0.017	0.306	0.356	–0.320	0.897
	ΔRAt–2	–0.030	–0.017	0.317	0.803	–0.681	0.897
	ΔRAt–3	0.664	0.007	0.264	0.011	0.119	0.565

Note: a – unless otherwise noted, bootstrap results are based on 1,000 stratified bootstrap samples.

Ten percent change in ROE changes CEO and Director cash pay by 5% owing to 3.2% and 1.9% from the current and 1-year lagged response, respectively (p-value = 0.009, F-statistic significant at 95% confidence level). CEO and Director pay in small size companies are linked to ROE.

Ten percent change in ROA would change CEO and Director cash pay by 4.6% owing to 8.9% and –4.4% from the current and 2-year lagged response. The negative response can be mostly attributed to medium size companies, which are associated with high responses to ROA.

Ten percent change in ROA changes CEO and Director total pay by 12.2%. Lagged responses are not statistically significant and the moderation removes the impact of a negative lagged response.

Ten percent change in market returns changes CEO and Director total pay in medium size companies by 29.5% in the short term and 44% in the long term owing to the positive 3-year lagged response of 14.8%. The cumulative response for Director total pay is comparable to the CEO total pay response to market returns. The Durbin-Watson statistic of 1.443 is just below the ideal range of 1.5 to 2.5 and the p-value

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Table 8. CEO and Director total pay to market returns

Bootstrap for coefficients							
Bootstrap[a]							
Model	Parameter	β	Bias	Std. error	Sig. (2-tailed)	95% confidence interval	
						Lower	Upper
1	(Constant)	0.152	0.001	0.021	0.001	0.111	0.197
	ΔRAt	0 340	0.006	0.055	0.001	0.244	0.454
	ΔRAt–1	0.306	0.003	0.049	0.001	0.216	0.407
	ΔRAt–2	0.148	0.003	0.050	0.004	0.053	0.252
	ΔRAt–3	0.064	0.000	0.033	0.043	0.004	0.127

Note: a – unless otherwise noted, bootstrap results are based on 1,000 stratified bootstrap samples.

of 0.00 is significant at 95% level. This moderated relationship is more aligned with the CEO relationship.

The cumulative response of CEO and Director pay to a 10% increase in market returns is 7.9% for the business sector, 16.5% for large size companies, 15.6% for medium size companies, and 2.6% for small size companies. The responses decay over 2 to 4-year period.

These results suggest that there is a significant number of Directors whose pay arrangements are similar to CEOs pay arrangements that was particularly evident in medium size companies.

CONCLUSION

Given the various methods that have led researchers to diverse findings and conclusions, the study aim was to establish an executive pay-performance relationship using data from listed companies from the Consumer Goods and Services sector in South Africa using three methods. The first method indicates that the ratio of executive pay to company earnings is confined within a range suggesting a relationship between executive pay and company performance. The second first restricted first difference model establishes a strong positive pay-performance association using ROA indicating that current pay levels are determined by current and previous levels of performance. No long-term response of executive pay to company performance was found. However, the respective lack of and weak relationships between executive pay and ROE and market returns reflects the limitations of the second model. The unrestricted first difference model shows that the pay-performance relationship is non-linear as the response of pay to changes in performance decays over time. Executive pay responds differently to measures of performance. There is a strong positive relationship between executive pay and ROE with a response of pay to ROE decaying after a year. Similarly, a strong pay-performance relationship based on ROA is characterized by both short- and long-term impacts similarly to Boschen et al. (2003) predictions. The change in ROA may have a positive cumulative effect, which is either lower or higher than the short-term effect. Finally, a change in market returns can impact executive pay over a 2 to 4-year period. The response of Director pay to market returns starts to decay after 1 year whereas the response of CEO pay to market returns starts to decay after 2 years similarly to Boschen and Smith (1995) and Joskow and Rose (1994).

Therefore, the study finds that the pay-performance association is evident when using both accounting and market performance measures providing support for the optimal contracting theoretical perspective, although the study cannot reject an alternative theory such as managerial power theory in setting executive pay arrangements. In addition, company size in the model is not found to improve the magnitude of the pay-performance relationship despite company size influencing the structure of executive pay. The results are generally consistent with international studies and highlight the complexity of the pay-performance relationship.

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