An Empirical Investigation of Relative Performance Evaluation in UK Chief Executive Compensation

by

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This thesis is being submitted in partial fulfillment of the requirements for the award of Doctor of Philosophy

at

Kingston University

July 2011

Declaration

I, Mark A. Farmer, hereby declare that this thesis is all my own work and the sources of information and material I have used have been fully identified and properly acknowledged as required. No material is included for which a degree has previously been conferred upon me.

Acknowledgments

It gives me great pleasure to thank all those who made this thesis possible.

First and foremost, I am extremely grateful to my PhD supervisors, Dr. Stuart Archbold and Dr. George Alexandrou, both of whom have offered their guidance and continued encouragement throughout the completion of this study.

I am also indebted to all those involved in the management of the doctoral research programme at Kingston Business School. I would like to thank, in particular, Dr. Thérèse Woodward for her kindness and unequivocal support. But also, Claire Gaskin, Dr. Stephen Gourlay, Dr. Chris Hand, Jill Horgan and Professor Stavros Kalafatis for their good advice and support.

I would like to take this opportunity to express my appreciation to Kingston University and its staff for the financial and technical support. In particular, I am most grateful to have received the award of a Postgraduate Studentship that provided the funding for this research.

My fellow postgraduate students in Kenry House deserve a special mention for we have shared so much fun and have been a source of constant encouragement for each other. This is especially true for Alia, Winne and Zelin.

I am utmost appreciative of the invaluable feedback received from the participants of the *British Accounting Association (BAA) South Eastern Area Group (SEAG) Annual* Conference *(2009).*

I would also like to thank Professor Martin Conyon for his words of encouragement.

Last but not the least, I would like to thank my wife Christine and my children Nicole and Nathan for their love and immense patience at all times. The same can be said for my parents, brother and sister. Special thanks must go to my Dad who invested many hours reading this thesis for grammatical consistency, punctuation and understanding.

Abstract

The purpose of this study is to examine how corporate performance influences Chief Executive Officer (CEO) pay in UK public listed companies. Specifically it is to identify evidence of relative performance evaluation in CEO pay, following the recommendation in the Combined Code (2003) to link long-term incentive compensation to relative firm performance. The major and a novel contribution of this study is the focus on the payments received by CEOs from performance-based long-term incentive schemes.

The pay-for-performance relationship is investigated in a longitudinal setting using random and fixed-effect panel data estimation methods. An unbalanced panel of CEOs is drawn from 204 of the largest, nonfinancial UK companies, between 2003 and 2007. From a principal-agent theory perspective it is hypothesised that firm performance is positively associated with chief executive pay and from a relative performance evaluation theory perspective it is hypothesised that, whilst controlling for actual firm performance, peer group performance is negatively associated with chief executive pay.

The CEO compensation data are hand collected exclusively for this study and provides a level of detail not previously found in the literature. The findings demonstrate that it is crucial to distinguish between the different elements of pay and the different performance conditions that attach to those elements in order to establish a comprehensive understanding of the pay-for-performance relationship. New and convincing evidence shows that actual bonus pay is determined relative to annual FTSE-350 market performance and actual long-term pay is determined relative to three-year FTSE-350 sector performance. These findings provide robust evidence that is consistent with the principal-agent framework of executive pay and corporate performance.

This study may alleviate the concerns held by some stakeholder groups that pay is not clearly linked to corporate performance. These findings will be of particular practical importance to investors who expect the interests of executives to be aligned with those of the company shareholders, via an incentive contract that rewards executives for enhanced corporate performance and consequently shareholder wealth maximisation. The findings also confirm that changes introduced to improve corporate governance practice in the field of executive pay are working to the benefit of shareholders.

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List of Abbreviations

Abbreviation	Meaning
ABI	Association of British Insurers
ASHE	Annual Survey of Hours and Earnings
CEO	Chief Executive Officer
CLM	Classical Linear Model
EPS	Earnings Per Share
ESO	Executive Share Option
EG	For Example
FP	Fixed Pay
GLS	Generalised Least Squares
HPD	Highest Paid Director
LTI	Long-Term Incentive
LTIP	Long-Term Incentive Plan
NAPF	National Association of Pension Funds
OLS	Ordinary Least Squares
PCP	Performance-Contingent Pay
PLC	Public Limited Company
PRP	Performance-Realised Pay
PVSO	Performance-Vested Share Option
RPE	Relative Performance Evaluation
RPI	Retail Price Index
TSO	Time-Vested Share Option
TSR	Total Shareholder Return
UK	United Kingdom
US	United States

Chapter One

Introduction

The purpose of this thesis is to examine how corporate performance influences chief executives' pay using a sample of 204 large, publically listed UK companies between 2003 and 2007. Specifically, it is to identify evidence of relative performance evaluation in elements of chief executive pay, following the recommendation in the Combined Code (2003) to link long-term incentive compensation to relative firm performance.

1.1 Background to the study

Corporate executive remuneration is a highly controversial issue in most developed capitalist economies, one that attracts the attention of academic researchers, investors, legislators and media commentators. Although the concerns of these groups have many similarities, there are often important differences of substance: in particular, the media tend to focus attention on the scale of executive pay, whereas for academics, investors and legislators the central concern tends to focus on whether executive compensation is linked to corporate performance.

The Cadbury Committee was set up in 1991 in response to the rapid increase in UK executive pay and the supposed failure of pay to be linked to performance, but also in response to a succession of corporate scandals (for example, Polly Peck[1] and Maxwell Communications[2]). Since the publication of the Cadbury Report (1992), there have been a number of other important corporate governance milestones in the process of ensuring greater transparency and improved accountability of UK executives to their shareholders. The Greenbury Report (1995), emphasized the need to tie executive incentives to 'more challenging performance criteria', and the Hampel Report (1998) reviewed the recommendations put forward by Cadbury and

[1] Poly Peck went into administration in 1990.
[2] Maxwell Communications went into administration in 1991.

Greenbury. The Combined Code[3] on corporate governance was first issued in 1998 by the London Stock Exchange in an attempt to codify the provisions of Cadbury, Greenbury and Hampel. Following these reports, which urged transparency and self-regulation, the UK government, enacted legislative provisions in relation to executive remuneration in the shape of the Directors' Remuneration Report Regulations (2002). In the wake of this legislation, there have been further corporate governance milestones that deal *inter alia* with executive remuneration, the Higgs Report (2003) and revisions to the Combined Code (2003, 2006, 2008, 2010).

Consequently, listed companies in the UK are now under constant pressure to disclose comprehensive information to their shareholders concerning the determination of top executive pay. However, despite numerous disclosure requirements designed to enhance the transparency and accountability of UK boards of directors to their shareholders; investors and investor organisations, such as the Association of British Insurers and the National Association of Pension Funds, remain concerned that executives continue to be rewarded substantially, even when company performance is poor.

Coverage of perceived excess in executive pay has remained a regular feature in the British media for many years, but particularly since British Gas was privatised in 1995 and the then chief executive, Cedric Brown, was awarded a 75 per cent pay rise (BBC News, 12th December 2002). The media portrayed Cedric Brown as a 'fat-cat' dining out undeservedly on the newfound investment in British Gas. Thereafter, the expression 'fat-cat' has remained synonymous with executive pay. In 2008, the global financial crisis, combined with media criticism of so-called greedy executives overseeing failing banks, intensified the executive pay debate. The UK government launched a '£500 billion bank rescue plan' and demanded an end to reckless behaviour and excessive incentive payments (The Telegraph, 8th October 2008). The US administration unveiled a similar rescue plan for US financial

[3] The Combined Code was renamed 'The UK Corporate Governance Code' in 2010.

institutions and Congress called for further regulation on executive pay. Today, the media are principally concerned with individual executive compensation arrangements that appear unwarranted and that the average compensation for a FT-SE chief executive continues to outpace increases in average national earnings[4].

Investor unease and significant changes in corporate governance, both in the UK and the US, have sparked considerable academic debate with regard to the determinants of chief executive pay, and in particular the relationship between pay and performance. Despite a substantial empirical literature, largely situated in the US and the UK, the existence, but more particularly the strength of the relationship between corporate performance and executive compensation continues to be an unresolved issue. Many recent UK studies have investigated whether corporate governance reform, with its intention to align pay more closely to performance, has had the desired effect, but the findings show at best, a weak association between performance and pay (for example, Girma et al., 2007).

1.2 Executive pay in theory and in practice

Executive compensation is thought to be the most effective means of addressing the well-known agency problem, advanced by Jensen and Meckling (1976), and caused by the separation of ownership and control. The owners of the company (shareholders) are the principals and delegate decision making authority to their agents (executive team) rather than manage the firm themselves (Conyon et al., 2000). The seminal contribution to agency theory by Jensen and Meckling (1976), says that agents perform a service on behalf of the principal (the shareholder) but will also potentially act in their own interests. According to agency theory, executive compensation should be related to the success of the firm via an incentive contract, which is designed to ensure that executives are acting in the interests of shareholders. Agency costs arise when managers and owners have differing interests. The most important goal of executive compensation is to align

[4] The findings reported in this thesis show that in 2003 median chief executive actual total pay was 43 times median all employee pay. It increased to 68 times by 2007. All employee pay is the all employee median annual total pay reported in the Annual Survey of Hours and Earnings (ASHE).

the interests of executives with those of shareholders and hence reduce agency costs. Executive incentives are therefore provided to optimise overall company performance, which will benefit both the executive and the shareholder (Balachandran, 2006). Agency theory would suggest a significant positive association between corporate performance and executive pay but due to agency problems, this may not be the case.

In their seminal writing on relative performance evaluation (RPE) theory, Holmström (1982) and Holmström and Milgrom (1987), contend that the incentive contract must exclude the effects of market-wide random or exogenous shocks, which are outside the control of the executive. In RPE theory, the agent's relative performance is determined by a comparison to the performance of other agents facing the same market risk. As a result executive compensation should be determined relative to the peer group performance of firms exposed to the same systematic risk.

In practice it is not the responsibility of shareholders to determine executive pay but the responsibility of the remuneration committee, who act on behalf of the shareholders. An executive incentive contract is negotiated by the remuneration committee and is necessary because executive *effort* is not easily observable due to the separation of ownership and control (Jensen and Meckling, 1976). Chief executives are provided with incentives and rewards, based on observable output, aligned to shareholders interests. Shareholders expect target incentives to be challenging in order that payouts are based on exceptional absolute firm performance and superior performance relative to peers. Whereas, risk averse, self interested managers prefer pay to be linked to observable and easily managed measures, such as firm size, that provide greater certainty with respect to pay outcomes (McKnight and Tomkins, 1999; Combs and Skill, 2003). It is the role of the remuneration committee to balance 'fixed promised payoffs' and 'incentive payoffs' (Fama and Jensen, 1983) so to provide the optimal level of incentives to manage shareholder and executive expectations.

1.3 Established results, gaps and inconsistencies in the executive pay literature

The executive pay literature has developed substantially over the last sixty years and covers many disciplines, including accounting, finance, economics and law. In addition to pay-for-performance studies, research in accounting explores other areas within the broader context of executive pay that are not directly relevant to this study. For example, Laux and Laux (2009) research chief executive compensation and earnings management and Iyengar and Zampelli (2008) study auditor independence in relation to chief executive incentive pay. Research in finance and economics also covers many areas besides pay-for-performance studies. For example, Girma et al. (2006) and Coakley and Iliopoulou (2006) study the impact of mergers and acquisitions on executive compensation. Ortiz-Molina (2007) investigates capital structure and chief executive compensation.

Research on executive pay is diverse and considers a variety of factors, in addition to those described above, which potentially influence executive pay. Other factors studied include the variation of pay across organisational levels within a firm (Conyon et al., 2001); ownership dispersion (Elston and Goldberg, 2003); managerial ownership concentration (Cheung et al., 2005); executive risk aversion (Becker, 2006); earnings differentials (Guy, 2005); stakeholder management (Coombs and Gilley, 2005); the influence of compensation consultants (Conyon et al., 2009); chief executive charisma (Tosi et al., 2004); environmental performance (Berrone and Gomez-Mejia, 2009); and human capital characteristics (McKnight and Tomkins, 2004).

Corporate governance research is embedded within the executive pay-for-performance literature and there are many examples of studies investigating the impact of various legal and corporate governance regimes, and regime changes, on executive pay. In 2009 alone, there were a number of new studies looking at the impact of corporate governance on executive pay. For example, Brenner and Schwalbach (2009), Chhaochharia and Grinstein (2009) and Gregory-Smith (2009).

The majority of executive pay studies explore the association between corporate performance and executive pay (even if it is not the main purpose of the study) and consider principal-agent theory as the foundation for the research. Recent studies include Gregg et al. (2005), Girma et al. (2007), Ogden and Watson (2007), Ozkan (2007), Eichholtz et al. (2008), Liu and Stark (2009) and Ozkan (2009) in the UK and Canarella and Gasparyan (2008) and Nourayi and Daroca (2008) and Albuquerque (2009) in the US. Research thus far suggests that there is a weak positive relationship between corporate performance and chief executive pay; however, there is typically a strong significant positive association between company size and chief executive pay. The impact of company size is usually explained by the increased complexity and information processing demands associated with managing a larger organisation.

A much smaller number of studies, in tests of relative performance evaluation (RPE) theory, investigate the association between peer group performance and executive compensation. The evidence of RPE in executive compensation is contradictory. The latest US research to investigate RPE is a study by Albuquerque (2009). Using a large longitudinal sample of over 2000 firms between 1992 and 2005, Albuquerque, finds strong evidence for the RPE hypothesis when performance is measured using average stock returns but no evidence for average return on assets. In the UK, there is virtually no significant evidence to support RPE theory, with the exception of a study by Liu and Stark (2009), which finds some evidence that executive compensation is determined relative to firm peer group accounting performance. Other UK studies find no significant support for RPE (Conyon and Leech, 1994; Main et al., 1996; Conyon, 1997; Cosh and Hughes, 1997; Conyon, 1998; Benito and Conyon, 1999). Relative performance evaluation is an important question that the most recent UK studies, barring Liu and Stark (2009), have failed to address.

In this thesis it is proposed that one of the major reasons for not finding evidence of RPE in UK executive compensation is due to the measures of executive compensation and corporate performance to be found in the empirical literature. In an extensive review of the executive compensation literature, Devers et al.

(2007) highlight the use of inconsistent compensation measures and suggest that future research needs to provide greater justification for the pay constructs and measures employed.

In the review of the empirical evidence concerning executive pay-for-performance (Chapter Four) it is established that prior research does not distinguish between potential and actual executive remuneration. This is because previous studies do not account for the actual vesting of *all* long-term performance-contingent awards. Consequently no study has investigated whether chief executive long-term incentive awards vest according to relative peer group performance. This gap in the literature is supported by Filatotchev et al. (2007) who suggest that further research investigating the association between corporate performance and executive compensation must distinguish between 'potential' and 'actual' rewards.

In this study a distinction is made between the different measures of executive compensation in ways that previous studies have not done. This is aided by the introduction of the Directors' Remuneration Report Regulations (2002), which impose disclosure requirements on remuneration reports that allows data to be hand collected that would not have been readily available prior to 2002. This study disentangles executive remuneration in order to distinguish between maximum incentive opportunities and realised incentive payments. The chief executive compensation construct is divided into its various elements: basic pay, target bonus, actual bonus, target long-term incentive, actual long-term incentive, target total pay and actual total pay. With these clarifications about the measurement of remuneration it is expected to observe a strong association between corporate performance and chief executive pay.

The review of the empirical evidence concerning executive pay-for-performance also highlights that research has seldom exploited the time period over which firm performance is measured. In practice firms measure long-term performance over three-years or longer and short-term performance over one-year (see Chapter Six for a review of CEO incentives and performance measures). However, the majority of prior studies measure either contemporaneous performance or predated performance only over a one-year period. It is therefore appealing to explore the impact of short-term performance on short-term compensation and long-term performance on long-term compensation to replicate the measures used by firms in practice and consequently address the apparent gap in the literature.

The next section describes the scope of the study, including the definition of the research problem, the research purpose, the research objectives and the main research questions. The specific research questions and hypotheses are not described here but are developed and set out in the review of the empirical literature (Chapter Four). The research definition, research objectives and questions are summarised in Figure 1.1. The following section also provides a brief description of the research approach and the main findings of the study.

1.4 Definition and scope of the study

This thesis is concerned with exploring the relationship between corporate performance and chief executive pay in UK public listed companies. The research is motivated by the typical weak association, reported in the literature, between corporate performance and chief executive pay and the minimal evidence of RPE in UK chief executive compensation, combined with enduring investor concern regarding executive pay.

The purpose of the research is to identify evidence of relative performance evaluation in UK chief executive pay, following the recommendation in the Combined Code to link incentive compensation to relative firm performance:

> *"Payouts or grants under all incentive schemes, including new grants under existing share option schemes, should be subject to challenging performance criteria reflecting the company's objectives. Consideration should be given to criteria which reflect the company's performance relative to a group of comparator companies in some key variables such as total shareholder return" (Combined Code, 2003, p.21).*

A theoretical framework founded on agency theory and relative performance evaluation theory predictions of executive pay is developed. It is proposed that different corporate performance and relative performance constructs may be associated with discrete elements of chief executive compensation.

1.4.1 Research questions and approach

To begin with, this study addresses the expectation that chief executive compensation ought to be determined relative to peer group firm performance. RPE theory is an important extension to agency theory predictions and together with the recommendation in the Combined Code it is a central area to investigate. It is apparent in recent years that UK research has not tested for relative performance evaluation (RPE) in chief executive compensation and therefore a new study will contribute to the existing research in this area. The most contemporary UK study is by Liu and Stark (2009), which was based on a sample between 1971 and 1998.

Next, it is recognised that total chief executive compensation consists of three core elements and all three are incorporated in this study. The first element is basic pay, which is not explicitly contingent on firm performance. Second, annual bonus, which is often based on a single year's corporate accounting performance, paid in cash, but sometimes with a mix of cash and shares (with one or both elements perhaps deferred). Third, long-term incentives, based on longer term absolute and/or relative corporate performance measured against a peer group and paid in shares or share options. This study also distinguishes the considerable difference that can arise between short or long-term incentive opportunities and realised incentive pay. That is the remunerative rewards that executives could achieve if they meet benchmark performance, versus the rewards that they do receive based on actual performance.

Then, the different performance requirements for the different elements that make up total chief executive compensation and in particular the short-term performance requirements of short-term incentives versus the long-term performance requirements of long-term incentives are addressed.

Based on the above considerations the following research questions are attended to in this study:

I. Is relative performance evaluation important in explaining the variation in chief executive compensation?
II. Is the relationship between corporate performance and chief executive pay different for fixed pay, incentive opportunity and actual incentive pay?
III. Are the different elements of chief executive pay based on different performance outcomes?

The association between corporate performance and UK chief executive pay is investigated in a longitudinal setting using random and fixed-effect panel data estimation methods. An unbalanced panel of Chief Executive Officers (CEO) is drawn from 204 of the largest, nonfinancial UK companies. From a principal-agent theory perspective it is hypothesised that firm performance is positively associated with chief executive pay and from a relative performance evaluation theory perspective it is hypothesised that, whilst controlling for actual firm performance, peer group performance is negatively associated with chief executive pay.

Figure 1.1

Research problem, purpose, questions and objectives

Research Problem	Weak association between corporate performance and executive pay and little implicit evidence of RPE in UK chief executive pay.
Research Purpose	To empirically examine how corporate performance influences chief executives pay in UK public listed companies and in particular to identify evidence of relative performance evaluation in chief executive pay.
Research Questions	(i) Is relative performance evaluation important in explaining the variation in chief executive compensation? (ii) Is the relationship between corporate performance and chief executive pay different for fixed pay, incentive opportunity and actual incentive pay? (iii) Are the different elements of chief executive pay based on different corporate performance outcomes?

Research Objectives	**Specific Research Questions**
(1) To explore whether short-term performance measures are associated with fixed pay.	(1.1) Is basic pay related to absolute short-term firm performance? (1.2) Is basic pay related to relative short-term firm performance?
(2) To explore whether short-term performance measures are associated with performance-contingent pay (PCP).	(2.1) Is PCP related to absolute short-term firm performance? (2.2) Is PCP related to relative short-term firm performance?
(3) To explore whether short-term performance measures are associated with short-term performance-realised pay (PRP).	(3.1) Is short-term PRP related to absolute short-term firm performance? (3.2) Is short-term PRP related to relative short-term firm performance?
(4) To explore whether long-term performance measures are associated with long-term performance-realised pay (PRP).	(4.1) Is long-term PRP related to absolute long-term firm performance? (4.2) Is long-term PRP related to relative long-term firm performance?

1.4.2 Main findings and contribution to knowledge and practice

The most important contribution of this study is the evidence to support the use of relative performance evaluation (RPE) in chief executive basic pay, actual bonus pay, actual long-term incentive pay and total pay. Thus, unlike many previous studies, this study finds a strong association between relative performance and the actual incentive compensation earned by CEOs. This result confirms that UK remuneration committees, in line with the recommendation in the Combined Code, consider own firm performance relative to peer group performance when making compensation decisions such as changes to basic pay and incentive plan design.

The chief executive compensation data is hand collected exclusively for this study and provides a level of detail not previously explored in the literature. The original dataset enables this study to empirically address the construct of pay. It contributes to the executive pay literature by conceptualising elements of compensation as either fixed pay, performance-contingent pay or performance-realised pay. The findings of this study show that it is important to divide total compensation in this way in order to comprehend exactly how corporate performance influences chief executive pay.

Company size is the most significant factor in the determination of basic pay and contingent pay but has a much smaller relative economic significance in the determination of actual realised incentives compared to corporate performance. Total shareholder return (TSR) is shown to have only a small influence on basic pay but is statistically and economically very important in determining actual bonus and actual long-term incentive payouts. This is the first study to separately analyse all the payments received by CEOs from performance-based long-term incentive schemes. The findings show that long-term payouts are positively related to absolute three-year TSR performance but also determined relative to three-year industry peer group TSR performance.

The study also finds that firm performance influences chief executive pay in different ways. Short-term absolute TSR and market peer group performance determines actual bonus pay. While long-term absolute TSR and industry peer group performance determines actual long-term pay.

Overall, the findings provide an original insight to the structure of chief executive pay. They are of particular practical interest to investors who expect the interests of executives to be aligned with those of the company's shareholders, via an incentive contract that rewards executives for enhanced corporate performance. These findings provide robust evidence that is consistent with the principal-agent framework of executive pay and corporate performance.

1.5 Structure of the thesis

The remainder of this thesis is structured as follows. Chapter Two evaluates the main theories used in the literature to explain the variation in executive pay and specifies the predictions connected to the theoretical arguments. Agency theory has dominated the empirical literature and alongside relative performance evaluation theory is employed in this study to investigate the association between corporate performance and chief executive pay.

Chapter Three describes and appraises the corporate governance development in the UK, which has occurred in response to principal-agent concerns. The important features of the UK corporate governance framework and the impact on executive pay are discussed.

Chapter Four reflects on the empirical pay-for-performance literature and in particular focuses on those studies investigating the use of relative performance evaluation in executive pay. The literature is evaluated in terms of the data collection approach and research methods, the influence of absolute and relative performance on executive pay and the various measures used to construct the executive pay variable. The specific research questions and hypotheses to be tested in this study are developed and set out in detail in this chapter.

Chapter Five describes the research strategy, the chief executive compensation and performance data, the econometric models and the random and fixed-effect panel data estimation methods used to test the association between corporate performance and chief executive pay.

The results of this study are presented in Chapter Six and Chapter Seven. Chapter Six reports the descriptive results and analysis. It includes an examination of the performance conditions specified in the design of incentive arrangements and a descriptive analysis of the progression of chief executive pay over the sample period. Chapter Seven presents the main empirical results, analysis and findings in relation to the hypotheses developed in Chapter Four.

Chapter Eight offers a conclusion and summarises the methodological and empirical contribution, as well as, the practical implications of the research. Limitations of the study are put forward and so are suggestions for future research in the area of executive compensation.

Chapter Two

Theories of Executive Pay

2.1 Introduction

Research on executive pay is founded on a variety of theories. Here seven theories of executive pay are reviewed: principal-agent theory, relative performance evaluation theory, managerial power theory, human capital theory, information processing theory, social comparison theory, and tournament theory. These theories and their application to research on executive compensation are each described in turn in this chapter.

The purpose of the review is to identify the leading theories used to investigate executive pay and provide the theoretical direction for this study. Principal-agent theory, relative performance evaluation theory and managerial power theory are very closely connected and stem from the managerialist perspective proposed by Berle and Means (1932). Each theory recognises that due to the separation of ownership and control, a manager's interest may differ from that of shareholders and that managers might seek to gain from this agency relationship. These are the leading theories adopted by researchers to explore the determinants of chief executive compensation in the economics, finance, accounting and management literature.

2.2 Principal-agent theory

An agency relationship describes a position where a principal entrusts responsibility for action to an agent, and that agent is expected to behave in a way commensurate with the interests of the principal (Gomez-Mejia and Wiseman, 1997). The owners of a public company (the shareholders) are the principals and delegate decision making authority to their agents (the executives) rather than manage the firm themselves.

Principal-agent theory dominates the empirical and theoretical literature on executive pay. The theory identifies the well-known agency problem caused by the separation of ownership and control. Adam Smith first recognised the problems associated with the separation of ownership and control in *The Wealth of Nations* (1776). Berle and Means (1932) developed these ideas within a managerialist perspective, which recognises that managers may have different objectives to the owners and therefore managers may put their own interests before that of the owners. The main theme of managerialism is that self-serving managers gain from linking their compensation to aspects of the firm that they can control, such as company size. The managerialist perspective suggests that through linking compensation to firm size executives shield themselves from employment risks, business risks and compensation risk (Combs and Skill, 2003).

As it is shown in Chapter Four, the empirical literature provides evidence to support the managerialist perspective since firm size is regularly found to be the most important determinant of executive pay.

The seminal contribution to agency theory by Jensen and Meckling (1976) combined property rights, managerialism and finance theory to describe a theory of the firm in which they define the agency problem in terms of the agency costs associated with the division of ownership and management. Agency costs arise when the agent's and the principal's interests are not fully aligned. In conjunction with monitoring, executive compensation is thought to be the most effective means of addressing the agency problem. The empirical work on the determinants of executive pay view the executive contract as the solution to agency problems (Weisbach, 2007). The managerialist perspective posits that executives are self-interested and agency theory recognises that if control and/or incentive mechanisms are not present agents are likely to prioritise their own interests over those of principals.

According to Bloom and Milkovich (1998), the agency model incorporates three main assumptions. First, the agent and the principal are rational. Second, the agent and the principal are self-interested. Third, the agent is effort and risk averse and the principal is risk neutral. Together these three assumptions identify the agency problem and suppose that managers want to receive maximum compensation with minimum effort. Principals can minimise agency costs through 'monitoring' or 'bonding' (Hoskisson et al., 2009). Shareholders delegate practically all decision making to managers and because of this delegation of responsibilities shareholders must monitor the managers' actions to ensure the executive's are acting in their best interests. Bonding is achieved by aligning managers' interests with those of shareholders via an incentive contract.

The intention of monitoring is to reduce agency costs and the accompanying moral hazard. Monitoring is not easily achieved since an individual's effort cannot be observed directly and agents might use this to their advantage thus creating agency costs (Holmström, 1979). This is a form of moral hazard where the agents have more information about their own efforts and actions than the principals. The extent of these costs may never be fully known due to this 'information asymmetry'. Monitoring in itself is also an agency cost; therefore, there is a balance to be achieved between excess monitoring and insufficient or inadequate monitoring. A diversified shareholder has no particular requirement to oversee the day-to-day management of any firm within their portfolio because they are diversified and their own wealth is not inextricably tied to one firm (Fama, 1980). Diversification is obviously beneficial for the investor but it also means that they are less likely to fully monitor an individual firm. Monitoring is considered to be better when there is a high degree of ownership concentration (Hoskisson et al., 2009).

In practice, monitoring is achieved via the non-executive directors who are appointed to the board to represent shareholder interests. According to agency theory, shareholders decide on the remuneration of managers (Conyon, 2006). However, it is not the responsibility of shareholders to determine executive pay but the responsibility of the remuneration committee which acts on behalf of the board and shareholders. Managerial power theorists, Bebchuk and Fried (2004, p2) describe this process as, "arm's-length bargaining – bargaining between executives attempting to get the best possible deal for themselves and boards seeking to get the best possible deal for shareholders." They describe this as a limitation of agency theory and suggest that non-executive directors also have no reason to act on behalf of shareholders and might be guided by their own self-interest. Agency theorists might respond with the argument that managers' self-interest is a basic assumption of agency theory and it is very unlikely that an agent and principal interests will ever be completely aligned and therefore agency costs are inevitable. Managerial power theorists describe many reasons why the executive contract might not be optimal.[5]

An incentive contract is necessary because not all of the managers' actions or effort is observable and, as discussed, managers are self-interested and are not inherently likely to maximise shareholder value (Bebchuk and Fried, 2003). Executives are motivated to promote shareholder wealth maximisation via an incentive contract that relates pay to performance (Conyon and Sadler, 2001). This is the most important goal of executive compensation in the principal-agent theory framework, to align the interests of executives with those of the company shareholders and hence reduce agency costs. Executive incentives are therefore provided to optimise overall company performance, which benefits both the executive and the shareholder. The principal, or in practice, the non-executive directors, must decide on the balance between fixed pay and incentive pay.

An executive compensation contract will have elements of 'fixed promised payoffs' and 'incentive payoffs' (Fama and Jensen, 1983). From the principal's perspective, fixed pay is preferred if the agent's actions are fully observable whereas incentive pay is preferred when monitoring is more difficult. Agents will always prefer fixed pay because they are assumed to be risk averse. Incentive payoffs will be a function of some measure(s) of performance and is the reward for risk taking. The difficulty is in optimising the amount of incentive pay in order to align the agent's interests with the principal's but also to ensure the agent does not bare excessive risk. A contract with too much compensation risk will not benefit the principal because the risk-averse agent has increased personal risk and so it will not have the intended

[5] Managerial power theory is discussed in Section 2.4.

effect (Gomez-Mejia et al., 2005). The optimal contract will minimise (not eradicate) agency costs and incentivise managers to act in the best interests of shareholders. The contract can therefore only be viewed as a 'partial' solution to the agency problem (Bebchuk and Fried, 2003).

Tests of the application of agency theory focus on the association between corporate performance and chief executive pay.[6] The UK empirical research suggests that the association between corporate performance and chief executive pay is weak or even statistically insignificant. Recent examples include Gregg et al. (2005), Bruce et al. (2007) and Liu and Stark (2009). The US literature also finds only a weak link between corporate performance and executive pay. A large and influential empirical study conducted by Jensen and Murphy (1990), was based on contract data for 1,049 chief executives between 1974 and 1986, finds only low sensitivity between shareholder returns and chief executive pay. This finding is confirmed in more recent research (for example Nourayi and Daroca, 2008).

Jensen and Murphy (1990), argue that pay-performance sensitivity is too low to be consistent with agency theory predictions and speculate that political pressures, designed to constrain executive pay, mean that executive pay is not optimally tied to shareholder wealth. However, Gomez-Mejia et al. (2005) argue that the lack of support for agency theory is partly because of the performance measure used in empirical work. They suggest the literature puts too much emphasis on market or accounting performance rather than other non-financial measures of corporate performance such as customer satisfaction or product development.

Although principal-agent theory predictions have not typically been supported by empirical research in the UK or the US, agency theory predictions are tested in this thesis using new measures of incentive compensation. According to Gibbons and Murphy (1990), principal-agent theory suggests that compensation should be tied to *relative* company performance. Relative performance theory is embedded within the agency tradition and is discussed next.

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[6] The empirical findings are discussed and critically evaluated in Section 4.5.

2.3 Relative performance evaluation theory

According to principal-agent theory, executive compensation should be related to the success of the firm via an incentive contract, which is designed to ensure that executives are acting in the interests of shareholders. However, since the executive is assumed to be risk-averse and company performance is assumed not simply to be influenced by executive effort but also by random shocks, an incentive contract that is purely tied to absolute company performance may not be optimal (Aggarwal and Samwick, 1999a). An incentive contract is thought not to be optimal if the performance of the firm is correlated with market performance since an executive contract based only on the absolute return of the firm will reward or penalise the executive for general market movement (Câmara, 2001). A more efficient compensation contract ought to exclude the effects of market wide random or exogenous shocks, which are outside the control of the executive. Examples of random shocks might include an economic recession, large fluctuations in commodity prices, unfavourable weather conditions, new technology or increased regulation (Albuqerque, 2009).

A group of companies exposed to the same random shocks are said to face similar systematic or market risk. Holmström (1982) and Holmström and Milgrom (1987) propose that a compensation contract reflective of an agent's own performance and the performance of other agents facing similar market risk will be more efficient. Relative performance evaluation (RPE) theory suggests that how well or poorly an agent performs is determined by a comparison to the performance of other agents, a peer group and as a consequence, executive compensation will also be relative (Holmström, 1982). A peer group is a group of firms that face similar market risk. This might for example, include firms in the same industry sector or firms operating in the same jurisdiction (Antle and Smith, 1986). Average peer performance might provide information on the common uncertainty faced by firms in the same market (Holmström, 1982). Appraising an agent's performance relative to peer group performance can indicate the level of unobserved managerial effort (Benito and Conyon, 1999). For example, if a firm's return to shareholders decreases or increases relative to a market benchmark, it provides important information to shareholders on the relative success/failure of the firm and this information can be used to determine executive compensation. According to the theory, the assessment of a risk-averse agent's performance in comparison to a competitor's performance filters the 'uncontrollable risk' from the agent's own incentive compensation and protects the agent from the common uncertainty associated with the market benchmark (Liu and Stark, 2009). The justification for rewarding executives, "on relative performance rather than on absolute performance" (Gibbons and Murphy, 1990, p.33) is to ensure executives are not overly compensated or penalised for market wide performance that is outside of their control.

The literature describes two forms of RPE. The strong form of the hypothesis completely filters out market-wide performance (systematic risk) whereas the weak form of the hypothesis only partially filters out market-wide performance and therefore includes elements of systematic as well as unsystematic performance (Rajgopal et al., 2006). RPE theory predicts a significant negative association between peer group performance and executive compensation after controlling for individual firm performance. If RPE is present in executive compensation then an executive will gain superior compensation for relatively better performance compared to a peer group. Conversely an executive will receive a reduced amount of compensation if they underperform their competitors.

There are several practical issues which shareholders, or more precisely the non-executive directors acting on behalf of the shareholders, must consider in order to implement RPE. Relative performance evaluation theory does not specify whether the relative performance measure must consist of firms in the same industry but is precise in stipulating that peer firms must face similar market risk (Antle and Smith, 1986). Relative evaluation is, "valueless if there is no common underlying uncertainty" to filter market wide performance (Holmström, 1982, p.335). A difficulty faced by remuneration committees is choosing a peer group of firms that share the same systematic risk (Ogden and Watson, 2008). There are many firm characteristics to consider when constructing a peer group such as company size, industry sector or global reach. But, a peer group based on too many different characteristics might be too small and therefore, "too noisy to filter external shocks" (Albuquerque, 2009, p.70). Albuquerque (2009) finds evidence of RPE when peer groups are constructed of firms of a similar size. Albuquerque proposes that a firm's size enables it to respond similarly to how firms of comparable size react to external shocks and that peer groups based on size are easily constructed by remuneration committees. For example, a small firm might be compelled to reduce investment in potentially profitable projects due to a lack of finance during a recession whereas a larger firm might be better protected against the adverse consequences of a recession.

In order to test for evidence of RPE, research ought to consider the range of peer groups that might be selected by firms to filter out exogenous shocks to company performance. The empirical literature on RPE is inconclusive but overall there is very little support for it in executive compensation research. The vast majority of empirical tests of RPE have been conducted in the US, although there are some UK studies. The US empirical research finds more support for RPE theory than the equivalent UK research.[7] For example Albuquerque (2009) in a recent US study, using peer groups selected on firm size, find strong evidence of RPE in executive compensation. Gibbons and Murphy (1990), Janakiraman et al. (1992), Hall and Liebman (1998) and Rajgopal et al. (2006) find support for the weak form of the hypothesis. Antle and Smith (1986), in a study spanning 30 years between 1947 and 1977, find mixed results for RPE. In contrast, other US studies find no evidence of RPE (for example, Barro and Barro, 1990; Jensen and Murphy, 1990; Aggarwal and Samwick, 1999b). The UK research regularly does not find significant evidence of RPE in executive compensation (for example, Conyon, 1997; Conyon, 1998; Benito and Conyon, 1999). An exception is a recent study by Liu and Stark (2009), of 169 UK listed companies between 1971 and 1998, who do find support for RPE.

[7] The empirical findings are discussed and critically evaluated in Section 4.6.

Overall, but particularly in UK executive compensation studies, the empirical evidence is inconsistent with agency theory predictions and optimal contracting. Similarly the lack of support for RPE suggests that UK executive compensation practice fails to exclude the effects of market wide random or exogenous shocks outside the control of the executive. These findings may perhaps be due to a failure of the literature to specify the executive compensation variables correctly, or the performance period over which relative performance is measured. In this thesis, using new definitions of compensation measures and industry sector peer groups, it is tested whether relative performance evaluation is used to determine chief executive compensation in the UK.

Critics of RPE and principal-agent theory, such as Bebchuk and Fried (2003), suggest that managers influence the determination of pay so that they are rewarded for industry or market wide performance through the opportunistic choice of peers. Supporters of the managerial power theory suggest that the power of the chief executive may influence how "market factors are interpreted", which might in turn impact on levels of compensation (Finkelstein and Hambrick, 1988, p.546). Managerial power theory is discussed next.

2.4 Managerial power theory

Managerial power theory, also known as 'executive power theory', 'self-serving executive model' or 'rent extraction theory' (Bruce et al., 2005), has recently been presented as an alternative model to principal-agent theory for explaining executive pay. However, managerial power theory is not new and like agency theory it originates from ideas of managerialism first put forward by Smith (1776) and Berle and Means (1932). According to Combs and Skill (2003, p.63) "managerialism is a theory that suggests that managers extract pay premiums by gaining control over their firms' compensation processes". Once in control of their own compensation managers will favour arrangements linked to their preferences rather than those of the shareholders.

The most recent illustration of managerialism is provided by Bebchuk and Fried (2003, 2004) and is labelled 'managerial power theory'. Reminiscent of agency theory, managerial power theory is founded on managers self-interest, hence the alternative name 'self-serving executive model'. However, while principal-agent theory supposes that principals design an incentive contract to align, managers interest with shareholders, managerial power theory suggests that due to a great deal of power, managers control their own pay irrespective of shareholders interests. Bebchuk and Fried (2004) view executive compensation arrangements as at best only a partial solution to the agency problem.

Agency theory predictions are based on the notion of "arm's-length bargaining", which according to Bebchuk and Fried (2004, p.4) does not consider the practical implications of negotiating an executive compensation contract due to executives' influence over the bargaining process. An assumption of 'arm's-length bargaining' is that 'risk averse' managers, who may have different interests to shareholders, want to reduce the amount of their compensation at risk. Managerial power theory assumes that managers reduce risk by controlling their pay and suggest that in reality executives have considerable power over their own pay (Hoskisson et al., 2009).

Bebchuk and Fried (2003) point out that executives have substantial 'authority' over non-executive directors, which allows them to gain more favourable compensation arrangements than if incentive arrangements were designed in shareholders' interests. This process of gaining additional compensation is known as, "rent extraction". Bebchuk and Fried (2003, p.75) suggest that the only constraint on executive pay is what they refer to as, "outrage costs" which can be defined as the costs associated with, "outsiders" discontent at an excessive compensation contract. Outrage costs might include the cost of negative media coverage and customer or employee dissatisfaction. In order to reduce outrage costs executives are then motivated to "camouflage" pay so that it will not appear excessive. According to Bebchuk and Fried (2003) the practice of executives controlling pay, obtaining rents and camouflaging pay is highly likely to reduce optimal incentives and consequently impair firm performance.

Agency theorists view the managerial power explanation of executive pay as, "a special agency case where governance institutions are weak" (Bruce et al., 2005, p.1496). Managerial power theorists disagree and although they do not claim it to be a substitute for agency theory they argue that managerial power is conceptually different. A key assumption of agency theory is executive self-interest and, according to Conyon (2006), an optimal contract does not necessarily perfectly align executives' interests with shareholders (agency costs are reduced but not "eliminated"). In managerial power theory, due to the separation of ownership and control, managers gain control over the compensation process (Bebchuk and Fried, 2003). Gomez-Mejia et al. (2005) assert that while agency-theory predictions are based on 'rational self-interest' managerial power predictions are based on 'opportunism', which can be defined as 'non-rational behaviour'. Managerial power theorists suggest that managers will do all in their power to extract rents from their firm.

Executive power can be a function of a weak board, the lack of a single large shareholder, a small number of institutional shareholders or anti-takeover provisions (Bebchuk and Fried, 2003). In any of these situations, or a combination, non-executive directors may not act solely on behalf of shareholders and instead may be influenced by the management team. Managerial power theorists claim that optimal contracts based on arms-length contracting and market forces fail to be successful because non-executive directors who negotiate and set pay on behalf of shareholders are themselves subject to an agency problem. Bebchuk and Fried (2003) provide several reasons for the ineffectual behaviour of non-executive directors. First, non-executive directors have an interest in their own compensation, which the executive can perhaps influence. Second, they also describe a loyalty component where the director is first loyal to their friends and colleagues, the executives, and then to the shareholders. Third, that the non-executive director is likely to have a desire to be re-elected to the board and will therefore not jeopardise this possibility by taking actions, such as opposing a pay increase, which will be unfavourable with the executive.

It is supposed that strong corporate governance reduces executive influence over the remuneration committee and hence over their own compensation. Core et al. (1999, p.372) find evidence to suggest that chief executive compensation is higher when, "the board is larger, there is a greater percentage of the board composed of outside directors, and the outside directors are appointed by the CEO." In a study by Bertrand and Mullainathan (2000), chief executive compensation is shown to increase substantially more where firms do not have a large outside shareholder (more than five percent holding). Bebchuk and Fried (2006) interpret this finding as evidence that a single large shareholder can exert considerable influence over managers' pay and consequently reduce managerial power.

The use of compensation consultants, "stealth compensation", and non-indexed share options, according to Bebchuk and Fried (2003, p.79), are examples of managers influence over the pay setting process. Compensation consultants are accused of collaborating with executives to provide 'executive friendly' advice on executive pay. It is argued that it is not in the interest of the compensation consultants to provide negative signals on pay because the executives can influence the appointment of the compensation consultant. Bebchuk and Fried (2003, p.83) point to the use of non-indexed options that do not, "filter out windfalls", as equivalent to extracting rents because the share option value is related to general market movement rather than relative performance. Bebchuk and Fried (2003) propose the use of indexed share options linked to an industry benchmark to better filter out windfalls unrelated to executive performance.

Another aspect of the managerial power theory is the desire of the remuneration committee to disguise compensation arrangements through stealth compensation, in order to reduce public and shareholder outrage. This may be in the form of complex long-term incentive plans that appear to be related to company performance but in reality are set against easily achievable targets. Payments may also be hidden in the way of benefits such as generous pension arrangements and various perquisites. In their illustration of managerial power theory Bebchuk and Fried (2003) conclude that executive compensation can be considered as part of the agency problem rather than a solution to it.

Principal-agent theory suggests that an appropriately aligned incentive contract, (designed by the principal and negotiated with the manager) predicts a positive association between corporate performance and pay. Whereas, the managerial power approach predicts a positive association between executive power and pay. The expected relationship predicts high levels of pay that is insensitive to performance. The managerial power view is highly convincing given the observed weak association between firm performance and pay and the high levels of executive pay. Although, it should also be noted that high pay is not necessarily the same as excessive pay and maybe an outcome of the executive labour market and bargaining power rather than a result of ineffective contracts (Conyon, 2006).

Managerialist theories also predict a strong positive association between company size and pay (Cosh and Hughes, 1997; Hoskisson et al., 2009). The empirical literature finds company size to be the most important determinant of executive pay, which perhaps provides further support for the managerial power approach. Combs and Skill (2003) describe two reasons for executives to tie pay to company size. First, executives have a lot of control over firm size through organic growth and growth through acquisition. Second, company size is less variable than firm performance and therefore provides less compensation risk for the executive.

It is not proposed to specifically measure managerial power through firm specific corporate governance mechanisms or other firm or individual characteristics. Nevertheless, if this study finds no or only a weak association between corporate performance and executive pay, combined with no evidence of relative performance evaluation, then this result in itself would lend some support to the managerial power argument.

2.5 Human capital theory

Human capital theory is a paradigm for studying the economic advantages gained from investing in people (Sweetland, 1996). Human capital comprises the skills, education and experience acquired by individuals over time. Individuals invest in human capital in order to increase productivity and as a result expect to be rewarded with higher compensation. Firms invest in people to increase productivity and to ensure individuals have the required level of competence to carry out a given role (Laing and Weir, 1999).

The study and appreciation of human capital dates back to as early as Adam Smith (1776) though human capital theory was not formally expressed as such until much later. Mincer (1958), one of the first authors to write about human capital theory, developed a model to explain the variation in 'personal incomes' with respect to human capital. Mincer established that additional years in education were compensated with additional earnings. In certain professions, such as legal or medical, where individuals are required to study for relatively long periods of time, personnel are paid more than professionals in other fields for whom less education is needed in order to do their job. Mincer showed that earnings increased with additional 'skills and experience'. Becker (1964, p.5) advanced Mincer's original work by associating the variation of earnings to, "rates of return and investment costs".

Human capital characteristics include education, industry experience and tenure (Gomez-Mejia and Wiseman, 1997). General human capital characteristics are acquired through experience, training and education. The expectation is that experienced individuals will be more productive because of their increased knowledge and skills, which should lead to higher compensation. It is expected that general human capital is positively related to executive pay because human capital develops with experience. The empirical evidence is mixed. A typical measure of general human capital is executive age as a proxy for experience. Conyon and Murphy (2000) establish that age, is significant and positively related to chief executive total remuneration. In contrast, Johnston (2002) finds no such association and McKnight and Tomkins (2004) find only a weak association between age and chief executive pay. The inconsistent results might be because the relationship between age and pay is non-linear. McKnight et al. (2000) report an inverted U-shape relationship between age and annual paid bonus.

Specific human capital is experience acquired relative to a particular firm or industry (Laing and Weir, 1999). Tenure within a firm is an estimate of specific human capital. It is also expected that acquired specific human capital has a positive association with chief executive compensation. Laing and Weir (1999) measure tenure in terms of the number of years in the current post and find chief executive tenure to be positively and significantly related to executive pay.

Murphy and Zábojnik (2004) suggest that transferable general skills and experience required to be a chief executive have increased in their importance due to progress in management science. For example, executives who have superior financial management and operational skills can use these to good effect across firms and industries. In contrast to general human capital, Murphy and Zábojnik (2004) suggest firm specific human capital has diminished in its importance due to the easy access and wealth of information published on firms. Murphy and Zábojnik (2004) propose that the increase in the number of external chief executive hires versus internal promotions shows the shift in importance from firm specific to general human capital. The increasing importance of general human capital might then also explain the increase in average executive pay due to additional compensation required to lure an executive away from their existing employment. Murphy and Zábojnik (2004) argue against the managerial power hypothesis and suggest high levels of executive pay can be explained by the competitive external market for executives. The value placed on general management skills has contributed to creating a more competitive external market for executives. Shareholders are willing to pay substantial premiums for individuals who have the right set of general skills and knowledge to manage their firm. In a test of human capital theory, Murphy and Zábojnik (2004), find an increase in chief executives general human capital, measured by education level, and a decrease in chief executive firm specific capital, measured by tenure prior to appointment. This, they argue, lends support to their argument that general measures of human capital are relatively more important than firm specific measures.

Human capital theory has also been used to explain the association between firm size and executive compensation. It is assumed that as an organisation increases in size and complexity, the required level of human capital and individual ability to manage multifaceted organisations, also increases (Gomez-Mejia and Wiseman, 1997; McKnight and Tomkins, 2004).

Measures of specific human capital have also been used to test other theories such as the managerial power hypothesis. As well as acquiring specific human capital over time executives will increase their bargaining power and ability to influence the determination of their compensation which may involve weakening the link between firm performance and pay (O'Reilly et al., 1988). McKnight and Tomkins (2004) use the accumulation of specific human capital, chief executive tenure, as an approximation for increased managerial power. They find the positive association between company performance and chief executive pay weakens with increased tenure and they interpret this finding as evidence to support the managerial power hypothesis. However, it may be argued that as tenure increases the executive becomes entrenched within the same firm and as a consequence has lower mobility to increase compensation by changing jobs (Pukthuanthong et al., 2004).

Although measures of human capital are potentially important determinants of chief executive pay it is not the intention of this thesis to test human capital theory predictions. In this study, factors associated with human capital theory will be employed as control variables for some of the empirical models. Finkelstein and Hambrick (1988) do not expect human capital to have much impact on the variation of chief executive pay but acknowledge that information on human capital may be important if other measures of chief executive effort or output are not easily available.

2.6 Information processing theory

Information processing theory has been employed in the empirical executive compensation literature to explain the variation of executive pay with respect to the information processing demands required to carry out the role of a company executive (Henderson and Fredrickson, 1996). Tushman and Nadler (1978, p.614) define information processing as, "the gathering, interpreting and synthesis of information in the context of organisational decision making". In a business environment, information is processed by executives to enable them to decide on alternative business actions. More difficult or complex tasks require an increased amount of information (Galbraith, 1974).

An important part of an executive's role is to process large amounts of information, which is essential for the success of an organisation (Galbraith, 1974; Henderson and Fredrickson, 1996; Sanders and Carpenter, 1998). If the ability to process a great quantity of information is critical for achieving superior performance, then according to information processing theory, executive's who are better able to do this will be paid more. Henderson and Fredrickson (1996) suggest that there are a limited number of exceptional individuals who have the ability to deal with the information processing demands required to be a CEO of a large company. Therefore firms are prepared to pay more in order to attract the very best executives with the required skills and capability.

The proposition is that increased information processing demands are positively associated with executive compensation. Proxies of information processing demands include company size, diversification and the degree of internationalisation. A number of studies support the information processing hypothesis. Henderson and Fredrickson (1996) find chief executive pay is related to increased information processing demands as measured by diversification strategy, technology and board structure. A study by Sanders and Carpenter (1998), of 258 US companies in 1992, investigated the degree of internationalisation since it can be argued that an international company is more complex than a company that focuses only on the domestic market. Results for Sanders and Carpenter (1998) also support the proposition that executive pay is associated with increased information processing demands measured by the degree of firm internationalisation. Further, a recent study by Yoshikawa et al. (2010) find increased information processing demands, measured by diversification strategy and research and development investment, positively influence average executive bonus pay in Japanese firms.

Despite its obvious appeal information processing theory has not been used a great deal in recent studies of pay and performance. However, it is generally understood that the large positive relationship between firm size and executive pay is a result of the increased complexity associated with managing a large company (Finkelstein and Hambrick, 1988).

In this thesis, it is hypothesised that company size is an important factor in determining chief executive pay. Executive compensation may be explicitly linked to increased information processing demands or implicitly linked through executive power to negotiate an improved contract based on information processing demands. If shareholder representatives, the non-executive directors, consider that information processing is an important capability required of an executive, then in the absence of ideal performance data, shareholders may be best served by relating executive pay to measures of information processing (Henderson and Fredrickson, 1996). In addition information processing demands could be unproblematic to measure and simpler to implement compared to measures of performance.

From an alternative perspective, linking executive pay to information processing demands might not be in the best interest of shareholders as it may encourage executives to pursue their own self-interests at the expense of corporate performance. For example, if company size or diversification is used as measures to judge information processing demands, executives might pursue growth or diversification strategies that may destroy rather than increase firm value (Henderson and Fredrickson, 1996).

2.7 Alternative theories of executive pay

Festinger (1954) proposed that individuals have a natural desire to compare themselves to others in order to judge their own ability and performance. Social comparison theory suggests that executives will compare themselves to others who are perceived to be equal or slightly better than they are. Executives will also be interested in their compensation relative to other executives and are likely to consider it 'unfair' if they are paid less than executives with similar ability and/or performing similar roles. Executives will possibly negotiate for increased pay if they observe this to be the case. Remuneration committees may plan to avoid this inequitable situation arising in the first place by gathering market data for similar roles (Fong et al., 2010) and paying the executive the market rate for the position. Drawing on social comparison theory, Fong et al. (2010, p.629) find that, "CEO underpayment", relative to the external labour market for chief executives, is associated with firm size. Fong et al. interpret this finding as confirmation that chief executives actively manage firm size to adjust compensation upwards. If this is the case, and executives dynamically increase the size of the firm so to manage their compensation expectations, it may well be at the expense of shareholder value creation. In contrast, Fong et al. also find that the incidence of overpaid chief executives is linked to "firm profitability", which is interpreted as evidence that overpaid chief executives perform better, in respect to firm profitability, compared to underpaid chief executives.

In terms of the determination of pay, social comparison theory predictions apply to how the remuneration committee evaluates the executives and hence set the level of compensation. Social comparison theory has been applied in an attempt to explain how remuneration committees set executive pay from both an inward looking and outward looking process. Non-executive directors might look towards themselves for an inward comparison or towards the external executive labour market for an outward comparison (Fong et al., 2010). The non-executive directors responsible for monitoring the top management team and deciding its compensation are often executives of other firms and are likely to be selected according to their similarities to the executive team (O'Reilly et al., 1988). In deciding executive pay, social comparison theory predictions suggest that the non-executive directors will first make a comparison with their own pay and then to other similar or more competent executives (O'Reilly et al., 1988; Gomez-Mejia and Wiseman, 1997; Ezzamel and Watson, 2002).

Social comparison theory is not extensively researched in the field of executive compensation. Nevertheless, there are examples of studies that explore social comparison theory as an explanation for the variation in executive pay. Ezzamel and Watson (2002), in a UK study, find evidence to support social comparison theory predictions that external peer group comparisons and internal board comparisons are significant in explaining the variation in chief executive pay.

In a US study, O'Reilly et al. (1988) show that the compensation of non-executive directors has an influence on chief executive compensation. They demonstrate that the strong relationship between chief executive pay and director pay provides evidence that directors set executive pay according to their own pay comparisons. They also argue that this finding may result in reduced pay-performance sensitivities due to the influence of non-executive directors, (who may also be the chief executive of another firm), who have an interest in maintaining a strong executive pay market.

Factors associated with social comparison theory might be important in determining executive pay but their investigation is beyond the scope of this study. Social comparison theory predicts that executive compensation reflects the pay of committee members and/or other similar executives. However, as suggested by Gomez-Mejia and Wiseman (1997), social comparison predictions might only result when executive monitoring has failed and as proposed by managerial power theory the executives have manoeuvred the non-executive directors to reflect their own interests rather than those of the shareholders.

Using tournament theory, Lazear and Rosen (1981, p.841) set out to explain the variation in chief executive compensation associated with "an individuals ordinal rank in an organisation rather than his output level". In particular, they wanted to understand the pay differential observed between the chief executive and their direct reports. Lazear and Rosen (1981) assert that the large observed wage differentials cannot be explained by differences in marginal productivity, rather it is based on the relative performance of individuals. Essentially the theory describes individuals of the same firm competing against each other in a "tournament" with the ultimate prize being the promotion to chief executive. The marked difference in pay between the chief executive and other individuals provides the motivation for individuals to compete with each other, increasing their effort and performance at more junior levels, for a chance of winning the top prize. Tournament theory provides an explanation for the large observed differences in compensation between executives at all organisation levels, but in particular the pay gap between the chief executive and their direct reports (O'Reilly et al., 1988).

In the scenario where executive input is straightforward to monitor and measure then compensation maybe best linked to observable effort. However, due to difficulties in full monitoring, particularly in large and diverse companies, output based systems prevail. Output based compensation systems shift the risk away from the principals onto the agents but also incur costs associated with measuring output. Whereas, rank order compensation systems are not costly to operate and reduce the risk borne by the principals and agents, which is why they are sometimes suggested to be more efficient than output based systems (Lazear and Rosen, 1981). It is the ordinal ranking that differentiates tournament models from other compensation schemes. There are some potential constraints of the tournament model such as the possibility for agents to mutually agree to reduce effort but maintain compensation levels. It is also suggested that tournament models are less effective if combined with output based compensation systems (Conyon et al., 2001).

According to tournament theory, tournaments take place at all levels in the organisation. Individuals compete against each other for fixed prizes and are promoted according to their relative performance (Conyon et al., 2001). As an individual is promoted in a tournament model their compensation is increased. Advancing through organisational levels prolongs an agent's, "career horizon" and ensures the best talent will rise to the top of the organisation (Lambert et al., 1993, p.440). Individuals find their own level within the firm to match their effort and ability. A manager who remains at the same level maintains the same compensation "for all future periods". Lambert et al. (1993) describe the career opportunity in terms of an, 'option'. As the manager is promoted through the ranks the option decreases in value because the number of future promotions decreases with each promotion. The principals must adjust the agent's compensation to compensate for the reduced option value as the executive is promoted from one level to the next. The option value is always positive but gets closer to zero as an agent advances through the organisational levels. The option value reaches zero when there are no further promotion opportunities. Therefore the principals compensate the agent with a substantial increase in compensation at the final level of the tournament.

The chief executive is considered the winner of the tournament and consequently receives the highest level of compensation in the firm. It is not necessarily that the chief executive is that many more times productive than their direct reports, as the high differential in compensation might reflect, but more rather the compensation represents the prize for hard work over the individual's tenure.

Empirical investigations of tournament theory are seldom in the literature. This is likely to be due to the non-disclosure of internal firm data below the main board of executives. Tournament models predict that promotion opportunities provide incentives for executives to increase effort and consequently impact positively on firm performance (Main et al., 1993; Conyon and Sadler, 2001). If executives are motivated to work hard in order to secure a top executive position, and therefore be remunerated substantially more than the lower reporting level, then the internal variation in compensation ought to be related to corporate performance because the model encourages additional effort. It is expected that additional effort should be matched by increased output and performance. Main et al. (1993), in a US study, do find an association between return on assets and the variation in compensation among agents of the same firm. However, Conyon et al. (2001) using UK data find no association between corporate performance and the variation in internal executive firm compensation.

Tournament models also predict that the prize is higher when there are a greater number of individuals competing for the prize. Main et al. (1993) and Conyon et al. (2001) do find evidence to support this hypothesis; however, O'Reilly et al. (1988) find no support for this proposition. For example, Conyon et al. (2001) find that the gap between chief executive pay and other executives is positively associated with the total number of executive board members, which they report is consistent with tournament theory. However, the study by O'Reilly et al. (1988), finds no association between the number of vice presidents and the pay difference between the chief executive and vice presidents.

The most consistent evidence provided in support of tournament theory is based on the proposition that compensation is an increasing function of organisational level and the differences between levels are also increasing as individuals are promoted (Lambert et al., 1993; Main et al., 1993; Conyon et al., 2001).

Although an interesting theory to explain pay differences among top executives it is beyond the scope of this study to test for tournament theory predictions.

2.8 Summary

This chapter set out to review the leading theories of executive pay and their application to research in order to provide the theoretical direction essential for this study. Seven theories of executive pay have been reviewed with respect to how they might be employed to investigate the determination of executive pay.

Principal-agent theory is identified as the most important foundation on which to test the association between corporate performance and CEO pay. Relative performance evaluation theory is recognised as a fundamental addition to agency theory predictions and will therefore also be employed in this study to examine CEO pay-for-performance. It is these theories, which are the basis of the hypotheses development described in Chapter Four.

The remaining theories have been shown to be potentially important in explaining the variation of executive pay but provide limited theoretical direction with regard to the relationship between corporate performance and pay. With this in mind, human capital theory is not used in this study although human capital characteristics are employed as control variables in some of the empirical models. Similarly, information processing theory is not considered in this study but firm size, which is linked to information processing demands, is included as an explanatory variable. An investigation of social comparison theory and tournament theory predictions is beyond the scope of this study.

Having reviewed the theory of executive pay the following chapter appraises the developments in corporate governance that have specifically taken place in order to address principal-agent concerns in publically owned firms.

Chapter Three

Changes to Corporate Governance and Executive Pay

3.1 Introduction

Having reviewed the most important theoretical perspectives applied throughout the executive pay literature; agency theory and relative performance evaluation theory are identified as the foremost theories to examine the association between corporate performance and executive pay. Now, in this chapter, the development of corporate governance policy is reviewed and evaluated with respect to its response to principal-agent concerns.

Executive remuneration holds a central role in corporate governance policy and in particular its function has become even more influential over the past two decades. Corporate governance reform has taken place in many western economies and in the UK specifically it has been far-reaching. The UK was one of the first economies to initiate major corporate governance reform with the publication of the Cadbury Report in 1992 and its Code of Best Practice. The Cadbury Report addressed the financial aspects of corporate governance and followed a number of high profile corporate scandals most notably Maxwell Communications and Polly Peck (Gregory-Smith, 2009). Together with examples of substantial corporate failure Cadbury was also set up in response to, "creative accounting" practices and in response to rapid growth in executive pay (Girma et al., 2007, p.67). Corporate governance reform in the US followed ten years after reform was first initiated in the UK. Similar to the UK, it was to take a series of major corporate scandals among large world renowned firms such as Enron, Tyco and Worldcom before action was taken to reform US corporate governance (Gregory-Smith, 2009). In the US, the Sarbanes-Oxley Act (2002) was intended to improve accounting regulation and oversight, enhance disclosure rules and lay out top management responsibilities (Girma et al., 2007, p.65).[8]

Following the Cadbury Report (1992) a number of other very important corporate governance reports have been published in the UK. Immediately after Cadbury was the Greenbury Report (1995), which focused entirely on director remuneration. Next, the Hampel Report (1998) reported on corporate governance and brought together the codes of best practice issued by Cadbury and Greenbury. The Combined Code on corporate governance was first issued in 1998 by the London Stock Exchange and effectively replaced Cadbury, Greenbury and Hampel. Since its initial release the Combined Code has been regularly updated, first in 2003, then in 2006, in 2008 and most recently in 2010. In 2003 the Higgs Report was published outlining the role of the remuneration committee. Other important corporate governance reports not related to executive remuneration policy or practice include the Turnbull Report (1999) on internal controls and financial reporting, the Myners Report (2001) on institutional investment in the UK, the Smith Report (2005) on the independence of auditors and the Walker Review (2009) on corporate governance within UK banks and other financial service firms.

The next section focuses on the UK corporate governance framework with respect to executive remuneration policy and practice and so it only reviews the recommendations and effective changes related to executive pay. Then the following section reviews the applied executive compensation literature specifically investigating the impact of changes in corporate governance on executive pay.

3.2 The UK corporate governance framework

3.2.1 The Cadbury Report (1992)

The Cadbury Committee was established in May 1991 to deliver a report on the financial aspects of corporate governance. The Financial Reporting Council, the

[8] There has been a number of corporate governance reports published around the world; the Bouton Report (2002) in France; the Cromme Report (2002) in Germany; the Tabaksblat Report (2003) in the Netherlands; and the Aldama Report (2003) in Spain.

London Stock Exchange and the accountancy profession were involved in its formation. The Cadbury Committee resulted in a voluntary code of best practice. The code was integrated into the listing rules of the London Stock Exchange and all listed companies were encouraged to adopt its recommendations. The main objective of the code was to increase the responsibility of non-executive directors in monitoring the board and inter alia to ensure greater transparency in the determination of executive pay. Girma et al. (2007) reported a high level of adoption of the Cadbury Code soon after it was issued.

The Committees recommendations with respect to the responsibility of non-executive directors included that the role of the chief executive and chairman of the board be held by separate incumbents; the board have a minimum of three non-executive directors independent of management; the creation of a non-executive nomination committee; and fixed term contracts (without automatic renewal) for non-executive directors. More directly related to executive compensation the voluntary code also recommended three year contracts for executive directors; full disclosure of total compensation for the highest paid director and chairman of the board; and that executive pay be determined by a remuneration committee consisting largely of non-executive directors. The setting up of a remuneration committee would transfer pay decisions to non-executives so that managers would not be responsible for determining their own pay. Full disclosure entailed providing detailed information of the different pay elements for the directors, chairman and highest paid director (HPD). Remuneration committees were also expected to explain performance criteria for short-term and long term incentive pay.

An important goal of the Cadbury Committee was to ensure that corporate performance was at the forefront of executive pay decisions and that managers were not involved in the determination of their own compensation (Main and Johnston, 1993; Girma et al., 2007). Therefore it is not unreasonable to suggest that executive compensation studies post Cadbury might expect to find a stronger association between corporate performance and executive pay, although this has not shown to be the case. On the contrary there is evidence that the association between corporate performance and executive pay, post Cadbury, remains weak while the impact of firm size on pay has gained in importance (Girma et al. 2007).

3.2.2 The Greenbury Report (1995)

The Greenbury Study Group was set up by the Confederation of British Industry (CBI) and was in response to continued public and investor unease with regard to executive pay post Cadbury. The goal of the Greenbury Group was to find areas of good pay practices and integrate them into a code of best practice. Similar to Cadbury the outcome of the Greenbury Group was a new code and an update to the listing rules on the London Stock Exchange.

The Greenbury Report (1995) strengthened the Cadbury recommendations and in Section A of the code proposed that the remuneration committee should consist entirely of non-executive directors. In Section B of the code, Greenbury advocated full disclosure of directors' pay but was more precise in terms of what was required. Greenbury recommended the full disclosure of directors' pay in a remuneration report, which would be the principle document for communicating remuneration policy and practice with the owners. The report should include detailed disclosure of pay by director name; it should reveal comparator groups used for the purpose of benchmarking compensation and corporate performance; it should identify performance criteria for annual bonuses and long-term incentive arrangements; and provide contract details including termination clauses. It was also recommended that all new long-term incentive plans be presented to shareholders for their approval.

Section C of the Code provided open advice on good practice to ensure shareholders interests are at the centre of the remuneration policy. This included promoting the idea of competitive pay but not excessive pay. Therefore, compensation should be used as an instrument to retain and/or recruit executives but without paying more than is necessary. It also provided guidance to remuneration committees on relative performance evaluation and suggested that committees should consider the performance of peer firms when making compensation decisions and position their own firm appropriate to the market. It was made clear that rewards should not be a function of general appreciation in the stock market or any other indicators such as price inflation; however measures such as relative shareholder return were identified as good performance metrics for judging relative long-term firm performance. It was also stated that restricted shares or share options should not vest within three years of the initial date of grant and that share options should not be issued at a discounted price relative to the price at the time of grant.

3.2.3 The Hampel Report (1998)

The Hampel Committee on corporate governance was set up in 1995 by the Chairman of the Financial Reporting Council. Hampel reviewed the recommendations put forward by Cadbury and Greenbury and the actions taken by firms since the publication of the respective codes. The Hampel Committee reported its findings in 1998. The Hampel Committee agreed with Cadbury and Greenbury that UK listed firms should have a remuneration committee and that it should be composed of non-executive directors. Hampel also agreed with Greenbury that shareholders should be invited to approve new long-term incentive plans. Further to the earlier codes Hampel proposed that remuneration committees should reflect cautiously on the level of executive pay and not unquestioningly rely on data from remuneration surveys that may potentially lead to increasing pay with disregard to corporate performance. Hampel also emphasised that, although disclosure is an important feature of transparency of the executive pay setting process, it had also been shown to put pressure on remuneration committees to increase pay in an open and competitive executive labour market. Hampel suggested that remuneration reports were often too complicated and recommended the introduction of an obligation to simplify them so that the essential information could easily be understood by the owners.

3.2.4 The UK Corporate Governance Code

The UK Corporate Governance Code, initially known as the Combined Code, was first issued in 1998 by the London Stock Exchange and was included as part of the listing rules. The Combined Code (1998) is an amalgamation of the Cadbury, Greenbury and Hampel Reports on good corporate governance. Section A of the Code refers to the directors' broad responsibilities including the recommendation to divide the responsibilities of chief executive and chairman into separate roles and the recommendation to have a minimum of one-third non-executive directors on the main board. Section B refers to guidance on directors' remuneration including a recommendation to remuneration committees to be sensitive towards the level of executive pay so that pay is not deemed to be excessive particularly when compared to average employee pay. It also recommended that pay ought to be linked to corporate performance in order to align executive interests with shareholders. Relative performance evaluation is underlined as an important measure of long-term performance; however remuneration committees are also advised against the use of comparator groups purely as a means to justify increasing pay. The Code retained the recommendations to disclose remuneration policy and to reveal the details of each director's pay in a remuneration report to be published with the annual report and accounts. Shareholders should also be invited to approve all new long-term incentive plans.

The Combined Code was first updated in 2003 and included a number of new recommendations specifically relating to executive remuneration. It advised on tougher performance conditions for annual bonuses; a minimum three year vesting requirement for long-term incentives; and payouts from long-term incentives should be linked to performance conditions such as relative shareholder return. It has since been updated in 2006, 2008 and 2010. The Combined Code was renamed 'The UK Corporate Governance Code' in 2010.

3.2.5 The Directors' Remuneration Report Regulations (2002)

The Directors' Remuneration Report Regulations were introduced in the UK for the year-ending 31st December 2002. The regulations require all firms listed on the London Stock Exchange to prepare a remuneration report in accordance with Schedule 7A. The Regulations replaced the prior remuneration disclosure obligations required by the Companies Act 1985. The Directors' Remuneration Report Regulations (2002) are divided into four sections within schedule 7A. Part 1 is the introduction. Part 2 of Schedule 7A is not subject to audit and requests the remuneration committee to present remuneration policy statements for the next financial year. The report must also provide a performance graph showing a five year history of total shareholder return (TSR) of the firm versus an industry benchmark. The objective of including the graph is to enable shareholders to observe the performance of the firm compared to its competitors. Therefore highlighting the importance shareholders place not just on absolute firm performance but more so on relative firm performance. Remuneration committees are obliged to detail performance conditions for compensation arrangements and explain why particular performance criteria are selected. Part 2 requires details of each director's contract of service. Part 3 of Schedule 7A is subject to audit and must include detailed remuneration data. The remuneration report must disclose salaries, fees, bonuses, expenses, compensation for loss of office and other benefits, including pension payments, paid to a director. In addition the report must include detailed disclosure on share option awards and other share based awards.

The Directors' Remuneration Report Regulations and the UK Corporate Governance Code both place a significant importance on the relationship between corporate performance and executive pay. Both recognise the value owners put on relative firm performance and the Combined Code (2003) specifically recommends the use of relative performance evaluation in executive compensation contracts. However, despite wide ranging reform on the governance of executive remuneration, often directed towards enhancing the link between corporate performance and executive pay, academic research has yet to provide any substantial evidence that the relationship has become stronger. It might be the case, as alluded to in the Hampel Report, that increased disclosure designed to enhance transparency has also improved market pay information, which is then used as justification by remuneration committees to change executive pay based on market data rather than on corporate performance. This may explain why Girma et al. (2007) find a stronger association between pay and firm size post Cadbury.

A key recommendation of the Combined Code (2003) is that executive pay is a function of performance relative to other firms and executives are not only rewarded for general appreciation in the stock market. This recommendation reinforces relative performance evaluation theory (RPE) predictions.[9] RPE theory predicts a significant negative association between peer group performance and executive compensation after controlling for individual firm performance. The applied literature testing for RPE in executive compensation is reviewed in Section 4.6 and the review shows that prior to the Combined Code there was insubstantial evidence of RPE in UK executive compensation. Since the publication of the Remuneration Report Regulations in 2002 and since the Combined Code revisions in 2003 there has been no implicit test of relative performance evaluation in studies of UK executive compensation. This study aims to benefit from the detailed executive remuneration data that firms are now required to disclose and implicitly test for RPE in the different components of UK chief executive compensation.

In the next section, the literature is reviewed in relation to studies investigating specific changes in corporate governance characteristics based on the recommendations of the various iterations of international codes of best practice. It is not an objective of this study to test the impact of specific changes in corporate governance on executive pay. However, the discussion of the results will involve comparisons to studies from previous sample periods before firms had adopted the initial recommendations of Cadbury, then Greenbury and the Combined Code.

3.3 Governance characteristics and empirical evidence

A review of the empirical executive compensation literature reveals that many different corporate governance characteristics have been used to test managerial power theory predictions[10] or to simply test the impact of changes in corporate governance on the association between corporate performance and executive pay. Managerial power theory suggests executives use their influence over the main

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[9] Relative performance evaluation theory and its predictions with regard to firm performance and executive pay are reviewed in Section 2.3.
[10] Managerial power theory is reviewed in Section 2.4.

board to extract additional compensation than they would otherwise receive under optimal contracting (Bebchuk and Fried, 2003). It is hypothesised that executives are able to exert more power over a weak and ineffectual board than over one that is strong and effective (Core et al., 1999). Researchers typically adopt an approach in which measures of good governance practice are used to test whether strong boards are more likely to implement optimal incentive contracts versus weak boards, which are supposed to write contracts with less sensitivity between corporate performance and pay. The division of responsibilities between a chairman and a chief executive is frequently cited as good governance and an indication of a stronger board compared to a board where these roles are combined. A board with a higher proportion of non-executive directors compared to executive directors is also considered to be more effective. The existence of a nomination committee and a remuneration committee are also perceived to represent good corporate governance and therefore an effective board. In a US study, Core et al. (1999), using a number of different measures provide evidence of an association between increased chief executive compensation and ineffectual boards.

In the UK, listed firms are obliged to adhere to the UK Corporate Governance Code, which recommends firms adopt specific characteristics of a strong board. Therefore it is unlikely that a current study will find significant variation with regard to the most prominent aspects of good corporate governance. Although boards do vary (i) with respect to their size; (ii) in terms of the proportion on non-executives on the board; and, (iii) the length of time non-executive directors serve on the board. Gregory-Smith (2009), in a UK longitudinal study between 1996 and 2005, examine an optimal contracting model of executive pay versus a rent capture model. The timeframe is important since it incorporates the release of many new recommendations of best corporate governance practice. Gregory-Smith (2009) finds no evidence that executives influence the board to benefit their own remuneration. Specifically a weaker board is not associated with higher chief executive pay. The impact of various aspects of corporate governance on executive pay is discussed next; starting with duality.

3.3.1 Duality

Duality occurs when the chief executive is also the chairman of the board. A combined role of chief executive and chairman is expected to have a positive influence on executive pay because the joint position is considered able to exert greater influence over the board and hence over their own pay (Cordeiro and Veliyath, 2003). It is for this reason that the Cadbury Code recommended the division of responsibilities at the head of a company. In the UK, studies typically find the incidence of duality to be not significant in explaining the variation in executive pay. For example, Main and Johnston (1993), in a study based on a single cross-section and preceding Cadbury, find the effect of duality on executive pay to be not significant. Conyon and Leech (1994) also investigated duality over a sample period predating Cadbury and similarly do not find a significant result. Benito and Conyon (1999) using a longitudinal sample covering the period leading up to the Cadbury recommendations and after the report was issued still do not find a significant result. Gregory-Smith (2009) in a longitudinal study since the Cadbury code also found duality is not associated with higher pay. It emerges from these results that there is no UK evidence to suggest that the recommendation to split the role of chief executive and chairman impacts on executive pay. However, these results cannot be interpreted as lack of support for the recommendation to divide the role of chief executive and chairman because remuneration is not the only aspect that can be influenced by a powerful chief executive who is also chairman of the board.

The study of duality is not restricted to a UK context. It is also an important issue of corporate governance in other countries. In the US the results are mixed with some studies finding a significant result. Sridharan (1996), Sanders and Carpenter (1998) and Core et al. (1999) each find that duality exerts a significant positive influence on executive pay. It may be that US research finds support for the duality hypothesis because there is more variation with respect to a higher proportion of firms operating with a combined role of chief executive and chairman. A Canadian study by Sapp and Ivey (2007) also find the combined role to be associated with higher pay. This study will not investigate the effect of duality since virtually all large UK listed companies adhere to the UK Corporate Governance Code and divide the role of chief executive and chairman of the board.

3.3.2 Board independence

The number of independent non-executive directors on the main board is also considered to be an important characteristic indicating the extent of 'board balance and independence'. Since 2003, the UK Corporate Governance Code expects at least half the main board (excluding the chairman) of a FTSE 350 company to be independent non-executive directors. It is proposed that more independent boards, that is, boards with a higher proportion of non-executive directors, are more likely to act in the best interests of shareholders than less independent boards. A few studies test whether measures of board independence influence executive compensation. For example, Ozkan (2009) finds the proportion of non-executive directors on the main board has no significant association with chief executive cash compensation but a significant positive association with total compensation. Cosh and Hughes (1997) and Stathopoulos et al. (2004) also find the proportion of non-executives has a positive influence on pay. These findings are somewhat surprising as it is assumed that a more independent board will restrain executive compensation. However, these findings do not necessarily indicate excessive pay or ineffective boards. It might be the case that while executive pay has increased so has its alignment with firm performance. Core et al. (1999) and Gregory-Smith (2009) find the number of non-independent directors on the board has a negative influence on total compensation.

The size of the main board is also considered to be an indication of board effectiveness. A large board is supposed to be less effective due to problems of communication and organization and therefore maybe more likely to be influenced by management. Core et al. (1999) and Ozkan (2009) find an increase in board size has a positive impact on chief executive compensation, which in both cases is interpreted as confirmation that large boards are considered to be ineffective and therefore managers are able to influence their own pay.

3.3.3 Nomination committee

The adoption of a nomination committee was a key recommendation of the Cadbury Report and the responsibilities of a nomination committee is an integral part of the UK Corporate Governance Code. The procedure by which directors are elected to the board and its sub-committees may affect the determination of executive pay. It is proposed that firms, which have adopted a nomination committee to elect directors, will be more effective in choosing directors to represent shareholder interests. Therefore the presence of a nomination committee is expected to have a negative association with the level of executive pay. The impact of the existence of a nominations committee on chief executive pay is investigated by a few studies, which find insignificant results (Conyon and Peck, 1998a; Benito and Conyon, 1999). This study will not investigate the impact of a nomination committee on chief executive pay since all UK listed firms have such a committee.

3.3.4 Remuneration committee

The adoption of a remuneration committee[11] was a key recommendation of the Cadbury Report and the responsibilities of a remuneration committee is an essential part of the UK Corporate Governance Code. A number of predictions with respect to executive compensation are estimated based on the presence and/or structure of a remuneration committee. In accordance with agency theory, a remuneration committee is acting on behalf of the shareholders and therefore it is expected that firms with such a committee will moderate executive pay; whereas, executives who operate without a remuneration committee will be in a position to reward themselves higher compensation (Benito and Conyon, 1999). It is also expected that the presence of a remuneration committee will be associated with a stronger association between corporate performance and executive pay than a firm operating without a remuneration committee. Further it is proposed that a remuneration committee with a higher proportion of non-executive directors is

[11] Remuneration committee is a UK term. The equivalent committee in the US is known as a compensation committee.

associated with lower pay; and a stronger relationship between corporate performance and pay (Conyon and Peck, 1998a).

It is not clear from the applied literature if the remuneration committee has such an impact on executive pay as the findings are mixed. Conyon (1997) finds the presence of a remuneration committee to be associated with lower executive pay; whereas, Benito and Conyon (1999) in a much larger study of over 1,000 firms do not find a significant association. Main and Johnston (1993) and Conyon and Peck (1998a) find that the presence of a remuneration committee is positively associated with executive pay. Conyon and Peck (1998a) and Sapp and Ivey (2007) investigate the composition of the remuneration committee and find a higher proportion of non-executives on the remuneration committee are associated with higher executive pay. These combined results appear to be at conflict with the proposition that a remuneration committee and in particular a predominantly independent committee, are expected to moderate executive pay. However, Conyon and Peck (1998a) do find the proportion of non-executives on the remuneration committee is associated with a greater alignment between corporate performance and executive pay. Thus, a possible conclusion is that remuneration committees introduce a stronger link between performance and pay but simultaneously increase total executive compensation to compensate the executive for the additional risk associated with performance related pay.

Stathopoulos et al. (2004) find the presence of executive directors on the remuneration committee has a positive influence on executive pay while committees comprised wholly of non-executives do not negatively influence pay. Although, Gregory-Smith (2009), in the most recent UK study on the impact of corporate governance characteristics on chief executive pay, finds the proportion of executives on the remuneration committee not to be a significant influence on pay. It is unlikely that any new study will find anything different since all UK listed firms adopt a remuneration committee and therefore this study will not investigate its impact on chief executive pay.

3.4 Summary

Overall the findings of studies investigating the impact of corporate governance characteristics on executive pay offer very little support to the proposition that certain characteristics enhance the association between corporate performance and pay. Ozkan (2009), in their recent study spanning the period between 1999 and 2005, says that changes to corporate governance have not been, "totally effective". This is because they do not find a significant positive association between corporate performance and chief executive total compensation. It is a particularly surprising result considering the wide-ranging reform and implementation of good corporate governance practice over the time preceding the investigation. However, the study did not consider relative performance evaluation (RPE) as an indication of firm performance. The Combined Code (2003) explicitly recommends the use of RPE in executive compensation and therefore an empirical study investigating the impact of the recommendations on executive pay ought to measure relative firm performance. If RPE is found to be present in executive compensation it would indicate, at least to some extent, that the recommendation in the Combined Code has had an influence on remuneration policy.

This study proposes to test for RPE in UK chief executive compensation but will not consider specific corporate governance factors as determinants of executive pay. This is because UK firms are required to comply with the remuneration report regulations and the UK Corporate Governance Code. Therefore there is insubstantial variability in corporate governance characteristics such as duality, the existence of a nomination committee or the existence of a remuneration committee. In addition, other characteristics where there is variability, for example the proportion of non-executives on the main board, have not been shown to be important in explaining the variation of chief executive pay (see Gregory-Smith 2009 and Ozkan 2009).

Chapter Four

Review of Empirical Evidence Concerning Executive Pay-for-Performance

4.1 Introduction

Having previously reviewed the alternative theoretical perspectives and the development of UK corporate governance practice, in this chapter the empirical executive pay-for-performance literature is critically reviewed. The purpose is to identify stylised facts and established results, but also gaps and inconsistencies in the empirical literature. These are discussed in detail and used to advance the specific research questions and hypotheses to be tested in this thesis from an agency and relative performance theory perspective.

The rest of the chapter consists of seven sections. To begin, the different data collection strategies and research methods applied in the executive pay-for-performance literature are evaluated in order to identify the empirical strategy to be used in this study. Next the dependent executive compensation and independent firm size and performance variables included in an executive pay-for-performance regression model are reviewed in turn. The complex nature of executive compensation is discussed and the various measures used in the literature, to construct the dependent executive pay variable are critically evaluated. The impact of firm size is reviewed as it has shown to be the largest and most significant determinant of executive pay. The review then focuses on absolute corporate performance as a determinant of executive pay. Following on from absolute corporate performance the review examines the empirical evidence concerning relative firm performance. The chapter concludes by setting out the specific research questions to be addressed in this study alongside the hypotheses to be tested.

4.2 Data collection approach and research methods

In an empirical investigation of executive pay the compensation[12] data is either hand collected from company remuneration reports/proxy statements or more typically exported from a financial database. The performance[13] data is usually exported from a financial database such as *Datastream* for UK data. A multivariate regression model is then employed where executive compensation is the dependent variable and corporate performance is an independent variable. The model incorporates other explanatory variables according to the exact purpose of the research. For example, research investigating the effects of relative firm performance on executive compensation will measure peer group performance in addition to absolute firm performance (for example Gibbons and Murphy, 1990; Dogan and Smyth, 2002; Garvey and Milbourn, 2006; Liu and Stark, 2009).

4.2.1 Sample selection and data collection

Executive compensation studies are typically performed on large publicly listed organisations across industry sectors. A number of studies do exclude financial services firms and investment trusts from the sample, which is almost certainly due to the unique financial structure and governance regime of firms in the sector. For example, Liu and Stark (2009), only include non-financial firms in their sample. There are also examples of studies, which focus on specific industries, for example, Barro and Barro (1990) study relative performance evaluation among 83 large US commercial banks. In the UK, Ogden and Watson (2004) study chief executive pay in the water industry shortly after the industry was privatized. There are also studies that research the executive pay-performance association in small firms. For example, Watson and Wilson (2005) investigate board pay among 571 small and medium sized UK firms. However, there are several reasons for research to concentrate on large firms. First, the principal-agent problem is likely to be more pronounced in larger firms because of more diversified ownership (Lewellen and

[12] The different approaches used to measure executive compensation are discussed and reviewed in Section 4.3.
[13] The different approaches used to measure corporate performance are discussed and reviewed in Section 4.5.

Huntsman, 1970). Second, as a result of disclosure regulations, executive compensation data is more readily available for examination.

The majority of executive pay studies, like this one, deliberately focus on chief executive pay. In the UK, prior to an amendment to the Companies Act (1985), firms were only required to disclose compensation data for the chairman and the highest paid director (HPD). Therefore early UK studies had to rely on compensation data for the HPD, which might not always have been the chief executive (Main and Johnston, 1993; Conyon, 1995; Conyon and Peck, 1998a). This can present an additional problem with longitudinal data where the change in individual pay may represent the difference in pay between two individuals (Conyon and Sadler, 2001). Research explores chief executive compensation because it is the CEO who is ultimately responsible for the performance of the firm and is therefore responsible for its success or failure. A small number of studies, for example, Main et al. (1996), Dogan and Smyth (2002) and Liu and Stark (2009) use total board remuneration because they argue that it is not solely the chief executive but the entire board, which is responsible to the shareholders. Typically the company remuneration policy and performance criteria apply to all executive directors and therefore chief executive pay is representative of all executives in this respect. However, the chief executive is likely to be the highest paid director by a large margin.

Next the relative merits of different sources of compensation data are considered. Executive compensation data is either hand collected from remuneration reports/proxy statements or exported from a financial database or possibly assembled from a proprietary database not usually made available to the public. In the US, research data is nearly always exported from a major database provider and rarely hand collected. US samples are typically very large because of the wide availability of data on commercial databases. For example, *Execucomp* is a commonly used database in recent US research because it enables researchers to export compensation data for many companies over many years. For example, Garvey and Milbourn (2006) analyse 6,263 chief executives over the period of 1992 to 2001.

In the UK samples are frequently much smaller, primarily because there are fewer large publically listed companies in the UK, but also due to the necessity to hand collect data in order to obtain the level of detail required. The advantage of hand collecting the data is that the level of detail can be decided by the researcher rather than by the information contained in the database. However, hand collecting the data can be liable to human error and is time intensive.

The length of sample period chosen for the study has implications for the econometric method employed. Cross-sectional analyses have the disadvantage of not being able to account for time-invariant unobserved effects (Henderson and Fredrickson, 1996). Studies with at least two time periods can make use of panel data techniques, which enable the econometric model to estimate the association between corporate performance and executive compensation across firms and over time. Next the different types of econometric methods used in the literature are discussed.

4.2.2 Econometric specification

The basic econometric specification for an executive pay-performance model is a regression of the level of corporate performance on the level of executive pay and is shown by Equation (4.1):

$$(EXECPAY) = \beta_0 + \beta_1(PERF) + \mu \tag{4.1}$$

This straightforward approach is a test of the cross-section association between firm performance and executive pay. The strength and significance of the relationship is expressed by the coefficient β_1 in Equation (4.1). The error term, μ, contains the factors, other than *PERF*, which are potentially important in explaining *EXECPAY*. It is not possible to control for all possible influences on *EXECPAY* using a basic cross-section approach because there will always be unobservable variables, such as executive ability, that cannot easily be measured and will therefore be omitted from the estimating equation (Wooldridge, 2009). Therefore cross-sectional analyses are susceptible to a serious problem of omitted variable bias (Brunello et al., 2001). The bias is due to the possible correlation between the omitted variables, contained in μ, and the coefficient β_1 of $PERF$ (Conyon and Sadler, 2001).

Thus, it is surprising perhaps to find that a large number of studies, including some of the latest research, rely on a single cross-section approach (for example, Ozkan, 2007; Conyon et al., 2009). Ozkan (2007) regresses stock return on the level of chief executive cash compensation and also on total compensation but finds no significant association for either test. It is conceivable that these non-significant findings are due to measuring the association between stock return and executive compensation over a single cross-section rather than over a number of different time periods. In contrast Ozkan (2009), using panel data methods, measures chief executive pay-for-performance from 1999 to 2005 and finds a significant positive association between stock return and cash compensation. Conyon et al. (2009), in a study on the impact of compensation consultants on executive pay, also only consider a single cross-section. Conyon et al. report no association between shareholder return and UK chief executive total pay or equity pay mix. Likewise it is reasonable to suggest that these non-significant findings are a result of utilizing a cross-section approach.

Since a cross-section approach does not measure the association between firm performance and pay over time, it does not capture the within-firm changes in compensation and its impact on the relationship. In order to control for observed and unobserved effects that do not change over time an alternative approach is necessary. Examples of these effects include firm complexity, 'unwritten' remuneration policy and executive talent (Henderson and Fredrickson, 1996, p.599).

Executive pay-for-performance research employs the following model shown in Equation (4.2) to control for all observed and unobserved differences across firms that do not change over time (Murphy, 1999):

$$(EXECPAY)_{it} = \gamma_i + \alpha_{it} + \beta(PERF)_{it} + \mu_{it} \qquad (4.2)$$

The outcome of firm performance on executive pay is shown by the significance and size of the coefficient β. γ_i captures unobserved firm and executive specific effects that are time invariant for executive i but varies across firms. α_{it} is a firm specific time trend for executive i. μ is the error term. If it is not possible to identify the individual executive, as is the case for a number of UK studies, for example Benito and Conyon (1999), then the model is only able to control for firm specific effects rather than firm and executive specific effects (e.g. executive talent).

Equation (4.2) can be modelled for each executive in a long time series study. This is the approach preferred by Antle and Smith (1986) in the seminal study on relative performance evaluation. The time series approach has the advantage of estimating the pay-performance association for each executive or for each firm. Janakiraman et al. (1992) and Liu and Stark (2009) also used this method. The drawback is that a long series of data is required to estimate Equation (4.2) for each executive or firm. For example, Antle and Smith used 30 years of data, Janakiraman et al. 18 years of data and Liu and Stark 27 years of data. Further it may not be realistic to assume executive or firm unobserved specific effects remain unchanged over such a long period of time. Therefore the vast majority of studies use a shorter period of investigation and make the assumption that the pay-performance association and time-trend is the same for all executives ($\alpha_i = \alpha$ and $\beta_i = \beta$) (Murphy, 1999, p.30):

$$(EXECPAY)_{it} = \gamma_i + \alpha_t + \beta(PEFF)_{it} + \mu_{it} \qquad (4.3)$$

The pay-performance association is then estimated using various panel data techniques.[14] It is usual to employ panel data models to remove the constant unobserved variation between firms (Gregg et al., 2005). This is accomplished by regressing the change in performance, $\Delta(PERF)$, on the change in executive pay, $\Delta(EXECPAY)$:

$$\Delta(EXECPAY)_{it} = \alpha + \beta\Delta(PERF)_{it} + \mu_{it} \qquad (4.4)$$

[14] The panel data techniques used in this study are described in detail in Section 5.5.

The most frequently used panel data method in the literature is a first difference approach (Conyon and Nicolitas, 1998; Aggarwal and Samwick, 1999a; Dogan and Smyth, 2002; Mcknight and Tomkins, 2004; Rajgopal et al. 2006). The first difference specification removes the unobserved and time invariant effects by taking the difference between each variable from one period to the next. The first difference model focuses on the variables that change from one year to the next and it is only the differences of variables that remain in the model (Gregg et al., 2005). Explanatory variables such as industry sector that do not change from period to period are eliminated from the estimating equation.

As an alternative to the first difference model a number of studies have used fixed-effect and random-effect models to remove the unobserved heterogeneity. For example, Aggarwal and Samwick (1999a), Coakley and Iliopoulou (2006) and Albuquerque (2009), use the fixed-effect specification. Coombs and Gilley (2005) use random-effects. Deckop (1988), Benito and Conyon (1999) and Gregg et al. (2005) use both fixed and random-effect models. A key difference between fixed-effects and random-effects is the error structure but also how the different specifications manage with the unobserved effects (Deckop, 1988). The random-effects model assumes the unobserved effects are random and providing the random-effects are not correlated with *PERF* the model is not biased. However, if the random-effects are correlated with *PERF* the estimates are 'biased and inconsistent'.

In contrast, the fixed-effects model assumes the unobserved effects are not random but fixed and might be correlated with *PERF*. Under this assumption the fixed-effect estimates are 'unbiased and consistent' (Deckop, 1988, p.219). In executive compensation research fixed-effect models are often preferred to random-effect models because it is not unreasonable to expect that an executive specific unobserved effect, such as individual ability, or a firm specific unobserved effect, such as remuneration policy, may be correlated with *PERF*.

On the other hand, random-effect models are sometimes preferred because first differencing and fixed-effect models remove all time-invariant variables, and these might be of particular interest depending on the purpose of the investigation. For example, industry sector or corporate governance characteristics, such as the presence of a remuneration committee, will often remain constant within a firm over time. Coombs and Gilley (2005) prefer the random-effects model to fixed-effects in order to include industry control variables that would be removed in a fixed-effects model.

To demonstrate the problematic choice between fixed-effect and random-effect models consider the study by Deckop (1988). In addition to using a fixed-effects model, Deckop (1988) also used a random-effects model in order to estimate the impact of industry sector on executive compensation. Deckop (1988) reports similar findings for the estimation of contemporaneous firm profit (net income) on chief executive cash compensation for both fixed and random-effect models, but remarkably different results between models for pre-dated profit. The association between pre-dated profit and pay is not significant and negative whereas current profit is significant and positively associated with pay. In contrast, Benito and Conyon (1999) also report findings for fixed and random-effect models and although the Hausman[15] diagnostic test indicates that the fixed-effects model is preferred to the random-effects model, the sizes of estimates are quantitatively unchanged. Shareholder return is positively associated with executive cash compensation for both fixed and random-effect estimates.

Researchers must also consider whether to adopt a sensitivity approach or an elasticity approach to test the association between firm performance and executive pay. Equation (4.5) is specified in terms of pay-performance sensitivity:

$$\Delta(EXECPAY)_{it} = \alpha + \beta\Delta(FIRM\ VALUE)_{it} + \mu_{it} \qquad (4.5)$$

In a sensitivity model, firm performance, which is measured as the change in firm value is regressed on the change in the level of executive compensation. The sensitivity approach is considered to have a more obvious economic interpretation

[15] The Hausman test indicates whether diagnostically random-effect models are preferred to fixed-effect models.

than the alternative elasticity specification (Murphy, 1999). Equation (4.6) is specified in terms of pay-performance elasticity:

$$\Delta ln(EXECPAY)_{it} \quad = \quad \alpha + \beta \Delta ln(RETURN)_{it} + \mu_{it} \qquad (4.6)$$

In an elasticity model executive pay is defined as the change in the natural logarithm of executive pay and performance is defined as the change in the rate of return. The elasticity of executive pay with respect to the rate of return is determined by β, the coefficient of *RETURN* (Murphy, 1999). In contrast to pay-performance sensitivity, the elasticity specification does not have a straightforward economic interpretation.

Executive compensation research is evenly divided between whether the pay-for-performance association is best estimated using a sensitivity or elasticity approach. The findings between the different specifications do vary. In the seminal pay-for-performance study, Jensen and Murphy (1990) prefer the sensitivity specification because of the natural interpretation between shareholder value and executive wealth. In contrast, Rosen (1992) prefers the elasticity approach because he asserts that the sensitivity specification does not account for variation in firm size. The elasticity approach reduces heteroskedasticity through transforming the arithmetic values into their natural logarithms and therefore the elasticity specification controls for firm size. Cichello (2005) finds it is essential to correctly control for firm size when measuring pay-performance sensitivity otherwise the sensitivity estimates may only be a reflection of the association in large firms. Zhou (2000) in Canadian executive pay study estimates both pay-performance sensitivity and elasticity. Zhou finds the pay-performance sensitivity in large firms is significantly reduced compared to smaller firms. The sensitivity estimate for large firms is close to that of the whole sample suggesting that large firms 'dominate' the sample. Whereas Zhou finds the elasticity estimates robust to firm size.

It is noticeable that the elasticity specification is preferred in UK executive compensation research (for example, Conyon and Murphy, 2000; McKnight and Tomkins, 2004; Gregory-Smith, 2009; Guest, 2009). Liu and Stark (2009) is one of the few UK studies to estimate pay-performance sensitivity. In doing so, they find minimal evidence that stock market performance is associated with cash compensation but significant evidence that accounting earnings are positively associated with cash compensation. Eiccholtz et al. (2008) employ a sensitivity and elasticity specification and find stock market return is positively and significantly associated with the natural log of long-term compensation but not cash compensation. Whereas, Eiccholtz et al. only find weak evidence of pay-performance sensitivity: changes in shareholder wealth are only weakly associated with changes in cash and long term compensation. Buck et al. (2008) measure executive pay-performance sensitivity and elasticity in China. They find very similar findings to US and UK estimates of elasticity although sensitivity estimates are lower.

4.2.3 Concluding remarks about the data collection approach and research methods

The review of the data collection approach and econometric models applied in the literature has emphasized a number of important aspects that must be considered in an executive pay-performance study. It has been shown that whilst employing a multivariate regression model it is essential to measure the association between corporate performance and executive compensation over time so as to remove the time invariant unobserved executive and firm specific effects from the model (Murphy, 1985). The panel data model employed will depend on the exact purpose of the research and it is prudent to estimate several models in order to compare estimates. The elasticity specification is often preferred over pay-performance sensitivity but it will ultimately depend on the requirement to control for firm size or whether there is a desire for a more natural economic interpretation in which a sensitivity specification would be preferred.

Here in this thesis, UK chief executive pay-performance elasticity is examined across 204 large firms over 2003 to 2007. Random-effect and fixed-effect panel data models are used to estimate the relationship. The chief executive compensation data is hand collected from company remuneration reports. The remainder of the literature review focuses on other important aspects of the executive pay-performance specification including the compensation measures, company size and corporate performance. The dependent compensation variable is discussed next.

4.3 Compensation measurement

The structure of executive compensation is complex and continually changing to reflect best corporate governance practice and market norms. In an analysis of US chief executive compensation data Towers Perrin (2008) report that in 2004 share option grants represented 38% of chief executive pay. By 2008 the proportion of share option grants had fallen to 23% of pay, while performance-share grants increased from 8% of the pay mix to 21%. In the UK, the nature of share option plans has transformed remarkably due to changes in corporate governance guidelines. For example, share options are no longer issued with the facility to retest performance conditions. There are also different pay practices between countries. For example, according to the Hay Group's (2006) Top Executive Compensation Study, US executive share options are normally issued without performance conditions (time-restricted option grants), while in the UK the vesting of executive share options are virtually always subject to performance criteria (performance-option grants). Main and Neate (2006, p.2) observe that "the relatively restrained quantities of executive share options issued and the almost universal use of performance hurdles in the design of option and performance share plans mark the UK pay scene as being quite distinct than that of the USA".

There is contrasting evidence with regard to the relationship between corporate performance and chief executive compensation. One of the difficulties researchers encounter when investigating the link between corporate performance and executive pay is finding appropriate measures for the different elements that constitute total compensation. Appendix I shows the compensation measures adopted in UK empirical research and the findings with respect to the association between corporate performance and executive compensation. It is reasonable to suggest that the diversity of findings between studies is partly a result of the different constructs of compensation adopted in the literature. Most studies use one or two calculated 'totals' in the analysis and surprisingly, very few studies attempt to measure more than just total measures of compensation. Murphy (1985), McKnight and Tomkins (1999), McKnight et al. (2000) and McKnight and Tomkins (2004) do separate compensation into various pay elements. More typically only total measures of compensation are employed as the dependent pay variable in chief executive pay-for-performance studies.

4.3.1 Fixed pay, performance-contingent pay and performance-realised pay

In this thesis compensation is categorised as either fixed pay (FP), performance-contingent pay (PCP) or performance-realised pay (PRP):

> *Fixed pay, for example basic salary, is not contingent on pre-determined performance criteria.*
>
> *Performance-contingent pay is target compensation that is subject to either short or long-term performance criteria. Therefore the maximum annual bonus opportunity, new performance-option grants and new performance-share grants represent PCP.*
>
> *Performance-realised pay is actual compensation that is not subject to any further performance conditions. Therefore actual annual bonus, new time-restricted option grants, performance-option payouts, new time-restricted share grants and performance-share payouts are considered PRP.*

The empirical executive compensation literature does not differentiate pay in the same way. When long-term compensation is included in total compensation the literature combines contingent pay with realised pay and does not account for the performance conditions that are attached to the vesting of long-term awards (for example, Conyon et al. 2009; Ozkan 2009).

Kay (2008, p.11) defines pay opportunity as "the fair-market value of new long-term incentives at grant date, the face value of restricted stock and target value of LTI plans (performance shares/cash) plus annual actual cash." The definition of pay opportunity provided by Kay (2008) is typical of what research has traditionally described as total compensation (for example, Gibbons and Murphy, 1990; Bertrand

and Mullainathan, 2001). Kay's measure of pay opportunity and the total compensation measure frequently applied in research include elements of realised pay, such as the value of time-restricted share grants and actual annual bonus, which are not subject to further performance conditions and are therefore already realised even though the cash or shares might not be paid out until a future period. It is presumed that Kay defines these elements as pay opportunity because, although they are earned and therefore promised to the executive, they will not be paid until sometime in the future. Therefore the executive has not realised the gain on the award, hence pay opportunity, but the award has been realised in terms of achieving any pre-determined performance criteria. Whereas the target value of performance-share grants are subject to future performance conditions and therefore represent contingent pay.

Kay (2008, p.11) defines realised pay as "the total of the potential gains from long-term incentives granted using the latest fiscal year-end closing stock price. This value includes the in-the-money value of share options, end-of-period value of restricted stock and payouts of LTI plans from grants over the same performance period plus cash". Kay's measure of realised pay includes elements of contingent pay. For example, if the potential gains from long-term incentives are subject to future performance conditions they have not been earned and the actual payout can range from a zero through to the maximum. It is put forward in this thesis that this differentiation is crucial in understanding the association between corporate performance and chief executive pay. In order to estimate the pay-performance sensitivity it is important to appreciate when elements of pay attain specified performance criteria, which are not necessarily when they are granted or when they payout.

Kaplan (2008, p.8) also defines compensation in terms of two broad categories. Kaplan defines 'estimated or ex ante' pay as "salary, bonus, the value of restricted stock issued, and the estimated value of the options issued that year (usually calculated with Black-Scholes)". This is similar to Kay's (2008) definition of pay opportunity and includes elements of PRP (e.g. bonus). Kaplan (2008, p.8) defines 'realised or actual' pay as "salary, bonus, the value of restricted stock, and the value of the options the CEO exercised that year". The only difference between Kaplan's measures of estimated and realised pay is in the treatment of share options. The distinction Kaplan forms is that realised pay is what the executive 'gets to take home'. However, it is not an appropriate measure to estimate the association between corporate performance and chief executive pay because the exercised options will have been granted and may well have vested in a previous performance period. The value of share options is based on a personal investment decision on when the executive chooses to exercise the options and not related to any pre-determined performance criteria.

Here, it is proposed that one reason for research typically only finding a small and frequently weak association between corporate performance and chief executive pay is due to studies not distinguishing between FP, PCP and PRP and therefore not accounting for the actual vesting of all long-term performance-contingent awards.

4.3.2 Pay components and performance criteria

The composition of an executive pay package typically comprises a fixed basic salary, an annual bonus, long-term incentive arrangements, benefits-in-kind, plus maybe some other relatively small cash payments and a pension plan. Table 4.1 describes the terminology used by academics and practitioners and how this study categorises each pay element into FP, PCP or PRP.

Basic salary is a fixed amount paid in cash with no performance restrictions or incentive component. As Buck et al. (2003) point out, in a pure principal-agent model of executive incentives shareholder-executive interests might be best aligned by paying executives only with shares. However, this is to ignore the differences in risk aversion and the different opportunities to diversify finance and human capital. To overcome these problems of executive risk aversion a substantial basic salary is paid, both to attract and to retain talented executives.

A maximum annual bonus is typically offered to executives based on short-term corporate performance. The incentive opportunity is at risk because it is dependent on future performance. The short-term incentive opportunities are most often set in terms of accounting performance and/or personal performance indicators. A bonus is typically paid at different levels of performance between a lower and an upper threshold. The actual annual bonus realised is either paid in cash, or with a mixture of cash and shares. In some cases, annual earned bonus is deferred to be paid at a later date and may also be subject to further longer term performance conditions; this is called a deferred bonus. A deferred bonus with further performance criteria on vesting has not been realised and is therefore PCP. Regardless of further performance conditions to claim deferred shares, if the share price falls in the deferral period, then the executive suffers a loss. So, in the case of a deferred short-term bonus payment, an executive suffers two forms of risk: first that subsequent corporate performance is insufficient to earn the highest level (or any) bonus and second, that once earned, if the bonus is deferred there is the risk of loss commensurate with any fall on the company share price.

Executives are also usually eligible for grants of executive share options and/or grants of restricted shares under the rules of a long-term incentive plan (LTIP). The value of share options and shares move in line with the share price and so to some degree the risk-reward opportunities of shareholders and executives are aligned. Further, in the UK, virtually all grants are subject to long-term relative share performance or absolute accounting performance criteria before vesting and may be more accurately referred to as performance-options or performance-shares. Similar to the annual bonus a maximum award vests for performance beyond an upper threshold while no award vests for performance below a lower threshold. The award typically vests at different levels of performance between the lower and upper threshold.

A performance-option or performance-share grant is PCP because it only vests if performance conditions are satisfied: the award is only 'realised' upon vesting and not at grant. In this thesis when a long-term incentive award vests upon the satisfaction of performance conditions the payout is defined as PRP. The valuation of performance related long-term incentive grants only reflects the potential gains and does not reflect the actual payout from the incentive. It is recognised that if performance conditions are not specified (more typical of US practice) the incentive is earned at grant (time and employment being the only restrictions). In this case the incentive is realised at the time of grant.

The executive may also be eligible for other all employee share-save schemes which will generally form only a small proportion of the executives overall compensation. Executives are also usually entitled to benefits in kind such as medical insurance, gym membership, a chauffeur, housing allowance etc. In most cases benefits in kind will not be a substantial proportion of remuneration with the possible exception of executives who may be entitled to an international relocation package. The company will also typically provide the executive with a retirement plan.

Table 4.1

Compensation terminology

Terminology	**Compensation element (s)**	**Compensation type**
Basic salary	(1) Salary	(1) Fixed pay
Bonus	(1) Maximum annual bonus	(1) Performance-contingent pay
	(2) Actual annual bonus	(2) Performance-realised pay
Deferred bonus	(1) Deferred cash bonus	(1) Performance-realised pay
	(2) Deferred time-shares	(2) Performance-realised pay
	(3) Deferred performance-shares	(3) Performance-contingent pay
	(4) Performance-share payouts	(4) Performance-realised pay
Executive share options	(1) Time-restricted option grants	(1) Performance-realised pay
	(2) Performance-option grants	(2) Performance-contingent pay
	(3) Performance-option payouts	(3) Performance-realised pay
Restricted shares	(1) Time-restricted share grants	(1) Performance-realised pay
	(2) Performance-share grants	(2) Performance-contingent pay
	(3) Performance-share payouts	(3) Performance-realised pay

Note:
The expression 'long-term incentive' is frequently used to describe any form of incentive plan that delivers a payout over a period of greater than one year. This may include deferred bonus, executive share options and / or restricted shares.

4.3.3 Cash compensation

A measure of executive pay that is widely used in empirical studies is cash compensation (for example, Liu and Stark, 2009; Ozkan 2009) and is usually the sum of basic salary and actual annual bonus. Cash compensation is a measure of realised pay because it only includes guaranteed pay or pay that has met performance criteria. It does not include or measure the maximum bonus opportunity. Cash compensation is inconsistently defined across studies. Some studies include basic salary, actual annual bonus plus allowances (Conyon et al., 2001; Gregg et al., 2005). Others exclude cash allowances (Henderson and Frederickson, 1996; McKnight and Tomkins, 1999; McKnight and Tomkins, 2004). A number of studies only measure cash compensation (Benito and Conyon, 1999; Johnston, 2002; Gregg et al., 2005; Girma et al., 2007; Liu and Stark, 2009). Cash compensation is a relatively simple measure and easily obtained, but the major drawback is that it does not include the long-term incentive elements of executive remuneration. Excluding long-term incentive compensation, which is frequently linked to pre-determined measures of corporate performance, such as growth in earnings per share (EPS) or total shareholder return (TSR), must impact on the validity of the cash compensation measure.

A reason often cited for excluding the long-term incentive component is due to the difficulties in collecting the data and the complexity of attributing a value to share options or other long-term incentive rewards. Early UK studies are particularly constrained by the availability of share option data. For example, it is only since Cadbury (1992) when firms were initially 'recommended' to disclose further detail on executive remuneration and only since 2002 following the introduction of the Directors' Remuneration Report Regulations that UK listed companies have been 'required' to disclose detailed remuneration data. Girma et al. (2007) justify the exclusion of share options on the basis that before the Cadbury Report (1992) the data was not sufficiently complete to enable valuation.

Using cash compensation Gregg et al. (1993) estimate a small positive and significant pay-for-performance relationship in a study of 288 large UK companies for the period 1983 to 1988. However, for the period 1988 to 1991 the results from the Gregg et al. (1993) study indicate that the relationship completely disappears. This is particularly surprising given the changing structure of compensation arrangements; including the wide spread use of share option plans, during this later period. The Gregg et al. (1993) study does not include long-term incentives in its definition of pay, which may explain why it only finds at most a weak link between corporate performance and executive compensation.

4.3.4 Long-term incentives

Executive long-term incentives include shares, share options and long-term cash plans. The executive's portfolio of long-term incentives will typically consist of (i) previously granted awards, which are subject to future performance conditions and have not yet vested; (ii) previously granted awards, which are not subject to future performance conditions and have not yet vested; (iii) awards which have vested but have not yet been exercised; and, (iv) own inside holding of company shares. The entire portfolio of company shares will of course vary in value according to the firm's absolute share price performance and in doing so aligns executive interests with those of the shareholders. If the share price appreciates so does the value of the long-term incentive holdings.

4.3.4.1 Executive wealth versus flow compensation

Executive compensation studies differ in terms of the elements included in the long-term incentive measure. A central distinction between measures is whether research is concerned with executive firm related wealth or executive flow compensation. Wealth measures include the value of the total portfolio including new equity grants. In the seminal pay-performance study, Jensen and Murphy (1990) include shareholdings and the value of option holdings, as do Main and Johnston (1993). In a later study, Main et al. (1996, p.1633) exclude shareholdings from their measure of compensation because according to them it "constitutes a personal investment". Core et al. (2003a) stipulates that the compensation variable must measure executive firm related wealth to appreciate the full incentive effects associated with the portfolio.

Murphy (1985, p.13) points out that since "previously-held assets...vary systematically" with the firm's share price the link to absolute firm performance is evident. Whereas, the basis on which new awards are granted or previous awards vest is "subtle and indirect". For this reason, Murphy (1985) uses flow compensation rather than a measure of executive wealth. Flow compensation includes 'new equity grants' and payouts from long-term incentives but not changes in the value of previously held stock (Core et al., 2003a). Examples of other studies to use flow compensation include Hartzell and Starks (2003), Garvey and Milbourn (2006) and Wade et al. (2006), Albuquerque (2009), Conyon et al. (2009) and Ozkan (2009). Albuquerque (2009) agrees with Murphy (1985) and further comments that previously granted stock is 'mechanically' tied to firm performance and therefore 'independent' of relative firm performance. Hartzell and Starks (2003) measure flow compensation because in their view the board has only limited control over executive share and option holdings whereas it has greater influence over current compensation. Measures of flow compensation are perhaps more appealing to analyse because the association with performance is not obvious, however to exclude previous awards biases the estimated association downwards.

Bertrand and Mullainathan (2001) say that the decision to adopt a measure of flow compensation or to include an executive wealth measure depends principally on the purpose of the research. Almazan et al. (2005, p.14) do not include previous stockholdings because they wish to "concentrate on the components that activist institutional shareholders could influence". This thesis is not concerned with the systematic relationship between corporate performance and previously vested awards; of which those acting on behalf of shareholders have no influence over. It is instead concerned with new incentive grants and the awards vesting in the current year.

4.3.4.2 Elements of long-term compensation

Regardless of whether research is examining flow compensation or executive wealth, studies must consider all forms of long-term incentive (shares, share options or long-term cash plans) otherwise the measure is not complete.

Nevertheless, a number of studies only include share options in the long-term incentive measure (McKnight and Tomkins, 1999; Cordeiro and Veliyath 2003; McKnight and Tomkins, 2004). Including only share options ignores forms of restricted shares and long-term cash plans, which must alter the pay-performance estimate.

In US research that includes restricted share grants in the long-term incentive measure the performance-share payout is also often included, which suggests there is cause to consider the payout when performance conditions are present. However, the realised payout is included alongside performance-share grants and the research has not explained the rationale for this. For example, Jiraporn et al. (2005) include performance-share payouts but do not justify why it is included. In the UK very few studies have included restricted shares in the long-term incentive measure and none have considered payouts from performance-share plans or performance-options plans. Eichholtz et al. (2008, p.413) do not include performance-share plan payouts but do include the "full expected value of options and shares". Eichholtz et al. (2008, p.413) acknowledge "the practice of granting options and shares with additional performance requirements has developed" but make the assumption "that firms set performance targets equal to expected performance". Clearly firms set targets that they expect executives to achieve but the objective of research is to understand if the payout varies according to actual performance and performance relative to other firms. Their assumption omits a very important aspect of the pay-performance relationship and if this were the case then firms would only pay a fixed basic salary.

4.3.4.3 Long-term incentive valuation

Research also varies with regard to the methods chosen to value share options and performance-shares. The most common method chosen to value share options is the Black and Scholes (1973) pricing methodology. Examples of studies to use Black-Scholes include Jensen and Murphy (1990), Buck et al. (2003), Rajgopal et al. (2006), Wade et al. (2006), Eichholtz et al. (2008) and Conyon et al. (2009). A minority of studies, for example Cordeiro and Veliyath (2003), use a binomial valuation model. Carpenter and Saunders (2004) use the Securities and Exchange Commission (SEC) method. McKnight and Tomkins (1999) devised the Minimum Share Option (MSO) valuation model. More recently studies have shown sophisticated valuation models yield results similar to the simple approach of discounting all options by a pre-determined rate. For example, Lambert et al. (1993), Henderson and Fredrickson (1996), Core et al. (1999) and Berrone and Gomez-Mejia (2009) value options at 25% of the exercise price. According to Henderson and Fredrickson (1996, p.585), this valuation method "produces values in the same range as more sophisticated option-pricing methods such as the Black-Scholes model".

The valuation of performance-share grants has also varied. Research has attempted to consider the impact of performance conditions on the expected value of the award by discounting performance-share awards by the probability of vesting. Conyon et al. (2001) measure incentive compensation and discount performance-share awards by 20% to reflect the performance conditions. Other research uses the face value of the award at the time of grant (Core et al. 1999; Eichholtz et al., 2008).

4.3.4.4 Long-term sensitivity to firm performance

So far it has been established that the long-term incentive measure used in the empirical research differs in several ways. First, in whether long-term incentives represent flow compensation or executive wealth. Second, whether all elements of long-term incentives are included in the measure. Third, with regard to the valuation techniques used to value share options or performance-shares. Further, it may be important to distinguish between contingent-pay and realised-pay. It is argued that the element of pay-for-performance is delivered through 'incentive payoffs' and not 'fixed promised payoffs' (Fama and Jensen, 1983). Given the emphasis on long-term incentive grants such as share options and restricted shares in executive compensation packages, one would expect to observe a stronger association between corporate performance and executive pay if long-term incentives are included in the pay measure (Conyon and Sadler, 2001). However, because the vesting of long-term incentives is subject to performance conditions it might be the case that the value of the initial grant is not related to past performance. The value of the award itself will of course vary in accordance to the firm's share price. This may explain why the literature frequently fails to find a robust association between corporate performance and long-term compensation. In this thesis it is suggested that it is important to distinguish between the initial long-term incentive award and the proportion of the award that actually vests.

There is evidence in the literature to suggest that compensation elements should be analysed separately. This is because measures of total compensation include fixed payoffs, for example basic salary, which may eschew the pay-for-performance estimate. Buck et al. (2003), the first study in the UK to include detailed performance-share plan valuations, found that while increasing average total rewards, the presence of performance-share plans actually reduces the sensitivity of executive compensation to shareholder return. A possible explanation for the reduced sensitivity may be because executives are rewarded with increased total compensation that outweighs the additional risk imposed by the incentive contract. Since, Buck et al. (2003) do not analyse the association between corporate performance and long-term compensation in a separate regression, or measure the actual payouts from the long-term incentive, it is not clear whether long-term incentives, as an individual component of pay are related to performance. Eichholtz et al. (2008) do measure executive long-term compensation, including share option grants and restricted share grants, as a distinct element of pay and find stock market performance is positively associated with long-term compensation, but defined as grants rather than realised awards. In the same study stock market performance is not associated with executive cash compensation. McKnight and Tomkins (1999) analysed the change in the value of share options and total compensation and found a significant positive association for both measures, but the effect on share options was much larger. Several studies by McKnight and Tomkins (1999, 2004) illustrate the importance of identifying the exclusive effects of performance on long-term compensation. When long-term incentives are included in a measure of total pay, which also includes the fixed promised payoffs, the incentive effect is difficult to isolate. These results provide evidence for analysing long-term compensation in a separate regression in order to gauge the association between corporate performance and long-term pay.

4.3.5 Total compensation

The problem with using total compensation is that cash compensation represents realised pay, while the long-term incentive measure frequently comprises both contingent pay and realised pay. For example, Conyon et al. (2009) define UK chief executive total compensation as the sum of salary, actual bonus, benefits, share option grants (valued using Black-Scholes at date of grant), restricted share grants (valued at 100% of performance-contingent awards) and other compensation. Salary, bonus, benefits and other compensation are realised pay; while share option grants and restricted share grants are contingent pay subject to future performance conditions.

Measures of total compensation are also often dependent on the source of data. If the data is hand collected from annual reports the measure can be tailored for the purpose of the research. Whereas data sourced from a financial database is reliant on the calculated item(s) in the database. Jensen and Murphy (1990) use Forbes total compensation data and note that the measure is less than perfect because it changes from year to year and does not include share options. In order to include share options, Jensen and Murphy use US proxy statements. Hallock (1997, p.333) also uses Forbes data and acknowledges that since, "total compensation includes exercised options, it may not reflect current compensation as accurately as the other measures". This is because exercised options represent a personal investment decision not current compensation. Further, whilst the number of performance-options that vest is subject to pre-determined performance criteria, the number of performance-options exercised is not, unless they are exercised immediately upon vesting.

The majority of recent US research uses compensation data from *Execucomp,*[16] which provides several alternative measures of total compensation. The *Execucomp* total compensation measure typically used in the literature consists of salary, annual bonus, value of restricted share grants, Black-Scholes value of share option grants and long-term incentive payouts. Examples of studies to use this definition include Rajgopal et al. (2006) and Wade et al. (2006), Ceccucci and Gius (2008) and Albuquerque (2009). If there were no performance conditions attached to the restricted share and share option grants this measure would represent realised pay. However, this is unlikely to be the case even though performance contingent long-term incentive awards are less prevalent in the US.

4.3.6 Concluding remarks about measures of compensation

Compensation contracts that incorporate an increased sensitivity of pay to corporate performance impose greater financial risk on the executive, who is likely to demand higher levels of pay to compensate for that additional risk (Conyon and Schwalbach, 2000). The balance between risk and performance is achieved by designing an optimal contract that links some aspect of the compensation to firm performance. However, there is likely to be a significant element of pay that may not be related to firm performance and effectively guaranteed to the executive regardless of firm performance. For example, basic pay is a contracted payment that may be increased on an annual basis for achieving high levels of performance but is unlikely to be reduced for inadequate performance. However, the executive is at risk of the contract being terminated for poor performance.

Studies that report on long-term incentives or total compensation versus cash compensation find contrasting results for each measure of pay. McKnight and Tomkins (1999) separated compensation into four components (i) basic salary; (ii) basic salary and actual annual bonus; (iii) executive share options; and, (iv) total pay. The empirical results indicated that the level of basic salary had a strong positive relationship to the level of sales turnover. The study also showed that changes in the value of executive share options were significantly and positively

[16] *Execucomp* is a Standard & Poor's executive compensation database.

related to changes in shareholder returns. Conyon et al. (2001) report similar significant positive coefficients for both cash and total compensation. However, the finding for long-term incentives reports a much larger positive coefficient. Core et al. (1999), also report similar results for cash and total compensation but find the results for basic salary are remarkably different. McKnight et al. (2000) find a relationship between corporate performance and both short-term and long-term pay; however, salary is predominantly determined by company size. These findings suggest there is evidence that dividing compensation into its various elements is an important pre-requisite to understanding the determinants of executive compensation.

The range of definitions, calculations and valuation techniques used to measure chief executive compensation enriches the literature which must be beneficial. However, these variations may also be a reason for the inconsistent results reported in the pay-for-performance literature. In an expansive review of the executive compensation literature, Devers et al. (2007, p.1042) suggest that more theoretical guidance is required particularly surrounding the "choice of performance measures, timeframes, samples, methods, and variables". Furthermore, Devers et al. (2007) highlight the use of ambiguous compensation measures.

Remuneration reports often declare that executive pay varies according to absolute and/or relative corporate performance, although the empirical evidence typically offers only weak support for these declarations (Jensen and Murphy, 1990; Conyon et al., 2000; Girma et al., 2007). It is put forward in this thesis that the weak relationship between firm performance and executive pay and the limited evidence of relative performance evaluation is a reflection of the measurement of the compensation variable used by researchers. For example, studies have combined elements of FP, PCP and PRP into a single construct of executive compensation (for example, Conyon et al., 2009; Ozkan, 2009). In contrast, this study disentangles the three types of executive remuneration in order to distinguish between maximum incentive opportunities and realised incentive payments. The chief executive compensation construct is divided into its various elements: basic pay, target bonus, actual bonus, target long-term incentive, actual long-term incentive, target total pay and actual total pay. The precise measurement specification for each pay element is described in detail in Chapter Five. With these clarifications about the measurement of remuneration it is expected to observe a strong association between corporate performance and actual chief executive pay.

4.4 Company size

There is substantial consistent evidence to suggest that company size is a significant predictor of chief executive compensation (Conyon et al., 2000; Cordeiro and Veliyath, 2003; Gregg et al., 2005). The main explanatory variable in most of the empirical executive pay research is firm performance; size is also included in the regression model but generally as a control variable rather than as the main explanatory variable (Buck et al. 2003).

The majority of studies in the UK, the US and elsewhere, have found company size to be a large, positive and significant predictor of executive pay. The association between company size and executive pay is the most consistent relationship discovered throughout the empirical literature. Firm size is repeatedly found to be the largest determinant of executive pay because larger firms are often more complex to manage (due to their size) and therefore necessitate, "more skill and more effort", than would be required to manage a smaller company (Smith and Szymanski, 1995, p.489). Managing a large firm also entails greater financial responsibility.

There are several convincing theoretical arguments that predict firm size to be related to executive pay. The span of control literature (Rosen 1982, 1992) predicts a positive relationship between size and chief executive compensation. The proposition is that the chief executive affects the productivity of subordinates so that the marginal product of the chief executive is replicated throughout the organisation (Conyon, 1998). There is also an argument that firms attempt to differentiate pay between hierarchical levels and so larger firms, which typically have a greater number of levels, pay more (O'Reilly et al., 1988). Proponents of managerial power theory suggest that executives exert power to seek control of the remuneration process and use their influence to link pay to factors, like firm size, which are more 'stable' and associated with less compensation risk (Chan, 2008).

It could also be the case that chief executive compensation is linked to firm size because a social comparison process operates where companies make use of firm size comparators. Firms publicly listed in the UK, typically make pay comparisons with other firms of a similar size or industry group. For example, in 2005 the basic pay for all BP's "executive directors were reviewed relative to top Europe-based global companies and the US oil and gas sector" (BP, Annual Report and Accounts, 2005, p.168). The remuneration report indicated that one executive director received a slightly higher increase, "to bring him to the same level as his peers." This is evidence that remuneration committees are prepared to make market adjustments based on firm size independent of company performance.

Drawing on the social comparison literature, Ezzamel and Watson (2002, p.207) studied the, "determinants of, and the relationships between, the cash pay awards of CEOs and other board members for a sample of large UK companies over the period 1992-1995." Ezzamel and Watson (2002) discussed the issues relating to the choice of a relevant comparator group of companies and observed that remuneration committees may deliberately benchmark against a group of highly paid executives. Similar to the BP example above they found evidence of "bidding-up" where the executive received an adjustment in pay to align the pay level with peers and concluded that it was likely that external market data comparisons explained the cash pay awards to chief executives set by the remuneration committee.

4.4.1 Measures of company size

Firm size has been measured in a variety of ways, which can be broadly defined as either market based or accounting based measures. Girma et al. (2006) regard the choice of firm size measure, in empirical executive pay studies, to be unimportant as the literature demonstrates a strong association between firm size and executive pay regardless of the size measure. Executive pay studies predominantly use an accounting measure, usually sales, as an approximation for company size (Conyon and Murphy, 2000).

Accounting based measures of firm size could be any number of variables all of which make theoretical sense in a given situation. Coakley and Iliopoulou (2006) and Wade et al. (2006) employ total assets as an approximation for firm size. Total assets represent the size of the firm in respect of the assets under control of the chief executive. However, some firms might not have a high worth of total assets, but still be large in terms of other measures. Guy (2005) and Bruce et al. (2007) and use total employment as an approximation for firm size. Total employment represents the size of the firm in terms of the number of employees under the direction of the chief executive and is a good indicator because it reflects organisational complexity and hierarchy. But not all industries are equally as labour intensive. Conyon (1995) and Conyon et al. (2001) use total capital employed as an approximation for firm size. However, by far the most universal measure used is company sales (Conyon et al., 2009; Gregory-Smith, 2009; Guest, 2009; Ozkan, 2009). Total firm sales are a good measure of firm size primarily because they are easily comparable among non-financial firms and equally represent firms that might be more or less labour intensive or more or less asset intensive.

Very few studies have used a market-based approach. For example, in the UK only four studies have employed market capitalisation as a measure of firm size (Laing and Weir, 1999; Stathopoulos et al., 2004; Eichholtz et al., 2008; Kuang and Qin, 2009). A likely reason for the dominance of accounting measures is that in a pay-performance study market capitalisation will be highly correlated with a market based measure of firm performance. Regardless of whether the variable employed is a market or accounting based measure the strong association between firm size and executive pay remains the prominent finding of the executive compensation research.

The majority of studies employ only a single measure of firm size. Although some studies do experiment with more than one measure for firm size, the findings remain the same regardless of which measure is chosen. For example, in a UK study, Conyon and Nicolitas (1998, p.150) use three measures of firm size and find very similar results regardless of the measure adopted. In a first model, using number of employees, they find that a 10% increase in total employment is related to a 2.4% increase in pay. In a second model, in which fixed assets are used, a 10% increase in fixed assets is associated with a 2% increase in pay. While in a third model, a 10% increase in sales is associated with a 2.7% increase in pay.

Depending on the specification of the econometric model[17] employed in the research, the coefficient of firm size will either represent the sensitivity of compensation to firm size or the elasticity of compensation (measured as the natural logarithm) to firm size. The econometric model is also frequently specified in first differences and therefore it is important to recognise that in this case firm size represents firm growth. Consequently, in the case where total firm sales is an explanatory variable and the model is specified in first differences the sales variable reflects the annual change in sales and not the level of sales. The correlation between company size and executive pay remains whether size is measured in absolute terms (Buck et al., 2003) or whether changes in size are used (Girma et al., 2007).

4.4.2 Concluding remarks about measures of company size

The positive association between firm size and executive compensation is supported by UK company remuneration policy where it is normal practice to benchmark chief executive compensation against peers of similar sized firms. Chief executive basic pay is consistently benchmarked against a comparator group of companies. For example, the food and beverage UK quoted company, Diageo, benchmark salary, "against the top 30 companies in the FTSE 100 excluding financial services businesses" (Diageo, Annual Report and Accounts, 2007, p.58). Since salary benchmarking according to firm size is a typical practice among UK firms, it is therefore not surprising that the literature finds company size to be a significant

[17] The econometric models employed in the literature, including the elasticity and sensitivity specifications, are reviewed in Section 4.2.

positive determinant of basic pay. Furthermore, company size is also expected to be the major determinant of target total pay, because target short and long-term incentive awards are typically expressed as a percentage of salary (Murphy, 1999). For example, the Diageo short-term incentive target is 100 percent of salary, the performance-share option grant is a maximum 375 percent of salary and the performance-share award is a maximum 250 percent of salary.

Overall, then, it is hypothesised that company size will be positively associated with basic pay, target bonus, target long-term incentive and target total pay. This being the case company size is also expected to play an important role in determining the variation in actual bonus, actual long-term incentive and actual total pay. The hypotheses are set out in more detail in Section 4.7.

In line with the argument outlined above firm sales is selected as the size measure since it is by far the most prevalent alternative among the literature and represents a good measure across different industries with varying levels of employees and assets. A market measure is not used, as it is likely to correlate with market based performance measures. The precise measurement specification, including time lags, is detailed in Chapter Five. The next section examines alternative measures of company performance.

4.5 Company performance

The predicted positive association between company performance and executive compensation, investigated from an agency theory[18] perspective, is an important proposition analysed throughout the empirical executive pay literature. The literature review has identified over 300 studies that include an explanatory firm performance variable in the executive pay equation. The purpose of this review of company performance is to evaluate those studies that explore the relative performance theory hypothesis. The review also has a UK focus since the study is conducted in the UK and there are important differences in pay practices between

[18] See Section 2.2 for a detailed review of agency theory.

the UK and other administrations. For example, Conyon and Murphy (2000) in a study titled 'The prince and the pauper? CEO pay in the United States and United Kingdom', find UK executives to lag significantly behind US executives in cash and total compensation. Also, in the UK, grants of long-term incentives (share options and restricted shares) are awarded contingent on future firm performance. This is not the same for US long-term incentive awards where it is common practice to grant large awards of share options which vest only according to time and are not contingent on future firm performance (Main and Neate, 2006).

Appendix II lists the relative performance evaluation studies, the measure of absolute corporate performance used in each study and the main findings of each study. Appendix III lists other UK studies (excluding those previously reported in Appendix II), the measure of absolute corporate performance used in each study and the main findings of each study.

The findings about the presumed association between company performance and executive pay are mixed and typically suggest that there is, at best, only a minor and weak relationship. Research finds that the results vary from no reported association between firm performance and executive pay (for example, Conyon, 1995); to only a weak positive association (for example, Girma et al., 2007); and very occasionally a strong positive association (for example, McKnight and Tomkins, 1999). Stathopoulos et al. (2005, p.91) summarise the empirical findings in the following way:

> *"The overall impression one gains from this vast body of work is that a link between executive pay (including stock option payoffs) and corporate performance does exist. However, the link is quite weak, statistically significant, but far from compelling".*

Alongside the array of often contrasting results, a wide variety of firm performance measures have been employed in the literature. It is also the case that where performance has been measured in logarithmic or arithmetic form or whether performance is predated or contemporaneous that the results are equally contrasting. For example, Conyon et al. (2000, p.15) find, "the results relating to shareholder return were not particularly sensitive to whether the performance term was entered as a level, a change or whether it was lagged or contemporaneously dated". No pattern appears to emerge to suggest, for example, that using stock market returns over accounting returns finds a more robust positive relationship between firm performance and executive pay.

4.5.1 The informativeness principle

From an agency theory perspective it is not entirely apparent, whether executive pay should be linked to market-based performance or other alternative measures of firm performance. Holmström (1979) established the informativeness principle, which asserts that since executive effort is not easily observable managerial compensation ought to be based on measures that provide information to shareholders that executive actions were taken in the interest of the owners. It is therefore not surprising that in an examination of executive pay, market-based measures are often preferred or at the very least included alongside other measures of firm performance as they are linked to shareholder interests. Empirical investigations are also often based on accounting measures of firm performance because they are easy to use. First, financial performance measures are standardised and widely used to study firm performance. Second, publicly listed companies are required to disclose their financial results to satisfy regulatory requirements so the data is readily available.

Instinctively shareholder returns might be the best measure but this is not necessarily the case. According to Benito and Conyon (1999) the informativeness principle allows for any indication of managerial effort to be incorporated into the compensation contract, which may not necessarily be based on market performance. For example, earnings information is likely to be a good approximation of managerial effort. But accounting-based measures are regularly subject to criticism because management has the potential to manipulate the performance target in their favour (Conyon et al., 2000).

Market measures of firm performance, as an indication of managerial effort, also receive criticism. Share price appreciation is not only deemed to be representative of managerial effort but also of general stock market movement and therefore a firm's share price is influenced and exposed to "general economy-wide shocks", whereas accounting measures are less so (Conyon et al., 2000, p.6). It is also said that, despite the fact that stock market returns contain important information to value the firm, they might not include all the necessary information needed to evaluate the firm's executive team (Antle and Smith, 1986). Whereas, there are different ways in which to judge an executive's performance based on accounting measures. For example, an executive's performance could be assessed with respect to the firm's profitability or growth.

Other signals of managerial effort may perhaps include relative performance evaluation[19] or other 'softer' measures of firm performance such as improvement in levels of customer service. The critical point is that whatever measure is used it must, "convey information to shareholders as to whether the CEO pursued the desired activity or not" (Benito and Conyon, 1999, p.120). It is therefore not surprising that there is no preference over either market-based or accounting-based measures of firm performance to evaluate executive effort.

4.5.2 Measures of corporate performance

In an empirical investigation of chief executive pay-for-performance, researchers must determine how to measure firm performance and whether to adopt a market-based and/or accounting-based approach. A review of the research suggests the preferred approach is to use market-based measures of firm performance or a combination of both market and accounting-based measures. In the case where a single measure is chosen a decision must be made whether to employ a market-based measure of corporate performance, such as shareholder return, for example Conyon et al. (2001) and Buck et al. (2003), or an accounting-based measure, such as return on assets, for example Guest (2009).

[19] Relative performance theory is reviewed in Section 2.3 and the empirical literature is reviewed in Section 4.6.

A selection of different accounting-based measures has been employed amongst those studies measuring accounting performance. For example, Smith and Szmanski (1995) used earnings per share and Laing and Weir (1999) used return on capital employed. The results are mixed regardless of which measure of accounting-based performance is used. Smith and Szymanski (1995) find earnings per share is positively related to cash compensation whereas Eichholtz et al. (2008) finds no significant association between earnings per share and cash or long-term compensation. Laing and Weir (1999) find a positive, albeit weak, association between return on capital employed and cash compensation, while Guy (2005), using the same measure finds no association.

The precise measure of market-based performance has also varied between studies. Some studies use a measure of shareholder returns which is typically capital gains plus dividends divided by the beginning of year share price (for example, Janakiraman et al., 1992; McKnight and Tomkins, 2004). Other studies use measures of shareholder wealth, which are calculated as the market value of the firm multiplied by the annual percentage return (for example, Jensen and Murphy, 1990; Rajgopal et al., 2006). As stated earlier, the results are equally mixed regardless of which precise measure of market-based performance is used. Conyon (1995) using a measure of shareholder return finds no association between firm performance and pay, while Janakiraman et al. (1992) and McKnight and Tomkins (2004) also using a measure of shareholder return find a positive association.

Tosi et al. (2004, p.409) mention that analysing market and accounting based measures in separate regressions is useful, "since they do not always converge to represent the same construct of firm performance". Other authors use a combination of market-based and accounting-based measures, for example Conyon et al. (2000), Guy (2000) and Dogan and Smyth (2002) to test whether either of the measures is more significant in explaining the variation in executive pay. Conyon et al. (2000) find a positive association with shareholder returns but no association with earnings per share. Guy (2000) also finds a significant positive association with shareholder returns but no association with return on capital employed. Dogan and

Smyth (2002) find shareholder wealth associated with total board remuneration but no association using return on assets.

If there is any pattern that emerges from the applied research, with regard to the pay-performance relationship and the preferred performance measure, it is that market-based performance appears to more frequently generate a positive and significant result than accounting-based measures.

The time period over which firm performance is measured is also potentially important and similar to the measure itself varies between studies. Firm performance is typically measured over one year and is either contemporaneous or predated. There is no consensus as to whether firm performance should be measured contemporaneously or predated and the reported results are not consistent across studies. Conyon (1997) finds compensation is associated with current shareholder returns but not predated returns. In a separate study, Conyon et al. (2000) measure predated and contemporaneous performance and find very similar results.

A criticism of the literature may be related to the length of period used to evaluate corporate performance. Firm performance, regardless of the actual measure, is nearly always measured over a one-year period while it is known in practice that executives are monitored over both the short and long-term. The measure employed in research matches short-term performance but rarely equates to the longer-term performance period that is used in practice.

There are a few studies that do measure firm performance over a period longer than one year. For example, Ceccucci and Gius (2008), in a US longitudinal study of chief executive compensation in the information technology sector, use a one-year, three-year and five-year measure of total shareholder return. The results are interesting, as they find no association between shareholder return and basic salary for any of the three performance periods. One-year and three-year shareholder returns were significantly related to chief executive bonus payouts. Five-year shareholder return was the only measure reported to be significantly associated with chief executive long-term compensation. In particular, Ceccucci and Gius (2008) find short-term performance to be associated with short-term pay and long-term performance to be related to long-term pay. This result is perhaps intuitive but it is surprising that very few studies have experimented with longer-term performance periods in tests of the executive pay-for-performance relationship.

Conyon et al. (2009), in a comparative UK/US study using cross-sectional data, investigate the impact of pay consultants on chief executive pay. They find a significant positive association between shareholder return, measured over three years, with US chief executive pay but no association with UK chief executive pay. However, it should be noted that the data used is a single cross-section and does not analyse the relationship in a panel setting and unlike Ceccucci and Gius (2008) they do not experiment with different performance periods matched to different forms of pay.

4.5.3 Concluding remarks about firm performance measures

The review of the corporate performance measure used in executive pay research has identified that a wide variety of measures have been employed and thus far the results indicate only a weak relationship between corporate performance and executive pay. The inconsistent findings between firm performance and executive pay may also be a result of differences between studies with respect to the methodological approach or a combination of other factors such as the time frame of the study and country under analysis.

It is put forward in this thesis that the literature has rarely exploited the time period over which performance is assessed particularly with regard to long-term actual pay. Specifically, it is hypothesised that short-term performance is related to short-term actual pay and long-term performance is related to long-term actual pay. Short-term performance is measured as Earnings Per Share (EPS) and annual Total Shareholder Return (TSR). Long-term performance is measured as three-year Total Shareholder Return (TSR). The hypotheses are detailed in Section 4.7.

4.6 Relative firm performance

The problems encountered with absolute firm performance, either with respect to market or accounting measures have been examined above. While shareholder returns or changes in shareholder wealth are suitable measures of actual firm performance, they have potential weaknesses as managerial performance measures. This is because they are only an approximation for managerial effort based on changes in the value of the firm. The value of the firm is not only dependent on executive actions but on many other factors outside the control of the executive (Gibbons and Murphy, 1990). Executive remuneration that is dependent solely on firm market performance will vary with common stock market performance, which is outside the manager's control, and may possibly bare no relation to the actions the executive actually took.

Relative firm performance evaluation is potentially a better assessment of managerial effort than measures of absolute firm performance. A relative performance measure that evaluates a firm's performance compared to a group of firms in the same industry, or relative to the whole market, to some extent protect the executive from the vagaries of the stock market (Gibbons and Murphy, 1990).

A key question put advanced in this research is whether there is evidence of relative performance evaluation in UK chief executive compensation. Relative performance evaluation theory (RPE) is an important extension of conventional agency theory predictions. According to both agency theory[20] and relative performance evaluation theory,[21] managers should be remunerated on a basis that excludes market-wide performance (systematic risk) but the empirical research does not always find this to be the case (Rajgopal et al., 2006).

The association between relative firm performance and executive compensation has been addressed in a number of pay-for-performance studies, of which the

[20] See Section 2.2 for a detailed review of agency theory and the propositions associated with the determination of executive compensation.
[21] See Section 2.3 for a detailed review of relative performance evaluation theory (RPE) and the propositions associated with the determination of executive compensation.

findings are summarised in Appendix II. The literature review has identified about 30 studies that tested for RPE in executive compensation, which is less than 10% of the executive pay-for-performance literature. The results of those studies vary in much the same way as the remaining studies that focus on absolute performance measures.

There is some evidence of RPE in US studies, typically finding support for the so called weak form of the RPE hypothesis, and very little support for either form of the RPE hypothesis in the UK literature. Antle and Smith (1986) was the first study to test Holmström's (1982) relative performance evaluation hypothesis. Antle and Smith (1986) employed long individual firm time-series regressions and reported evidence of RPE in 16 of the 39 sample firms. Overall, this result is interpreted as finding only weak evidence of RPE in US executive pay given that for the majority of firms in the sample there was no evidence of RPE.

Jensen and Murphy (1990), in their seminal pay-for-performance study, tested for RPE but did not find any significant results. In contrast, Gibbons and Murphy (1990) using the same Jensen and Murphy sample but applying a different approach, found strong evidence of RPE in US chief executive compensation.

There have been several RPE studies completed outside the US and the UK. A Spanish study by Crespi—Cladera and Gispert (2003), between 1990 and 1995, finds significant evidence of RPE. Dogan and Smyth (2002) in a Malaysian study between 1989 and 2000 find no evidence of RPE using either average sector shareholder wealth or average sector return on assets.

The latest research to investigate RPE includes a US based study by Albuquerque (2009) and a UK based study by Liu and Stark (2009). Using a large longitudinal sample of over 2000 firms between 1992 and 2005, Albuquerque (2009), finds strong evidence for both forms of the RPE hypothesis[22] when performance is measured using average stock returns but no evidence for average return on assets.

[22] The RPE hypothesis is described in Section 2.3.

In contrast, Liu and Stark (2009) using an even longer longitudinal sample between 1971 and 1998, find some evidence to support the weak form of the RPE hypothesis when using an accounting-based performance measure, average industry return on book value, but no evidence for average cash stock market industry return. Otherwise the evidence on RPE in UK chief executive compensation is for the most part not convincing. Ezzamel and Watson (2002), in a study of social comparison theory between 1992 and 1995, find some evidence of RPE using a relative performance measure based on the difference between individual firm total shareholder return and sector shareholder return. The most recent sample period to be investigated in a UK setting is from an unpublished study by Gregg et al (2005). This study draws on a sample of 415 firms over the period 1994 to 2002. Gregg et al. (2005) use a measure of abnormal firm returns and interpret the overall results as providing no evidence of RPE in UK chief executive compensation. However, they do report some evidence of RPE with regard to industry-adjusted returns. Other UK studies, using various measures of relative firm performance, find no significant support for RPE (Conyon and Leech, 1994; Main et al., 1996; Conyon, 1997; Cosh and Hughes, 1997; Conyon, 1998; Benito and Conyon, 1999).

Relative performance evaluation is an important question that recent UK studies, with the exception of Gregg et al. (2005) and Liu and Stark (2009), have failed to address. This lack of investigation may be attributable to the many early UK studies that did not report any significant findings. There has been no implicit test of RPE in executive compensation on UK data since 2002, the year when the Directors' Remuneration Report Regulations were introduced. The absence of recent UK research in this area is puzzling given the improved transparency and therefore the granularity of compensation data that allows researchers to perform more intricate tests. As well as the theoretical arguments, there is an expectation that firms will link executive remuneration to relative performance ever since the Greenbury Report (1995, p.17) advocated the use of RPE in long-term incentive schemes. Following that report, the Combined Code (2003, 2006) reinforced the idea that firms should link payouts or grants of long-term incentives to relative firm performance. The Association of British Insurers (ABI) also expects firms to use RPE with respect to long-term incentive arrangements (Liu and Stark, 2009). Liu and Stark (2009, p.22) make the following statement with regard to the anticipated use of RPE in UK executive compensation:

> *"...given the likely influential views of the ABI and the NAPF, backed up by the Greenbury (1995), as to the desirability of RPE, it is also likely that researchers searching for evidence of the use of RPE in total compensation (i.e., including salary, bonus, ESOs and LTIPs) would be progressively more likely to find it as time has passed since the mid-1990s."*

However, UK pay-for-performance studies tend to focus on the impact of corporate governance characteristics on executive compensation rather than perform new tests of RPE on the latest datasets. It is partly this lack of investigation, which provides some of the impetus for this study to perform implicit tests of RPE on new UK executive compensation data.

4.6.1 Implicit versus explicit use of RPE

Studies on the implicit use of RPE are mostly based on US firms where the evidence of explicit RPE is weak. Murphy (1999) reports the limited use of RPE in a sample of 177 large US companies. Murphy finds the lack of explicit RPE in executive compensation puzzling when compared to the findings from Gibbons and Murphy (1990), which provide implicit evidence. Overall, the empirical findings are mixed and therefore the lack of explicit use of RPE might be seen as being consistent with the lack of implicit RPE (for example Jensen and Murphy, 1990).

In the UK, remuneration committees make extensive use of RPE, yet the implicit evidence is practically non-existent. For example, in the UK, long-term incentive plans are designed so that the awards typically vest according to a firm's performance relative to the average performance of a pre-determined peer group. Ogden and Watson (2008) in a small study of five privatised water companies find evidence for explicit use of RPE in UK executive compensation. Câmara (2001) in a study of the explicit use of RPE, reports its widespread use among FTSE 100 firms. The conflicting evidence between explicit and implicit use of RPE may possibly be due to a paucity of recent UK studies investigating RPE. Even the latest UK study, Liu and Stark (2009), is based on a sample dated between 1971 and 1998.

Another possible reason for the contradictory results to be found in the literature might well be due to, remuneration committees or the research miss-specifying a firm's peer group, so that the selected firms are not exposed to similar market risk (Albuquerque, 2009). Furthermore, Aggarwal and Samwick (1999a) argue that executive compensation might be increasing with peer group performance due to the impact of 'strategic interactions' among firms. Aggarwal and Samwick (1999a, p.2000) find relative performance evaluation is less prevalent where competition between firms is most intense, due to the requirement of firms to, "soften product market competition". In this scenario executives are remunerated for both own firm performance and competitor performance.

4.6.2 Implicit tests of RPE

The most frequent investigation of RPE in the empirical literature is to test either, the supposed weak form of the RPE hypothesis or the strong form of the RPE hypothesis. The strong form of the hypothesis predicts that market-wide performance (systematic risk) is completely removed from chief executive compensation so that pay is based only on performance not influenced by market conditions (unsystematic risk). The weak form of the hypothesis is where the systematic element of firm performance is only partially filtered out and pay is influenced by both market risk and unsystematic risk (Rajgopal et al., 2006).

In order to test the weak and/or strong form of the RPE hypothesis chief executive compensation is regressed on a firm's own performance and peer group performance (Equation 4.7). Peer group performance is typically a measure of average industry or average market performance using either accounting-based or market-based measures.

$$EXECPAY = \beta_0 + \beta_1(FIRM) + \beta_2(PEER) + \beta_3(CONTROLS) + \mu \qquad (4.7)$$

The strength of the relationship between absolute firm performance and chief executive pay is represented by the coefficient β_1 in Equation (4.7)[23]. *PEER* represents the market-based or accounting-based average performance of the industry or market as a whole. Evidence of RPE is based on the strength and the sign of the coefficient β_2. Whilst controlling for absolute firm performance, β_1, the coefficient β_2 is expected to be negative (Gibbons and Murphy, 1990; Benito and Conyon, 1999). This prediction implies that an executive's compensation will increase the better a firm's performance is relative to an industry or market benchmark. In Equation (4.7), the strong form of the hypothesis expects the coefficient β_2 to be negative and equal in size to the predicted positive coefficient β_1. In other words the sum of the two coefficients is equal to zero. This expected result is consistent with the complete filtering out of the market risk component of firm performance. The weak form of the hypothesis simply predicts that β_2 is significantly negative but smaller in size than β_1. This is consistent with only partial filtering out of market performance (Rajgopal et al., 2006).

There is also a small number of studies that do not use the measure of peer group performance in the econometric equation. Instead they simply subtract absolute firm performance from the average peer group performance to calculate a new net performance variable. Net relative performance is then included in the regression model, rather than peer group performance, and regressed on executive compensation:

$$EXECPAY = \beta_0 + \beta_1(FIRM) + \beta_2(NET\ PERF) + \beta_3(CONTROLS) + \mu \quad (4.8)$$

The strength of the relationship between absolute firm performance and chief executive pay is represented by the coefficient β_1 in Equation (4.8). Evidence of RPE is supported by a significant positive coefficient on the net performance variable β_2.

[23] The literature with regard to the association between absolute market-based or absolute accounting-based firm performance and executive compensation is critically evaluated in Section 4.5.

4.6.3 Measures of relative performance

Similar to absolute corporate performance, a wide variety of measures have been employed to measure relative firm performance. Clearly the same measure must be used for firm and peer group performance in order to test the RPE hypothesis. Market-based measures have included total shareholder return and shareholder wealth and accounting-based measures have included, among others, return on assets, return on equity and return on capital employed. Again, contradictory results have been reported in the literature for the number of different measures used. The divergent findings are likely to be a result of different pay practices between countries, methodological distinctions between studies, and as it has been argued in Section 4.3, variation in the specification of the executive compensation variable.

Each of the RPE studies listed in Appendix III includes a market-based approach to measure relative firm performance with the exception of Ingham and Thompson (1995). In a study of UK building societies whose stock is non-tradable, Ingham and Thompson (1995), use average industry return on assets because no market-based measure is obtainable. It is probable that market-based relative performance measures are used in all other studies where market data is available, since it is simpler to implement as a comparative firm performance measure. In contrast there are a number of noteworthy difficulties in calculating accounting-based relative performance. To begin with accounting-based measures are subject to a firm's own calculation and presentation whereas market data is not. It is also not straightforward to compare firms with different accounting year-ends. Therefore, when using accounting-based data, researchers often take the approach of selecting peers based on firms with the same year-end, which is a practical solution rather than a theoretically valid reason for which to base a peer group on. For example, Albuquerque (2009) finds support for the weak and strong form of the RPE hypothesis when using an average shareholder return measure but no support when using average return on assets. Albuquerque uses industry-size peer groups for both measures and argues that it is important to match firms according to their size. However, the selected peer groups for the average return on assets measure are reduced by a number of firms because of the requirement to also match firms according to their year-end accounting date. It is feasible that this subtle difference in the compilation of the peer groups will influence the outcome of the statistical test which may possibly be the reason for the insignificant result reported using return on assets.

There are a number of studies that, like Albuquerque (2009), use an accounting-based relative performance measure in conjunction with a market-based measure of relative performance. Antle and Smith (1986) also use return on assets and shareholder return, but differing to Albuquerque (2009), find support for the strong form of the RPE hypothesis when average peer group performance is measured using return on assets but only support for the weak form of the hypothesis for the stock return measure. Dogan and Smyth (2002) find no evidence of RPE when using average sector shareholder wealth or average sector return on assets. Crespi-Cladera and Gispert (2003) find strong support for the RPE hypothesis using pre-dated average peer group return on assets and average shareholder wealth but no support for current accounting returns. Liu and Stark (2009) find support for RPE using average industry return on book value but no support when using average stock market return. It is observed from these results that, similar to absolute firm performance, RPE studies use various measures of average peer group performance and report varying results.

A minority of studies investigate relative performance using a net firm performance variable. For example, Cosh and Hughes (1997) use relative return on capital employed (ROCE) which is defined as ROCE minus the median ROCE in the peer group. They also calculate relative shareholder return in the same way and find no association between relative firm performance (using either measure) and executive compensation.

In a novel test of the strong form of Holmström's (1982) RPE hypothesis, Bertrand and Mullainathan (2001) compare oil firms' executive compensation and performance with the price of crude oil and find chief executive pay is linked to the 'luck' of oil price movement. They repeat the test using a broader group of companies and compare firms' executive compensation and performance to exchange rates and find a similar result. Chief executive pay is linked to the 'luck' of exchange rate movements. Both of these results are then confirmed using the more typical measure of mean industry performance; chief executive pay is linked to the 'luck' of mean industry performance. Overall, Bertrand and Mullainathan (2001) interpret the findings as providing no evidence of RPE and that in each model specification pay for luck is equal in magnitude as pay for general firm performance.

4.6.4 Peer group selection in RPE studies

In tests of RPE, the majority of studies use a measure of average peer group performance, however there are differences in how the peer group is defined. A number of studies use an industry/sector peer group whilst other studies employ a much broader definition of the whole stock market. Many US studies use both a narrow industry benchmark and a broader market index measure. The empirical findings once again are mixed and vary from study to study regardless of the peer group selection.

Albuquerque (2009) makes use of three different classifications of peer group with the purpose of testing the proposition that it is important to select peers based on firm size. Albuquerque suggests that previous research has failed to correctly specify a firm's peer group, which is a reason for the mixed results reported in the literature. First, Albuquerque uses a broad index measure, the S&P 500,[24] second an industry peer group measure and third an industry-size adjusted peer group. The results find support for RPE across the three different peer groups; however the findings for the industry-size adjusted peer groups are more compelling. Gibbons and Murphy (1990) use value-weighted market return (based on all 11,000 *Compustat* firms) and value-weighted industry return and find strong evidence of RPE for both measures. Rajgopal et al. (2006) use industry shareholder wealth and S&P 500 shareholder wealth and find significant support for the weak form of the RPE hypothesis (partial filtering of market risk). The predicted negative coefficient

[24] The S&P 500 is an index of 500 US companies listed on the New York or Nasdaq stock exchange.

for S&P 500 shareholder wealth is larger than the negative coefficient for average industry performance.

In contrast to the US based studies, the near majority of UK research only uses an industry/sector definition of peer group. The one exception is Gregg et al. (2005) who in their test of RPE measure market and industry abnormal returns. They report only weak evidence that executive compensation varies according to relative industry performance.

Peer group composition also differs in terms of whether each sample firm is included or excluded from the relative performance measure. For example, Aggarwal and Samwick (1999a), in a study of competitive strategic interactions, test for RPE using contemporaneous value weighted average industry shareholder wealth excluding the sample firm. Thus a unique measure of relative performance is calculated for each firm based on their industry group less their own firm performance. Aggarwal and Samwick (1999a) report that RPE is less evident in more competitive industries. In contrast, Conyon (1997), Conyon (1998) and Benito and Conyon (1999) use average shareholder returns in the stock exchange industry but do not exclude the sample firm and therefore each firm in the same industry has the same measure of relative performance. No evidence of RPE is reported in any of the three studies.

4.6.5 Concluding remarks about RPE measures

In general, the evidence for RPE in executive compensation is mixed. There is some strong evidence of RPE in US executive compensation but the support is not overwhelming. However, it is observed from this review of the literature that the UK evidence of RPE is practically non-existent which may well be due to the absence of new research in this area and misspecification of the peer group performance measure.

Similar to absolute firm performance it is put forward in this thesis that there is a gap between the peer group performance measures used in the literature versus the measures used by firms in practice. Specifically, it is hypothesised that short-term actual pay is a function of relative short-term shareholder performance and that long-term actual pay is a function of relative long-term shareholder performance. The specific research questions to be addressed in this study and hypotheses are set out in the following section.

4.7 Specific research questions and hypotheses

Thus far, it has been shown in this literature review that the association between corporate performance and chief executive pay is inconsistently reported between studies and between different elements of pay. It is also evident from company remuneration reports that chief executive compensation contracts incorporate elements of absolute firm performance and relative firm performance in short and long-term pay, but that basic pay is not necessarily influenced by firm performance in the same way. Further, performance-contingent pay is a target incentive not a pay outcome and therefore target bonus pay, target long-term incentive pay and target total pay, may not be associated with past firm performance. Therefore, as is the reason for dividing pay in this way, it is expected that different findings be reported depending on the specific hypothesis being tested. The following sections articulate the specific research questions[25] to be addressed in this thesis in terms of fixed pay, performance-contingent pay, short-term performance-realised pay and long-term performance-realised pay.

4.7.1 Fixed pay

A review of UK remuneration policy suggests that basic pay is not always dependent on firm performance. For example, the following declarations from UK remuneration reports are clear that basic pay is not related to firm performance.

> *"Base salaries are not performance-related. They are determined having regard to those for similar positions in international business of broadly comparable size and structure, taking account of turnover, market value and*

[25] See Section 1.4.1 for the main research questions.

number of employees, business sector and international involvement" (Enodis, Annual Report and Accounts, 2005, p.39).

"The payment of base salaries is not related to company performance" (Northumbrian Water Group, Annual Report and Accounts, 2005, p.48).

Alternatively, WPP does not make such a bold statement but does report that there are many factors in addition to performance that determines basic pay. However, there is no mention of overall corporate performance.

"Salary levels are determined by taking a number of relevant factors into account, including individual and business unit performance, level of experience, scope of responsibility and the competitiveness of total remuneration" (WPP, Annual Report and Accounts, 2007, p.132)

These remuneration report statements are supported by findings in two UK studies on remuneration policy. Pass (2003), in a study of executive remuneration policy of 51 large UK firms between 1994 and 2001, notes that firms claim that basic pay levels must reflect international pay practice in order to, "attract and retain" the executive talent while long-term incentive schemes provide the incentive alignment between executives and owners. Pass (2003, p.24) describes basic pay as a, "non-performance related" payment. Ogden and Watson (2004), in a study of UK privatised water companies, also comment that basic pay is related to retention and attraction.

This thesis explores exactly how performance is related to all elements of pay and therefore it is an objective to explore whether short-term performance measures are associated with fixed pay. The specific research questions connected with this objective are:

1.1 Is basic pay related to absolute short-term firm performance?

1.2 Is basic pay related to relative short-term firm performance?

4.7.2 Performance-contingent pay

Performance-contingent pay (PCP) is communicated to executives and shareholders in terms of a maximum annual bonus incentive for short-term pay and grants of performance-options, performance-shares or cash plans for long-term incentive pay. Contingent pay is an incentive and not an actual pay outcome. A review of remuneration policy indicates that target incentive pay is typically expressed in reference to multiples of basic pay. It is therefore reasonable to expect it to respond to firm performance in a way similar to that of basic pay.

Similar to basic pay, it is an objective of this study to explore whether short-term performance measures are associated with PCP. The specific research questions connected with this objective are:

2.1 Is PCP related to absolute short-term firm performance?

2.2 Is PCP related to relative short-term firm performance?

4.7.3 Short-term performance-realised pay

The Directors' Remuneration Report Regulations (2002) require the remuneration committee to detail performance measures and actual criteria for performance related pay. A review of individual UK company remuneration policies indicates that short-term pay outcomes are often based on absolute annual financial performance measures. For example, the Diageo Remuneration Report states that the short-term incentive is, "entirely based on Diageo's overall financial performance" and "at least 70% based on profit measures" (Diageo, Annual Report and Accounts, 2007, p.58). This is confirmed by Pass (2003) who reports that payments of short-term incentives are typically, though not exclusively, linked to an accounting profitability measure. In addition to profitability, the annual bonus payment is frequently linked to a combination of individual and non-financial measures. For example, the executive annual bonus payment at WPP (Annual Report and Accounts, 2007, p.132) is based on a combination of annual financial and non-financial measures. According to the PwC Executive Compensation Review of the year, in 2009, about 30% of FTSE 100 firms only applied a financial measure in annual bonus plans and others used various combinations of financial, individual and non-financial measures. Ogden and Watson (2004) also find that annual bonus payments, in UK water companies, are based on financial and non-financial measures.

It is apparent from UK remuneration policy that short-term pay is supposed to be a function of short-term financial performance. This study does not measure non-financial performance since the purpose of the study is to examine corporate performance in terms of shareholders expectations, which are financial or market related. It is an objective of this study to explore whether short-term performance measures are associated with short-term PRP. The specific research questions connected with this objective are:

3.1 Is short-term PRP related to absolute short-term firm performance?

3.2 Is short-term PRP related to relative short-term firm performance?

4.7.4 Long-term performance-realised pay

Firms publically listed in the UK are required to report the precise vesting criteria and vesting schedules (i.e., when ownership of share options or restricted shares is transferred to the executive) for all elements of executive long-term performance-realised pay. A review of company remuneration reports indicates that the majority of large UK companies design the vesting criteria of performance-option plans based primarily on long-term EPS growth. Pass (2003) reported that performance-option plans frequently use EPS or TSR as a performance measure. Performance-share plans are designed, at least to some extent, so that the vesting conditions are linked to long-term company TSR relative to a comparator group of companies. Comparator companies include either a broad index or peer group of industry related firms (Pass, 2003). Ogden and Watson (2004) in a study of performance-share plans among privatised water companies also found long-term incentive plans were based on TSR. Firm performance is typically measured over a three-year period for both performance-option and performance-share plans. The reported use of RPE in long-term incentive plans is to be expected, considering the Association of British Insurers (ABI) advocate the use of RPE measured with respect to stock market performance in executive share option and performance share plans (Liu and Stark, 2009). Câmara (2001) also reports that the ABI and the National Association of Pension Funds (NAPF) asked members to vote on remuneration policies according to relevant use of RPE.

The remuneration report evidence is supported by the PwC, Executive Compensation, Review of the year (2009, p.65). The PwC Review reports that TSR and EPS are the most frequently used long-term performance measures used in UK long-term incentive schemes (options and shares). According to the review a number of firms are also using other measures, "such as economic profit, cash flow, or return on capital" but typically only in addition to EPS and TSR measures. Performance-option plans for FTSE 100 chief executives use EPS as the only measure in about 70% of firms. A fraction under 20% of firms uses TSR only for performance-option plans. Just over 10% of firms use a combination of EPS and /or other measures. The representation is slightly different for chief executive performance-share plans. Around 20% of firms use only TSR. About 35% of firms use TSR and EPS. Just over 20% use TSR and other measures. About 5% use EPS only. The remainder of firms use a combination of other measures. Overall among large UK firms, it emerges that long-term EPS growth is the most common criteria for performance-option plans while long-term relative TSR combined with an additional measure is typical among performance-share plans.

It is an objective of this study to explore whether long-term performance measures are associated with long-term performance-realised pay. The specific research questions connected with this objective are:

4.1 Is long-term PRP related to absolute long-term firm performance?

4.2 Is long-term PRP related to relative long-term firm performance?

Figure 4.1

Theoretical Framework

Factors	Prediction	Pay Element	Type
Short-term firm performance	(+)	Basic	Fixed pay
Short-term peer group performance	(-)		
Company size	(+)		
Short-term firm performance	(+)	Target bonus	Performance-contingent pay
Short-term peer group performance	(-)		
Company size	(+)		
Short-term firm performance	(+)	Actual bonus	Performance-realised pay
Short-term peer group performance	(-)		
Company size	(+)		
Short-term firm performance	(+)	Target LTI	Performance-contingent pay
Short-term peer group performance	(-)		
Company size	(+)		
Long-term firm performance	(+)	Actual LTI	Performance-realised pay
Long-term peer group performance	(-)		
Company size	(+)		
Short-term firm performance	(+)	Target total	Performance-contingent pay
Short-term peer group performance	(-)		
Company size	(+)		
Short-term firm performance	(+)	Actual total	Performance-realised pay
Short-term peer group performance	(-)		
Long-term firm performance	(+)		
Long-term peer group performance	(-)		
Company size	(+)		

4.7.5 Hypotheses

The hypotheses are formalised and grouped together here. It has been put forward that the weak relationship between corporate performance and chief executive compensation is due largely to previous studies having combined different elements of pay, which relate to corporate performance in different ways. Furthermore, some previous studies have employed remuneration categories that have mixed performance-contingent pay and performance-realised payments, and it is the latter that we expect to be positively related to actual corporate performance, not necessarily the former. It is further proposed that, after controlling for actual firm performance, peer group performance will be negatively associated with chief executive compensation.

The first set of alternate hypotheses test the factors that are proposed to impact on chief executive fixed basic pay.

H1a. Ceteris paribus, short-term company performance is positively related to chief executive basic pay.

H1b. Ceteris paribus, short-term peer group performance is negatively related to chief executive basic pay.

H1c. Ceteris paribus, company size is positively related to chief executive basic pay.

A rejection of the null hypotheses will imply that chief executive basic pay varies positively with company size and short-term company performance; and negatively with short-term peer group performance.

The second set of alternate hypotheses test the factors that are proposed to impact on chief executive target bonus pay.

H2a. Ceteris paribus, short-term company performance is positively related to chief executive target bonus pay.

H2b. Ceteris paribus, short-term peer group performance is negatively related to chief executive target bonus pay.

H2c. Ceteris paribus, company size is positively related to chief executive short-term target bonus pay.

A rejection of the null hypotheses will imply that chief executive target bonus pay varies positively with company size and short-term company performance; and negatively with short-term peer group performance.

The third set of alternate hypotheses test the factors that are proposed to impact on chief executive actual bonus pay.

H3a. Ceteris paribus, short-term company performance is positively related to chief executive actual bonus pay.

H3b. Ceteris paribus, short-term peer group performance is negatively related to chief executive actual bonus pay.

H3c. Ceteris paribus, company size is positively related to chief executive actual bonus pay.

A rejection of the null hypotheses will imply that chief executive actual bonus pay varies positively with company size and short-term company performance; and negatively with short-term peer group performance.

The fourth set of alternate hypotheses test the factors that are proposed to impact on chief executive target long-term incentive pay.

H4a. Ceteris paribus, short-term company performance is positively related to chief executive target long-term incentive pay.

H4b. Ceteris paribus, short-term peer group performance is negatively related to chief executive target long-term incentive pay.

H4c. Ceteris paribus, company size is positively related to chief executive target long-term incentive pay.

A rejection of the null hypotheses will imply that chief executive target long-term incentive pay varies positively with company size and short-term company performance; and, negatively with short-term peer group performance.

The fifth set of alternate hypotheses test the factors that are proposed to impact on chief executive actual long-term incentive pay.

H5a. Ceteris paribus, long-term company performance is positively related to chief executive actual long-term incentive pay.

H5b. Ceteris paribus, long-term peer group performance is negatively related to chief executive actual long-term incentive pay.

H5c. Ceteris paribus, company size is positively related to chief executive actual long-term incentive pay.

A rejection of the null hypotheses will imply that chief executive actual long-term incentive pay varies positively with company size and long-term company performance; and, negatively with long-term peer group performance.

The sixth set of alternate hypotheses test the factors that are proposed to impact on chief executive target total pay.

H6a. Ceteris paribus, short-term company performance is positively related to chief executive target total pay.

H6b. Ceteris paribus, short-term peer group performance is negatively related to chief executive target total pay.

H6c. Ceteris paribus, company size is positively related to chief executive target total pay.

A rejection of the null hypotheses will imply that chief executive target total pay varies positively with company size and short-term company performance; and negatively with short-term peer group performance.

The seventh set of alternate hypotheses test the factors that are proposed to impact on chief executive actual total pay.

H7a. Ceteris paribus, short-term company performance is positively related to chief executive actual total pay.

H7b. Ceteris paribus, short-term peer group performance is negatively related to chief executive actual total pay.

H7c. Ceteris paribus, long-term company performance is positively related to chief executive actual total pay.

H7d. Ceteris paribus, long-term peer group performance is negatively related to chief executive actual total pay.

H7e. Ceteris paribus, company size is positively related to chief executive actual total pay.

A rejection of the null hypotheses will imply that chief executive actual total pay varies positively with company size, short-term company performance and long-term company performance; and negatively with short-term peer group performance and long-term peer group performance.

4.8 Summary

The empirical executive pay-for-performance literature has been reviewed in this chapter. It is observed that differences in data collection approach and research methods, compensation variable definitions, performance measures and performance periods have undoubtedly contributed to the contrasting results in the pay-performance literature. The review shows that in spite of the different approaches research seldom finds a robust large positive association between corporate performance and executive pay. Nonetheless, it is clear that research must employ a longitudinal methodology in order to measure the phenomenon over time. Cross-sectional studies do not control for unobserved fixed-effects, such as executive ability, that do not change over time (Murphy, 1985).

The literature review has identified particular concerns over the measurement of the chief executive compensation variable. It is proposed that it is crucial to identify unique components of pay and to estimate the impact of corporate performance on each measure in separate regressions rather than to simply use cash or total compensation. In addition, it is proposed that one reason for research typically finding only a small and frequently weak association between corporate performance and chief executive pay is due to research not distinguishing between performance-contingent pay and performance-realised pay and therefore not accounting for the actual vesting of all long-term incentive awards.

The review of corporate performance as an independent variable finds the majority of studies measure either contemporaneous or predated performance over a one-year period. In this thesis it is proposed that measures of short-term performance are potentially less able to predict long-term compensation than are measures of long-term performance. The executive pay-for-performance relationship is complex and it may be necessary to explore the impact of long-term performance on long-term compensation and short-term performance on short-term compensation rather than assuming that all compensation is simply a function of one-year performance.

It is also apparent from the literature review that research, particularly in the UK, has not consistently found evidence of RPE in executive compensation, which may be due to the lack of empirical investigation in recent years. The absence of empirical evidence is surprising considering the theoretical basis for RPE, the remuneration report evidence and the clear recommendation in the Combined Code (2003) for firms to consider relative performance evaluation. It is proposed in this study that RPE is more important in explaining the variation in chief executive compensation than research has shown to be the case.

In addition to the corporate performance variables this study includes firm size as a control variable in the regression models. Company size is reported to be the most important firm specific factor influencing the determination of executive compensation (Rosen, 1992).

Overall this study suggests that an explanation for the mixed findings in the executive pay-for-performance literature may be due to different elements of pay being determined by different factors. Rather than merely investigating the association between one-year corporate performance and total compensation, this study considers the effect of short and long-term absolute and relative performance, on individual elements of basic pay, target incentive pay and actual incentive pay.

Chapter Five

Research Methodology and Research Methods

5.1 Introduction

The purpose of this chapter is to describe the positivistic philosophical approach and quantitative research strategy employed in this thesis. The study follows a longitudinal research design and uses panel data estimation methods to test the hypotheses developed in Chapter Four. To begin with, the deductive nature of the study is described followed by an explanation of the data collection strategy, which includes the sample selection criteria and the description of the dependent and independent variables. The random and fixed-effects panel data estimation methods and the empirical models used to examine the association between corporate performance and chief executive pay are identified and explained.

The research methodology pursued in this study is similar to the vast majority of empirical executive compensation research. Recent studies include Gregg et al. (2005), Girma et al. (2007), Ogden and Watson (2007), Ozkan (2007), Eichholtz et al. (2008), Liu and Stark (2009) and Ozkan (2009) in the UK and Canarella and Gasparyan (2008), Nourayi and Daroca (2008) and Albuquerque (2009) in the US. However, the research methods adopted in this thesis set it apart from the prior literature.

This thesis contributes to the executive pay literature with respect to its findings but also with regard to the following attributes that distinguish it from previous research on chief executive pay-for-performance.

I. The study is based on an original dataset covering five years from 2003, the year following the introduction of the Directors' Remuneration Report Regulations (2002), to year-ending 31st December 2007. The longitudinal design of the study enables the relationship between corporate performance and chief executive pay to be measured across units and over time.

II. The UK chief executive compensation data is hand collected from company remuneration reports to a level of detail not realised in prior research. The distinctive feature of the data is that it incorporates the vesting of performance-options and performance-shares. This facilitates analysis on elements of chief executive compensation that have not been previously possible.

III. The dataset used in this study identifies the individual chief executive, which allows for the empirical strategy to remove unobserved chief executive specific effects that do not change over time. Numerous earlier studies, for example Benito and Conyon (1999), draw on datasets which do not identify the chief executive and therefore only control for firm effects and not, as in this study, both firm and individual effects.

IV. The chief executive compensation data reflects the implementation of changes to remuneration practice initially recommended by Greenbury (1995) and included in the Combined Code (1998, 2003). For example, the Combined Code advocates the inclusion of performance conditions on the vesting of share option and other long-term incentive awards and that executive long-term incentive pay is relative to peer group performance.

V. This is the first study to investigate whether chief executive long-term incentive awards vest according to relative peer group performance.

5.2 Research philosophy and approach

The econometric relationship between a set of explanatory performance variables and UK chief executive pay is investigated from a positivist perspective. The positivistic nature of the study is initially characterised by the research purpose, which is to examine the association between corporate performance and chief executive pay. Positivism is an epistemological perspective that considers knowledge of social science to be developed, in accordance with scientific methods, beyond the reality of the human mind (Bryman and Bell, 2003). There are specific research designs and methods, which are typically associated with a positivistic philosophical perspective. Positivists usually adopt a quantitative research design, for example a survey, and may use questionnaires to collect large amounts of data for statistical analysis and hypothesis testing. Here, the chief executive pay-for-performance relationship is investigated in a longitudinal setting using panel data estimation methods.

The research approach used in this study is deductive, which is symbolised by the development of a set of hypotheses, deduced from principal-agent theory and relative performance evaluation theory, to test the association between corporate performance and chief executive compensation. From a principal-agent theory perspective it is hypothesised that firm performance is positively associated with chief executive pay and from a relative performance evaluation theory perspective it is hypothesised that, whilst controlling for actual firm performance, peer group performance is negatively associated with chief executive pay. A rejection of the null hypotheses will provide support for the theoretical propositions derived from principal-agent theory and relative performance evaluation theory.

The research strategy adopted is to quantitatively investigate a longitudinal sample of 204 companies between 2003 and 2007. This design is very typical of a positivistic philosophical stance. In terms of the ontology the research is objective; the researcher and reality being observed are separate. Positivists view the research object to have qualities independent of the researcher (Bryman and Bell, 2003). The researcher is working with real data, chief executive pay data and firm performance data, which exist independently of the researcher.

Alternatively, an interpretivist approach would be to interview the 'social actors' involved or influenced by the executive compensation process to understand remuneration policy and the performance criteria on which compensation is awarded. The research strategy could be a case study or a series of case studies for a particular industry sector. The method of data collection might be to interview the chief executive, the chairman of the remuneration committee, shareholder groups or fund managers. The interview process may focus on one of the above groups or try to collect information from each group. An advantage of an interpretivist approach is that it would allow the researcher to be subjective and aim to understand the performance criteria affecting the determination of chief executive compensation. Each of the above interviewees is likely to have a different perspective on executive compensation and would therefore contribute uniquely to the study. Disadvantages are that the interviewee's responses may be biased towards their own agenda and the interviewer's interpretation may also be predisposed. An interpretivist approach is more suited to a situation where the researcher is trying to 'understand' phenomena rather than, as in this study, 'explain' phenomena. An interpretivist philosophical stance involving the collection of qualitative data would enhance the executive compensation literature but is not suitable for a quantitative and explanatory investigation of the data.

5.3 Research strategy

5.3.1 Longitudinal design

This study makes use of quantitative executive compensation and firm performance data to test the association between the explanatory performance variables and the explained pay variables. Quantitative studies are intent with testing theory and therefore aligned with a deductive research approach. Explaining the association between variables, in this case corporate performance and chief executive pay, is a strong tenant of positivism and very much informs the chosen quantitative methodology pursued in this empirical investigation. Quantitative research is concerned with, measurement validity; internal validity; external validity; and, replicability (Bryman and Bell, 2003, p.49). The measurement validity of the study depends on the quality of the measures used. The internal validity of a quantitative strategy is related to its power to explain the phenomenon. External validity is how capable the research is to generalise the findings beyond the study. Replicability is the ability to reproduce the findings.

In this study the quantitative research strategy is a longitudinal design. Internal validity is strong with a longitudinal design because of the capacity to measure changes in variables over time. Bryman and Bell (2003, p.52) assert that, "a longitudinal design can allow some insight into the time order of variables and therefore may be more able to allow causal inferences to be made". External validity, another feature of a quantitative strategy, is also likely to be strong with a longitudinal study (Bryman and Bell, 2003). An advantage of a longitudinal research design, according to Denscombe (2007), is that it improves the probability of getting a representative sample, which is a key aspect of the ability to generalise from the sample to the population. Replicability should be present in longitudinal research but it depends to a great extent on the data collection method and access to data required to replicate the study. The archival research strategy used in this study is likely to enhance replicability since the data is documented and available for other researchers to access and therefore repeat the study and its findings.

5.3.2 Archival research

The archival research strategy employed in this study involves using documents originally prepared for another purpose (Saunders et al., 2007). The original documents used in this research are, the company annual report and accounts, which are prepared at the end of each financial year to communicate information to shareholders and financial records of firm stock market performance. The documents used in archival research are a record of historical information that represent real observations over time. The annual report and accounts, document real observed compensation paid to the chief executive and observed firm historical accounting performance. Archival research can employ hard copy documents such as the company annual report or computer generated records from a commercial database such as the *Computstat* database used in US research (Larraza-Kintana et al. 2007). Virtually all-prior empirical executive compensation research adopts an archival research strategy to collect pay and firm performance data. Here the executive compensation data is hand collected from the annual report and accounts and the firm performance data is gathered from *Datastream*, a commercial database, whom have compiled the observations from the original documents.

Alternative research strategies to collect the chief executive compensation data were considered but not chosen as it was decided that they would not present any advantages over an archival research strategy. For instance, an executive remuneration consultancy may have been prepared to provide secondary chief executive compensation data originally collected via a survey of UK firms. But, this would have entailed gaining permission to access the data and undoubtedly, if permission were granted, there would be restrictions on the research. Yet this approach would probably have been more time efficient than hand collecting the data. There are a few examples of research, which have used secondary survey data provided by practitioner consulting firms. For example, Kato and Kubo (2006) in a chief executive pay-for-performance study of 51 Japanese firms used compensation data provided by an unnamed major consulting firm.

A survey research strategy using questionnaires was considered but was deemed not practical or efficient given that the chief executive compensation data is publicly available. In the past, researchers have used surveys to collect supplementary data not available in the company annual report and accounts. For example, Conyon (1997) used a postal survey to collect additional corporate governance data, which at that time was not published in the company annual report. The data required for this study is publically available since the Directors' Remuneration Report Regulations (2002) require UK plc's to fully disclose chief executive compensation data.

There are some obvious advantages of archival research. The researcher has easy access to a large amount of data. The approach is typically cost-effective because the data is already in a useable form or may require only limited modification and is typically available at no or minimal cost. Perhaps the most important advantage is the permanence of the data. This is particularly relevant as it allows future researchers the ability to replicate the study. Archival research can typically adopt a longitudinal research design since the data and changes in the data are observed over time (Saunders et al., 2007). The reliability of annual report data is very high since it is subject to external audit and public scrutiny (Denscombe, 2007). However, the data provided in the document has been produced for other purposes and therefore 'cleaning' of the data is imperative to ensure the data meets the requirements of the research project.

The capacity to answer certain research questions from archival data will greatly depend on the availability of data. This is particularly evident with regard to executive compensation research. Early UK studies had to rely on a basic level of data, which did not identify individual executives and did not disclose long-term incentive data in a useable form. Therefore many studies only examined cash compensation for the highest paid director (HPD), which may or may not have been the chief executive. For example, a recent study by Girma et al. (2007) used a dataset from 1981 to 1996 gathered from *Hemmington-Scott Corporate Register* and *Datastream*. In their study, Girma et al. (2007) only measure cash compensation for the HPD because more detailed data is not available for the whole period. Since Cadbury (1992) disclosure has improved, which has facilitated the study of new research questions. The introduction of the Directors' Remuneration Report Regulations (2002) has greatly enhanced access to historical compensation data from 2002 onwards and improved the consistency of reporting, which has enabled this thesis to address a set of research questions that were not possible in times when only limited information was available.

5.4 Data collection

5.4.1 Sample selection and description

The sample is selected based on large UK firms where the agency problem, caused by the separation of ownership and control, is likely to be most apparent (Lewellen and Huntsman, 1970). Manager and shareholder interests are expected to diverge as firms get larger and monitoring becomes more difficult. In order to focus attention towards large firms this study selected a sample from the top 350 firms in the UK by market capitalisation. It is not unusual for UK research to concentrate on the largest 350 firms; for example, Gregg et al. (2005) and Greggory-Smith (2009) follow this approach. The companies were selected from the constituents of the FTSE-350 stock market index on 31st December 2007. The FTSE-350 represents a range of industry sectors and the constituents stock is diversified over many owners.

Table 5.1

Sample selection and exclusion criteria

Criteria	Number of firms
FTSE-350 as at 31st December 2007	353
Exclude dual listing (include main listing only)	(3)
Exclude financial services and investment trusts	(79)
Exclude real estate and investment trusts	(23)
Exclude combined chairman / CEO role	(6)
Exclude recently listed firms (less than two years)	(22)
Exclude data not available	(16)
Final number of firms	**204**
Target number of executive years / observations	**1,020**
Exclude incumbents less than two consecutive years	(81)
Exclude where no CEO at year-end	(23)
Exclude combined chairman / CEO role	(3)
Exclude data not available	(8)
Final number of executive years / observations	**905**

The initial number of sample firms, before exclusions, included all firms listed on the FTSE-350 index at the end of the sample period. Firms and chief executives are then excluded based on a pre-determined set of exclusion criteria. The sample selection and exclusion criteria are summarised in Table 5.1. First, three listings are dropped from the sample because they are listed twice on the exchange (the main listing remains in the sample). Next, as is characteristic in executive pay studies, financial services, real estate and investment trusts are excluded from the sample because of the unique financial structure and governance regime of firms in these sectors (McKnight and Weir, 2009). Chief executives are excluded from the sample if the role is combined with the role of chairman of the board. This is because this situation is now exceptional and is not representative of proposed best corporate governance practice outlined in the UK Corporate Governance Code. A chief executive must be incumbent in a listed firm for a minimum of two years and therefore recently listed firms and new chief executive appointees are excluded if there are not two continuous observations.

Once all exclusions are considered, the final dataset comprises an unbalanced panel of 204 companies and 905 chief executive-years from 2003 to 2007. The sample includes firms from nine different FTSE-350 industry sectors. The full list of sample companies is shown in Appendix IV. The sample is unbalanced and therefore the number of observations analysed each year is always less than the maximum number of firms due to exclusions. The number of observations ranges from a low of 154 in 2003 through to a high of 200 in 2006. There is an average of 4.4 observations per sample firm. Table 5.2 shows that the consumer goods, consumer service and industrials sector comprise 75% of the sample firms. Together healthcare, technology and telecommunications represent only 7% of the sample firms.

Table 5.2

Industry distribution by number of firms

Industry sector	**Number of firms**
Basic materials	12
Consumer goods	26
Consumer service	55
Healthcare	5
Industrials	71
Oil & Gas	15
Technology	8
Telecommunications	2
Utilities	10
Total sample	**204**

Table 5.3 reports the distribution of chief executive-firm observations by each year and industry sector. Table 5.4 shows the summary statistics for CEO age and tenure. The median chief executive age is 53 for each year between 2003 and 2005

and is 52 for 2006 and 2007. The mean age ranges from a low of 51.59 in 2006 to a high of 52.34 in 2004. The median chief executive tenure is 4 years except for 2006 when it is 3 years. The mean tenure ranges from 4.59 in 2003 to 5.46 in 2007.

Table 5.3

Industry distribution by number of observations

Industry sector	2003	2004	2005	2006	2007	Total
Basic materials	8	11	12	12	8	51
Consumer goods	19	24	25	26	20	114
Consumer service	41	51	50	54	48	244
Healthcare	4	4	4	5	4	21
Industrials	57	64	67	69	63	320
Oil & Gas	10	13	15	14	13	65
Technology	6	8	8	8	6	36
Telecommunications	1	2	2	2	2	9
Utilities	8	9	10	10	8	45
Observations	**154**	**186**	**193**	**200**	**172**	**905**

Table 5.4

CEO age and tenure summary statistics

Year	Variable	N	LQ	Median	UQ	Mean	Std. dev.
2003	Age	154	48.00	53.00	57.00	52.04	6.08
	Tenure	154	2.00	4.00	7.00	4.59	4.82
2004	Age	186	48.00	53.00	57.00	52.34	6.40
	Tenure	186	1.00	4.00	7.00	4.76	4.79
2005	Age	193	48.00	53.00	57.00	52.00	6.39
	Tenure	193	2.00	4.00	6.00	4.75	5.00
2006	Age	200	47.00	52.00	56.00	51.59	6.39
	Tenure	200	2.00	3.00	6.00	4.71	5.09
2007	Age	172	48.00	52.00	56.00	52.04	6.29
	Tenure	172	2.00	4.00	6.00	5.46	4.64

N is the number of observations. LQ is the lower quartile. UQ is the upper quartile. Std. dev. is the standard deviation.

The chief executive compensation data is hand collected from firm remuneration reports published in each company's annual report and accounts. The reports were retrieved from company websites and if not available electronically hard copies were obtained from the *London Business School* archive of company reports and accounts. The corporate data is exported from *Datastream*. The chief executive compensation data and corporate data is collected and input into a database using *Stata10* a data analysis and statistical software package.

5.4.2 Survivorship bias

The sample criteria used in this study is to a limited degree biased towards successful firms because it does not include those firms who enter the index during the sample period but are not constituents on the last day of the time frame. However, 47 firms listed on the FTSE-350 on 31st December 2007 dropped out of the index in 2008, which is typical of the regular basis on which firms move in and out of the index. Survivorship bias is a type of "sample selection bias" caused by the selection of non-random data (Wooldridge, 2009, p.845). The bias is the result of excluding data due to a common characteristic, which might influence the outcome of statistical tests. Survivorship bias is a problem inherent in longitudinal research design particularly if using a balanced data panel.[26] Recent empirical studies in the executive compensation literature have frequently used a longitudinal research design, for example Dong and Ozkan (2008), Eichholtz et al. (2008), Gregory-Smith (2009), Kuang and Qin (2009) and Liu and Stark (2009) so survivorship bias is also a potential concern in this work.

Executive compensation studies using a balanced panel, for example Bruce et al. (2007), Chhaochharia and Grinstein (2009) and Liu and Stark (2009) acknowledge that the nature of the sample design implies that only companies with a proven track record over the entire sample period will be included. Gregg et al. (2005) use an unbalanced panel[27] and design a sample selection frame to include non-survivor

[26] A balanced panel requires data for all years and all cross-sectional units (Wooldridge, 2009).
[27] An unbalanced panel does not require data for all years on all cross-sectional units (Wooldridge, 2009).

firms in order to alleviate the potential bias. However, unlike this current study, the executive compensation data used in their study is not hand collected and therefore the additional time to sample non-survivors from a commercial database is minimal. Retrieving executive compensation data for companies that no longer exist is problematic and time consuming for hand collected data. For example, firm websites where company remuneration reports are typically retrieved are no longer maintained. Moreover, survivorship bias cannot be completely alleviated because at least two consecutive observations are required for panel data methods and therefore firms with only one period of data will drop out of the sample.

In a seminal pay-performance study, Murphy (1985) uses an unbalanced sample of firms. Similar to the design used in this study the firms were selected from a stock exchange index at the end of the sample period being investigated. Murphy (1985, p.13) notes that designing the sample selection in this way introduces, "a bias towards successful firms" because firms that delist, merge, are acquired, or simply drop out of the index are excluded. Murphy acknowledges that survivorship bias is a concern but does "not expect this to lead to a serious systematic bias". According to Murphy, survivorship bias is not a concern if there is considerable variance in performance across the sample firms; for which there is among the firms analysed in this current study.[28] In a recent study of UK property companies, Eichholtz et al. (2008) expect that the sample bias due to excluding companies as a result of a merger or acquisition is limited. This study uses a similar sample design to Murphy (1985) and in doing so accepts that the sample may be somewhat biased towards successful firms.

5.4.3 Compensation data

The chief executive compensation data used in this study is hand collected from company annual reports and accounts, rather than from a commercial database, in order to facilitate the precision and detail necessary to construct the compensation variables. Other readily available data sources, such as *Datastream, Manifest* or the *Hemmington-Scott* corporate information database, do not provide the necessary

[28] See Chapter Six for descriptive statistics of sample firm performance.

detail to construct the measures of compensation required for this study. For example, it is an objective of this study to collect and analyse performance-option and performance-share vesting data, which is not known to be available from a commercial database.

Compensation data is collected according to a firm's fiscal-year end and matched to the respective calendar year between 2003 and 2007. If compensation data is collected in a currency other than pound sterling (GBP) it is converted into GBP using the average annual exchange rate provided by Great Britain, HM Revenue & Customs. There are a number of difficulties related to hand collecting the compensation data due to inconsistencies in the approach by which firms report remuneration policy and data and because of the insufficient clarity afforded by a number of firms. However, it must be said that although there are complications, an advantage of hand collecting the data is that the differences can be reconciled during the data collection process. The difficulties associated with collecting the chief executive compensation data are discussed next.

5.4.3.1 Compensation data concerns

During the 2003 to 2007 sample period all companies were required to disclose compensation policy and data in accordance with the Directors' Remuneration Report Regulations (2002). Although all companies are expected to abide by the rules governing the remuneration report it was observed that some firms disclose information over and above the minimum that is required. Firm remuneration reports varied substantially in length with some reports under 5 pages, for example Autonomy (2003), and others more than 15 pages long, for example GSK (2007). It was not simply the case that extended remuneration reports disclosed more information than the shorter reports. In many instances the longer reports were more complicated and therefore it was more time consuming to retrieve the required data. Firm remuneration reports differed considerably in terms of their complexity, which in one respect was a function of complex compensation arrangements and in another respect a function of complex reporting.

The differences in reporting between firms were usually in regard to share option and restricted share data, which meant that it was more difficult to apply a consistent approach in collecting this form of data. The format in which long-term compensation data was reported and the actual information disclosed varied between firms. For example, many reports clearly stated that performance-options had achieved pre-determined performance conditions and had therefore vested during the current year, while for other reports it was necessary to study several years of data in order to determine if performance-options had vested. Performance-share data was typically reported in an unproblematic format. The majority of firms reported the number of shares granted in a given year, the number of shares vested in a given year and the number of shares lapsed in a given year. However, there were some difficulties concerning the transparency of the performance-share data. For example, Reed Elsevier (2006, p.39 and p.48), only report the on-target performance-share award in the award table. On further reading of the text, situated elsewhere in the report, it was noted that the maximum award on vesting is an additional multiple of the on-target award listed in the table. This type of example is not a regular feature of reporting but nevertheless there are other similar examples of poor transparency. With this in mind, it was imperative to rely not only on the long-term compensation data reported in the tables but to read the full remuneration report in detail in order to collect the data in a consistent fashion.

In contrast to long-term compensation, basic pay and annual bonus data was reported in the emoluments table in a more consistent manner and was therefore relatively straightforward to collect and input into the *Stata10* database. However, a specific difficulty concerned the reporting of deferred bonus data and whether firms considered the award as short-term compensation and therefore reported it in the emoluments table or as long-term compensation and reported it elsewhere. Firms frequently did not report deferred bonus data, with no further performance conditions relating to it, in the emoluments table. For example, Travis Perkins (2006) reports it in the following year's remuneration report as a new allocation of time-vesting shares. Other firms reported deferred bonus, with no further performance conditions, in the emoluments table alongside the annual bonus payment. Occasionally firms reported the payout from performance-shares, which are not short-term pay, in the emoluments table (for example, Ladbrokes, 2004, p.73). It was important to reconcile these differences in the collection of the compensation data and to consistently consider data in the same way.

A foremost benefit of hand collecting the data is that the differences in reporting are recognised during the data collection process and the data is therefore collected and stored in the *Stata10* database, set up for this study, in a consistent manner. Further, it is probable that commercial databases do not go to the trouble of sorting through the remuneration report to the same fine level of detail afforded in this study and simply reports what is included in emoluments and other compensation tables.

5.4.3.2 Compensation data input

The full list and description of compensation data elements collected from the remuneration report and input into the *Stata10* database are shown in Appendix V. The data elements listed include the dependent chief executive compensation variables and the additional elements required to compute the compensation variables. The compensation data can be broadly categorised into four groups: (i) incumbent characteristics; (ii) fixed pay data elements; (iii) short-term incentive data elements; and, (iv) long-term incentive data elements. Incumbent characteristics include the name of the chief executive, the year the incumbent was hired by the firm, the year the incumbent was assigned their position and the incumbent's age. Fixed pay data includes basic pay, cash value of benefits-in-kind and other cash. Other cash includes any other cash allowance, for example pension allowance and housing allowance. Following Stathopoulos et al. (2004, p.64) and Gregory-Smith (2009, p.21), the emoluments data is annualised if the incumbent has not been in the position for a full year. The fixed pay data does not include defined contribution or defined benefit pension plan data. This is because, as recognised by the FTSE industrial firm Premier Farnell (2003, p.44), it is difficult to attribute a value to pension data, which, "represent sums payable to individual Directors".

The short-term incentive data elements include the maximum bonus incentive award, the actual bonus, the deferred bonus with no further performance conditions and a description of the annual bonus performance conditions. The annual bonus data is assigned to the year for which its performance relates and this is the approach by which virtually all firms report actual bonus data. However, as noted earlier, firms frequently report deferred bonus data, particularly if it is paid in shares, in the subsequent financial year to which the performance relates. This is reconciled during the data collection and input process to ensure all short-term bonus data, whether it is deferred or not, relates to the appropriate performance period. The actual bonus data includes zeros if no bonus was paid due to the incumbent failing to achieve the minimum pre-determined performance criteria.

The long-term incentive data includes share option grant data, share option vesting data, restricted share grant data, restricted share vesting data, long-term cash plan grant data, long-term cash plan vesting data and a description of the associated performance conditions for each award. Similar to actual bonus the vesting data includes zeros for when performance-share options, performance-shares or performance-cash plans do not vest because the minimum performance conditions have not been achieved. In contrast to annual bonus plans firms usually report long-term vesting data in the year subsequent to the performance period end date. Since this is the usual reporting practice of the sample firms the same approach is followed in this study in the collection and input of the long-term vesting data into the *Stata10* database. This is then considered in the regression of long-term performance on long-term compensation in order to correctly match the timing of the payout with the long-term performance period. Payments are included in the year they vest and performance is measured up to the end of the previous financial year-end.

5.4.3.3 Dependent compensation variables

The dependent chief executive compensation variables used in this study are measures of flow compensation[29] and categorized as fixed pay (FP), performance-contingent pay (PCP) or performance-realised pay (PRP). PCP is defined as maximum current incentive pay, dependent on future performance conditions, while PRP is defined as pay, which has satisfied the performance conditions in the current year. A performance-option grant or performance-share grant is PCP because it only vests when and if performance conditions are satisfied: the award only becomes 'realised' upon vesting and not at grant. Therefore, the valuation of performance related long-term incentive grants only reflects the potential reward and does not reflect the actual payout from the incentive. However, it is recognised that if performance conditions are not specified at grant, (more typical of US practice), the incentive is earned at grant (time and continued employment being the only vesting restrictions). The precise composition of the chief executive compensation variables used in this study is summarised in Table 5.5 and described next.

Basic pay is FP and measured as the annual salary reported in the directors' emoluments table in the remuneration report. Target bonus is PCP and measured as the maximum annual bonus opportunity. Actual bonus is PRP and is measured as paid bonus, cash and/or shares, based on annual performance criteria, plus any guaranteed deferred cash and/or share compensation with no further performance conditions attached.

Target LTI is PCP and is measured as the value of performance-options granted in the current year, plus the value of performance-shares granted in the current year, plus the value of any long-term performance-cash awards granted in the current year. The potential payout from these awards is dependent on future performance criteria. Target LTI excludes time-only vesting awards because they are not dependent on future performance criteria. Actual LTI is PRP and is measured as the

[29] Flow compensation includes 'new equity grants' and payouts from long-term incentives but not changes in the value of previously held stock (Core et al., 2003a).

value of performance-options vesting in the current year, plus the value of performance-shares vesting in the current year, plus the value of long-term performance cash awards vesting in the current year, plus the grant value of time-vesting options, plus the grant value of time-vesting shares.

Table 5.5

CEO compensation variable description

Compensation variable[a]	*Specification*
Basic Pay (BP)	*The annual basic salary[b].*
Target Bonus (T.BON)	*The cash value of annual maximum bonus incentive (including deferred bonus incentive compensation [to be paid in cash, options or shares] without additional performance conditions).*
Actual Bonus (A.BON)	*The cash value of paid annual bonus (including guaranteed deferred bonus compensation [paid in cash, options or shares] without additional performance conditions). Includes zeros[c] for when minimum performance conditions have not been satisfied.*
Target Long-Term Incentive (T.LTI)	*The cash value of annual performance-option grant[d], plus annual performance-share grant[e], plus long-term cash plan (in all cases the payout is contingent on future performance conditions).*
Actual Long-Term Incentive (A.LTI)	*The cash value of performance-options[d] vesting in the current year, plus performance-shares[e] vesting in the current year, plus long-term cash plan vesting in the current year, plus the grant value of time-vesting options[d], plus the grant value of time-vesting shares[e]. Includes zeros[c] for when minimum performance conditions have not been satisfied.*
Target Total Pay (T.PAY)	*The sum of basic pay, plus other cash, plus target bonus, plus target LTI.*
Actual Total Pay (A.PAY)	*The sum of basic pay, plus other cash, plus actual bonus, plus actual LTI.*

[a] All compensation variables are expressed in natural logarithms.
[b] Annualised for part-year.
[c] Zero payments are replaced with £1 to enable log transformation.
[d] Share options are valued at 25% of grant/exercise share price.
[e] Shares are valued at 100% of year-end share price.

Target total pay is PCP and measured as basic pay, plus any other fixed cash paid in the current year, plus target bonus, plus target LTI. Actual total pay is PRP and is measured as basic pay, plus any other fixed cash paid in the current year, plus actual bonus, plus actual LTI.

Following Lambert et al. (1993), Henderson and Fredrickson (1996), Core et al. (1999) and Berrone and Gomez-Mejia (2009), all calculations involving either performance-options or time-vesting options are valued at 25% of their exercise value. Previous studies find quantitatively similar results for this method compared to more sophisticated techniques such as the Black-Scholes valuation model.[30] Following Eichholtz et al. (2008), Conyon et al. (2009) and Kuang and Qin (2009), all calculations involving performance-shares or time-vesting shares are valued at 100% of the award as at the fiscal year-end company share price.

Similar to numerous executive pay-for-performance studies, for example, Murphy (1985), Aggarwal and Samwick (1999b), Bertrand and Mullainathan (2001), Crespi—Cladera and Gispert (2003), Wade et al. (2006) and Albuquerque (2009), the compensation variables are transformed into their natural logarithm. The natural log-transformation is used primarily so that extreme values do not bias the research (Wade et al., 2006). According to Wooldridge (2009, p.191) the natural log-transformation is preferred when the dependent variable is always greater than zero, since it will better satisfy the assumptions of a Classical Linear Model (CLM) than the alternative approach, which is to use the level of compensation. The natural log-transformation reduces heteroscedasticity [31] caused by "strictly positive variables".

Wooldridge (2009) identifies certain variables that must be transformed into natural logs when used in empirical work. First, monetary values such as compensation, sales and firm market value should be transformed into their log-functional form. Second, other variables that are always positive and can assume very large values such as the number of employees in a firm. Conversely,

[30] See Section 4.3.4.3 for a discussion of executive share option valuation techniques and their merits.
[31] "The variance of the error term, given the explanatory variables, is not consistent" (Wooldridge, 2009, p.839).

Wooldridge (2009, p.191) also recommends that variables measured in years such as age and tenure must remain in "their original form".

The log-transformation cannot be applied where a variable has a zero or negative value. Therefore, to facilitate the logarithmic transformation of the data zero bonuses and zero payouts from performance-option or performance share awards are replaced with the small value of £1. McKnight and Tomkins (1999, 2004) and Leone et al. (2006) employ the same approach for share option grants.

5.4.4 Corporate data

Consistent with the empirical executive pay-for-performance literature this study employs measures of absolute market and absolute accounting performance to test the association between firm performance and chief executive pay.[32] Market and accounting measures are used in the empirical models since both measures are potentially important indicators of managerial effort and hence firm performance. In addition both measures have their own strengths and weaknesses.[33] Market measures of firm performance have a clear and intuitive link to shareholder interests but are subject to, "general economy-wide shocks" while accounting measures are not (Conyon et al., 2000, p.6). However, accounting measures are prone to executive manipulation. A further and perhaps more important reason to use both market and accounting measures is that they are each used explicitly as performance criteria in chief executive incentive pay arrangements. The specific company performance variables used in this study are selected to replicate measures typically found in the chief executive compensation contracts. Absolute firm short-term accounting performance is measured using earnings per share (EPS). Absolute firm short and long-term market performance is measured using total shareholder return (TSR). Conyon et al. (2000), Bruce et al. (2007) and Gregory-Smith (2009), also use both an EPS and TSR measure in their respective executive pay-for-performance studies.

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[32] See Section 4.5.2 for a review of the absolute firm performance measures used in the extant empirical literature.
[33] See Section 4.5.1 for a critical review of market versus accounting performance.

Following the relative performance evaluation literature peer group performance is measured using industry sector TSR and market index TSR.[34] Gibbons and Murphy (1990), Rajgopal et al. (2006) and Albuquerque (2009), also employ an industry sector and market index measure of peer group market performance. An accounting measure of peer group performance is not used for several reasons. First, in order to evaluate comparative accounting performance it is necessary to match firms according to their fiscal year-end, which reduces the comparator sample size to a small number of firms particularly in some industry sectors. Second, a review of company remuneration reports illustrates that, other than using firm sales as a benchmark for firm size, firms very rarely make peer group comparative judgements based on accounting performance, whereas relative TSR is extensively used in long-term compensation arrangements.

Short-term firm performance and short-term peer group performance is measured over one year and long-term performance is measured over three years. The vast majority of executive compensation studies only measure short-term performance and rarely use a performance period measured over more than one year. Nevertheless, there are a few instances of studies measuring performance over a longer performance period. For example, similar to this study, Brick et al. (2006), Ceccucci and Gius (2008) and Conyon et al. (2009), use a three-year market return measure. Miller et al. (2002) and Ceccucci and Gius (2008) measure market return over a five-year performance period.

The composition of the corporate performance variables used in this study is described below in Section 5.4.4.2 and Section 5.4.4.3 and summarised in Table 5.6.

5.4.4.1 Corporate data input

The company financial information is collected from *Datastream*, which is a familiar source of financial data in UK executive pay studies. The data is collected over an eight-year period between 2000 and 2007 which starts three years earlier than the

[34] See Section 4.6.3 for a review of the relative performance measures used in the extant empirical literature.

chief executive compensation data in order that firm and peer group long-term TSR performance can be measured. The corporate data elements include the company fiscal year-end required to match executive year data to the appropriate calendar year. End-of year closing share price is included in order to calculate the cash value of share grant and vesting data. The FTSE sector index to which each firm belongs is included and used to calculate peer group performance. Net firm annual sales are collected in order to measure the firm size explanatory variable. The firm performance data elements, EPS and the *Datastream* return index, are collected as of firm fiscal year-end to enable calculation of the absolute firm performance variables. The *Datastream* return index includes share price appreciation and paid dividends. Company return index data is collected from *Datastream* on a daily basis, which enables industry sector and market index total shareholder return variables to be calculated to match each firm's own fiscal year-end.

5.4.4.2 Independent company performance and size variables

Short-term accounting performance is measured as the reported absolute earnings per share (S.EPS). Short-term total shareholder return (S.RET) is measured as the annual change in the natural logarithm of the return index and long-term total shareholder return (L.RET) is measured as the three year change in the natural logarithm of the return index. The company size independent variable is measured as the natural logarithm of net firm annual sales (SALES).

5.4.4.3 Independent peer group performance variables

Industry total shareholder return is calculated from the portfolio of firms in the same FTSE-350 sector index. FTSE-350 index total shareholder return (excluding financial services, real estate and investment trusts) is calculated in the same way. As with the company performance data the industry and market return measures are matched with criteria typically found in company long-term incentive plans. Therefore the median total shareholder return is used rather than the mean return (Benito and Conyon, 1999) or mean value-weighted return (Aggarwal and Samwick, 1999a; Liu and Stark, 2009) used in previous studies. Short-term market performance is measured as the median annual return of the FTSE-350 share index

(S.MK.RET). Short-term industry performance is measured as the median annual return of the FTSE-350 share sector index (S.IN.RET). Long-term market performance is measured as the median three-year return of the FTSE-350 share index (L.MK.RET). Long-term industry performance is measured as the median three-year return of the FTSE-350 share sector index (L.IN.RET).

Four sets of peer group dummy variables are employed in two of the empirical models, to indicate short and long-term company performance relative to market performance and to indicate short and long-term company performance relative to industry performance (Q_.S.MK.RET; Q_.L.MK.RET; Q_.S.IN.RET; Q_.L.IN.RET). The base variable takes on the value of 1 for bottom-quartile performance and 0 otherwise. A second dummy variable takes on the value of 1 for lower-quartile performance and 0 otherwise. A third dummy variable takes on the value of 1 for upper-quartile performance and 0 otherwise. A fourth dummy variable takes on the value of 1 for top-quartile performance and 0 otherwise.

Table 5.6

Independent variable specification

Independent variable	***Specification***
Short-term accounting performance (S.EPS)	*Earnings per share (£).*
Short-term shareholder return (S.RET)	*Annual change in the natural logarithm of the return index.*
Long-term shareholder return (L.RET)	*Three-year change in the natural logarithm of the return index.*
Short-term industry sector performance (S.IN.RET)	*Median annual return of the FTSE-350 share sector index.*
Short-term industry sector dummy variables (Q_.S.IN.RET)	*Q_.S.IN.RET is a set of dummy variables which indicate annual firm performance relative to FTSE-350 sector performance. Q1.S.IN.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.S.IN.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.S.IN.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.S.IN.RET takes on the value of 1 for top-quartile performance and 0 otherwise.*

Independent variable	*Specification*
Long-term industry sector performance (L.IN.RET)	*Median three-year return of the FTSE-350 share sector index.*
Long-term industry sector dummy variables (Q_L.IN.RET)	*Q_.L.IN.RET is a set of dummy variables which indicate three year firm performance relative to FTSE-350 sector performance. Q1.L.IN.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.L.IN.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.L.IN.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.L.IN.RET takes on the value of 1 for top-quartile performance and 0 otherwise.*
Short-term market performance (S.MK.RET)	*Median annual return of the FTSE-350 share index.*
Short-term market dummy variables (Q_S.MK.RET)	*Q_.S.MK.RET is a set of dummy variables which indicate annual firm performance relative to FTSE-350 performance. Q1.S.MK.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.S.MK.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.S.MK.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.S.MK.RET takes on the value of 1 for top-quartile performance and 0 otherwise.*
Long-term market performance (L.MK.RET)	*Median three-year return of the FTSE-350 share index.*
Long-term market dummy variables (Q_L.MK.RET)	*Q_.L.MK.RET is a set of dummy variables which indicate three year firm performance relative to FTSE-350 performance. Q1.L.MK.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.L.MK.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.L.MK.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.L.MK.RET takes on the value of 1 for top-quartile performance and 0 otherwise.*
Company size (SALES)	*The natural logarithm of total company sales.*
Year dummy variables	*The set of year variables are according to the years covered by the panel: 2003, 2004, 2005, 2006 and 2007.*
CEO Age (AGE)[a]	*The age of the CEO in number of years.*
CEO Tenure (TEN)[a]	*The number of years since being appointed CEO.*

[a] Variables drop out of fixed-effects model.

5.4.4.4 Control variables

Following the extant literature several control variables are included in the empirical models. Year dummy variables are included to filter average changes in CEO compensation due to macro-economic shocks such as price inflation and pay trends (Benito and Conyon, 1999; Gregg et al., 2005; Albuquerque 2009). A dummy variable is created for each of the five years of the sample period. The year dummy variables will capture factors that are constant across firms but change over time.

Following Conyon and He (2004), Albuquerque (2009) and Berrone and Gomez-Mejia (2009), specific chief-executive human capital characteristics are also included as control variables. AGE is the age of the chief executive and TEN is the number of years since being appointed chief executive. The chief executive characteristics variables drop out of fixed-effect panel data models.

5.5 Empirical strategy

The quantitative research strategy adopted for this study is a longitudinal design. Longitudinal data has both cross-sectional and time-series properties (Brooks, 2008). The data collected are repeated measurements over time, of the dependent compensation variable and the independent variables, on the same CEO-firm pair. The longitudinal design requires a minimum of two continuous observations for each CEO-firm pair and the sample time frame is such that there is a maximum of five continuous observations. There are a number of alternative estimation methods, which can be applied to estimate the association between corporate performance and chief executive compensation.[35]

A straightforward estimation method is to perform cross-sectional Ordinary Least Squares (OLS)[36] regressions for each time period in the sample. Despite that, this approach would ignore the time series variation in the data and for that reason it is not used in this study. A second estimation method is to perform individual time

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[35] See Section 4.2.2 for a review of the various estimation techniques applied in the empirical literature.
[36] OLS is a method to estimate the parameters of a linear regression model (Wooldridge, 2009).

series OLS regressions on each CEO-firm pair. This is the approach taken by Antle and Smith (1986), Janakiraman et al. (1992) and Liu and Stark (2009), who estimate firm level time-series regressions in their respective relative performance evaluation studies. A time-series approach will not be employed in this study given the relatively low number of time-series observations. The estimation of time series regressions requires a large number of observations over time to produce efficient estimates. A third estimation method is to perform pooled OLS estimation on all the data for all years in the sample. This approach assumes the association between the independent and dependent variables are constant over time and constant across units (Brooks, 2008). However, in this longitudinal sample design, each new CEO-firm observation is not independent of the previous period observation and therefore there will be correlation over time within each CEO-firm pair, which is not permitted. Pooled OLS estimation does not fully exploit the longitudinal aspect of the data and will therefore not be used in this study.

5.5.1 Panel data methods

Advanced panel data methods are to be employed in this study to take full advantage of the time-series and cross-sectional properties of the data. Cameron and Trivedi (2009) describe the following panel data model shown in Equation (5.1).

$$Y_{it} = \gamma_i + X'_{it}\beta + \mu_{it} \qquad (5.1)$$

Where, γ_i is the random individual-specific effects. The individual-specific effects are CEO-firm specific and do not change over time for a given CEO-firm pair but do vary across units. μ_{it} is the idiosyncratic error. The idiosyncratic error changes over time and across units (Wooldridge, 2009). X'_{it} is a vector of explanatory variables. The explanatory variables in this study include time-variant corporate performance and size variables together with time-invariant chief executive characteristics.

This study uses the fixed-effects estimator[37] and the random-effects estimator to estimate the association between corporate performance and chief-executive pay. Both estimation methods have been employed in the empirical executive

[37] The fixed-effects estimator is also known as the within estimator (Wooldridge, 2009).

compensation literature although the fixed-effects estimator has been used more frequently than the random-effects estimator. The fixed-effects estimator and random-effects estimator differ in their assumptions regarding the time-invariant component of the error term (γ_i) (Cameron and Trivedi, 2009). The fixed-effects estimator allows the explanatory variables (X'_{it}) to be correlated with the time-invariant component of the error term (γ_i). This is a limited form of endogeneity[38] since the explanatory variables (X'_{it}) must always be uncorrelated with the idiosyncratic error (μ_{it}). The random-effects estimator does not allow any form of endogeneity: no correlation is permitted between the explanatory variables (X'_{it}) and the composite error term $(\gamma_i + \mu_{it})$.

Before the fixed-effects and random-effects estimators are described in detail it must be emphasised that the models do not control for all omitted variables. The fixed-effects estimator does account for the time-invariant omitted variables by eliminating the time-invariant component of the error term (γ_i) during the fixed-effects transformation. However, neither estimation method controls for unobserved variables that change over time and across units. Therefore there is a potential problem of endogeneity if the control variables "do not absorb all the correlation" between firm performance and executive compensation (Liu and Stark, 2009, p.24).

Institutional ownership concentration is an example of an unobserved variable that changes over time and across units. It is a potentially important variable since there is an expectation that institutions or other large blockholders can serve as better monitors of executive actions than individual shareholders, which is likely to reduce the sensitivity of pay to firm performance (Hartzell and Starks, 2003; Dong and Ozkan, 2008; Ozkan, 2009). Other examples of potentially important regressors excluded from this study are the proportion of non-executives on the board, board size and non-executive share ownership (Ozkan, 2009). However, these confounding variables will be effectively eliminated from the fixed-effects model if

[38] Endogeneity is correlation between the independent variables and the error term (Wooldridge, 2009).

there is only limited time variation (almost constant over the sample period) since the mean difference will be close to zero (Cameron and Trivedi, 2009).

The pay-performance estimates will be unbiased if the firm size, year dummy variables and human capital variables absorb all the pay-performance correlation due to unobserved variables (Liu and Stark, 2009). Next the fixed-effects and random-effects estimators are explained.

5.5.1.1 The fixed-effects estimator

The fixed-effects panel data model eliminates the time-invariant component of the error term (γ_i) during the fixed-effects transformation. The transformation is computed by mean-differencing the data (Cameron and Trivedi, 2009). The mean-difference is the difference between the observation and the mean of the observations. The fixed-effects model is thus represented by Equation (5.2):

$$(Y_{it} - \hat{Y}_i) \quad = \quad (X_{it}-X_i)'\beta + (\mu_{it}-\mu_i) \qquad (5.2)$$

The time-invariant component of the error term (γ_i) is eliminated from Equation (5.2) in the course of the fixed-effects transformation. $(X_{it}-X_i)$ are the time-variant explanatory variables. The time-invariant explanatory variables, such as CEO age and tenure, also drop out of the model because their mean difference is zero. The fixed-effects transformation eliminates the unobserved heterogeneity[39] across CEO-firm units and in doing so focuses exclusively on the variables that change over time. Therefore, it is only the within CEO-firm variation in compensation, which can be explained by the explanatory variables (Fiss, 2006). Fixed-effects estimation is performed using pooled OLS on the 'mean-differenced data' (Cameron and Trivedi, 2009, p.251). The resulting OLS estimates are consistent even if the unobserved individual effects are correlated with the explanatory variables. Yet, the explanatory variables must be uncorrelated with the idiosyncratic error. First differencing is an alternative estimation method, not used in this study, to remove the time-invariant component of the error term.

[39] Unobserved heterogeneity is the estimation bias caused by omitted variables (Wooldridge, 2009).

5.5.1.2 The random-effects estimator

The fixed-effects model concentrates on within variation in the data whereas the random-effects panel data model considers between and within variation. The random-effects transformation does not eliminate the time-invariant component of the error term (γ_i) or time-invariant explanatory variables. The transformation is performed by subtracting a fraction of the time average from each original observation, which results in, "quasi-demeaned data on each variable" (Wooldridge, 2009, p.490). The random-effects model is shown in Equation (5.3):

$$Y_{it} = X'_{it}\beta + (\gamma_i + \mu_{it}) \tag{5.3}$$

The individual-specific effects (γ_i) are a random component of the composite error term $(\gamma_i + \mu_{it})$. The random-effects model assumes that the composite error term is uncorrelated with the explanatory variables (X'_{it}). Both time-variant and time-invariant explanatory variables can be estimated in a random-effects model. The random-effects estimation is performed on the quasi-demeaned data using Generalized Least Squares (GLS)[40]. The estimates are consistent if the random-effects model is suitable but are inconsistent if the fixed-effects model is suitable (Cameron and Trivedi, 2009).

5.5.1.3 Fixed or random-effects estimator

The preference between fixed or random-effects estimators ultimately depend on whether it is realistic to assume that the unobserved fixed-effect is uncorrelated with all the explanatory variables (Wooldridge, 2009). If the unobserved individual fixed-effects are correlated with the explanatory variables then the random-effects model estimates are inconsistent and the fixed-effects estimates are unbiased and consistent. The fixed-effects model is widely used in the microeconomics literature because the model allows the explanatory variables to be correlated with the time-invariant component of the error term. In an executive pay-for-performance study, Deckop (1988) asserts that it is likely that the unobserved time-invariant effects are

[40] "An estimator that accounts for a known structure of the error variance (heteroskedasticity), serial correlation pattern in the errors, or both, via a transformation of the original model" (Wooldridge, 2009, p.839).

correlated with the explanatory variables. Examples of unobserved effects include corporate governance characteristics, executive ability and organisation complexity. Since it is expected that the unobserved effects will be correlated with the explanatory variables the fixed-effects model is at the outset preferred in this study. Further, fixed-effects models are preferred to random-effects models if, as in this study, the sample is selected from the whole population rather than selected randomly (Brooks, 2008). Aggarwal and Samwick (1999b) and Albuquerque (2009) used the fixed-effects model in their respective studies on chief executive relative performance evaluation. In this study, the fixed-effects model is estimated using OLS regression with robust standard errors clustered on the CEO-firm pair. Robust standard errors are used to correct for heteroskedasticity[41] (Cameron and Trivedi, 2009).

The disadvantage of fixed-effect models is that they remove all the time-invariant explanatory variables and so in circumstances where the main variables of interest are time-invariant then random-effect models will be preferred. Similar to Benito and Conyon (1999) and Gregg et al. (2005) the random-effects model is also estimated in this study. An advantage of the random-effects model is that CEO tenure and CEO age are included in the estimation. The random-effects model is estimated using GLS regression with robust standard errors clustered on the CEO-firm pair.

This study will use the Hausman test to check for exogeneity.[42] According to Wooldridge (2009) it is common practice for researchers to select either fixed or random-effects estimates based on the result of the Hausman test. This approach is adopted by Benito and Conyon (1999) and Gregg et al. (2005) who report both fixed and random-effects estimates and employ the Hausman test to judge which estimates to focus on.

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[41] "The variance of the error term, given the explanatory variables, is not constant" (Wooldridge, 2009, p.839).

[42] Exogeneity is no correlation between the independent variables and the error term (Wooldridge, 2009).

The Hausman test provides statistical guidance in terms of which model estimates are preferred. The null hypothesis of the Hausman test declares the random-effects estimates consistent and since they are more efficient the random-effects estimates are preferred. If the null hypothesis is rejected then the random-effects estimates are inconsistent and the fixed-effects estimates are preferred (Wooldridge, 2009). The test compares both sets of estimates and if they are remarkably different the random-effects assumption is not viable. Conversely if the random-effect estimates are preferred then both estimates will be comparable (Wooldridge, 2009).

The fixed-effects estimates will always provide consistent results, which is why they are often preferred to random-effects estimates. However, reliance on the Hausman test is justified since if the Hausman test indicates that random-effects are appropriate then they are consistent. Therefore random-effects are preferred because they are more efficient (Cameron and Trivedi, 2009). The econometric models are described next.

5.5.2 Econometric model

This section sets out the econometric models employed to estimate the association between firm performance and chief executive pay; peer group performance and chief executive pay; and, firm size and chief executive pay. Equation (5.4) specifies the general model used in this study to test the hypotheses outlined in Section 4.7. The actual model used to test each group of hypotheses is presented and described in Sections 5.5.2.1 to Section 5.5.2.7.

$$(PAY) = \beta_0 + \beta_1(FIRM) + \beta_2(PEER) + \beta_3(SIZE) + \beta_4(PEER.DUMMIES) + \beta_5(CONTROLS) + \mu \qquad (5.4)$$

The dependent *PAY* variable is a measure of chief executive compensation[43] and assumes a different specification for each model/group of hypotheses being tested. *FIRM* is own firm performance and *PEER* is the related benchmark performance of the group to which the firm belongs. The *FIRM* and *PEER* group performance

[43] The dependent chief executive compensation variable descriptions are shown in Table 5.4.

variables[44] adopt different specifications for each model/group of hypotheses being tested.

The strength of the relationship between absolute firm performance and chief executive pay is represented by the coefficient β_1 in Equation (5.4). The dependent compensation variable, as described in Table 5.4, is in logarithmic form. The natural log-transformation translates changes in variables into percentage changes and therefore, β_1 the coefficient of *FIRM*, is the pay-for-performance elasticity (Wooldridge, 2009). Shareholder return is expressed as the change in the natural logarithm of the return index and therefore the regression coefficient represents the *approximate* percentage change in compensation that is associated with a one-percent change in shareholder return. Earnings per share are expressed in its original form and therefore the regression coefficient, multiplied by 100, is the *approximate* percentage change in compensation associated with a one unit change in earnings per share. The approximation based on the coefficient is "always between the absolute value of the estimates for an increase or a decrease" (Wooldridge, 2009, p.191). For large coefficients the approximation becomes more inaccurate, however the exact percentage increase or decrease can be calculated using the exponential transformation of the coefficients. In this study, the exponential transformation is employed to calculate the exact percentage change in compensation for a 10% increase in shareholder return or a £0.10 increase in earnings per share. The corresponding results for a 10% decrease in shareholder return or a £0.10 decrease in earnings per share are not reported.

The econometric specification and in particular the functional form of the dependent compensation variable and independent variables is frequently challenged in the literature. Section 4.2.2 evaluates the main arguments put forward in the literature for using an elasticity specification versus a sensitivity specification (changes in monetary terms). Section 5.4.3.3 also reflects on the use of log compensation as the dependent variable. The foremost reasons why the

[44] The performance variables specification and other independent variables are shown in Table 5.5.

elasticity specification is preferred, in this study, to a straightforward linear approach are stated below.

In a review of methodological considerations relevant to executive pay-for-performance research, Florin et al. (2010) assert that the log-transformation is the "right" functional form to employ in an econometric model of executive pay-for-performance.

According to Florin et al. (2010, p.67) it is essential to use the natural log-transformation with highly skewed compensation data in order to attain "valid statistical inference". Florin et al. recognise that although the economic interpretation of elasticities is more complicated than using changes in monetary terms, the consequence of not employing a log functional form can "seriously alter the magnitude and interpretation of results". Zhou (2000) and Merhebi et al. (2006) also recognise that elasticities are not easy to interpret but suggest that due to extreme compensation values the elasticity approach is better able to explain the relationship between firm performance and executive pay.

Despite the benefit of a more straightforward economic interpretation through employing a linear specification, the elasticity model is preferred in this study since it overcomes the serious concerns posed by extreme compensation values. Further, as emphasised by Murphy (1999), rates of shareholder return better explain the change in log compensation than changes in shareholder value explain changes in pay.

Next the interpretation of the peer group performance variables is discussed in relation to the Relative Performance Evaluation (RPE) hypothesis.

According to Holmström and Milgrom (1987), evidence of RPE is based on the strength and the sign of the coefficient of β_2 in Equation (5.4). Whilst controlling for absolute firm performance, β_2 the coefficient of $PEER$, is expected to be significant and negative (Gibbons and Murphy, 1990; Benito and Conyon, 1999). The strong form of the RPE hypothesis expects the coefficient of the $PEER$ explanatory variable to be significantly negative and equal in size to the predicted positive coefficient of the *FIRM* explanatory variable. In other words the sum of the two coefficients is equal to zero $(\beta_1 + \beta_2 = 0)$. The predicted result is consistent with the complete filtering out of the market risk component of firm performance. The weak form of the hypothesis simply predicts that β_2 is significantly negative but smaller in size than β_1. This is consistent with only partial filtering out of market performance (Rajgopal et al., 2006).

An important assumption of Holmström's (1982) RPE hypothesis is that peer group performance is positively associated with firm performance (Walker, 1989; Liu and Stark, 2009). It is therefore necessary to test the association between peer group performance and absolute firm performance before estimating each of the models. Equation (5.5) is estimated for each different set of market peer group and firm performance variables used to test the hypotheses.

$$(FIRM) = \beta_0 + \beta_1(PEER) + \mu \qquad (5.5)$$

The different models used to test the sets of hypotheses 1 through 7 are described next.

5.5.2.1 CEO basic pay

Equation (5.6) specifies the econometric model to test the alternate hypotheses 1a, 1b and 1c set out in Section 4.7. It is hypothesised:

$H_0$1a: $\beta_1 \leq 0$; H_A1a: $\beta_1 > 0$

$H_0$1b: $\beta_2 \geq 0$; H_A1b: $\beta_2 < 0$

$H_0$1c: $\beta_3 \leq 0$; H_A1c: $\beta_3 > 0$

The short-term firm performance variables; the short-term industry sector and market index performance variables; alongside the control variables, defined in Table 5.5, are regressed on basic pay. The random-effects and fixed-effects regression models are clustered by year and by CEO-firm pair, to estimate the following Equation (5.6).[45]

$$
\begin{aligned}
(BP)_{it} \quad = \quad & \gamma_i + \alpha_t + \beta_1(S.FIRM)_{it-1} + \beta_2(S.PEER)_{it-1} + \beta_3(SIZE)_{it-1} + \\
& \beta_4(CONTROLS)_{it} + \mu_{it} \qquad (5.6)
\end{aligned}
$$

Chief executive basic pay is determined at the start or set partway through the financial year and is paid in equal monthly instalments over the financial year. Basic pay is therefore assumed to be associated with the previous year's financial performance, rather than related contemporaneously with firm performance. For this reason the performance variables and company size variable are lagged one year to correctly estimate the association between corporate performance and basic pay.

5.5.2.2 CEO target bonus

Equation (5.7) specifies the econometric model to test the alternate hypotheses 2a, 2b and 2c set out in Section 4.7. It is hypothesised:

$H_0$2a:	$\beta_1 \leq 0$;	H_A2a:	$\beta_1 > 0$
$H_0$2b:	$\beta_2 \geq 0$;	H_A2b:	$\beta_2 < 0$
$H_0$2c:	$\beta_3 \leq 0$;	H_A2c:	$\beta_3 > 0$

The short-term firm performance variables; the short-term industry sector and market index performance variables; alongside the control variables, defined in Table 5.5, are regressed on target bonus. The random-effects and fixed-effects regression models are clustered by year and by CEO-firm pair, to estimate the following Equation (5.7).[46]

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[45] The subscript *i* refer to a CEO-firm pair and the subscript *t* refer to time in years. α_t is a time trend. γ_i is a time-invariant chief executive/firm specific effect and differs between firms. μ_{it} is the idiosyncratic error. *S.FIRM* is a vector of short-term firm performance variables *(S.EPS and S.RET)*. *S.PEER* is a vector of short-term peer group performance variables *(S.IN.RET and S.MK.RET)*. *SIZE* is firm sales. *CONTROLS* include CEO age and CEO tenure.

[46] The subscript *i* refer to a CEO-firm pair and the subscript *t* refer to time in years. α_t is a time trend. γ_i is a time-invariant chief executive/firm specific effect and differs between firms. μ_{it} is the idiosyncratic error. *S.FIRM* is a vector of short-term firm performance variables *(S.EPS and S.RET)*.

$$(T.BON)_{it} = \gamma_i + \alpha_t + \beta_1(S.FIRM)_{it-1} + \beta_2(S.PEER)_{it-1} + \beta_3(SIZE)_{it-1} + \beta_4(CONTROLS)_{it} + \mu_{it} \quad (5.7)$$

Chief executive target bonus pay is set at the start of the financial year and is typically expressed as a multiple of basic pay. Therefore, akin to basic pay, target bonus is assumed to be associated with the previous year's financial performance, rather than related contemporaneously with firm performance. For this reason the performance variables and company size variable are lagged one year to correctly estimate the association between corporate performance and target bonus pay.

5.5.2.3 CEO actual bonus

Equation (5.8) specifies the econometric model to test the alternate hypotheses 3a, 3b and 3c set out in Section 4.7. It is hypothesised:

$H_0$3a:	$\beta_1 \leq 0$;	H_A3a:	$\beta_1 > 0$
$H_0$3b:	$\beta_2 \geq 0$;	H_A3b:	$\beta_2 < 0$
$H_0$3c:	$\beta_3 \leq 0$;	H_A3c:	$\beta_3 > 0$

The short-term firm performance variables; the short-term industry sector and market index performance variables; alongside the control variables, defined in Table 5.5, are regressed on actual bonus pay. The random-effects and fixed-effects regression models are clustered by year and by CEO-firm pair, to estimate the following Equation (5.8).[47]

$$(A.BON)_{it} = \gamma_i + \alpha_t + \beta_1(S.FIRM)_{it} + \beta_2(S.PEER)_{it} + \beta_3(SIZE)_{it-1} + \beta_4(S.PEER.DUMMIES)_{it} + \beta_5(CONTROLS)_{it} + \mu_{it} \quad (5.8)$$

Chief executive actual bonus pay is determined at the end of the financial year and is paid in the following year to which it is earned. However, it is reported in the

S.PEER is a vector of short-term peer group performance variables *(S.IN.RET and S.MK.RET)*. *SIZE* is firm sales. *CONTROLS* include CEO age and CEO tenure.

[47] The subscript *i* refer to a CEO-firm pair and the subscript *t* refer to time in years. α_t is a time trend. γ_i is a time invariant chief executive/firm specific effect and differs between firms. μ_{it} is the idiosyncratic error. *S.FIRM* is a vector of short-term firm performance variables *(S.EPS and S.RET)*. *S.PEER* is a vector of short-term peer group performance variables *(S.IN.RET and S.MK.RET)*. *SIZE* is firm sales. *S.PEER.DUMMIES* is a vector of relative peer group short-term performance dummy variables *(Q_S.MK.RET and Q_S.IN.RET)*. *CONTROLS* include CEO age and CEO tenure.

annual report and accounts in the year to which it relates and has been collected in this way. Therefore, it is expected that the relationship between corporate performance and actual bonus pay is contemporaneous. Hence the firm and peer group performance variables are not lagged.

5.5.2.4 CEO target LTI

Equation (5.9) specifies the econometric model to test the alternate hypotheses 4a, 4b and 4c set out in Section 4.7. It is hypothesised:

$H_0$4a:	$\beta_1 \leq 0$;	H_A4a:	$\beta_1 > 0$
$H_0$4b:	$\beta_2 \geq 0$;	H_A4b:	$\beta_2 < 0$
$H_0$4c:	$\beta_3 \leq 0$;	H_A4c:	$\beta_3 > 0$

The firm performance variables; the short-term industry sector and market index performance variables; alongside the control variables, defined in Table 5.5, are regressed on target LTI. The random-effects and fixed-effects regression models are clustered by year and by CEO-firm pair, to estimate the following Equation (5.9).[48]

$$(T.LTI)_{it} = \gamma_i + \alpha_t + \beta_1(S.FIRM)_{it-1} + \beta_2(S.PEER)_{it-1} + \beta_3(SIZE)_{it-1} + \beta 4(CONTROLS)_{it} + \mu_{it} \qquad (5.9)$$

Chief executive target LTI pay is granted in the form of performance-options, performance-shares or a long-term performance-cash plan during the financial year and is typically expressed as a multiple of basic pay. Therefore, akin to basic pay and target bonus, target LTI pay is assumed to be associated with the previous year's financial performance, rather than related contemporaneously with firm performance. For this reason the performance variables and company size variable are lagged one year to correctly estimate the association between corporate performance and target LTI pay.

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[48] The subscript *i* refer to a CEO-firm pair and the subscript *t* refer to time in years. α_t is a time trend. γ_i is a time invariant chief executive/firm specific effect and differs between firms. μ_{it} is the idiosyncratic error. *S.FIRM* is a vector of short-term firm performance variables *(S.EPS and S.RET)*. *S.PEER* is a vector of short-term peer group performance variables *(S.IN.RET and S.MK.RET)*. *SIZE* is firm sales. *CONTROLS* include CEO age and CEO tenure.

5.5.2.5 CEO actual LTI

Equation (5.10) specifies the econometric model to test the alternate hypotheses 5a, 5b and 5c set out in Section 4.7. It is hypothesised:

$H_0$5a:	$\beta_1 \leq 0$;	H_A5a:	$\beta_1 > 0$
$H_0$5b:	$\beta_2 \geq 0$;	H_A5b:	$\beta_2 < 0$
$H_0$5c:	$\beta_3 \leq 0$;	H_A5c:	$\beta_3 > 0$

The long-term market firm performance variable; the long-term industry sector and market index performance variables; alongside the control variables, defined in Table 5.5, are regressed on long-term performance-realised pay. The random-effects and fixed-effects regression models are clustered by year and by CEO-firm pair, to estimate the following Equation (5.10).[49]

$$(A.LTI)_{it} = \gamma_i + \alpha_t + \beta_1(L.FIRM)_{it-1} + \beta_2(L.PEER)_{it-1} + \beta_3(SIZE)_{it-1} + \beta_4(L.PEER.DUMMIES)_{it-1} + \beta_5(CONTROLS)_{it} + \mu_{it} \qquad (5.10)$$

Chief executive actual LTI pay is determined at the end of a pre-determined performance period, which may or may not be the fiscal year-end. Actual LTI pay is typically reported in the year, which it is paid and based on the previous three years corporate performance. For this reason the three-year performance variables are lagged one year to correctly estimate the association between corporate performance and actual LTI pay.

5.5.2.6 CEO target total pay

Equation (5.11) specifies the econometric model to test the alternate hypotheses 6a, 6b and 6c set out in Section 4.7. It is hypothesised:

$H_0$6a:	$\beta_1 \leq 0$;	H_A6a:	$\beta_1 > 0$
$H_0$6b:	$\beta_2 \geq 0$;	H_A6b:	$\beta_2 < 0$

[49] The subscript *i* refer to a CEO-firm pair and the subscript *t* refer to time in years. α_t is a time trend. γ_i is a time invariant chief executive/firm specific effect and differs between firms. μ_{it} is the idiosyncratic error. *L.FIRM* is long-term firm performance *(L.RET)*. *L.PEER* is a vector of long-term peer group performance variables *(L.IN.RET and L.MK.RET)*. *SIZE* is firm sales. *L.PEER.DUMMIES* is a vector of relative peer group long-term performance dummy variables *(Q_ L.MK.RET and Q_ L.IN.RET)*. *CONTROLS* include CEO age and CEO tenure.

H_06c: $\beta_3 \leq 0$; H_A6c: $\beta_3 > 0$

The short-term firm performance variables; the short-term industry sector and market index performance variables; alongside the control variables, defined in Table 5.5, are regressed on total target pay. The random-effects and fixed-effects regression models are clustered by year and by CEO-firm pair, to estimate the following Equation (5.11).[50]

$$(T.PAY)_{it} = \gamma_i + \alpha_t + \beta_1(S.FIRM)_{it-1} + \beta_2(S.PEER)_{it-1} + \beta_3(SIZE)_{it-1} + \beta 4(CONTROLS)_{it} + \mu_{it} \qquad (5.11)$$

Chief executive target total pay is assumed to be associated with the previous year's financial performance, rather than related contemporaneously with firm performance. For this reason the performance variables and company size variable are lagged one year to correctly estimate the association between corporate performance and total target pay.

5.5.2.7 CEO actual total pay

Equation (5.12) and Equation (5.13) specify the econometric models to test the alternate hypotheses 7a, 7b, 7c, 7d and 7e set out in Section 4.7. It is hypothesised:

H_07a: $\beta_1 \leq 0$; H_A7a: $\beta_1 > 0$

H_07b: $\beta_2 \geq 0$; H_A7b: $\beta_2 < 0$

H_07c: $\beta_1 \leq 0$; H_A7c: $\beta_1 > 0$

H_07d: $\beta_2 \geq 0$; H_A7d: $\beta_2 < 0$

H_07e: $\beta_3 \leq 0$; H_A7e: $\beta_3 > 0$

First, the short-term firm performance variables; the short-term industry sector and market index performance variables; alongside the control variables, defined in Table 5.5, are regressed on actual total pay. The random-effects and fixed-effects

[50] The subscript *i* refer to a CEO-firm pair and the subscript *t* refer to time in years. α_t is a time trend. γ_i is a time invariant chief executive/firm specific effect and differs between firms. μ_{it} is the idiosyncratic error. *S.FIRM* is a vector of short-term firm performance variables *(S.EPS and S.RET)*. *S.PEER* is a vector of short-term peer group performance variables *(S.IN.RET and S.MK.RET)*. *SIZE* is firm sales. *CONTROLS* include CEO age and CEO tenure.

regression models are clustered by year and by CEO-firm pair, to estimate the following Equation (5.12).[51]

$$(A.PAY)_{it} = \gamma_i + \alpha_t + \beta_1(S.FIRM)_{it} + \beta_2(S.PEER)_{it} + \beta_3(SIZE)_{it-1} + \beta_4(CONTROLS)_{it} + \mu_{it} \quad (5.12)$$

Chief executive actual total pay is assumed to be associated with the current financial year's performance since it includes actual bonus. Therefore, it is expected that the relationship between short-term corporate performance and actual total pay is contemporaneous. Hence the firm and peer group performance variables are not lagged.

Second, the long-term market firm performance variable; the long-term industry sector and market index performance variables; alongside the control variables, defined in Table 5.5, are regressed on actual total pay. The random-effects and fixed-effects regression models are clustered by year and by CEO-firm pair, to estimate the following Equation (5.13).[52]

$$(A.PAY)_{it} = \gamma_i + \alpha_t + \beta_1(L.FIRM)_{it-1} + \beta_2(L.PEER)_{it-1} + \beta_3(SIZE)_{it-1} + \beta_4(CONTROLS)_{it} + \mu_{it} \quad (5.13)$$

Chief executive actual total pay is assumed to be associated with the previous three years corporate performance since it includes actual LTI. The long-term performance variables are lagged one year to correctly estimate the association between long-term corporate performance and actual total pay.

[51] The subscript *i* refer to a CEO-firm pair and the subscript *t* refer to time in years. α_t is a time trend. γ_i is a time invariant chief executive/firm specific effect and differs between firms. μ_{it} is the idiosyncratic error. *S.FIRM* is a vector of short-term firm performance variables *(S.EPS and S.RET)*. *S.PEER* is a vector of short-term peer group performance variables *(S.IN.RET and S.MK.RET)*. *SIZE* is firm sales. *CONTROLS* include CEO age and CEO tenure.

[52] The subscript *i* refer to a CEO-firm pair and the subscript *t* refer to time in years. α_t is a time trend. γ_i is a time invariant chief executive/firm specific effect and differs between firms. μ_{it} is the idiosyncratic error. *L.FIRM* is long-term firm performance *(L.RET)*. *L.PEER* is a vector of long-term peer group performance variables *(L.IN.RET and L.MK.RET)*. *SIZE* is firm sales. *CONTROLS* include CEO age and CEO tenure.

5.6 Summary

This chapter has identified the attributes of this study that distinguish it from the vast empirical literature on chief executive pay-for-performance. The association between corporate performance and chief executive pay and relative performance evaluation is investigated from a positivist research philosophy. The research follows a deductive approach, which is characterised by the quantitative research strategy used to test the set of hypotheses specified in Chapter Four. The research employs a longitudinal design through the collection of repeated chief executive compensation and corporate performance data observations.

Random-effect and fixed-effect panel data models are employed to estimate the association between the independent corporate performance and size variables on the dependent chief executive compensation variables. A Hausman test for correlation between the individual random-effects and the independent variables will indicate whether random-effect models are preferred to fixed-effects. The next chapter describes the chief executive pay and firm performance data collected for the purpose of this study. Chapter Seven presents the results of the hypothesis tests based on the empirical strategy outlined in this chapter.

Chapter Six

Descriptive Review of Corporate Performance and CEO Compensation, 2003-07

6.1 Introduction

This chapter will present the descriptive empirical evidence about firm performance and chief executive compensation among large UK plcs. The analysis is on the data collected for the sample of 204 firms for this study. The empirical analysis based on the panel data regression models is then presented in Chapter Seven.

A key contribution of this chapter is to emphasize the different performance criteria used in annual bonus plans versus those adopted in long-term incentive plans. But also this chapter highlights the substantial difference in pay between what a CEO actually receives and what they might have received had performance targets been met in full.

To begin, the FTSE-350[53] stock market index and the FTSE-350 sector indices performance is reviewed over the five-year sample period. This analysis provides an initial indication on how average chief executive pay outcomes ought to have responded to corporate performance over the same period if average market performance is aligned with average CEO pay.

Next is an examination of chief executive annual bonus and long-term incentive schemes. Here the performance measures employed in incentive schemes are reviewed with particular attention on the way different measures have developed over time. The data collection and analysis shows considerable differences in the disclosure requirements between cash-based annual bonuses and share-based long-term incentives. Annual cash bonus design has not received as much attention from the regulators and consequently the reporting of annual bonus performance

[53] Excludes financial services, real estate and investments trusts.

criteria is not consistent across firms. In contrast the performance criterion for share-based incentives is disclosed in full. The analysis of long-term incentive design shows how firms have responded to the regulators. For example, the removal of retesting on share option grants.

Then the growth of basic pay, short-term pay and long-term pay is analysed. Particular attention is paid to the difference between short-term target bonus and actual bonus pay and also between target long-term incentives and actual long-term incentives. The distinction between target and actual long-term pay is important since previous studies have only considered target long-term incentive pay and not the actual pay received from the vesting of performance-options and performance-shares. The analysis shows that there is considerable variation between target long-term incentive and the actual long-term incentive received. Finally, for each compensation variable, a comparison is drawn between chief executive pay, company size and corporate performance.

6.2 Market performance

This section presents a review of the UK stock market performance over the sample period, 2003 to 2007. Performance is measured as annual total shareholder return and three-year total shareholder return. The analysis is then presented at three levels. First, FTSE-350 industry sector performance, second, FTSE-350[54] performance and third, the performance of the sample firms included in this current study.

The FTSE-350 overall and industry sector performance is presented in terms of the median shareholder return as of 31st December for each year in the sample period. Table 6.1 and Table 6.2 show respectively the median short-term total shareholder return[55] and the median long-term total shareholder return[56] by industry, FTSE-350

[54] Excludes financial services, real estate and investments trusts.
[55] Short-term total shareholder return is the annual change in the natural logarithm of the return index.
[56] Long-term total shareholder return is the three-year change in the natural logarithm of the return index.

and the current sample. The median sample short-term total shareholder return increases between 2003 and 2005 and then decreases from 2005 to 2007. It is hypothesised in this study that annual shareholder return is related to basic pay and short-term pay. Therefore it might be expected to observe a similar decline in short-term pay over the same period. However, as shown in Section 6.6, target and actual bonus has continued to increase over the sample period.

Table 6.1

Median short-term total shareholder return[a] analysis

Industry sector	**2003**	**2004**	**2005**	**2006**	**2007**
Basic materials	0.3039	0.0590	0.4830	0.3422	0.3093
Consumer goods	0.2760	0.2047	0.2169	0.2150	-0.1097
Consumer service	0.3313	0.1840	0.1563	0.2076	-0.1543
Healthcare	0.2105	0.0102	0.3124	-0.0070	0.0936
Industrials	0.3161	0.2404	0.2822	0.2380	-0.0162
Oil & Gas	0.1009	0.3704	0.5662	0.2591	0.3142
Technology	0.3140	0.0129	0.1690	0.0794	-0.0040
Telecommunications	0.4751	-0.0214	0.0903	0.1694	0.2141
Utilities	0.1327	0.3198	0.1947	0.3012	0.0913
FTSE-350	**0.2953**	**0.2070**	**0.2284**	**0.2329**	**0.0512**
Sample (current study)	**0.1524**	**0.2363**	**0.2401**	**0.2329**	**0.1485**

[a]Annual change in the natural logarithm of the return index as of 31st December.

There is substantial variation in short-term total shareholder return among the different industry sectors but for the most part median total shareholder return is positive for each industry and each year. There is a noticeable decrease in short-term total shareholder return across all industry sectors between 2006 and 2007, which is also replicated in the current sample data. The current sample shareholder return does not decline to the same extent as the FTSE-350.

Table 6.2

Median long-term total shareholder return[a] analysis

Industry sector	2003	2004	2005	2006	2007
Basic materials	0.3708	0.3173	0.8498	0.9294	1.2015
Consumer goods	0.4034	0.5208	0.6161	0.6764	0.3301
Consumer service	0.1561	0.2882	0.7099	0.6299	0.2762
Healthcare	-0.3076	-0.2374	0.3749	0.1585	0.2191
Industrials	0.1514	0.2745	0.8471	0.7706	0.5239
Oil & Gas	0.2141	0.6449	0.9915	1.4182	1.2026
Technology	-1.8370	-0.6635	0.7003	0.1362	0.2992
Telecommunications	-1.2269	-0.5369	0.2399	0.1996	0.4260
Utilities	0.1645	0.4567	0.5904	0.8262	0.6480
FTSE-350	0.1514	0.2817	0.7605	0.7183	0.4806
Sample (current study)	0.1831	0.2635	0.5908	0.7461	0.6525

[a]Three-year change in the natural logarithm of the return index as of 31st December.

Long-term total shareholder return increases between 2003 and 2006 respectively for most industry sectors, the FTSE-350 and the current sample, but then declines between 2006 and 2007. This indicates an overall drop in stock market performance during this period. The analysis of long-term CEO pay, Section 6.7, finds a similar variation in long-term actual pay and therefore it may reflect the actual stock market performance. Healthcare, technology and communications all recorded negative median long-term total shareholder returns in 2003 and 2004, which undoubtedly reveals the relative and absolute poor performance of these stocks during the dot-com crash.[57]

6.3 Incentive plan design and analysis

This section provides an analysis of the performance measures adopted by remuneration committees in their design of CEO compensation packages. It highlights widespread use of accounting performance measures, particularly EPS,

[57] The massive growth in Internet based stocks at the end of the 20th century, burst spectacularly on the 10th March 2000. It was several years before stock markets around the world and in particular Internet based stocks recovered from the dot-com crash.

but also other profitability measures in short-term bonus plans. For long-term incentive plans there is extensive use of relative TSR, which is in line with the recommendation of the Combined Code (2003) for remuneration committees to consider using relative peer group performance measures in executive share-based compensation plans.

The design of executive incentive plans and in particular long-term plans changed remarkably in the decade prior to 2003 and progress in implementing best corporate governance practice has continued since then. These developments and improvements are in a large part due to remuneration committees adhering to the UK Corporate Governance Code. Institutional investor organisations such as the Association of British Insurers (ABI) and the National Association of Pension Funds (NAPF) have also influenced the structure of executive remuneration through the publication of their guidelines (Main, 2006; Main and Neate, 2006). Therefore much of the evolution in executive remuneration practice has occurred as a direct result of corporate governance reform and institutional investor pressure.

Most of the attention with regard to incentive plan design has been rightly focused on share-based compensation, where investors will be particularly concerned about dilution and excessive risk taking by executives. For example, prior to the period of investigation, traditional share option grants were frequently issued without performance conditions on vesting. Now, in contrast, virtually all share-based incentive awards are issued with performance conditions attached to vesting. In comparison, much less attention has been directed towards annual bonus plan design (Bruce et al., 2007).

6.3.1 Bonus plan design

The only recommendation in the most recent publication of the UK Corporate Governance Code (2010) is that executive annual bonuses should be performance related and that performance conditions must be challenging. There is also a requirement in the Code to disclose the maximum bonus opportunity. The Directors' Remuneration Report Guidelines (2002) require the disclosure of the actual amount of bonus paid or due to be received.

There is no requirement in the Directors' Remuneration Report Guidelines (2002) for remuneration committees to disclose performance conditions with respect to annual bonus awards. However, the data for this study shows that for the most part firms do disclose some detail regarding performance conditions. In 2007, only 1% of the sample firms did not specify at least a basic minimum level of detail.

The degree of information provided varies between firms. Some firms only report that the annual bonus is based on financial performance, while others provide a detailed breakdown of how the bonus is linked to a variety of performance conditions. For example, British Airways (2007) details how the bonus will be allocated based on several short-term performance measures. In 2007, 50% was based on operating margin, one-sixth customer recommendation, one-sixth punctuality and one-sixth employee involvement in the mainline business. BT (2007) provides a similar level of detail. In 2007, 40% was based on EPS, 40% on free cash flow and 20% on customer satisfaction.

Other firms provide much less detail regarding annual bonus performance conditions. For example, Rio Tinto (2006) simply report annual bonus to be based on group financial performance, group safety performance and personal performance. Shire (2007) reports chief executive annual bonus to be a function of financial performance, customer performance, people and capabilities, operational effectiveness and personal objectives. There is obviously substantially more discretion in awarding bonuses when there is less disclosure on the detailed allocation of the annual bonus and where measurement is difficult. Bruce et al. (2007, p.283) suggest that firms will often not detail precise measures as they are perhaps "commercially sensitive".

From the data collected in this study, Table 6.3 shows a very clear move away from purely financial performance measures towards a combination of financial and non-financial measures. In 2003, 49% of chief executive bonus plans were based solely on financial performance, which reduced to 37% of plans by 2007. Correspondingly, bonus plans incorporating both financial and non-financial performance measures increased in number from 48% in 2003 to 60% in 2007. Only a very small proportion of firms exclude financial performance as a measure. The shift towards using non-financial performance metrics coincides with, as shown later in Section 6.6, increased average actual bonus payouts relative to the maximum bonus opportunity. This may be coincidence or perhaps due to discretionary based non-financial measures being easier to justify on grounds other than corporate financial performance. The PwC Executive Compensation Review of the Year (2009) also reports a move towards combined financial and non-financial performance measures for annual bonus plans.

Table 6.3

Financial versus non-financial short-term performance measures

Year	N	Financial	Non-financial	Both	Not specified
2003	154	49%	1%	48%	3%
2004	186	46%	1%	52%	1%
2005	193	41%	2%	56%	2%
2006	200	34%	2%	63%	1%
2007	172	37%	2%	60%	1%

Figure 6.1 shows the diversity of financial performance measures used among the sample firms. Short-term financial performance measures are typically described in absolute terms and are based on one-year performance. Bonus plans frequently employ more than one of the measures shown in Figure 6.1. Profitability measures, including EPS, are by far the most prevalent measures used across the sample period. EPS is highlighted because of all profitability measures it was by far the most common. Overall the use of profitability measures has remained relatively constant over time even though over the sample period the data shows a slight move towards firms using alternative targets such as revenue and cash flow.

A number of firms defer the payment of a proportion of actual bonus beyond a further financial year.[58] The use of deferred bonus arrangements increased substantially during the sample period with 24% of some proportion of bonus awards being deferred in 2003 rising to 49% by 2007.

[58] In this study, deferrals that are not subject to further performance conditions are included in short-term pay. Deferred bonus subject to further longer-term performance conditions whether to be awarded in cash or shares is included in long-term pay.

Figure 6.1

Mix of short-term financial performance measures

	Revenue	EPS	Other profitability	EVA	Working capital	TSR	Cash flow	Cost reduction	Other financial
2003	6%	28%	58%	2%	4%	4%	18%	1%	16%
2004	8%	27%	57%	3%	3%	2%	19%	3%	17%
2005	9%	27%	56%	2%	2%	4%	22%	2%	15%
2006	13%	28%	61%	2%	3%	3%	23%	1%	11%
2007	14%	28%	61%	2%	2%	2%	23%	1%	10%

6.3.2 Long-term incentive design

This section presents evidence of the performance measures employed in chief executive long-term incentive schemes. These schemes include share option plans, restricted share plans and long-term cash plans. Executive share-based incentive arrangements increased in popularity shortly after the Finance Act (1984) and over time they have become an integral component of the total executive compensation package (Main, 2006).

At first, executive share options were issued up to an Inland Revenue approved maximum of four-times basic salary and their vesting was not dependent on pre-determined performance criteria. Share options issued without performance-vesting criteria are known as time-vested or traditional share options (Kuang and Qin, 2009). Performance conditions were widely introduced on the vesting of share options soon after Greenbury (1995) recommended that remuneration committees consider alternatives to traditional share option schemes. The ABI guidelines for share-based incentives further endorsed the use of performance criteria around the vesting of share options. Share options issued with performance conditions are known as performance-vested share options (Kuang and Qin, 2009).

Alternatives to traditional share option schemes also include restricted shares or long-term cash plans with performance criteria attached to the vesting of the award. Together, performance-share plans or long-term cash plans with performance conditions are collectively referred to as Long-Term Incentive Plans (LTIPs) (Buck et al., 2003). Since Greenbury (1995) many UK firms introduced LTIPs alongside existing share option plans. Pass (2003), in a study of 51 large UK companies between 1994 and 2001, reported that by the end of 2001, 44 out of the 51 firms employed performance-option plans and 41 firms used LTIPs.

Initially, performance-option plans incorporated a facility allowing for the retesting of the performance conditions over the term of the share option, if the criteria were not achieved at the first opportunity. The retesting facility virtually guaranteed that share options would vest at some point over the usual seven or ten year term of the option. This was considered to dilute the impact of attaching performance conditions and so the ABI recommended the removal of the retesting facility from option plans (Main, 2006).

According to Carter et al. (2009) firms have been typically reporting detailed disclosures on long-term incentive arrangements since the publication of the Combined Code (1998). Compliance with the UK Corporate Governance Code is voluntary but firms not complying are required to explain this non-compliance to shareholders. The firms included in the current study provided detailed disclosure on share-based incentives as required by the Directors' Remuneration Report Regulations (2002).

The level of detail provided in remuneration reports enables a full analysis of the performance measures used in share option and performance-share plans and provides support for the financial performance measures and performance periods adopted in the main regression analysis in Chapter Seven. The analysis of performance criteria is based on the long-term incentive grant data since this is the basis on which the award vests. The analysis in this section is based on the total number of long-term incentive grants awarded and is not weighted by firm or chief executive.[59]

Table 6.4

Share option grants

Year	N	Number of share option grants	Percentage of share option grants	Percentage of share option grants with retesting facility
2003	154	113	73%	78%
2004	186	103	55%	51%
2005	193	91	47%	19%
2006	200	65	33%	6%
2007	172	45	26%	0%

[59] The sample includes a number of chief executives who received multiple grants of share options and /or restricted shares in any given year.

Table 6.4 reports the total number of share option grants for each year of the sample period. The percentage of option grants issued has gradually reduced from 73% in 2003 to only 26% in 2007. This shows a distinct shift away from the use of executive share options over the sample period with a commensurate increase in LTIP grants as reported in Table 6.5. The number of LTIP grants issued increased from 57% in 2003 to 118% in 2007. It is clear that LTIPs have replaced share option plans over the sample period. This trend has been observed for some time. For example, Ozkan (2009) studied 390 non-financial firms between 1999 and 2005 and reports similar findings to this current study. According to Ozkan the average value of share options more than halved between 1999 and 2005 while the average value of LTIPs nearly quadrupled.

Table 6.5

Share or long-term cash plan grants

Year	N	Number of LTIP grants	Percentage of LTIP grants
2003	154	88	57%
2004	186	134	72%
2005	193	176	91%
2006	200	219	110%
2007	172	203	118%

The rate of decrease in share option grants does not appear to be slowing down with the PwC Review of the Year (2009) reporting that around 80% of FTSE-250 firms used share option plans in 2003 versus just over 20% in 2009. The PwC review also shows around 50% of FTSE-250 firms operated performance-share plans in 2003, which increased to over 80% by 2009. According to a Towers Perrin[60] (2008) survey the movement away from share options and towards LTIPs is also occurring in the US. For example, share options formed 28% of the pay mix in 2008, which was down from 38% in 2004. Over the same period performance-shares increased from 8% of the pay mix to 23%.

[60] Towers Perrin merged with Watson Wyatt 1st January 2010 to form Towers Watson.

There are several reasons put forward for the decline in chief executive share option grants. Most commentators suggest the reason for the reduction and the rise in the prevalence of LTIPs is a direct response to Greenbury (1995), which called for the adoption of LTIPs to replace traditional share options (Main, 2006). Others suggest the main reason for the decline in share option popularity is the requirement for firms to charge share option grants to the profit and loss account thus equalising the accounting treatment of share options to that of LTIPs (The PwC Review of the Year, 2005). This suggestion is supported by a number of firms' remuneration policy announcements to shareholders. For example, the following statements are taken from two remuneration reports of firms included in this study.

> *"Following a review of the remuneration structures for the senior executives of the Group, the remuneration committee concluded that the existing 1998 Scheme was no longer an appropriate incentive vehicle, particularly in view of the impending changes to the accounting regime"* (Game Group, 2004, p.23).

> *"In the light of changes to the accounting treatment of share options and changing market practice, the Remuneration Committee decided not to grant options to Executive Directors during 2005 and does not intend to do so in the foreseeable future" (Informa, 2005, p.29).*

An important development over the course of the sample period is the complete abandonment of retesting in performance-option plans. Table 6.4 shows that 78% of share option grants included a retesting facility in 2003, which completely disappeared from all new option grants by 2007.

Figure 6.2 and Figure 6.3 show the mix of performance measures used in chief executive share option plans and LTIPs respectively and the development over the sample period. Only a minority of share option or LTIP grants were awarded without a vesting schedule based on pre-determined performance criteria. In 2007 only 2% of option grants and only 2% of LTIP awards were not conditional on future performance. For the remainder of awards whose vesting were contingent on future performance, over 80% of LTIPs and 97% of share option plans adopted a three-year performance period. Carter et al. (2009) find the majority of performance-vested equity grants to vest at the end of a three-year performance period. This provides support for the hypotheses developed in Chapter Four that chief executive actual long-term incentive pay is proposed to be a function of long-term performance measured over three years.

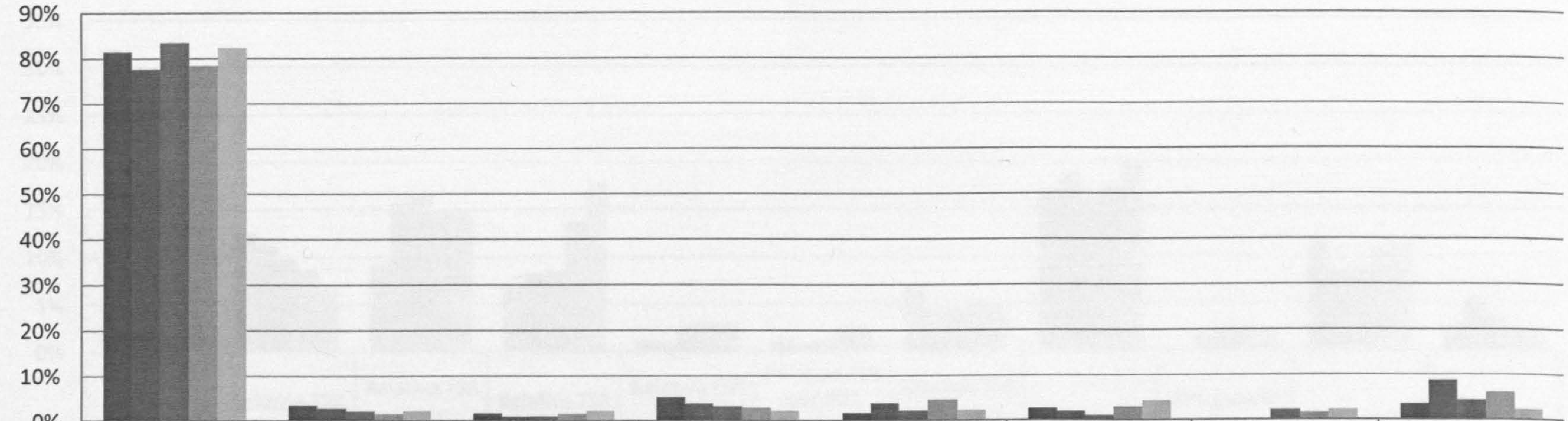
The dominance of EPS growth as the sole performance indicator adopted in share option plans is clearly visible in Figure 6.2. For each sample year, around 80% of share option awards are contingent exclusively on EPS growth. A much smaller number of grants are conditional on a combination of EPS growth and another measure or relative TSR or share price growth. While the number of share option grants has decreased over the sample period the selection of performance measure has not changed substantially.

There is, however, a greater variety of performance measures used in LTIPs than employed in performance-option plans. But even then relative TSR is employed either on its own or alongside another measure in 70% of LTIP grants in 2003 and 65% of grants continued to be based to some extent on relative TSR in 2007. The change with regard to LTIPs is the reduction in the number of grants that are solely dependent on one measure, namely relative TSR, which reduced from 32% in 2003 to 15% by 2007. Figure 6.3 indicates that an increased number of LTIP grants included a performance hurdle alongside relative TSR or included EPS growth in addition to relative TSR.

The findings of this study are substantiated by several other recent studies on UK long-term incentive design. Pass (2003), in a study of 51 large UK companies between 1994 and 2001, also found the most prevalent performance measure for share option plans was an EPS target and LTIPs predominantly used relative TSR. In a study of FTSE-100 firms during 2003/04, Main and Neate (2006) find share option plans to be largely based solely on EPS growth while 90% of LTIPs employed relative TSR and/or EPS growth. According to the PwC Review of the Year (2009) share option plans and LTIPs are still dominated by EPS and relative TSR. Although, as seen in the data for this current study other financial performance measures are emerging to accompany relative TSR and EPS growth. According to the PwC survey these include economic profit, cash flow and return on capital employed.

Figure 6.2

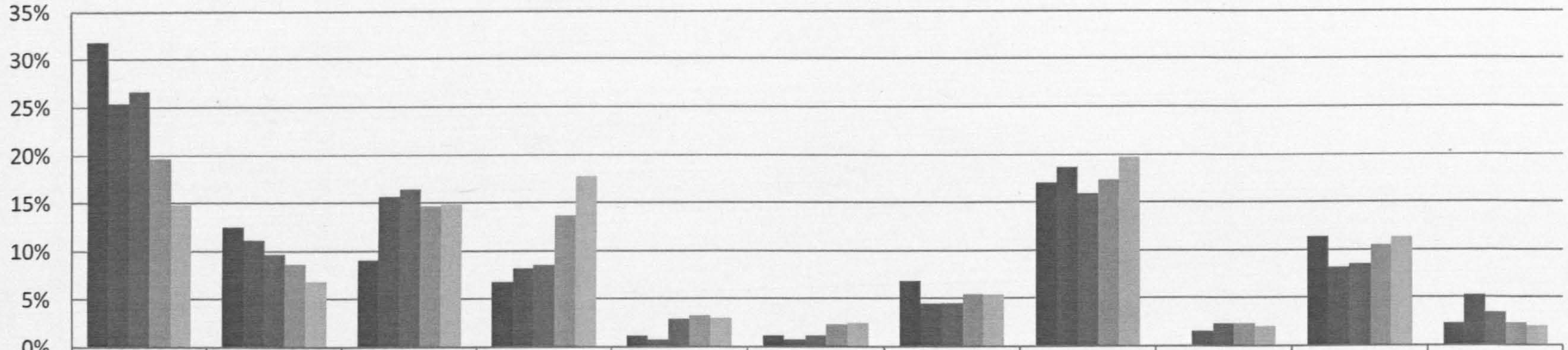
Share option plan performance measures



	EPS growth	EPS growth and relative TSR	EPS growth and other measure	Relative TSR	Relative TSR with financial underpin	Share price growth	Other	None
2003	81%	4%	2%	5%	2%	3%	0%	4%
2004	78%	3%	1%	4%	4%	2%	0%	9%
2005	84%	2%	1%	3%	2%	1%	2%	4%
2006	78%	2%	2%	3%	5%	3%	2%	6%
2007	82%	2%	2%	2%	2%	4%	2%	2%

Figure 6.3

LTIP performance measures



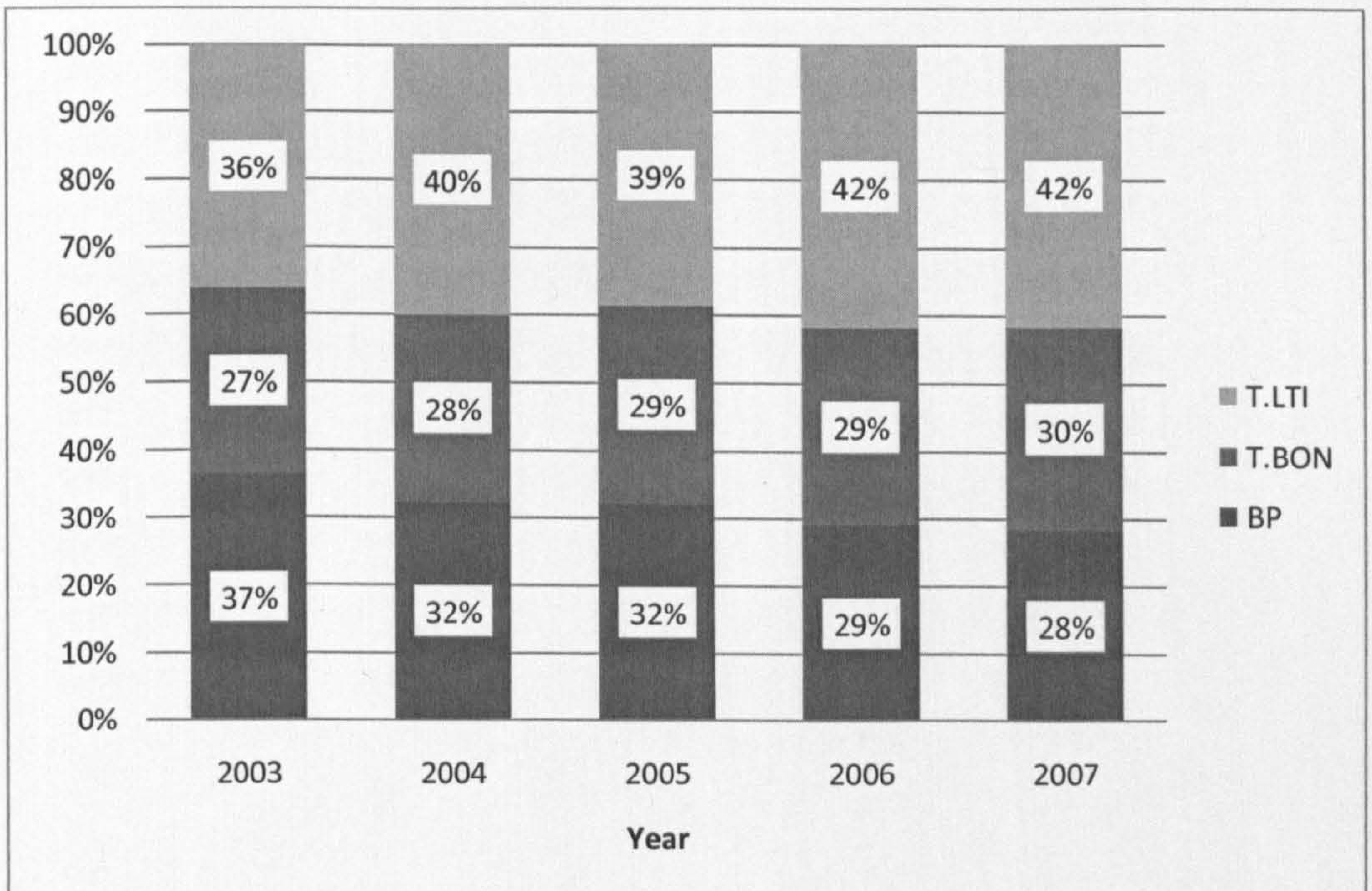
	Relative TSR	Relative TSR with EPS hurdle	Relative TSR with performance hurdle	Relative TSR and EPS growth	Relative TSR and EPS growth with EPS hurdle	Relative TSR and EPS growth with performance hurdle	Relative TSR and other profit measure	EPS growth	EPS growth with other measure	Other	None
2003	32%	13%	9%	7%	1%	1%	7%	17%	0%	11%	2%
2004	25%	11%	16%	8%	1%	1%	4%	19%	1%	8%	5%
2005	27%	10%	16%	9%	3%	1%	5%	16%	2%	9%	3%
2006	20%	9%	15%	14%	3%	2%	5%	17%	2%	11%	2%
2007	15%	7%	15%	18%	3%	2%	5%	20%	2%	11%	2%

6.4 Total pay mix

This section describes how the different elements of pay comprise total target and total actual pay. The analysis provides some context of the importance of each element before the three main categories of pay, basic pay; short-term pay; and long-term pay, is examined in detail. The mix of median chief executive target total pay and actual total pay is shown in Figure 6.4 and 6.5 respectively. Each chart shows how the composition of pay has changed between 2003 and 2007.

Figure 6.4

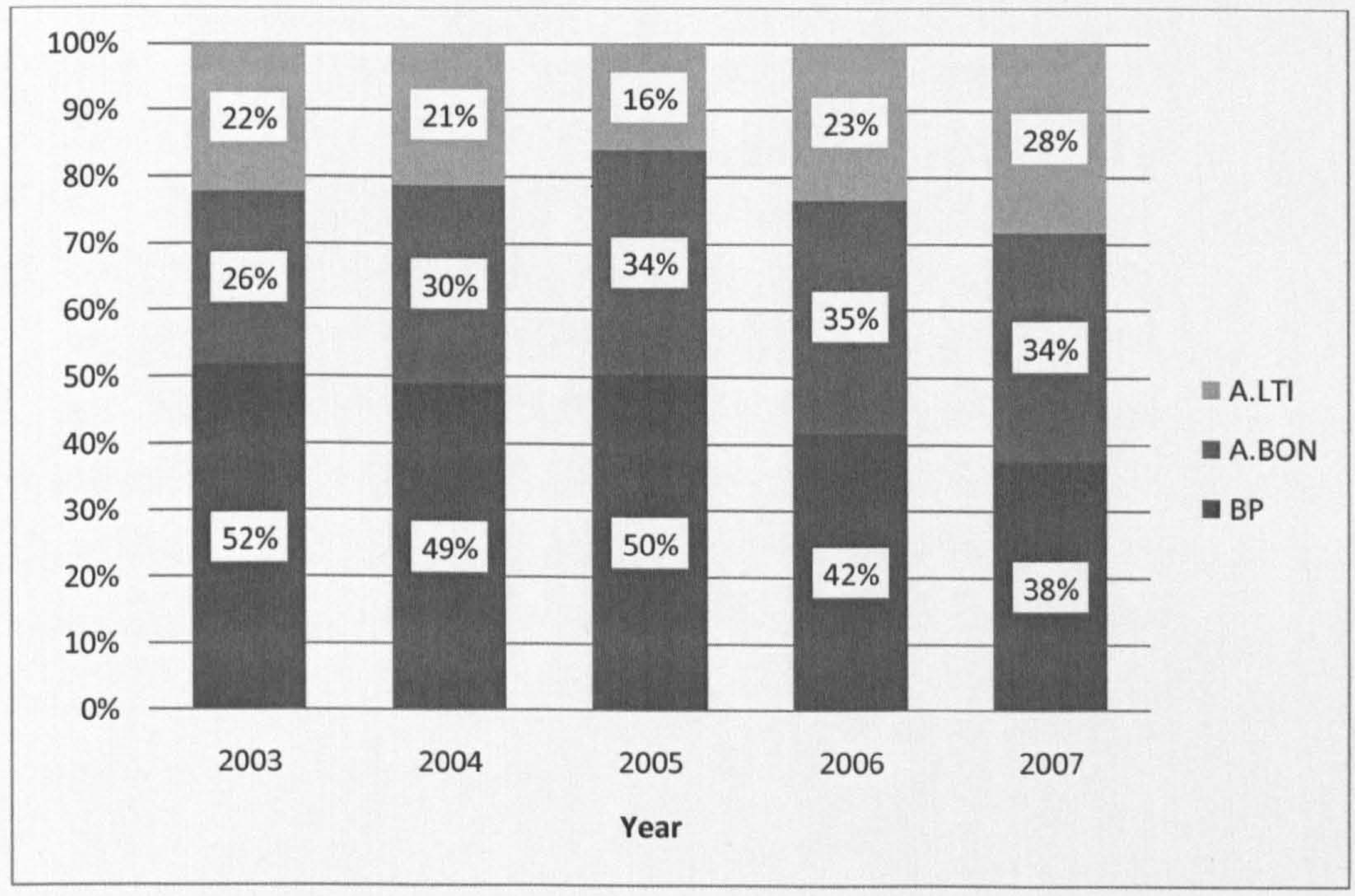
Median CEO target pay mix



Total target pay shows the expected mix of pay if performance conditions are met in full. Median chief executive basic pay has decreased in proportion of total target pay from 37% in 2003 to 28% in 2007. This indicates that over the sample period remuneration committees have pursued remuneration strategies to reduce basic pay in relation to performance-contingent pay. Basic pay represented the largest proportion of total target pay in 2003, but over time the fraction of basic pay has decreased. Over the sample period target long-term incentive has increased from 36% of pay in 2003 to 42% in 2007. In 2007 long-term pay was the largest proportion of total target pay. The proportion of target bonus has also increased over the period from 27% in 2003 to 30% in 2007. Overall at median chief executive pay the amount of variable pay has increased from 63% of the pay mix in 2003 to 72% in 2007. This is line with the UK Corporate Governance Code (2010) and the expectation of individual investors and investor organisations such as the Association of British Insurers (ABI) and National Association of Pension Funds (NAPF) for a higher proportion of pay to be contingent on firm performance.

Figure 6.5

Median CEO actual pay mix



Total actual pay shows the mix of pay once performance conditions have been considered and awards have vested in accordance to the predetermined targets. Basic pay is a larger proportion of the actual total than the target due to it being guaranteed while maximum incentive opportunity is not. But similar to total target pay the amount of basic pay decreased in its proportion of total actual pay over the five year period. Basic pay decreased from a high of 52% in 2003 to a low of 38% in 2007. Actual long-term pay is a much smaller proportion of the total actual pay mix than target long-term pay is of the total target mix. In 2007 actual long-term pay represented 28% of total actual pay, which is somewhat less than the 42% of target long-term pay that comprised total target pay.

This is not the case for actual bonus pay, which for all years, with the exception of 2003, represents a much larger proportion of the pay mix than target bonus pay. This may suggest that short-term median pay is more likely to satisfy performance conditions than long-term pay. It is not possible to draw any definitive conclusions from this descriptive data but it may indicate that the performance targets for short-term pay are more likely and therefore perhaps easier to be attained than for long-term pay. Further, it has been shown in Section 6.3.1 that there is more discretion in the performance targets used for short-term pay while long-term pay is typically more formulaic (based on explicit financial performance measures).

In the following sections the progression of the individual components of pay are analysed in succession.

6.5 CEO basic pay

This section provides a descriptive analysis of chief executive basic pay over the sample period. To begin, Table 6.6 shows that median chief executive basic pay increased by 29% from £397,500 in 2003 to £513,500 in 2007. In comparison, the Annual Survey of Hours and Earnings (ASHE) Report (no date) all employee median annual total pay to have increased by only 14% over the same period.

Annual increases in median chief executive basic pay are between a low of 3.4% from 2003 to 2004 to a high of 9.5% between 2004 and 2005. These increases are comparable to the PwC Review of the Year (2008, 2009) for FTSE-100 and FTSE-250 firms, which show that between 2003 and 2007 median chief executive basic pay increased between 5% and 8% per year. According to the ASHE survey, all employee median annual pay increased from a low of 3.3% between 2005 and 2006 and a high of 4.3% between 2004 and 2005. Evidently the average annual percentage increase in chief executive basic pay outpaced that of total all employee pay over the sample period. The data in this study shows that in 2003 chief executive basic pay was 22.7 times total all employee pay and it increased to 25.7

times in 2007. Obviously, the difference between *total* chief executive pay and total all employee pay is even greater (see Section 6.8).

Table 6.6

CEO basic pay summary statistics

Basic pay (£)	N	LQ	Median	UQ	Mean	Std. dev.
2003	154	295,000	397,500	585,000	450,263	202,798
2004	186	319,000	411,000	609,000	473,879	210,466
2005	193	344,000	450,000	636,300	507,573	220,239
2006	200	351,563	482,125	663,000	536,198	227,678
2007	172	381,500	513,500	699,500	566,700	227,486

N is the number of observations. LQ is the lower quartile. UQ is the upper quartile. Std. dev. is the standard deviation.

In this study it is hypothesised that company size is positively related to chief executive basic pay. In order to gain an insight into the relationship (before the main basic pay regression results are analysed in Section 7.3) firm size is plotted against CEO basic pay. The pooled CEO pay data is grouped into pay ranges and Figure 6.6 shows the corresponding median firm size for each group. The graph clearly shows a positive correlation between firm size and basic pay.

This study also tests the hypothesis that absolute firm performance is positively related to chief executive basic pay. Using EPS, annual shareholder return and three-year shareholder return, Figures 6.7 to 6.9 respectively show median firm performance for each basic pay range. Figure 6.7 shows a positive correlation between EPS and basic pay. While Figure 6.8 shows annual shareholder return to be decreasing as basic pay is increasing over the period. In Figure 6.9 three-year shareholder return first increases with chief executive basic pay and then similar to annual shareholder return decreases as basic pay increases.

Overall the graphical representation appears to show basic pay to be positively related to firm size and EPS, but negatively related to shareholder return. Later in Section 7.3, the CEO basic pay panel data regression results confirm that firm size is related to basic pay; but in contrast to what the graphical evidence might suggest, there is a small positive association between annual shareholder return and CEO basic pay. The graphs might not highlight such a relationship because the pooled data does not allow for within firm/chief executive variation, whereas the panel data regression analysis does.

Figure 6.6 - Median firm sales by basic pay

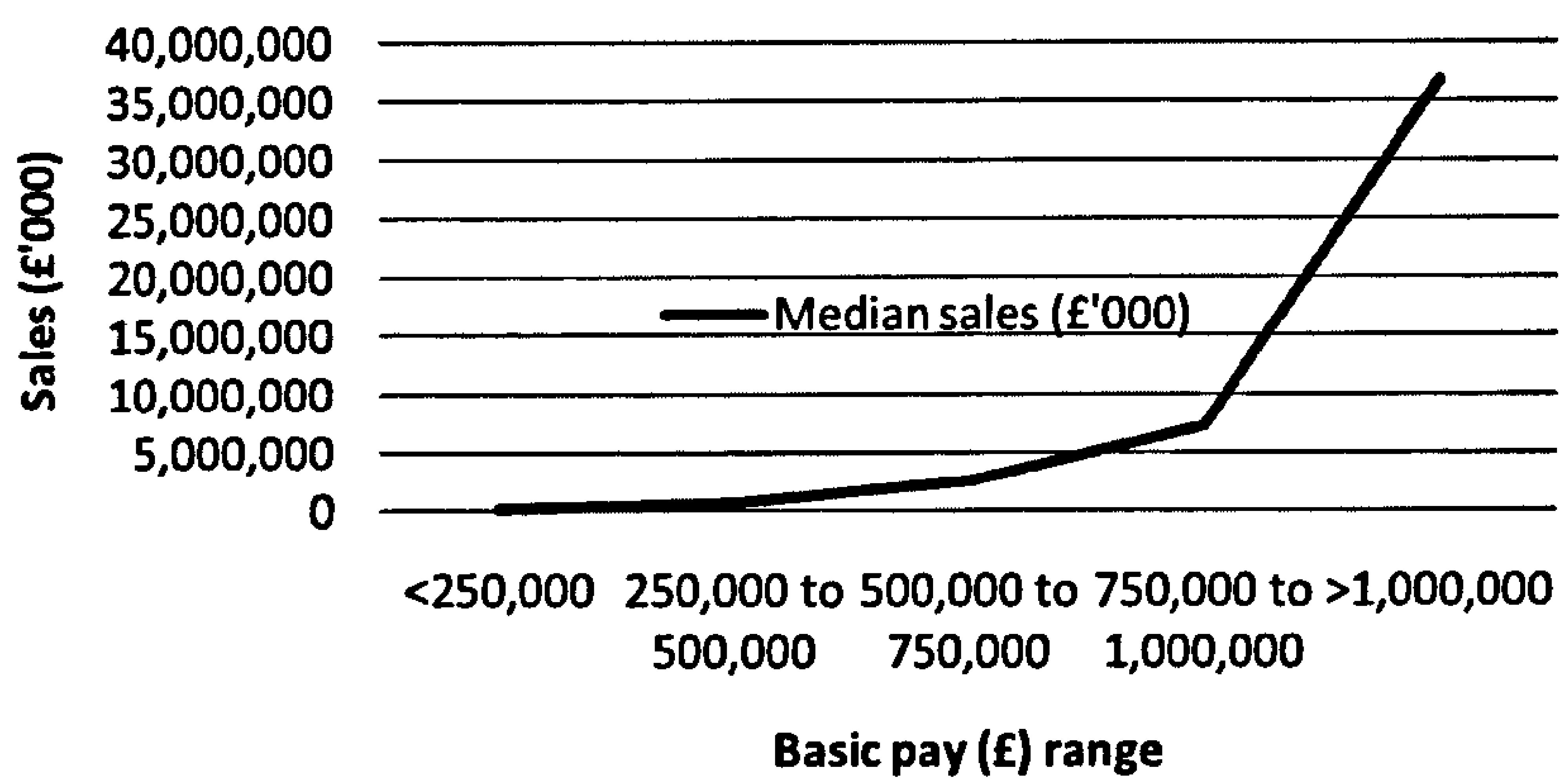


Figure 6.7 - Median firm EPS by basic pay

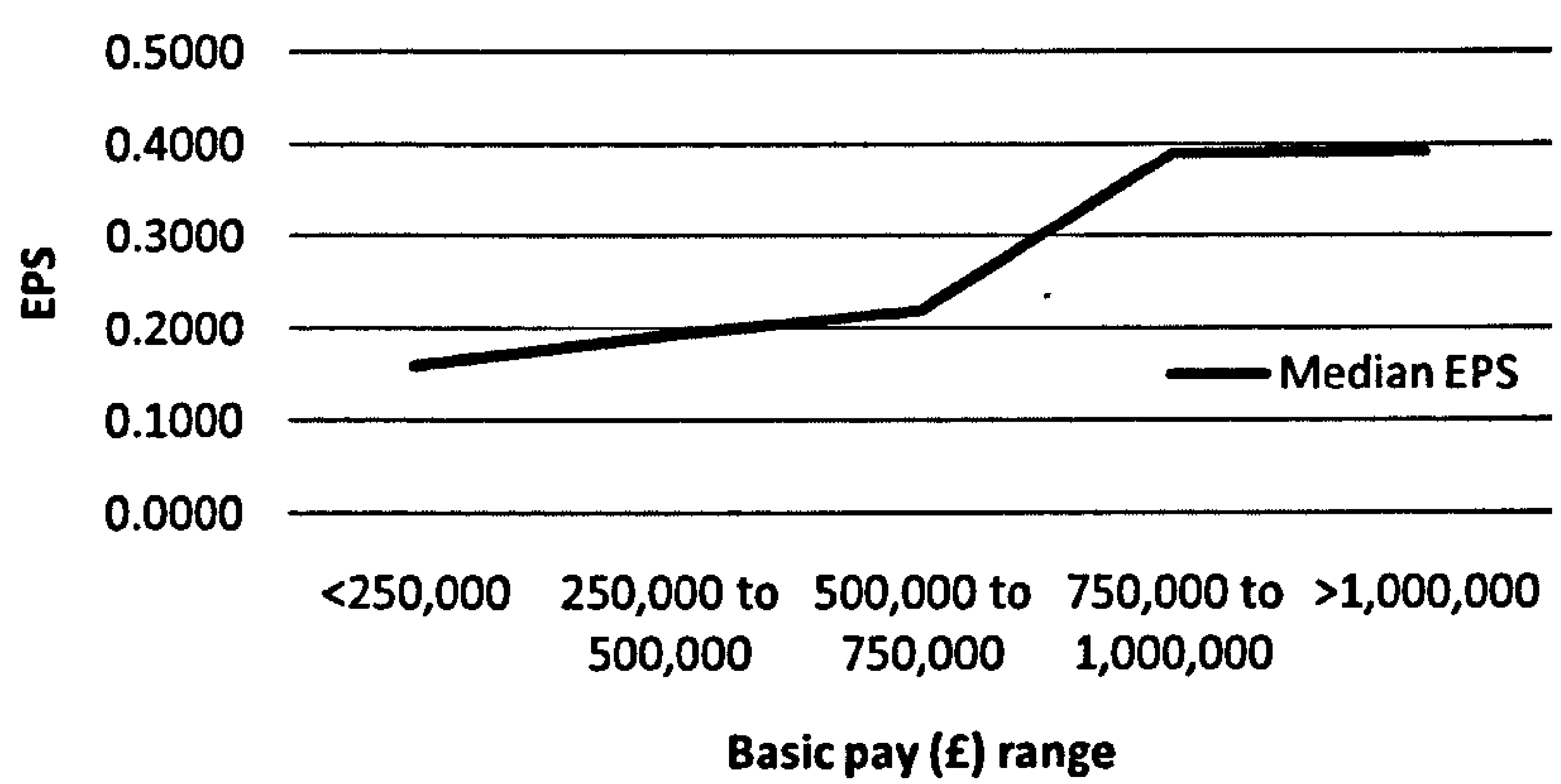


Figure 6.8 - Median firm S.RET by basic pay

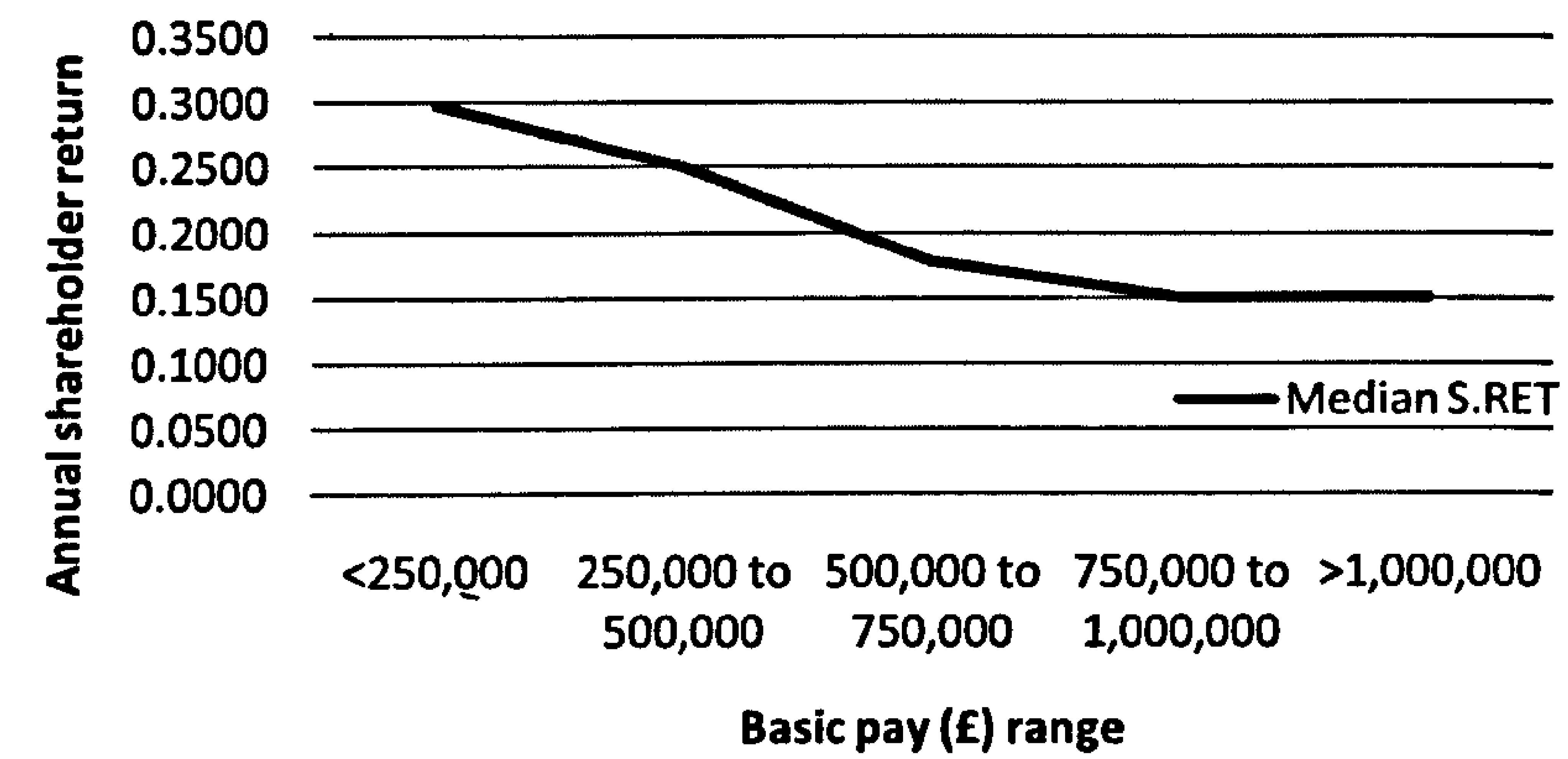
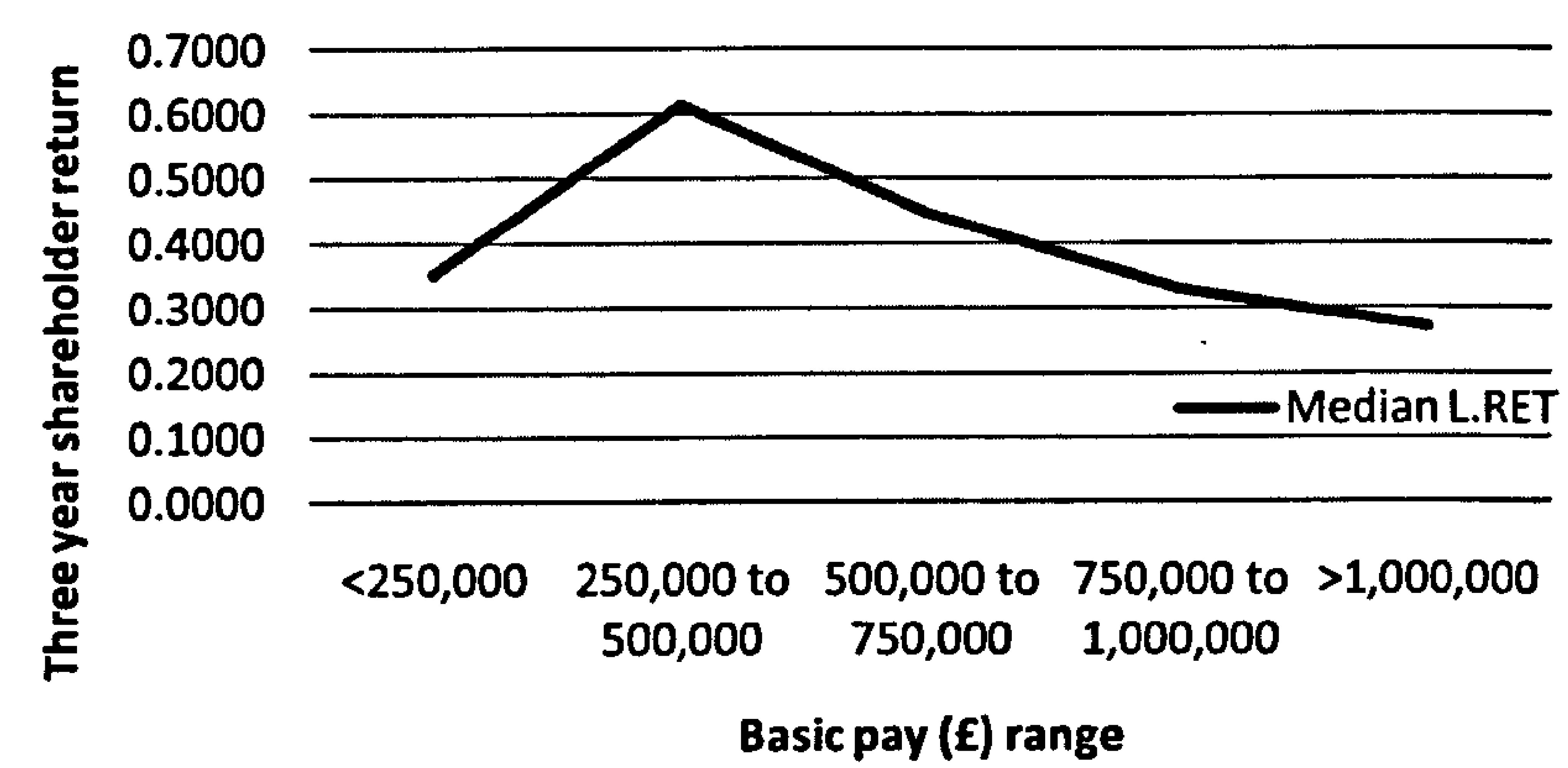


Figure 6.9 - Median firm L.RET by basic pay



6.6 CEO short-term bonus pay

This section presents the analysis of target and actual short-term bonus pay over the sample period. Target bonus pay is the cash value of annual maximum bonus incentive including deferred bonus compensation (without additional performance conditions). Actual bonus pay is the cash value of paid annual bonus including actual deferred bonus compensation without additional performance conditions.

To begin, Table 6.7 shows the variation in CEO short-term pay across the sample firms. In each year there is substantial variation in the amount of target pay available to chief executives and also in the actual bonus pay received. In 2003, the target bonus standard deviation is just over 100% of the mean, which decreased to 81% of the mean in 2007. The large variation is reflective of the composition and diversity of the sample firms. The standard deviation remains equally as high for actual bonus pay.

Table 6.7

CEO short-term bonus pay summary statistics

Year	Short-term (£)	N	LQ	Median	UQ	Mean	Std. dev.
2003	T.BON	140	200,500	297,791	558,779	447,791	452,220
	A.BON	152	80,774	200,000	396,500	338,814	449,409
2004	T.BON	175	240,000	349,700	628,000	499,054	450,000
	A.BON	184	123,502	250,000	500,500	396,864	472,989
2005	T.BON	186	279,310	405,750	679,000	593,688	539,821
	A.BON	191	163,000	300,000	590,000	456,214	456,601
2006	T.BON	194	315,000	478,750	820,000	665,281	545,875
	A.BON	199	223,776	400,000	644,000	530,696	511,316
2007	T.BON	168	386,500	540,476	900,000	763,266	617,856
	A.BON	172	280,500	469,500	823,000	647,560	596,041

N is the number of observations. LQ is the lower quartile. UQ is the upper quartile. Std. dev. is the standard deviation.

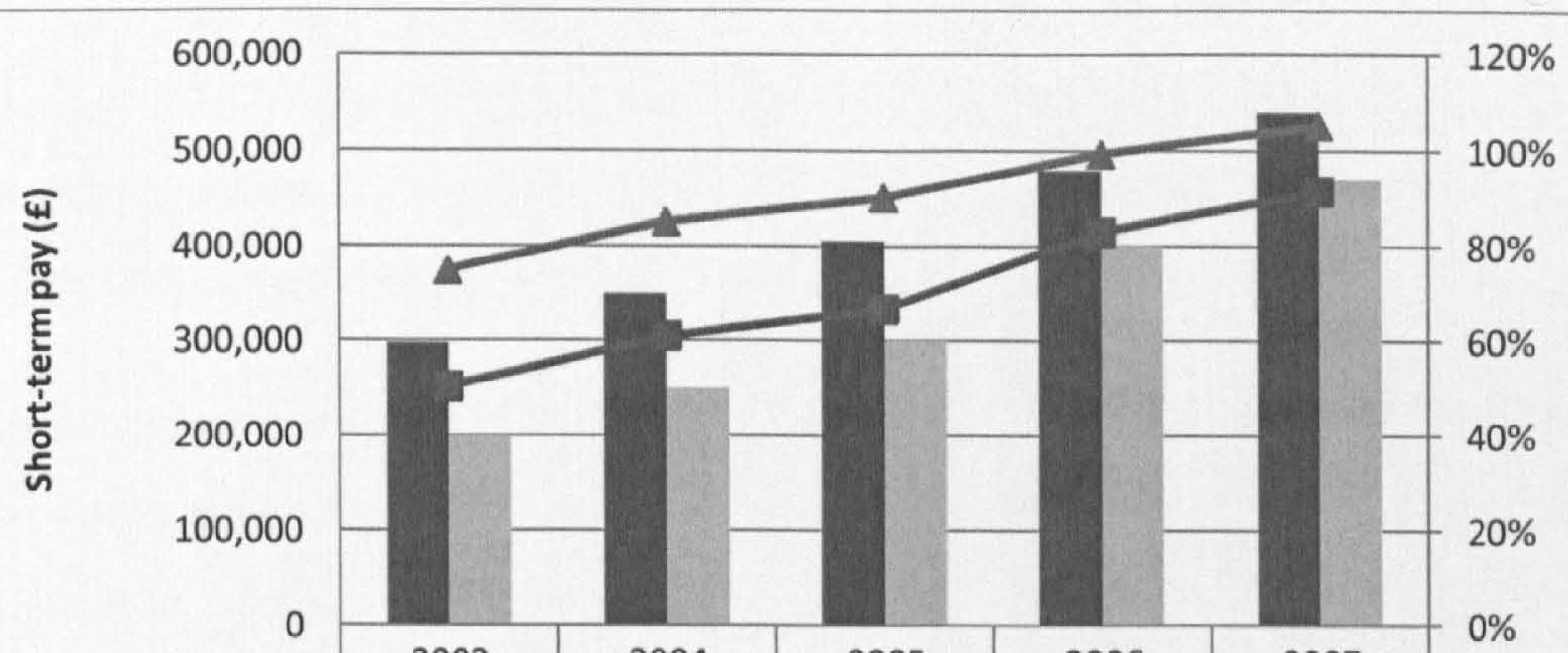
A central question asked in this study is whether it is important to distinguish between target incentives and actual incentive pay in order to understand the association between corporate performance and CEO pay. It is clear in Table 6.7

that there is a difference between the amount of target pay available and the actual pay received. For example, in 2007 the median target bonus was £540,476, but the median actual received was £469,500. Later in Section 7.4, the panel data regression results find firm performance is associated with both target and actual bonus pay, but that the economic significance is considerably more important for actual pay.

The Figure 6.10 shows the growth in median chief executive short-term pay and the proportional change in relation to basic pay. This is an important representation since firms typically report target incentive pay as a multiple of basic pay (Murphy, 1999). As a percentage of basic pay median target bonus is 75% in 2003 and gradually rises to 105% of basic pay by 2007. The PwC Executive Compensation Review of the Year (2009) reports similar findings to this current study.

Figure 6.10

Median CEO short-term pay progression



	2003	2004	2005	2006	2007
Median T.BON (£)	297,791	349,700	405,750	478,750	540,476
Median A.BON (£)	200,000	250,000	300,000	400,000	469,500
% T.BON of BP	75%	85%	90%	99%	105%
% A.BON of BP	50%	61%	67%	83%	91%

Median actual bonus also increased progressively as a percentage of median basic pay from 50% in 2003 to 91% in 2007. Most noticeably the gap between target and actual has reduced over the five-year sample period. Where there was a 25-

percentage point difference in 2003 there is only a 14-percentage point difference between median target bonus and median actual bonus as a percentage of basic pay in 2007. The difference between the cash value of target and actual bonus is also narrowing. In 2003 the lower quartile actual bonus was 40% of lower quartile target bonus and by 2007 lower quartile actual bonus increased to 73% of lower quartile target bonus. Median actual bonus increased from 67% to 87% and upper quartile actual bonus from 71% to 91%.

The narrowing gap between actual bonus and target bonus over the sample period must be a result of an increasing number of chief executives attaining pre-determined performance conditions. This could be a reflection of improved performance or easier performance targets. Over the sample period the median target bonus has increased 81% from £297,791 in 2003 to £540,476 in 2007. This very large increase reflects both an increase in basic pay as well as an increase in target pay available. Median actual bonus has increased 135% from £200,000 in 2003 to £469,500. A potential concern for investors is that pay opportunity has increased dramatically without the strengthening of performance conditions resulting in increased actual bonus payouts. Bruce et al. (2007, p.281) suggest that "bonuses are virtually guaranteed to executives" and that performance conditions merely "act as camouflage".

The dramatic increase in actual bonus and the decreasing difference between actual and target bonus provides superficial evidence that annual bonuses appear to be largely guaranteed to the chief executives in this sample. At the very least the increase in basic pay combined with the increase in maximum contingent pay, effectively shields CEOs from poor performance. However, as it is shown later in Section 7.4, the regression results find a strong positive association between firm performance and actual bonus pay.

Figure 6.11 plots firm size against chief executive short-term bonus pay. The relationship is represented in terms of median firm sales by chief executive short-term pay ranges. The graph shows a positive correlation between firm size and target bonus and between firm size and actual bonus. This is consistent with the prediction that compensation is a function of firm size (Conyon et al., 2000; Cordeiro and Veliyath, 2003; Gregg et al., 2005). The results of the regression analysis, Section 7.4, also find firm size is significantly associated with target and actual bonus.

Figures 6.12 to 6.14 plot selected measures of absolute firm performance against chief executive short-term pay. Overall, Figure 6.12 shows target and actual short-term pay is increasing relative to EPS. Whereas, Figure 6.13 and 6.14 respectively show median annual shareholder return and median three-year shareholder return to be broadly decreasing with short-term pay.

In contrast to this simple analysis, the panel data regression results find annual shareholder return is significantly related to target and actual bonus and that EPS is related to actual bonus. As mentioned in the analysis of basic pay, the graphical evidence presented here reports the data on a pooled basis, which does not consider the within firm/chief executive variation, whereas the panel data regression analysis does.

Figure 6.11 - Median firm sales by short-term pay

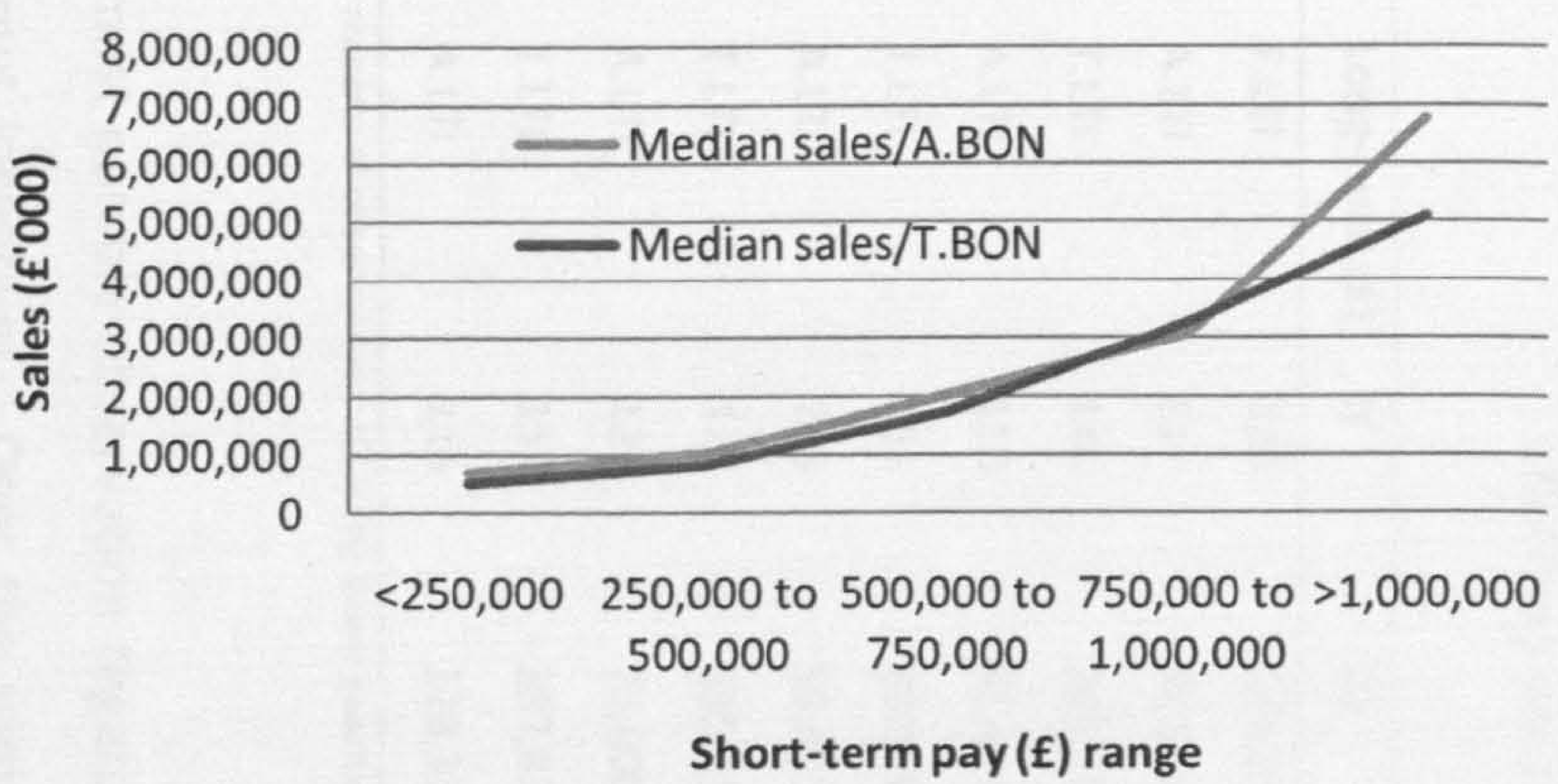


Figure 6.13 - Median firm S.RET by short-term pay

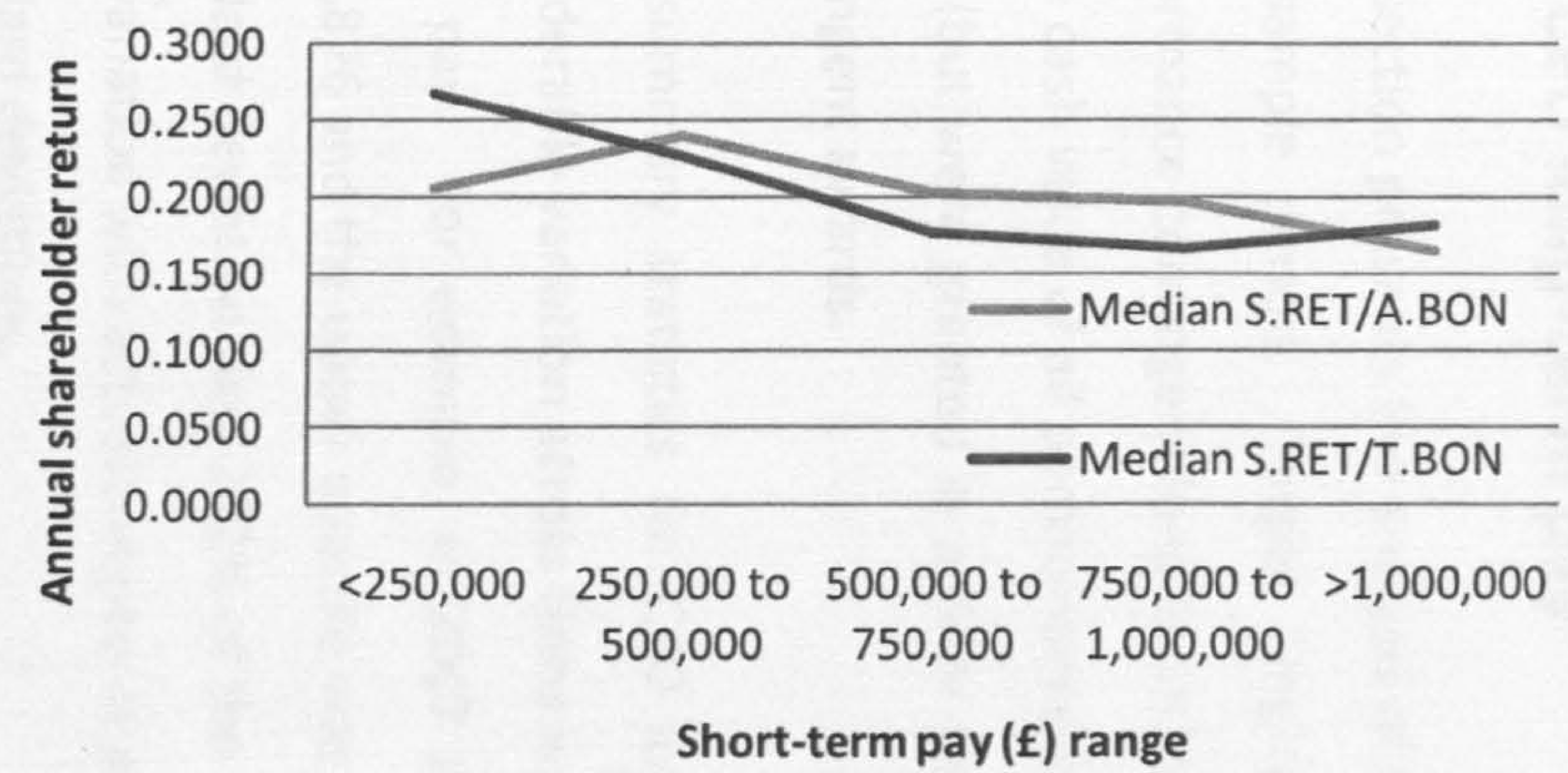


Figure 6.12 - Median firm EPS by short-term pay

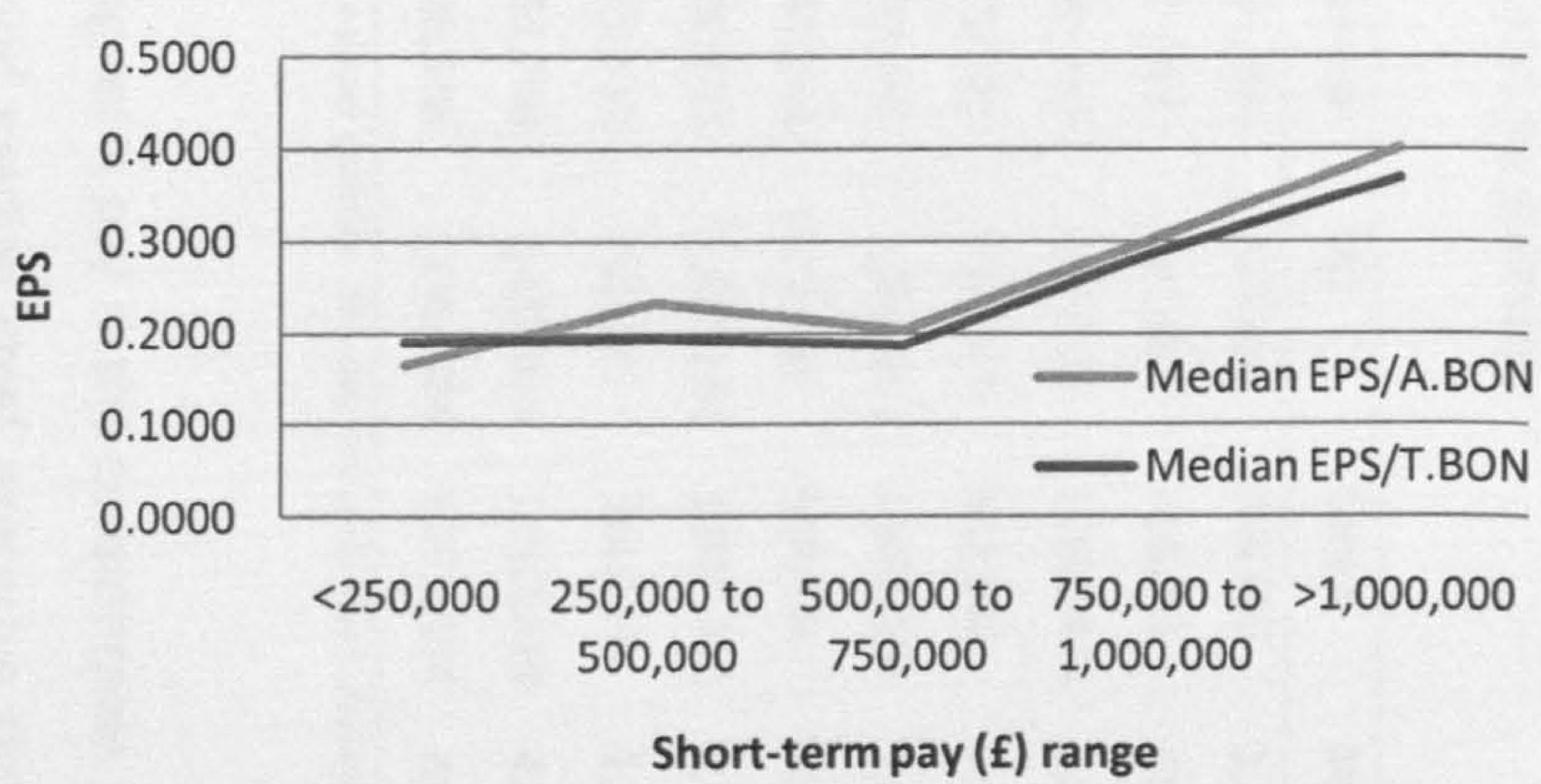
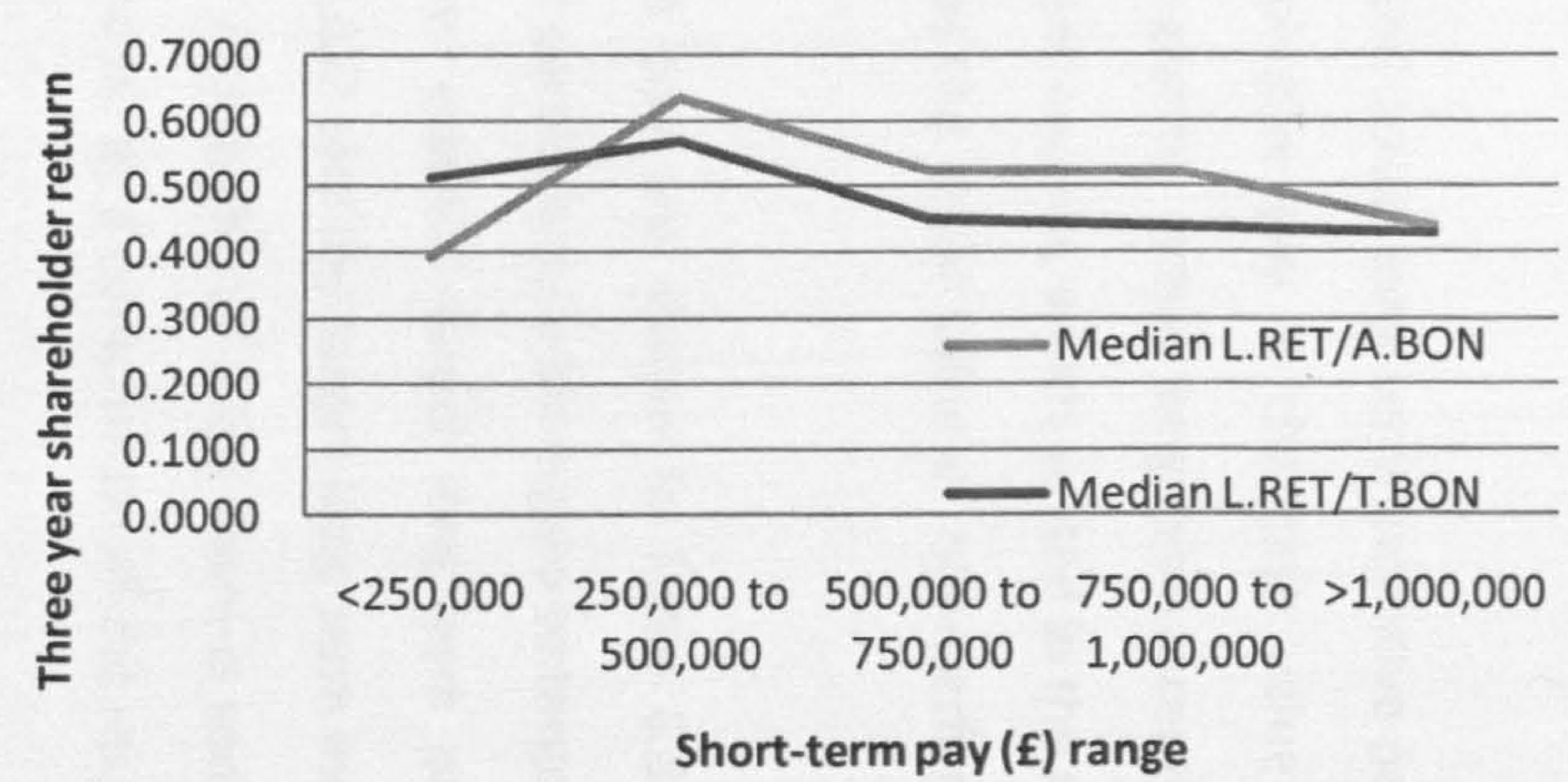


Figure 6.14 - Median firm L.RET by short-term pay



6.7 CEO long-term pay

This section presents the analysis of target and actual long-term incentive pay over the sample period. Target long-term incentive pay is the cash value of all performance-contingent long-term incentive grants. Actual long-term incentive pay is the cash value of all performance-contingent awards, which vested in the current year (but were granted in a prior year), plus the grant value of non-performance contingent awards.

The summary statistics for CEO long-term pay are shown in Table 6.8. The considerable variation across firms is evident particularly with regard to target long-term pay. For example, in 2007 the lower quartile target long-term pay was £387,876 and the upper quartile was £1,410,033 and the target long-term incentive standard deviation was 272% of the mean. Although still large there is somewhat less variation with actual long-term pay as shown by a comparison of the respective standard deviations.

Table 6.8

CEO long-term pay summary statistics

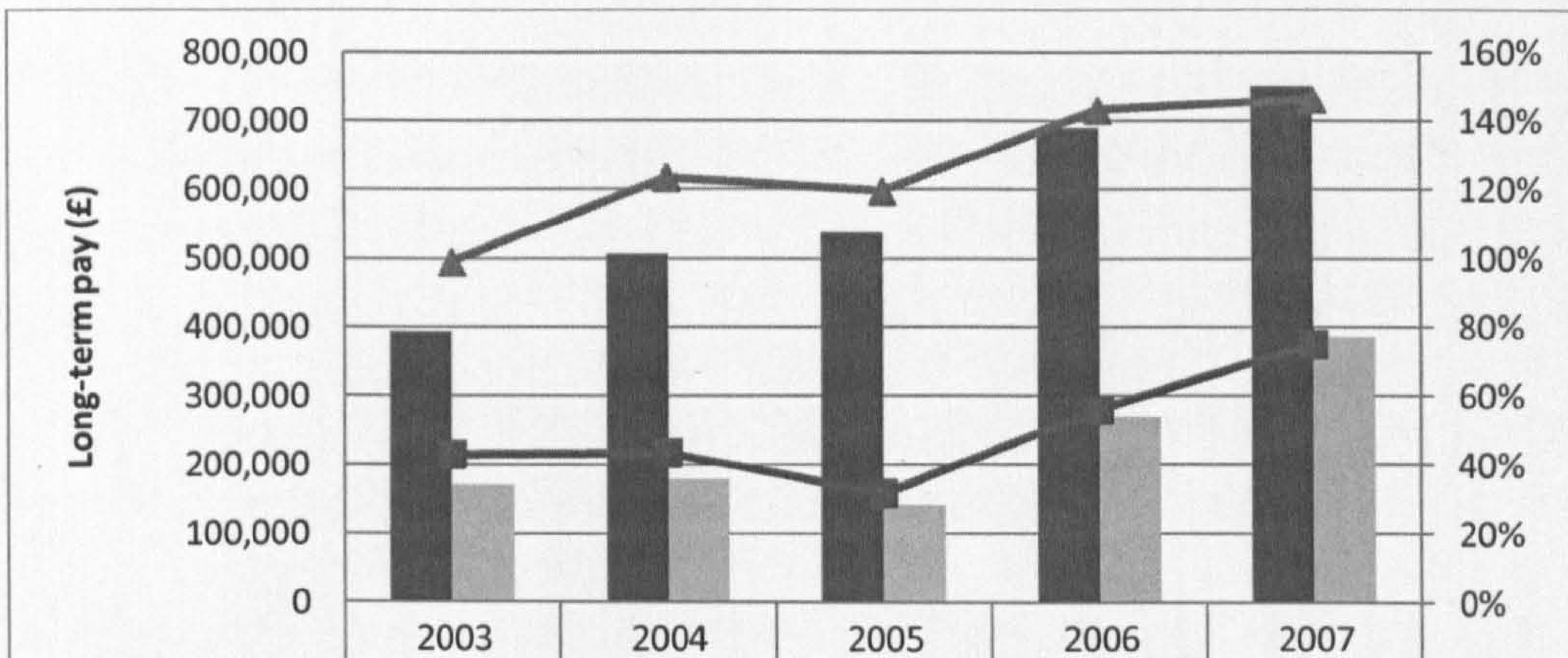
Year	Long-term (£)	N	LQ	Median	UQ	Mean	Std. dev.
2003	T.LTI	125	134,250	393,684	700,828	730,757	1,278,234
	A.LTI	81	42,690	170,000	551,497	419,716	616,847
2004	T.LTI	146	243,726	507,395	943,560	1,052,403	2,385,123
	A.LTI	113	62,499	178,325	555,247	662,018	1,946,916
2005	T.LTI	161	299,999	537,792	1,243,861	1,691,104	7,022,151
	A.LTI	118	55,406	142,281	613,437	517,584	1,094,803
2006	T.LTI	176	380,314	690,653	1,428,602	1,304,382	1,815,449
	A.LTI	123	75,000	269,632	756,427	704,019	1,344,679
2007	T.LTI	157	387,876	751,708	1,410,033	1,802,838	4,906,439
	A.LTI	116	128,317	385,508	1,041,889	1,072,554	2,069,519

N is the number of observations. LQ is the lower quartile. UQ is the upper quartile. Std. dev. is the standard deviation.

The most notable observation regarding long-term pay is the considerable growth in target incentives. Over the sample period median chief executive target LTI increased 91% from £393,684 in 2003 to £751,708 in 2007. Figure 6.15 shows that target long-term incentive pay has also increased substantially in relation to basic pay. Median target LTI increased from 99% of basic pay in 2003 to 146% by 2007. While median actual long-term pay was only 32% of basic pay in 2005 it increased to 75% in 2007.

Figure 6.15

Median CEO long-term pay progression



	2003	2004	2005	2006	2007
Median T.LTI (£)	393,684	507,395	537,792	690,653	751,708
Median A.LTI (£)	170,000	178,325	142,281	269,632	385,508
% T.LTI of BP	99%	123%	120%	143%	146%
% A.LTI of BP	43%	43%	32%	56%	75%

The summary statistics show a big difference between the level of target long-term pay and actual long-term pay. This suggests it is important to separate target long-term incentives, which are contingent on performance conditions, from the actual pay received. While this study makes the distinction, prior pay-for-performance studies do not and instead concentrate on target long-term incentives and assume that the performance conditions will be satisfied (for example, Conyon et al., 2009; Ozkan, 2009).

Figure 6.16 plots firm size against target and actual long-term pay. The pooled CEO target and actual pay data are grouped into their respective pay ranges and Figure 6.16 shows the corresponding median firm size for each group. The graph shows that target incentives broadly increases with firm size. In contrast, actual long-term pay increases with firm size up until £1,250,000 and then decreases sharply after this point. Whilst the graphical representation does not show a definitive relationship between firm size and long-term pay, the results of the regression analysis, Section 7.5, does find firm size is significantly associated with both target and actual long-term pay.

This study tests the hypotheses that absolute firm performance is positively related to target and actual long-term CEO pay. Using EPS, annual shareholder return and three-year shareholder return, as alternative measures of performance, Figures 6.17 to 6.19 show target and actual pay against each measure. Figure 6.17 shows little variation between EPS and target, but actual long-term pay initially increases with EPS and then decreases at higher levels. Figure 6.18 and 6.19 show respectively annual shareholder return versus long-term pay and three-year shareholder return versus long-term pay. Neither graph shows any obvious pattern.

The descriptive analysis presented in this section finds a large difference between levels of target and actual long-term pay, which provides initial evidence that both might respond differently to firm performance. The necessity to distinguish between target and actual long-term pay is confirmed by the regression results in Section 7.5. The regression analysis shows there is no association between shareholder return and target long-term pay, while there is a strong and large association between shareholder return and actual long-term pay.

Figure 6.16 - Median firm sales by long-term pay

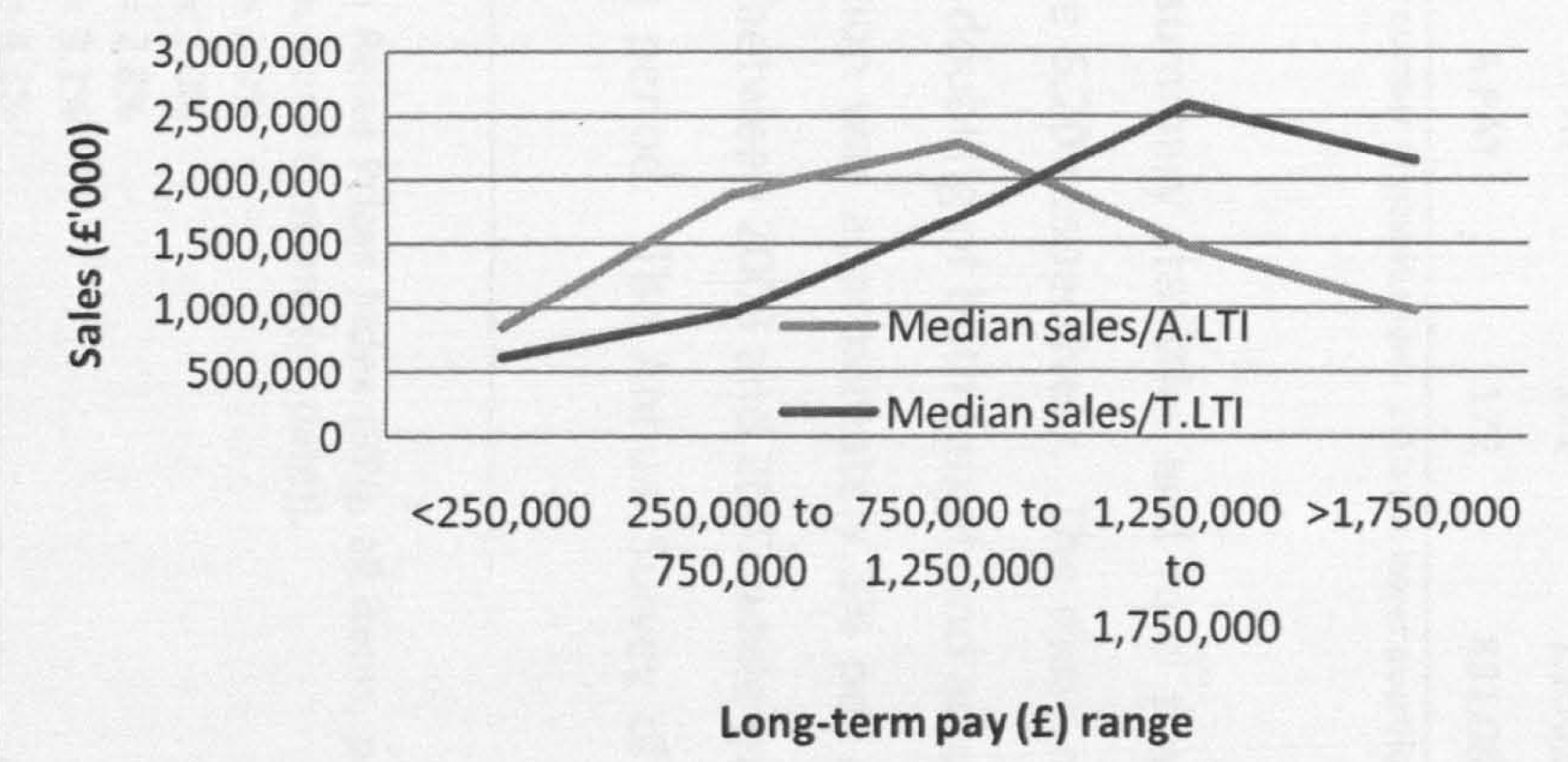


Figure 6.17 - Median firm EPS by long-term pay

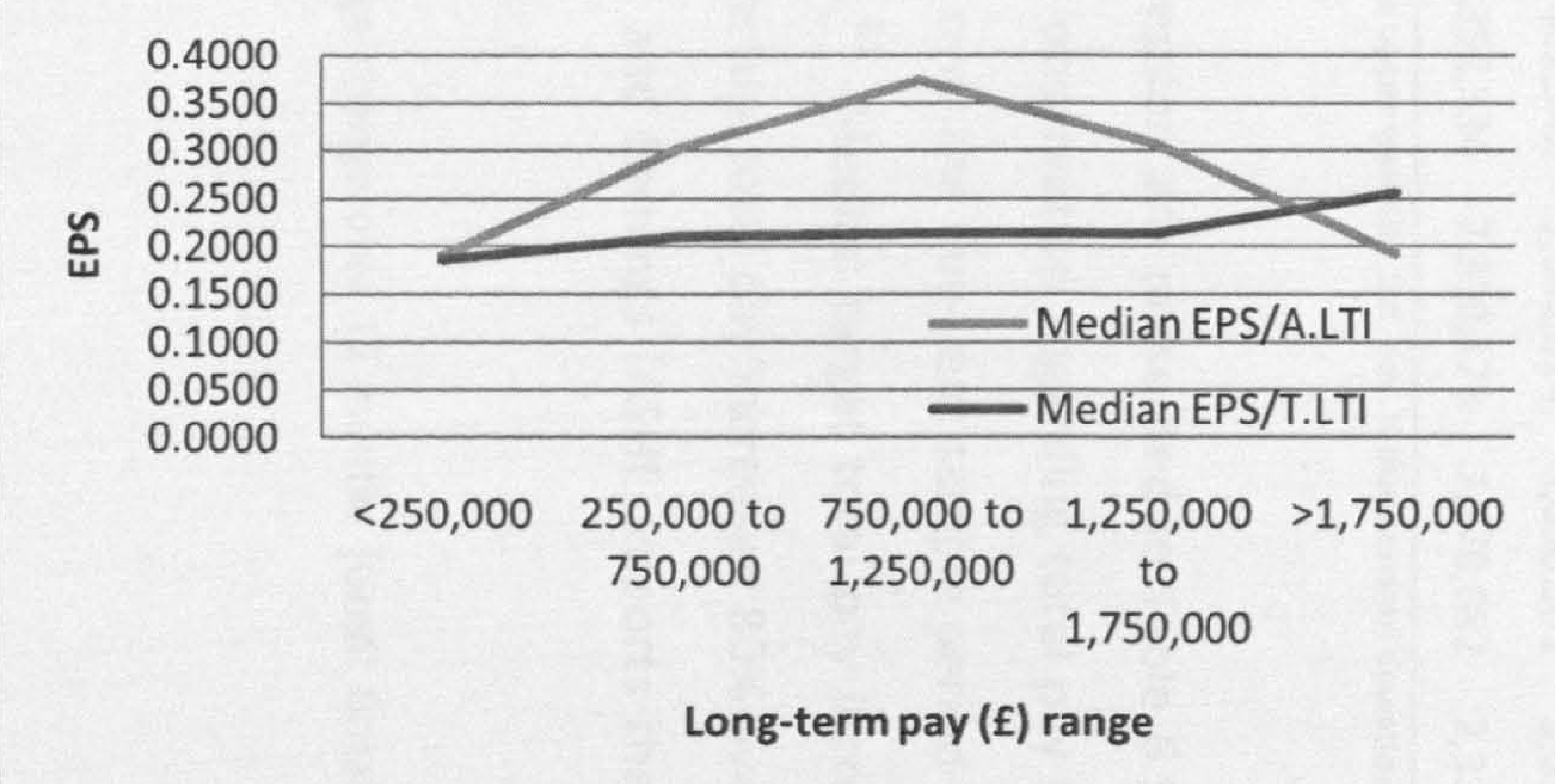


Figure 6.18 - Median firm S.RET by long-term pay

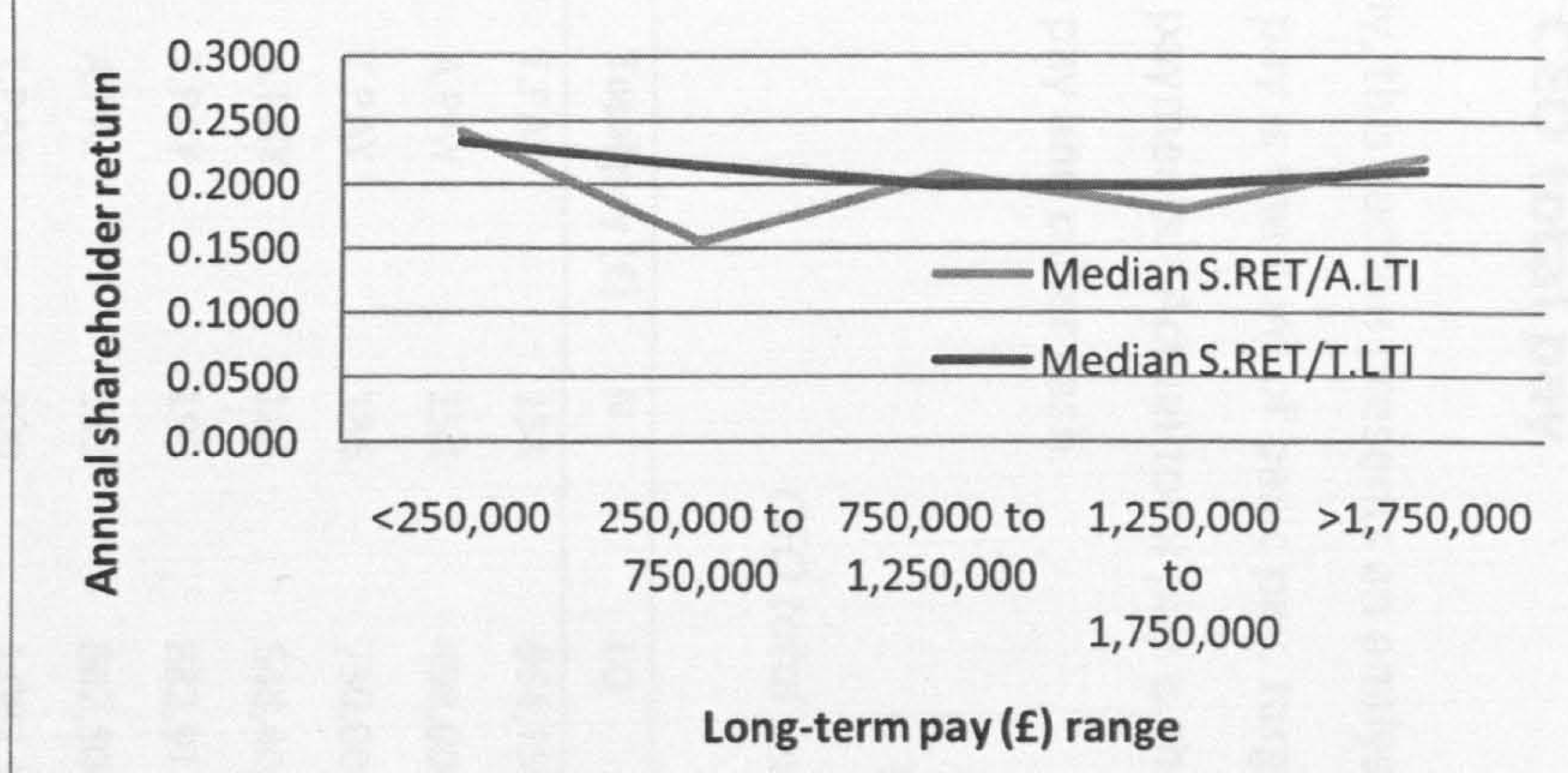
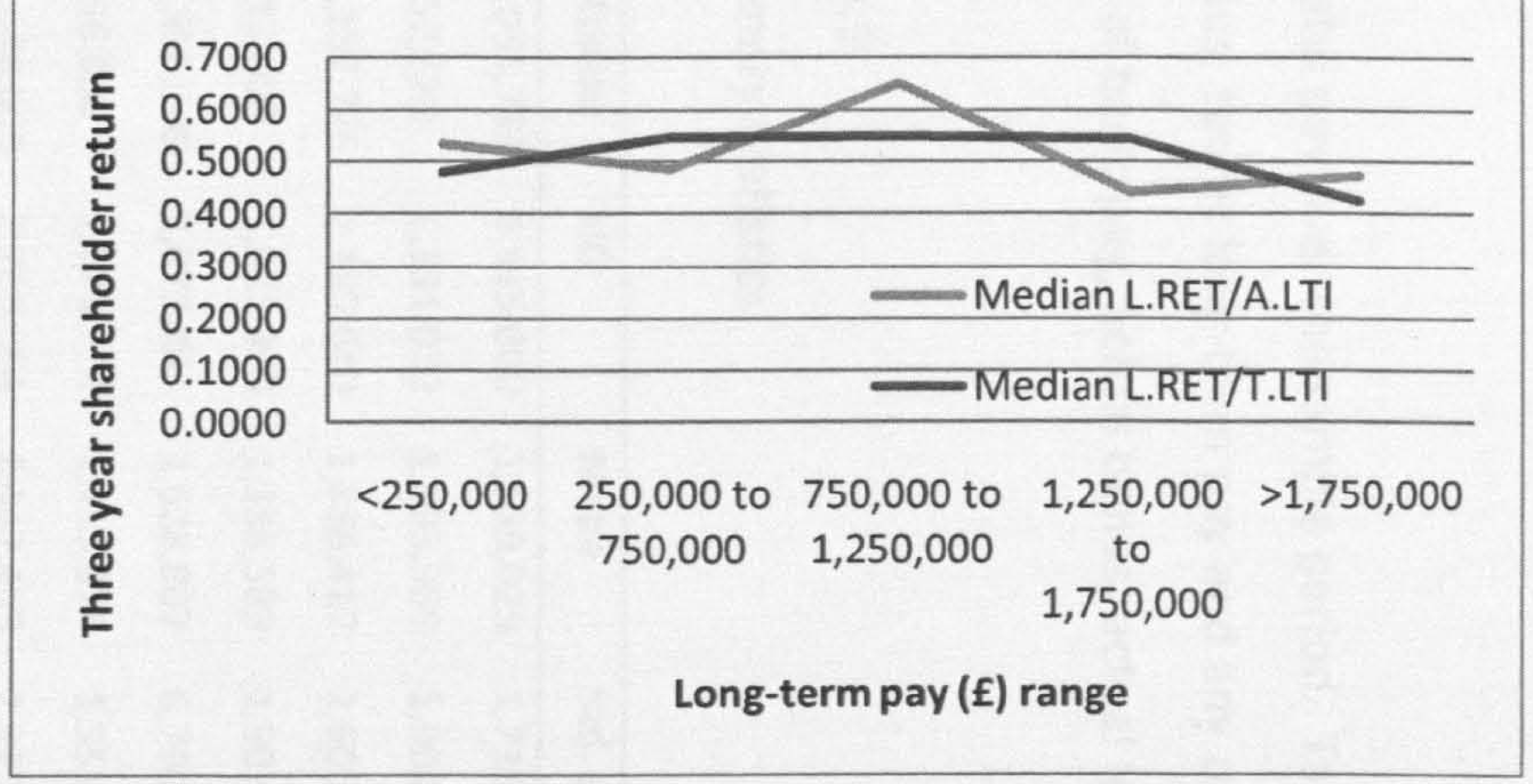


Figure 6.19 - Median firm L.RET by long-term pay



6.8 CEO total pay

Finally, this section presents an analysis of total pay over the sample period. Target total pay is the sum of basic pay, target bonus, target long-term pay and any other cash payments. Actual total pay is the sum of basic pay, actual bonus, actual long-term pay and other cash.

Table 6.9

CEO total pay summary statistics

Year	Total pay (£)	N	LQ	Median	UQ	Mean	Std. dev.
2003	T.PAY	154	664,750	1,051,763	1,815,000	1,539,025	1,718,278
	A.PAY	154	498,000	752,520	1,331,002	1,093,969	1,003,290
2004	T.PAY	186	730,000	1,187,776	2,150,640	1,886,412	2,605,625
	A.PAY	186	548,409	933,000	1,531,399	1,385,583	1,903,932
2005	T.PAY	193	882,917	1,356,109	2,677,861	2,628,807	6,700,117
	A.PAY	193	662,501	956,800	1,670,274	1,413,874	1,351,348
2006	T.PAY	200	1,082,952	1,648,605	2,760,004	2,447,459	2,375,426
	A.PAY	200	732,500	1,104,282	1,897,240	1,615,295	1,595,679
2007	T.PAY	172	1,250,605	1,862,942	3,042,624	3,090,901	5,010,289
	A.PAY	172	881,086	1,352,534	2,308,473	2,070,682	2,328,326

N is the number of observations. LQ is the lower quartile. UQ is the upper quartile. Std. dev. is the standard deviation.

The summary statistics and total pay progression are presented in Table 6.9 and Figure 6.20 respectively. The most notable observation regarding total pay is the near doubling of both target and actual pay over the five-year sample period when inflation was approximately 3% per annum.[61] Median target total pay increased 77% between 2003 and 2007 while median actual total pay increased 80% over the same period. The Annual Survey of Hours and Earnings (ASHE) reports that the

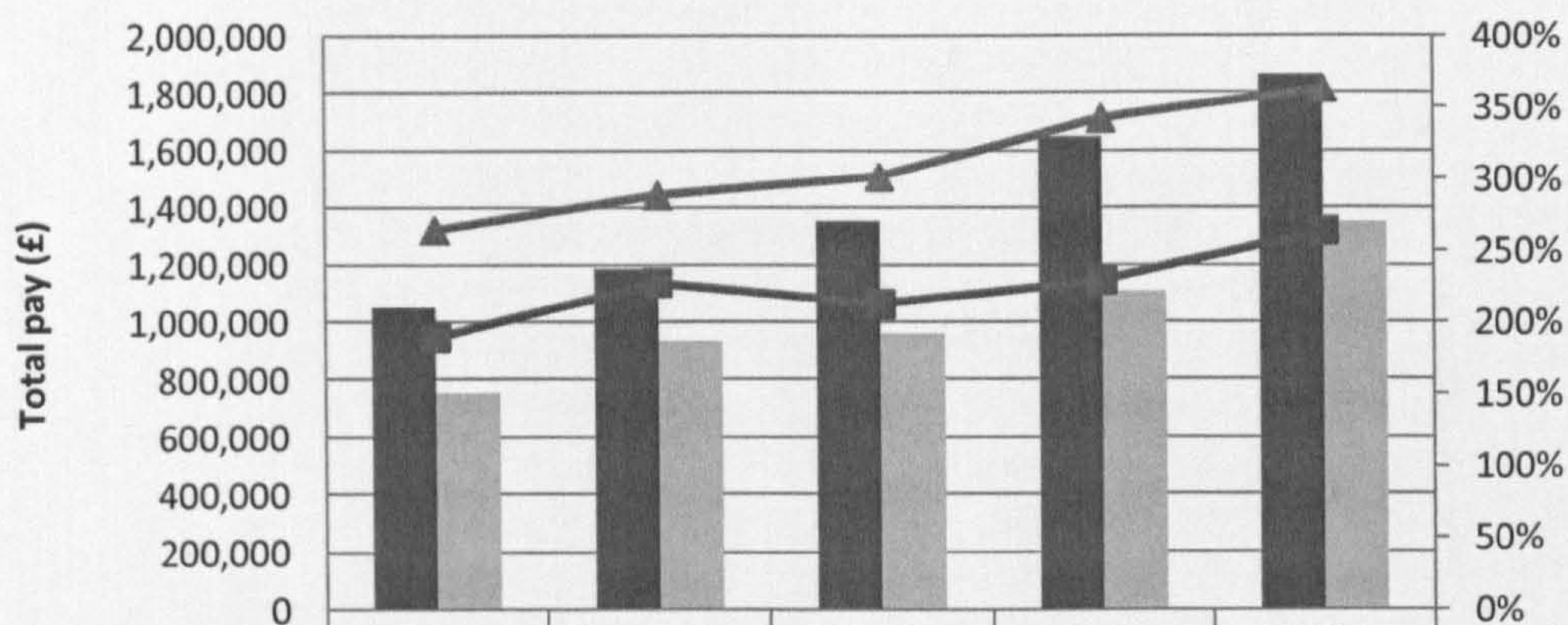
[61] The Retail Prices Index (RPI), all items, percentage change over 12 months (Great Britain, HM Revenue and Customs (no date)).
2003 = 2.9%
2004 = 3.0%
2005 = 2.8%
2006 = 3.2%
2007 = 4.3%

annual all employee median pay increased by only 14% over the same period. It is apparent from the data that the gap between chief executive total compensation and all employee pay continued to increase at an astonishing rate over the sample period. In 2003 median chief executive pay was 43 times median all employee pay and by 2007 it had increased to 68 times. The rise in CEO pay compared to employee pay contrasts with one of the supporting principles of the UK Corporate Governance Code (2010), which is that remuneration committees should be mindful of employee pay when determining executive pay.

A further observation is the considerable variation in total target pay across chief executives. In 2007 the total target pay standard deviation is 162% of the mean. However, it is noticeable that there is less variation in total actual pay. Compared to target pay the actual pay standard deviation in 2007 was 112% of the mean. Similar to the analysis of short-term pay and long-term pay, the examination of total pay further underlines the significant difference between target and actual pay.

Figure 6.20

Median CEO total pay progression



	2003	2004	2005	2006	2007
Median T.PAY (£)	1,051,763	1,187,776	1,356,109	1,648,605	1,862,942
Median A.PAY (£)	752,520	933,000	956,800	1,104,282	1,352,534
% T.PAY of BP	265%	289%	301%	342%	363%
% A.PAY of BP	189%	227%	213%	229%	263%

Median T.PAY (£) Median A.PAY (£) % T.PAY of BP % A.PAY of BP

Figure 6.21 plots firm size against chief executive total pay. The relationship is represented in terms of median firm sales by total pay ranges. The graph shows a positive relationship between firm size and both target and actual total pay and is therefore consistent with the stylised fact that firm size is associated with CEO pay. The results of the regression analysis, Section 7.6, confirm that firm size is significantly associated with target and actual total pay.

Figures 6.22 to 6.24 plot selected measures of absolute firm performance against chief executive total pay. Overall, Figure 6.22 shows target and actual total pay is to some extent increasing relative to EPS. Figure 6.23 shows median annual shareholder return to be decreasing with total pay. Figure 6.24 does not identify an obvious relationship between long-term shareholder return and total pay.

Figure 6.21 - Median firm sales by total pay

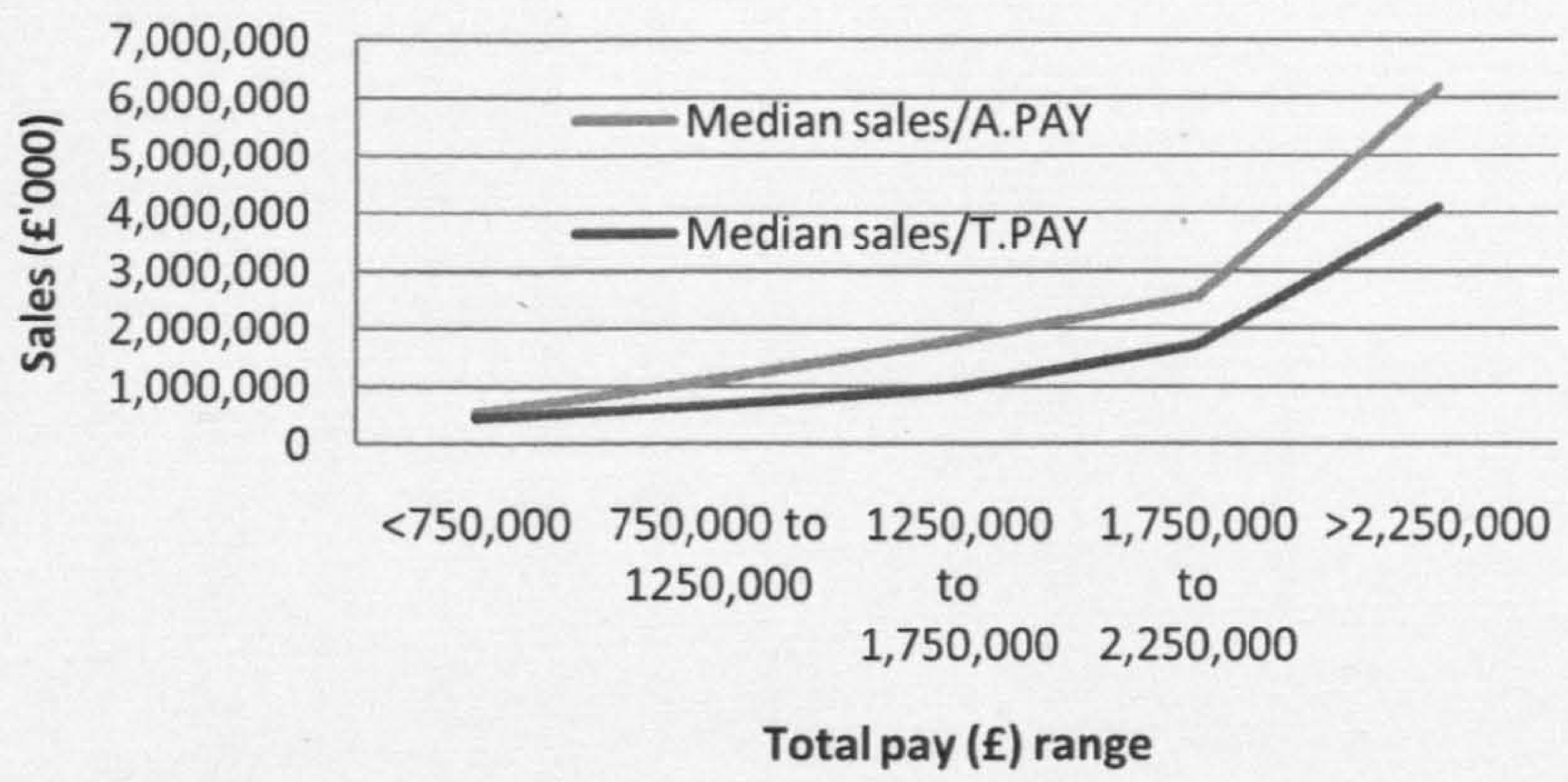


Figure 6.23 - Median firm S.RET by total pay

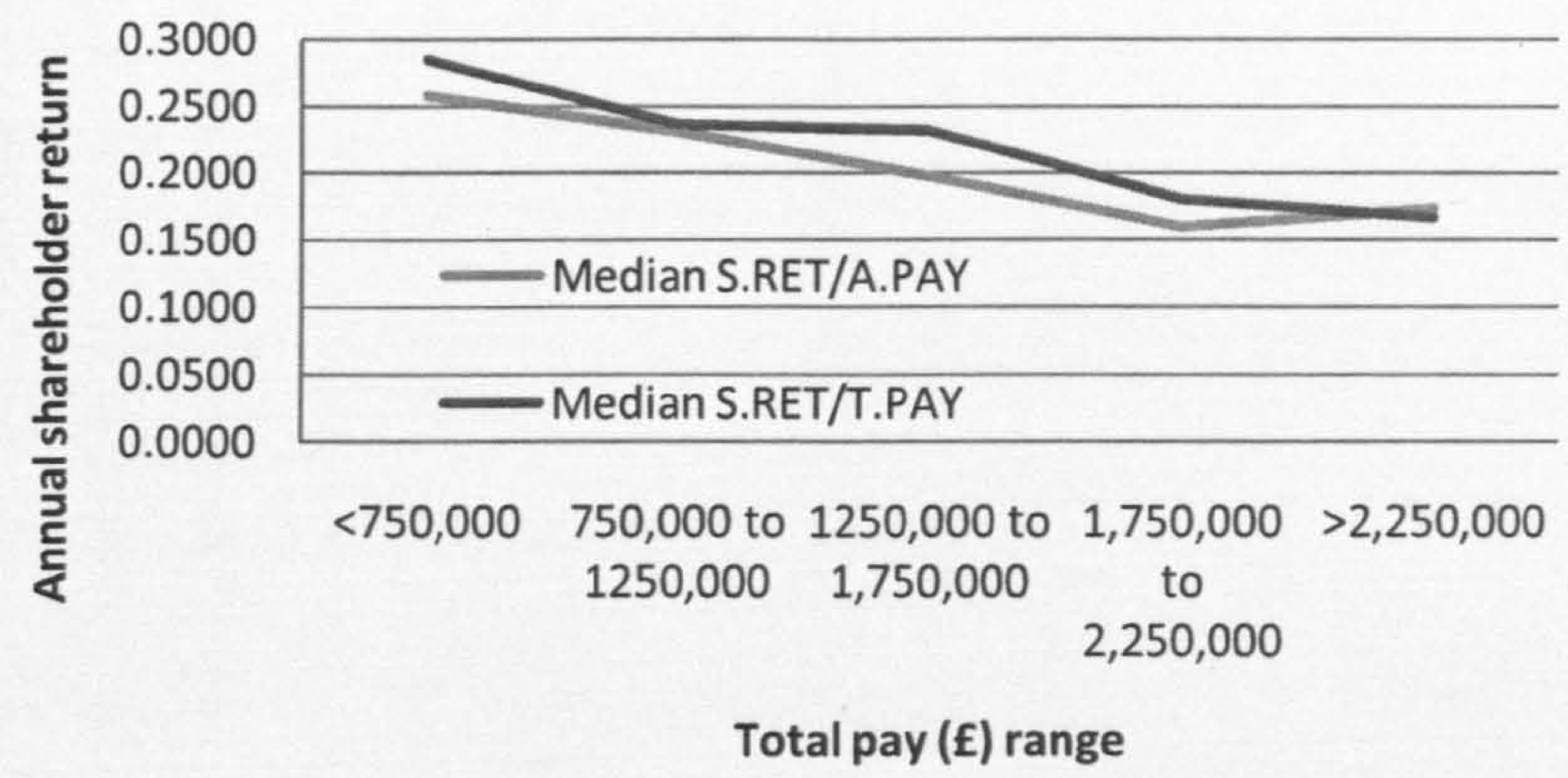


Figure 6.22 - Median firm EPS by total pay

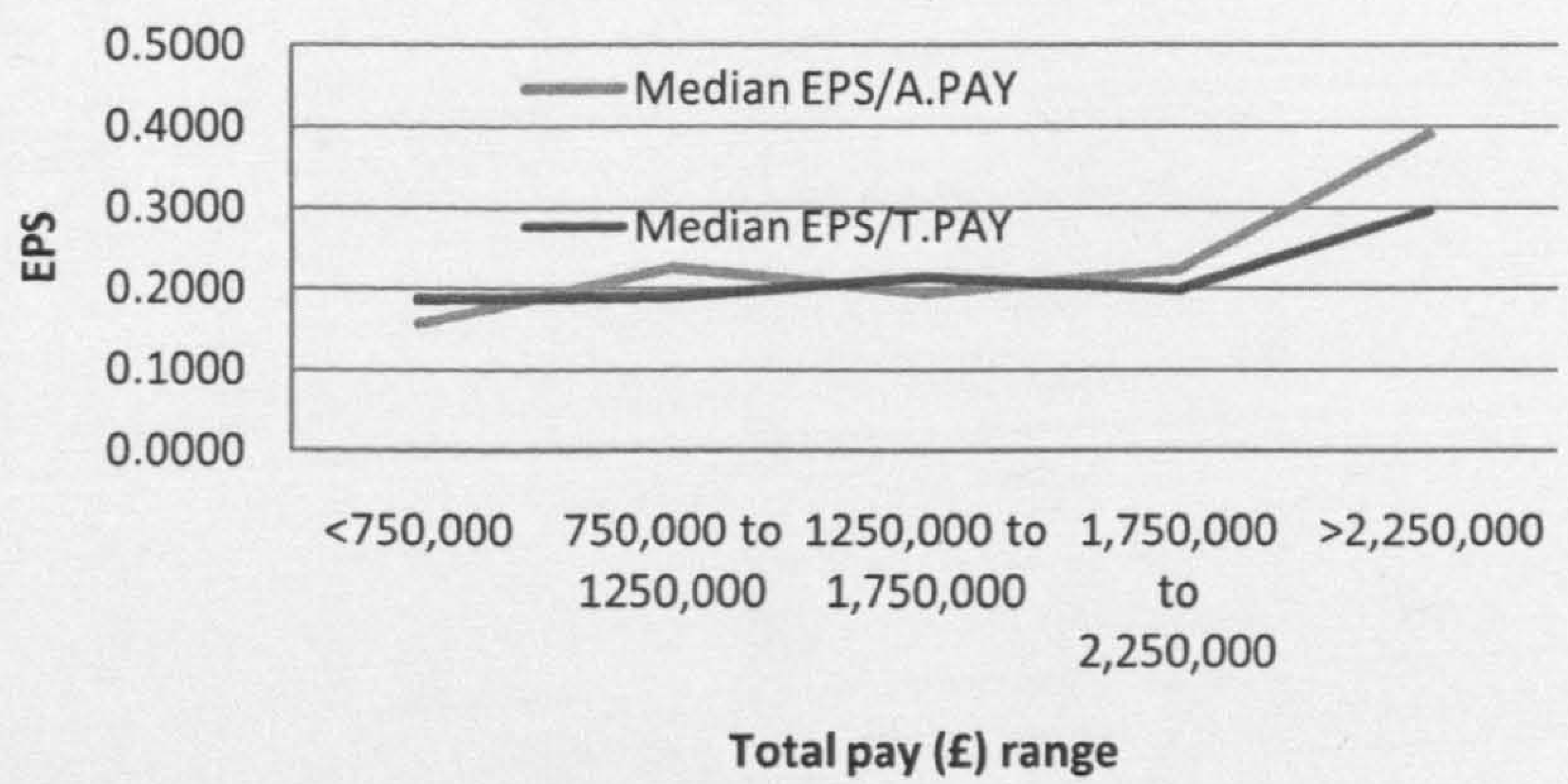
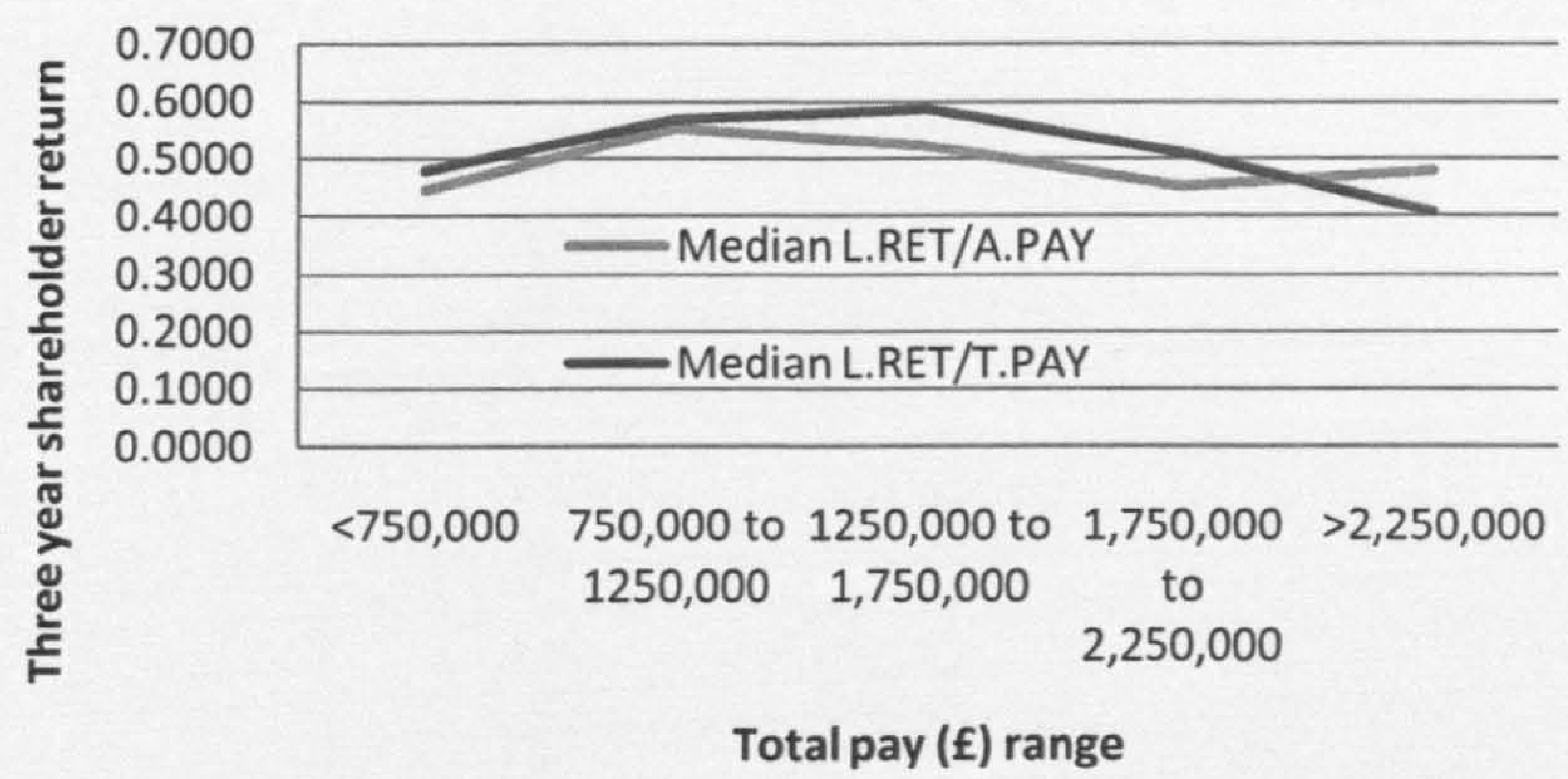


Figure 6.24 - Median firm L.RET by total pay



6.9 Summary

The descriptive analysis of chief executive compensation and corporate performance, presented in this chapter, provides an insight to the structure of pay and how it is allied to corporate performance. In particular, the use of relative performance measures in the design of long-term incentives suggests that relative performance evaluation ought to be important in explaining the variation in chief executive actual long-term compensation and therefore also the impact on actual total pay.

The analysis of chief executive bonus plan design finds that annual bonuses are based on a combination of financial and non-financial performance measures. There has been a tendency towards a greater use of non-financial measures over the sample period, which coincides with a greater likelihood of performance criteria being attained. EPS is reported to be the leading financial performance measure used in chief executive bonus plans. The analysis of long-term incentive design finds that the vast majority of firms measure long-term performance over three years for share option plans and LTIPs. The number of share option grants has reduced substantially over the sample period while LTIPs increased and superseded share options as the preferred long-term incentive. The analysis finds that share options typically vest according to long-term EPS performance whilst LTIPs tend to vest according to relative TSR. The dominance of EPS and TSR as performance measures in chief executive incentive plans supports their selection as independent performance variables in this study.

The analysis illustrates a remarkable increase in chief executive pay over the five-year sample period. All elements of compensation, regardless of the definition, have increased notably particularly in comparison to all employee pay and to the retail price index (RPI). Median actual total pay is 68 times median all employee pay in 2007. The spectacular increase in pay compared to employee pay is not in accordance with a supporting principle of the UK Corporate Governance Code (2010), which is that remuneration committees should be mindful of employee pay when determining executive pay. However, while total pay has increased at a phenomenal rate, the analysis also shows that incentive pay has increased in its importance in the overall pay mix. Median all incentive pay as a proportion of total pay increased from 48% in 2003 to 62% in 2007. This is in harmony with the recommendation in the UK Corporate Governance Code (2010, p.22) that "A significant proportion of executive directors' remuneration should be structured so as to link rewards to corporate and individual performance."

The notable difference between levels of target and actual pay suggests that the relationship between corporate performance and chief executive pay might be different for fixed pay, incentive opportunity and actual incentive pay. Further, the incentive design analysis suggests, as asserted in this study, that the different elements of chief executive pay are based on different performance criteria and hence different outcomes.

The differences between the simple analysis presented in this chapter and the more sophisticated analysis to follow, suggests that great care is required when drawing conclusions about CEO pay and corporate performance. The next chapter tests the hypotheses developed in Chapter Four using the panel data regression models presented in Chapter Five.

Chapter Seven

Empirical Results, Analysis and Discussion

7.1 Introduction

This chapter presents the results of the multiple regression analysis used to examine the association between corporate performance and chief executive compensation for the sample of 204 large UK plcs, between 2003 and 2007. The four categories of compensation, basic pay; short-term pay; long-term pay and total pay are examined in succession.

The analysis begins with basic pay where, according to the descriptive analysis in the previous chapter, the relationship with firm performance is not made explicit by remuneration committees. The panel data regression is used to investigate whether firm absolute and relative performance is related to basic pay. Next, short-term pay is considered where it has already been shown in chapter six that firms do use a mix of financial and non-financial performance measures in the design of annual bonus plans. The incentive setting process is first explored by reporting target pay, which is then followed by the major element of this study – the relationship between firm performance and actual pay. This analysis is repeated for long-term pay and total pay.

The regression is performed using panel data econometric techniques that lessen the problem of estimation bias caused by omitted variables. The estimation methods control for non-observed firm or chief executive characteristics that may influence the determination of chief executive compensation (Conyon and Peck, 1998b). Random-effects and fixed-effects panel data models are employed to estimate the association between firm performance and chief executive pay; peer group performance and chief executive pay; and company size and chief executive pay. The results are presented in relation to the hypotheses developed in Chapter Four. First, it is hypothesised that firm performance is positively related to chief executive pay. Second, whilst holding firm performance constant, peer group performance is expected to be negatively associated with pay. Third, it is predicted that company size is positively related to chief executive pay. It is expected that the magnitude and strength of the predicted relationships will depend on the respective chief executive compensation variable.

Overall and in relation to the research purpose and research questions outlined in Section 4.7 the results show that it is essential to differentiate between fixed pay, performance-contingent pay and performance-realised pay, in order to comprehend how corporate performance influences chief executive pay outcomes. Further, the results find it is important to match the performance measure and performance period to the different elements of chief executive compensation.

The principal finding is the strong evidence of relative performance evaluation (RPE) in chief executive compensation, which has rarely been identified in UK chief executive pay. This study finds that different measures of peer group performance impact on chief executive pay in different ways. Actual bonus pay is determined relative to the short-term performance of the overall market index; actual long-term pay is determined relative to long-term industry sector performance. This finding provides evidence of the importance in matching the performance indicator to the executive compensation measure.

The regression results are set out and discussed in the sections below for each of the seven dependent chief executive compensation variables: basic pay, target bonus, actual bonus, target LTI, actual LTI, target total pay and actual total pay. In each case both the random-effect and fixed-effect estimates are reported. If the unobserved time-invariant effects (e.g. executive ability) are correlated with the explanatory variables the random-effect estimates are biased and the fixed-effects are preferred since they are consistent (Deckop, 1988). Otherwise the random-effect estimates are preferred. A Hausman (1978) test is performed for each regression to identify which estimator is preferred. The result is reported below the estimates for each model in the random-effect results table. The null hypothesis, of no systematic differences between the random and fixed-effect models, is rejected for a large and significant Hausman statistic; the unobserved CEO-firm specific effects are correlated with the explanatory variables and therefore the random-effect estimates are biased. If the null hypothesis is retained the random-effect estimates are preferred since they are considered more efficient (Wooldridge, 2009).

As described in Chapter Five, the dependent compensation variables are in logarithmic form. Therefore changes in the independent variables are expressed as percentage changes in compensation. In this study, the exponential transformation is employed to calculate the exact percentage change in compensation for a percentage increase in a log independent variable (e.g. total shareholder return) or a one unit increase in a variable expressed in its original form (e.g. earnings per share). The corresponding results for a percentage decrease or one unit decrease are not reported.

7.2 Preliminary statistics

7.2.1 Compensation variable correlation

This section presents the compensation variable correlation analysis, which above all shows how target incentives are strongly correlated with basic pay, while actual incentives are much less so. The correlation matrix, Table 7.1, clearly shows a strong and significant correlation between basic pay and the performance-contingent pay variables (target bonus and target long-term incentive). A strong correlation between the two forms of pay is to be expected, as it is evident over the sample period that remuneration committees set maximum chief executive short and long-term incentive opportunities as a proportion of basic pay. This is illustrated by the following statements, taken from the remuneration reports of two sample firms included in this study, regarding maximum annual bonus and long-term incentive grant practice.

> *"The amount of annual bonus available for distribution to senior executives for the financial year 2007 was subject to a maximum limit of 100 per cent of salary"* (British Airways, 2007, p.39).

"The annual bonus provides an incentive opportunity in the range of 0% to 80% (Chief Executive) and 0% to 75% (for other executive Directors) of base salary" (UK Coal, 2007, p.55).

"The Remuneration Committee supervises the operation of the PSP [Performance Share Plan]. Awards worth up to 150 per cent of an executive's base salary can be granted" (British Airways, 2007, p.40).

"Under the terms of the current LTIP, an award of shares up to a maximum value of 100% of base salary is conditionally allocated to each executive Director" (UK Coal, 2007, p.56).

The correlation between basic pay and the performance-realised pay variables (actual bonus and actual long-term incentive), while still significant, is of much smaller magnitude (0.25 for actual bonus and only 0.15 for actual long-term pay). It is contended in this study that it is necessary to differentiate between basic pay, performance-contingent pay and performance-realised pay in order to ascertain how firm performance influences the various components of pay. The correlation coefficients indicate strong correlation between basic pay and performance-contingent pay, but much weaker correlation between basic pay and performance-realised pay. This observation provides initial evidence that the distinction between PCP and PRP is valid.

A further research question is whether it is important to match the performance measure and performance period to each element of compensation. In this study it is hypothesised that actual bonus pay is a function of short-term performance while actual long-term pay is a function of long-term performance. It is therefore noteworthy that there is no significant correlation between actual bonus and actual LTI, which suggests that they might be determined by different levels of performance.

Table 7.1

Pearson correlation matrix: CEO compensation variables

Dependent Variable[a]	1	2	3	4	5	6	7
Basic pay	1.00						
Target bonus	0.88**	1.00					
Actual bonus	0.25**	0.29**	1.00				
Target long-term incentive	0.71**	0.69**	0.29**	1.00			
Actual long-term incentive	0.15**	0.15**	0.04	0.20**	1.00		
Target total pay	0.86**	0.87**	0.27**	0.92**	0.18**	1.00	
Actual total pay	0.79**	0.82**	0.42**	0.73**	0.41**	0.81**	1.00

This table reports Pearson's correlation coefficients for the dependent variables. Basic pay is the natural logarithm of annual basic pay. Target bonus is the natural logarithm of the cash value of annual maximum bonus incentive (including deferred bonus incentive compensation [to be paid in cash, options or shares] without additional performance conditions). Actual bonus is the natural logarithm of the cash value of paid annual bonus (including guaranteed deferred bonus compensation [paid in cash, options or shares] without additional performance conditions). Target long-term incentive is the natural logarithm of the cash value of annual performance-option grant, plus annual performance-share grant, plus long-term cash plan (in all cases the payout is contingent on future performance conditions). Actual long-term incentive is the natural logarithm of the cash value of performance-options vesting in the current year, plus performance-shares vesting in the current year, plus long-term cash plan vesting in the current year, plus the grant value of time-vesting options, plus the grant value of time-vesting shares. Target total pay is the natural logarithm of the sum of basic pay, plus other cash, plus target bonus, plus target long-term incentive. Actual total pay is the natural logarithm of the sum of basic pay, plus other cash, plus actual bonus, plus actual long-term incentive. *Correlation is significant at better than the 5% level (two-tailed). **Correlation is significant at better than the 1% level (two-tailed). [a]variable in natural logarithms.

7.2.2 Firm and peer group performance correlation

In order to test the RPE hypothesis, that peer group performance is negatively related to pay whilst controlling for firm performance, peer group performance must first be shown to be correlated with own firm performance (Liu and Stark, 2009). A pooled OLS regression is used to examine the correlation between peer group performance and firm performance and the results of these regressions are reported in Table 7.2. In each regression the coefficient of the peer group performance variable is large and significant ($p < 0.001$). These results indicate that a significant negative coefficient on the peer group performance variable in the random and fixed regression models is evidence of relative performance evaluation (Conyon and Leech, 1994).

Table 7.2

Pooled OLS regression of firm performance

Dependent variable	Firm performance variable	Peer performance variable	Coefficient of peer group performance	Statistical significance (t-value)
Basic pay	$S.RET_{t-1}$	$S.IN.RET_{t-1}$	1.075	23.33
		$S.MK.RET_{t-1}$	1.248	20.94
Target bonus	$S.RET_{t-1}$	$S.IN.RET_{t-1}$	1.086	22.95
		$S.MK.RET_{t-1}$	1.288	21.01
Actual bonus	$S.RET_{t}$	$S.IN.RET_{t}$	1.087	23.06
		$S.MK.RET_{t}$	1.242	18.64
Target LTI	$S.RET_{t-1}$	$S.IN.RET_{t-1}$	1.095	21.32
		$S.MK.RET_{t-1}$	1.234	18.76
Actual LTI	$L.RET_{t-1}$	$L.IN.RET_{t-1}$	1.081	19.66
		$L.MK.RET_{t-1}$	1.209	14.22
Target total pay	$S.RET_{t-1}$	$S.IN.RET_{t-1}$	1.075	23.33
		$S.MK.RET_{t-1}$	1.248	20.94
Actual total pay	$S.RET_{t}$	$S.IN.RET_{t}$	1.098	23.41
		$S.MK.RET_{t}$	1.258	19.04
	$L.RET_{t-1}$	$L.IN.RET_{t-1}$	0.989	25.34
		$L.MK.RET_{t-1}$	1.243	16.93

This table reports the regression coefficients for the peer group performance variables from the pooled regression of firm performance on peer group performance for each model specification. Basic pay is the natural logarithm of annual basic pay. Target bonus is the natural logarithm of the cash value of annual maximum bonus incentive (including deferred bonus incentive compensation [to be paid in cash, options or shares] without additional performance conditions). Actual bonus is the natural logarithm of the cash value of paid annual bonus (including guaranteed deferred bonus compensation [paid in cash, options or shares] without additional performance conditions). Target LTI is the natural logarithm of the cash value of annual performance-option grant, plus annual performance-share grant, plus long-term cash plan (in all cases the payout is contingent on future performance conditions). Actual LTI is the natural logarithm of the cash value of performance-options vesting in the current year, plus performance-shares vesting in the current year, plus long-term cash plan vesting in the current year, plus the grant value of time-vesting options, plus the grant value of time-vesting shares. Target total pay is the natural logarithm of the sum of basic pay, plus other cash, plus target bonus, plus target LTI. Actual total pay is the natural logarithm of the sum of basic pay, plus other cash, plus actual bonus, plus actual LTI. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. L.RET is the three-year change in the natural logarithm of the return index. L.IN.RET is the median three-year return of the FTSE-350 share sector index. L.MK.RET is the median three-year return of the FTSE-350 share index.

7.3 CEO basic pay

This section presents the random and fixed-effect regression results and analysis for chief executive basic pay.

7.3.1 Basic pay regression results

Chief executive basic pay is determined at the start or set partway through the financial year and is paid in equal monthly instalments over the financial year. Basic pay is therefore assumed to be associated with the previous year's financial performance, rather than related contemporaneously with firm performance. For this reason the performance variables and company size variable are lagged one year to correctly estimate the association between corporate performance and basic pay.

The results for basic pay are reported in Table 7.3 for random-effect estimates and Table 7.4 for fixed-effect estimates. Hypothesis 1a predicts short-term performance is positively related to chief executive basic pay. Hypothesis 1b predicts short-term peer group performance is negatively related to basic pay. Hypothesis 1c predicts company size is positively related to basic pay.

The Hausman (1978) test statistic for each regression model is shown in Table 7.3. The Hausman statistic is large and significant for RE models 1a to 1f. The null hypothesis of no correlation between random-effects and the independent variables is rejected. Random-effects are inconsistent, and therefore the consistent fixed-effects estimates are preferred (Wooldridge, 2009).

Table 7.3

Random-effect regressions of chief executive basic pay[a]

Variable	RE model 1a[a]	RE model 1b[a]	RE model 1c[a]	RE model 1d[a]	RE model 1e[a]	RE model 1f[a]
$S.EPS_{t-1}$	-0.017		-0.021			-0.022
	(-1.22)		(-1.36)			(-1.42)
$S.RET_{t-1}$		0.008	0.010	0.018	0.019	0.023*
		(0.76)	(0.96)	(1.39)	(1.47)	(1.76)
$S.IN.RET_{t-1}$				-0.034*		-0.012
				(-1.80)		(-0.45)
$S.MK.RET_{t-1}$					-0.050**	-0.042
					(-2.37)	(-1.34)
$SALES^{a}_{t-1}$	0.185***	0.184***	0.185***	0.184***	0.184***	0.185***
	(13.86)	(13.75)	(13.77)	(13.65)	(13.73)	(13.69)
AGE	0.007**	0.007**	0.007**	0.007**	0.007**	0.007**
	(2.54)	(2.51)	(2.55)	(2.52)	(2.51)	(2.55)
TEN	0.009***	0.008***	0.009***	0.008***	0.008***	0.008***
	(3.09)	(3.05)	(3.08)	(3.05)	(3.03)	(3.06)
YR.2004	0.049***	0.047***	0.047***	0.051***	0.052***	0.053***
	(5.73)	(5.43)	(5.43)	(6.22)	(6.38)	(6.53)
YR.2005	0.104***	0.099***	0.100***	0.108***	0.112***	0.114***
	(8.78)	(8.30)	(8.37)	(8.58)	(9.17)	(9.20)
YR.2006	0.158***	0.153***	0.155***	0.161***	0.163***	0.166***
	(10.70)	(10.69)	(10.66)	(10.73)	(11.07)	(10.96)
YR.2007	0.205***	0.199***	0.202***	0.207***	0.211***	0.215***
	(11.87)	(11.77)	(11.76)	(12.04)	(12.24)	(12.19)

Variable	RE model 1a[a]	RE model 1b[a]	RE model 1c[a]	RE model 1d[a]	RE model 1e[a]	RE model 1f[a]
Intercept	9.976***	9.992***	9.973***	9.993***	9.994***	9.974***
	(44.77)	(45.13)	(44.51)	(44.88)	(45.14)	(44.36)
Wald $\chi 2$	665.91	714.37	714.55	718.15	744.76	742.91
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
Hausman $\chi 2$	45.39	46.81	46.38	48.95	50.25	50.00
	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)
R^2 within	0.667	0.668	0.668	0.670	0.670	0.671
R^2 between	0.670	0.668	0.669	0.668	0.667	0.669
R^2 overall	0.670	0.669	0.670	0.669	0.669	0.669
Observations	833	833	833	833	833	833

This table reports random-effect regressions clustered by year and CEO-firm pair with robust standard errors. Basic pay is the natural logarithm of annual basic pay. S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. AGE is the age of the CEO in number of years. TEN is the number of years since being appointed CEO. YR is a set of year dummy variables. z-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.4

Fixed-effect regressions of chief executive basic pay[a]

Variable	FE model 1a[a]	FE model 1b[a]	FE model 1c[a]	FE model 1d[a]	FE model 1e[a]	FE model 1f[a]
$S.EPS_{t-1}$	-0.007		-0.012			-0.014
	(-0.44)		(-0.69)			(-0.77)
$S.RET_{t-1}$		0.011	0.012	0.023*	0.024**	0.028**
		(1.18)	(1.25)	(1.84)	(2.06)	(2.19)
$S.IN.RET_{t-1}$				-0.040**		-0.014
				(-2.09)		(-0.52)
$S.MK.RET_{t-1}$					-0.060***	-0.050
					(-2.99)	(-1.58)
$SALES^{a}_{t-1}$	0.099***	0.098***	0.099***	0.097***	0.096***	0.097***
	(3.69)	(3.70)	(3.69)	(3.67)	(3.69)	(3.67)
YR.2004	0.069***	0.067***	0.067***	0.072***	0.074***	0.074***
	(8.80)	(8.38)	(8.38)	(9.35)	(9.53)	(9.70)
YR.2005	0.145***	0.140***	0.141***	0.150***	0.155***	0.157***
	(13.25)	(12.53)	(12.66)	(12.42)	(13.38)	(13.31)
YR.2006	0.223***	0.218***	0.220***	0.228***	0.231***	0.234***
	(16.41)	(16.46)	(16.40)	(15.79)	(16.65)	(16.15)
YR.2007	0.293***	0.288***	0.290***	0.297***	0.302***	0.306***
	(18.42)	(18.04)	(18.30)	(17.69)	(18.33)	(18.31)

Variable	FE model 1a[a]	FE model 1b[a]	FE model 1c[a]	FE model 1d[a]	FE model 1e[a]	FE model 1f[a]
Intercept	11.521***	11.541***	11.528***	11.551***	11.559***	11.544***
	(31.06)	(31.65)	(31.24)	(31.70)	(32.00)	(31.56)
F-test	86.33	90.94	77.66	78.39	78.67	61.03
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
R^2 within	0.679	0.680	0.680	0.682	0.683	0.684
R^2 between	0.566	0.562	0.563	0.558	0.557	0.558
R^2 overall	0.562	0.559	0.560	0.555	0.554	0.554
Observations	833	833	833	833	833	833

This table reports fixed-effect regressions clustered by year and CEO-firm pair with robust standard errors. Basic pay is the natural logarithm of annual basic pay. S EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

7.3.2 Basic pay analysis and discussion

The results of the hypothesis tests, based on the fixed-effect estimates, are summarised in Table 7.5. Overall the results for basic pay are comparable to the firm size and firm performance elasticities reported in the UK literature for executive cash compensation and total pay (for example, Conyon et al., 2000; Conyon and Schwalbach, 2000; Gregory-Smith, 2009). The findings are also similar to the small number of studies that specifically report elasticities for executive basic pay (for example, Murphy, 1985; McKnight and Tomkins, 1999). The most significant finding and reported for the first time in the executive pay literature is the support for the RPE in basic pay. This new finding may be the outcome of using a median peer group shareholder return performance variable rather than the mean performance used in prior studies. The problem with mean performance is that it can be influenced by the performance of only a few firms, while median performance is not influenced by outliers.

Table 7.5

Basic pay: summary hypothesis results[a]

Independent Variable	Hypothesis	Prediction	Outcome
Short-term EPS	H_A1a	$\beta_1 > 0$	Not significant
Short-term shareholder return	H_A1a	$\beta_1 > 0$	Significant (+)
Short-term FTSE-350 industry sector return	H_A1b	$\beta_2 < 0$	Significant (-)
Short-term FTSE-350 market return	H_A1b	$\beta_2 < 0$	Significant (-)
Net sales	H_A1c	$\beta_3 > 0$	Significant (+)

[a]Statistical significance determined by the fixed-effect estimates.

In terms of the EPS performance measure we retain the null hypothesis 1a. The EPS measure is not significant in determining basic pay a finding comparable to McKnight and Tomkins (1999). Whereas, there is evidence with respect to the shareholder return variable to reject the null hypothesis 1a. The FE Models 1d, 1e and 1f report a significant positive association between shareholder return and basic pay, although the effect is small. Specifically, according to FE model 1f, which reports the highest within variation explanatory power of 68.4%, a 10% increase in shareholder return is associated with a 0.28%[62] increase in basic pay. The result is statistically significant but has small economic significance. This is equivalent to only a £1,438 increase in pay if assessed relative to median chief executive basic pay in 2007, which was £513,500. The findings are comparable to the empirical literature. The reported elasticity value lies between the estimate for UK executive basic pay by McKnight and Tomkins (1999) of 0.024 and the value for US executive pay estimated by Murphy (1985), of 0.041.

The most important and appealing finding is the significant and negative association between FTSE-350 sector and market peer group performance and basic pay, demonstrating evidence of RPE. The null hypothesis 1b can be rejected. When the peer group is defined as the industry sector, the coefficient is -0.040 (p-value < 0.05). The coefficient on market peer group performance is -0.060 (p-value < 0.01). This is the first study to find significant evidence of RPE in *chief executive basic pay*. The result is also in contrast to most other UK studies, which measure cash compensation (basic pay plus actual bonus) or total compensation (cash compensation plus long-term target incentives). The UK literature typically finds no evidence of RPE in executive cash compensation (for example, Conyon and Leech, 1994; Conyon 1997; Conyon, 1998; Benito and Conyon, 1999) or total compensation (Main et al., 1996). More recently, Liu and Stark (2009) find a negative association between total board cash compensation and accounting-based RPE but no evidence of market-based RPE.

Interestingly, there is no evidence from the descriptive analysis of firm remuneration reports in Chapter Six, to suggest firms consider *performance* in the determination of basic pay. However, the significant negative estimate of peer group performance on chief executive basic pay suggests that remuneration committees do indeed consider RPE when adjusting chief executive basic pay.

The final regression in Table 7.4, FE model 1f, includes both sector and market peer group performance variables. The results find neither index is significant, which

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[62] $[(e^{(0.1 \times 0.028)} - 1) \times 100 = 0.28\%]$

may be due to issues of multicollinearity between the industry sector performance and overall market peer group performance variables.

Sales are positively related to basic pay and therefore the null hypothesis 1c is rejected. The coefficient regarding the elasticity of basic pay with respect to sales is around 0.10 for all models and significant (p-value < 0.01). A 10% larger firm will pay its executives on average 1%[63] more. A 1% increase in 2007 median basic pay is equal to an absolute increase of £5,135.

The random-effects estimates for the control variables CEO age and CEO tenure are significant and positively related to basic pay, an indication that executives are rewarded for additional increments of human capital.

The year dummy variables are positive and significant for both the random and fixed-effect regressions. The positive effect increases year on year relative to the 2003 base year. The year dummy variables capture average changes in compensation in part due to price inflation but also due to general pay trends. The coefficients are reflective of the overall growth in CEO basic pay over the sample period, which is reported in Section 6.5.

7.3.3 Concluding remarks about basic pay

Overall the findings suggest that while basic pay is a function of own firm performance and relative firm performance, company size is in economic terms a more significant predictor of chief executive basic pay. The dominance of company size is consistent with previous findings reported throughout the executive pay literature (for example, Conyon, 1998; Lang and Weir, 1999; Johnston, 2002; Gregg et al., 2005; Girma et al., 2007).

Next, the regression analysis is repeated for the short-term bonus pay dependent variables.

[63] $[(e^{(0.1 \times 0.100)} - 1) \times 100 = 1\%]$

7.4 CEO short-term pay

This section presents the random and fixed-effect regression results and analysis for target and actual bonus pay. Target bonus pay is the cash value of annual maximum bonus incentive including deferred bonus compensation (without additional performance conditions). Actual bonus pay is the cash value of paid annual bonus also including actual deferred bonus compensation without additional performance conditions.

7.4.1 Target bonus regression results

Chief executive target bonus pay is set at the start of the financial year and is typically expressed as a multiple of basic pay. Therefore, akin to basic pay, target bonus is assumed to be associated with the previous year's financial performance, rather than related contemporaneously with firm performance. For this reason the performance variables and company size variable are lagged one year to correctly estimate the association between corporate performance and target bonus pay.

The estimated impact of firm performance, peer group performance and firm size on target bonus pay are reported in Tables 7.6 and 7.7. The random-effect estimates in the former and the fixed-effect estimates in the latter. Hypothesis 2a predicts short-term performance is positively related to chief executive target bonus pay. Hypothesis 2b predicts short-term peer group performance is negatively related to target bonus pay. Hypothesis 2c predicts company size is positively related to target bonus pay.

The Hausman (1978) test statistic for each regression model is shown in Table 7.6. The Hausman statistic is large and significant for RE models 2a to 2f. Therefore, the null hypothesis of no correlation between random-effects and the independent variables is rejected. Random-effects are inconsistent and therefore the consistent fixed-effect estimates are preferred (Wooldridge, 2009).

Table 7.6

Random-effect regressions for chief executive target bonus[a]

Variable	RE model 2a[a]	RE model 2b[a]	RE model 2c[a]	RE model 2d[a]	RE model 2e[a]	RE model 2f[a]
$S.EPS_{t-1}$	-0.030		-0.036			-0.038
	(-0.90)		(-1.05)			(-1.08)
$S.RET_{t-1}$		0.015	0.019	0.036	0.034	0.043*
		(0.86)	(1.06)	(1.51)	(1.52)	(1.80)
$S.IN.RET_{t-1}$				-0.071*		-0.039
				(-1.86)		(-0.84)
$S.MK.RET_{t-1}$					-0.087*	-0.059
					(-1.90)	(-1.05)
$SALES^{a}_{t-1}$	0.293***	0.292***	0.294***	0.292***	0.293***	0.295***
	(10.93)	(10.82)	(10.91)	(10.80)	(10.96)	(11.01)
AGE	0.005	0.005	0.005	0.005	0.005	0.005
	(0.87)	(0.83)	(0.88)	(0.84)	(0.83)	(0.88)
TEN	0.014**	0.014**	0.014**	0.014**	0.014**	0.014**
	(2.00)	(1.98)	(1.98)	(1.97)	(1.98)	(1.98)
YR.2004	0.105***	0.102***	0.102***	0.111***	0.111***	0.113***
	(5.33)	(5.03)	(5.04)	(5.55)	(5.61)	(5.71)
YR.2005	0.222***	0.213***	0.215***	0.230***	0.234***	0.239***
	(7.38)	(6.95)	(6.96)	(7.42)	(7.63)	(7.69)
YR.2006	0.366***	0.356***	0.360***	0.372***	0.373***	0.381***
	(9.51)	(9.44)	(9.34)	(9.62)	(9.69)	(9.64)
YR.2007	0.494***	0.483***	0.489***	0.499***	0.502***	0.510***
	(10.80)	(10.85)	(10.68)	(10.93)	(11.05)	(10.89)

Variable	RE model 2a[a]	RE model 2b[a]	RE model 2c[a]	RE model 2d[a]	RE model 2e[a]	RE model 2f[a]
Intercept	8.310***	8.334***	8.302***	8.331***	8.316***	8.282***
	(18.14)	(18.17)	(18.08)	(18.12)	(18.25)	(18.11)
Wald $\chi2$	423.90	431.51	433.97	438.39	443.73	448.01
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
Hausman $\chi2$	15.07	15.41	15.39	17.61	25.87	26.12
	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)
R^2 within	0.592	0.592	0.593	0.594	0.594	0.595
R^2 between	0.493	0.494	0.494	0.493	0.492	0.492
R^2 overall	0.509	0.509	0.509	0.509	0.508	0.508
Observations	795	795	795	795	795	795

This table reports random-effect regressions clustered by year and CEO-firm pair with robust standard errors. Target bonus is the natural logarithm of the cash value of annual maximum bonus incentive (including deferred bonus incentive compensation [to be paid in cash, options or shares] without additional performance conditions). S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. AGE is the age of the CEO in number of years. TEN is the number of years since being appointed CEO. YR is a set of year dummy variables. z-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.7

Fixed-effect regressions of chief executive target bonus[a]

Variable	FE model 2a[a]	FE model 2b[a]	FE model 2c[a]	FE model 2d[a]	FE model 2e[a]	FE model 2f[a]
$S.EPS_{t-1}$	-0.027		-0.035			-0.037
	(-0.70)		(-0.88)			(-0.92)
$S.RET_{t-1}$		0.017	0.021	0.042*	0.042*	0.051**
		(1.03)	(1.19)	(1.77)	(1.89)	(2.12)
$S.IN.RET_{t-1}$				-0.083**		-0.040
				(-2.12)		(-0.84)
$S.MK.RET_{t-1}$					-0.110**	-0.080
					(-2.42)	(-1.41)
$SALES^{a}_{t-1}$	0.166***	0.163***	0.166***	0.161***	0.161***	0.164***
	(3.02)	(2.97)	(3.02)	(2.97)	(2.96)	(3.01)
YR.2004	0.131***	0.127***	0.127***	0.138***	0.139***	0.141***
	(7.23)	(6.87)	(6.88)	(7.46)	(7.58)	(7.66)
YR.2005	0.275***	0.265***	0.267***	0.285***	0.291***	0.296***
	(9.95)	(9.45)	(9.46)	(9.91)	(10.34)	(10.38)
YR.2006	0.451***	0.440***	0.444***	0.460***	0.461***	0.470***
	(13.11)	(13.27)	(13.02)	(13.23)	(13.58)	(13.29)
YR.2007	0.609***	0.597***	0.603***	0.616***	0.622***	0.631***
	(15.05)	(15.28)	(15.01)	(15.11)	(15.50)	(15.19)

Variable	FE model 2a[a]	FE model 2b[a]	FE model 2c[a]	FE model 2d[a]	FE model 2e[a]	FE model 2f[a]
Intercept	10.375***	10.410***	10.379***	10.433***	10.438***	10.408***
	(13.59)	(13.64)	(13.62)	(13.80)	(13.79)	(13.80)
F-test	53.80	54.89	47.10	47.49	47.26	37.32
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
R^2 within	0.598	0.598	0.599	0.601	0.601	0.602
R^2 between	0.440	0.439	0.439	0.435	0.434	0.433
R^2 overall	0.440	0.439	0.439	0.435	0.434	0.434
Observations	795	795	795	795	795	795

This table reports fixed-effect regressions clustered by year and CEO-firm pair with robust standard errors. Target bonus is the natural logarithm of the cash value of annual maximum bonus incentive (including deferred bonus incentive compensation [to be paid in cash, options or shares] without additional performance conditions). S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

7.4.2 Target bonus analysis and discussion

The results of the hypothesis tests, based on the consistent fixed-effect estimates, are summarised in Table 7.8. Overall the results for target bonus pay are unchanged from the findings reported for basic pay. The compensation variable correlation analysis presented at start of this chapter indicated a strong correlation between basic pay and target incentives and therefore it is not surprising to find a similar regression result for basic pay and target bonus. The similar findings for target bonus pay and basic pay are a likely consequence of the widespread practice for remuneration committess to set target incentive pay as a multiple of basic pay (Murphy, 1999).

As discussed in Section 6.6, the mechanical link between bonus opportunity and basic pay is a potential concern for investors since the amount of bonus opportunity will increase simply because basic pay has increased. An increase in basic pay combined with an increase in maximum bonus opportunity can effectively shield a CEO from poor firm performance – if the performance criteria remain unchanged the amount of actual bonus paid out increases at performance levels above the minimum threshold without any change in actual performance.

Table 7.8

Target bonus: summary hypothesis results[a]

Independent Variable	Hypothesis	Prediction	Outcome
Short-term EPS	H_A2a	$\beta_1 > 0$	Not significant
Short-term shareholder return	H_A2a	$\beta_1 > 0$	Significant (+)
Short-term FTSE-350 industry sector return	H_A2b	$\beta_2 < 0$	Significant (-)
Short-term FTSE-350 market return	H_A2b	$\beta_2 < 0$	Significant (-)
Net sales	H_A2c	$\beta_3 > 0$	Significant (+)

[a]Statistical significance determined by the fixed-effect estimates.

Target bonus pay is an ex-ante measure of pay and whilst researchers use an ex-ante measure for target long-term pay previous studies define bonus pay in terms of the actual pay received since, unlike actual long-term pay, it is easily available and measureable.

In parallel to the basic pay findings, EPS is not a significant determinant of target bonus pay. Shareholder return is associated with target bonus pay and therefore the null hypothesis 2a can be rejected on this result. FE Models 2d, 2e and 2f report a significant positive but small association between shareholder return and target bonus pay. The results reported for FE model 2f, which reports the highest within variation explanatory power of 60.2%, indicate that a 10% increase in shareholder return is equal to a 0.51%[64] increase in target bonus pay. This is equivalent to an additional £2,756 in maximum short-term incentive opportunity if assessed at 2007 median target bonus pay, which was £540,476.

Similar to basic pay, FTSE-350 sector and market performance are significant and negatively associated with target bonus pay demonstrating further evidence of RPE in chief executive pay. The null hypothesis 2b can be rejected. The coefficient on FTSE-350 peer group performance is negative and significantly different from zero (coefficient of -0.110, and p-value < 0.05). Industry sector performance also reports a negative coefficient of -0.083 (p-value < 0.05). The FE model 2f finds neither peer group performance index is significant when included in the same model

Sales are positively related with target bonus pay and therefore the null hypothesis 2c can be rejected. The coefficient regarding the elasticity of target bonus pay with respect to sales is around 0.16 for all models and significant (p-value < 0.01). Specifically, a 10% increase in sales equates to a 1.61%[65] increase in chief executive target bonus pay. This is equivalent to an increase of £8,702 in pay opportunity when assessed against the median target bonus in 2007, which was £540,476.

In the random-effects model the control variable CEO tenure is significant and positively related to target bonus pay. In contrast to the basic pay findings CEO age is not significantly related to target bonus pay.

The year dummy variables are positive and significant for both the random and fixed-effect regressions. The findings indicate that target bonus pay increases each

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[64] $[(e^{(0.1 \times 0.051)} - 1) \times 100 = 0.51\%]$
[65] $[(e^{(0.1 \times 0.160)} - 1) \times 100 = 1.61\%]$

year after allowing for firm performance, firm size and human capital characteristics. The large positive coefficients are reflective of the substantial growth in median CEO target bonus pay reported in Section 6.5, which increased 81% between 2003 and 2007.

In a repeat of the findings for basic pay, company size is established to be economically more significant in determining target bonus pay than own firm performance or relative peer group performance. The regression analysis continues in the next section with an estimation of actual bonus pay.

7.4.3 Actual bonus regression results

Here the attention focuses on the actual bonus pay received rather than, as in the previous section, the target incentives. Chief executive actual bonus pay is determined at the end of the financial year and is paid in the following year to which it is earned. However, it is reported in the annual report and accounts in the year to which it relates and has been collected in this way. Therefore, it is expected that the relationship between corporate performance and actual bonus pay is contemporaneous. Hence the firm and peer group performance variables are not lagged.

The results for the random-effect and fixed-effect regressions of actual bonus pay are presented in Table 7.9 and Table 7.10 respectively. Hypothesis 3a predicts short-term performance is positively related to chief executive actual bonus pay. Hypothesis 3b predicts short-term peer group performance is negatively related to actual bonus pay. Hypothesis 3c predicts company size is positively related to actual bonus pay.

The Hausman (1978) test statistic for each regression model is reported in Table 7.9. The test is not significant for RE models 3a to 3h. The null hypothesis of no systematic difference between the two models cannot be rejected and therefore random-effect estimates are more efficient than fixed-effects (Wooldridge, 2009).

Table 7.9

Random-effect regressions of chief executive actual bonus[a]

Variable	RE model 3a[a]	RE model 3b[a]	RE model 3c[a]	RE model 3d[a]	RE model 3e[a]	RE model 3f[a]	RE model 3g[a]	RE model 3h[a]
$S.EPS_t$	1.032***		0.825***					0.721**
	(2.82)		(2.67)					(2.37)
$S.RET_t$		1.750***	1.589***	2.033***	1.808	2.343***	2.415*	1.907
		(3.12)	(2.90)	(2.88)	(1.45)	(3.55)	(1.88)	(1.42)
$S.IN.RET_t$				-0.875	-0.665			0.948
				(-0.80)	(-0.42)			(0.52)
$Q2.S.IN.RET_t$					0.920***			0.549*
					(2.61)			(1.69)
$Q3.S.IN.RET_t$					0.497			0.371
					(1.00)			(0.70)
$Q4.S.IN.RET_t$					0.336			0.383
					(0.51)			(0.60)
$S.MK.RET_t$						-2.773**	-2.766*	-3.141*
						(-2.34)	(-1.66)	(-1.73)
$Q2.S.MK.RET_t$							0.900**	0.650*
							(2.25)	(1.78)
$Q3.S.MK.RET_t$							0.384	0.170
							(0.72)	(0.32)
$Q4.S.MK.RET_t$							0.042	-0.085
							(0.06)	(-0.12)
$SALES^{a}_{t-1}$	0.221**	0.346***	0.296***	0.352***	0.342***	0.366***	0.355***	0.307***
	(2.26)	(3.77)	(3.06)	(3.82)	(3.74)	(3.95)	(3.88)	(3.19)
AGE	0.001	0.012	0.004	0.012	0.016	0.010	0.009	0.004
	(0.04)	(0.61)	(0.21)	(0.60)	(0.80)	(0.53)	(0.45)	(0.22)
TEN	0.015	0.009	0.010	0.010	0.011	0.010	0.012	0.012
	(0.72)	(0.43)	(0.49)	(0.49)	(0.54)	(0.49)	(0.60)	(0.59)

Variable	RE model 3a[a]	RE model 3b[a]	RE model 3c[a]	RE model 3d[a]	RE model 3e[a]	RE model 3f[a]	RE model 3g[a]	RE model 3h[a]
YR.2004	0.790**	0.540	0.516	0.655*	0.693*	0.915**	0.967**	0.903**
	(2.14)	(1.38)	(1.33)	(1.71)	(1.83)	(2.35)	(2.52)	(2.37)
YR.2005	1.157***	0.977**	0.894**	1.074***	1.112***	1.219***	1.244***	1.132***
	(2.98)	(2.37)	(2.19)	(2.65)	(2.77)	(2.97)	(3.05)	(2.82)
YR.2006	1.331***	1.237***	1.098***	1.321***	1.360***	1.554***	1.589***	1.444***
	(3.43)	(3.10)	(2.74)	(3.37)	(3.49)	(3.88)	(4.01)	(3.65)
YR.2007	1.420***	1.658***	1.441***	1.672***	1.665***	1.709***	1.740***	1.530***
	(3.75)	(4.44)	(3.82)	(4.52)	(4.54)	(4.60)	(4.71)	(4.11)
Intercept	7.377***	5.143***	6.087***	5.114***	4.579**	5.156***	4.982***	5.577***
	(4.07)	(2.97)	(3.38)	(2.93)	(2.59)	(2.98)	(2.84)	(3.14)
Wald $\chi 2$	46.65	51.56	63.04	53.89	70.12	56.43	69.29	86.65
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
Hausman $\chi 2$	10.82	12.28	12.26	12.14	11.29	11.55	11.60	12.82
	($p = 0.09$)	($p = 0.06$)	($p = 0.09$)	($p = 0.10$)	($p = 0.34$)	($p = 0.12$)	($p = 0.31$)	($p = 0.62$)
R^2 within	0.055	0.071	0.078	0.073	0.085	0.084	0.098	0.107
R^2 between	0.110	0.136	0.151	0.138	0.147	0.139	0.149	0.163
R^2 overall	0.084	0.099	0.112	0.100	0.111	0.107	0.118	0.132
Observations	855	855	855	855	855	855	855	855

This table reports random-effect regressions clustered by year and CEO-firm pair with robust standard errors. Actual bonus is the natural logarithm of the cash value of paid annual bonus (including guaranteed deferred bonus compensation [paid in cash, options or shares] without additional performance conditions). Includes zeros for when minimum performance conditions have not been satisfied. S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. Q_.S.IN.RET is a set of dummy variables which indicate annual firm performance relative to FTSE-350 sector performance. Q1.S.IN.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.S.IN.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.S.IN.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.S.IN.RET takes on the value of 1 for top-quartile performance and 0 otherwise. S.MK.RET is the median annual return of the FTSE-350 share index. Q_.S.MK.RET is a set of dummy variables which indicate annual firm performance relative to FTSE-350 performance. Q1.S.MK.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.S.MK.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.S.MK.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.S.MK.RET takes on the value of 1 for top-quartile performance and 0 otherwise. SALES are the natural logarithm of total company sales. AGE is the age of the CEO in number of years. TEN is the number of years since being appointed CEO. YR is a set of year dummy variables. z-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.10

Fixed-effect regressions of chief executive actual bonus[a]

Variable	FE model 3a[a]	FE model 3b[a]	FE model 3c[a]	FE model 3d[a]	FE model 3e[a]	FE model 3f[a]	FE model 3g[a]	FE model 3h[a]
$S.EPS_t$	1.111 (1.38)		0.881 (1.26)					0.759 (1.12)
$S.RET_t$		1.441** (2.31)	1.333** (2.16)	1.734** (2.22)	1.667 (1.18)	2.097*** (2.85)	2.189 (1.52)	1.810 (1.20)
$S.IN.RET_t$				-0.881 (-0.76)	-0.829 (-0.48)			1.061 (0.52)
$Q2.S.IN.RET_t$					0.833** (2.28)			0.453 (1.34)
$Q3.S.IN.RET_t$					0.447 (0.79)			0.271 (0.45)
$Q4.S.IN.RET_t$					0.197 (0.26)			0.214 (0.29)
$S.MK.RET_t$						-2.800** (-2.24)	-2.797 (-1.55)	-3.450 (-1.64)
$Q2.S.MK.RET_t$							0.909** (2.06)	0.699* (1.70)
$Q3.S.MK.RET_t$							0.446 (0.76)	0.302 (0.49)
$Q4.S.MK.RET_t$							0.029 (0.03)	-0.018 (-0.02)
$SALES^{a}_{t-1}$	-0.404 (-0.63)	-0.191 (-0.32)	-0.241 (-0.40)	-0.137 (-0.22)	-0.116 (-0.19)	-0.211 (-0.36)	-0.296 (-0.50)	-0.366 (-0.61)

Variable	FE model 3a[a]	FE model 3b[a]	FE model 3c[a]	FE model 3d[a]	FE model 3e[a]	FE model 3f[a]	FE model 3g[a]	FE model 3h[a]
YR.2004	0.836**	0.654	0.605	0.765*	0.799**	1.023**	1.082***	1.007**
	(2.18)	(1.63)	(1.50)	(1.94)	(2.05)	(2.57)	(2.76)	(2.58)
YR.2005	1.188***	1.092**	0.971**	1.181***	1.209***	1.324***	1.366***	1.222***
	(2.68)	(2.41)	(2.11)	(2.67)	(2.76)	(2.97)	(3.09)	(2.74)
YR.2006	1.458***	1.429***	1.257**	1.499***	1.530***	1.742***	1.806***	1.650***
	(2.80)	(2.81)	(2.37)	(3.02)	(3.10)	(3.49)	(3.65)	(3.19)
YR.2007	1.534***	1.798***	1.541***	1.795***	1.791***	1.857***	1.931***	1.701***
	(2.77)	(3.55)	(2.80)	(3.53)	(3.53)	(3.71)	(3.89)	(3.12)
Intercept	16.171*	13.296	13.847*	12.600	11.908	13.789*	14.543*	15.260*
	(1.85)	(1.61)	(1.67)	(1.51)	(1.42)	(1.74)	(1.81)	(1.86)
F-test	3.52	4.43	4.20	4.08	3.96	4.62	4.29	3.58
	($p = 0.002$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
R^2 within	0.057	0.072	0.079	0.074	0.086	0.086	0.101	0.110
R^2 between	0.014	0.027	0.052	0.041	0.057	0.025	0.021	0.034
R^2 overall	0.016	0.033	0.047	0.042	0.056	0.036	0.035	0.046
Observations	855	855	855	855	855	855	855	855

This table reports fixed-effect regressions clustered by year and CEO-firm pair with robust standard errors. Actual bonus is the natural logarithm of the cash value of paid annual bonus (including guaranteed deferred bonus compensation [paid in cash, options or shares] without additional performance conditions). Includes zeros for when minimum performance conditions have not been satisfied. S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. Q_.S.IN.RET is a set of dummy variables which indicate annual firm performance relative to FTSE-350 sector performance. Q1.S.IN.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.S.IN.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.S.IN.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.S.IN.RET takes on the value of 1 for top-quartile performance and 0 otherwise. S.MK.RET is the median annual return of the FTSE-350 share index. Q_.S.MK.RET is a set of dummy variables which indicate annual firm performance relative to FTSE-350 performance. Q1.S.MK.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.S.MK.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.S.MK.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.S.MK.RET takes on the value of 1 for top-quartile performance and 0 otherwise. SALES are the natural logarithm of total company sales. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

7.4.4 Actual bonus analysis and discussion

The random-effect estimates reported in Table 7.9 show absolute short-term shareholder return is strongly related to actual bonus pay and market peer group returns are negatively related to actual bonus pay, which is consistent with the RPE hypothesis. In the more efficient random-effect regressions, EPS has the anticipated positive significant coefficient. However, this result is not robust to estimation method as the fixed-effect coefficients on EPS are of similar magnitude but not significant. Firm size is also significant in the random-effect regressions but not in the fixed-effect regressions. The hypothesis findings for the random-effect estimates are summarised in Table 7.11

Table 7.11

Actual bonus: summary hypothesis results[a]

Independent Variable	Hypothesis	Prediction	Outcome
Short-term EPS	H_A3a	$\beta_1 > 0$	Significant (+)
Short-term shareholder return	H_A3a	$\beta_1 > 0$	Significant (+)
Short-term FTSE-350 industry sector return	H_A3b	$\beta_2 < 0$	Not significant
Short-term FTSE-350 market return	H_A3b	$\beta_2 < 0$	Significant (-)
Net sales	H_A3c	$\beta_3 > 0$	Significant (+)

[a]Statistical significance determined by the random-effect estimates.

The coefficient on short-term shareholder return is positive and statistically significant for RE models 3b, 3c, 3d, 3f and 3g with coefficients ranging from 1.589 ($p < 0.01$) to 2.415 ($p < 0.1$). The null hypothesis 3a can be rejected. Thus, on average a chief executive will receive an increase of between 17%[66] and 27%[67] in actual bonus pay for a 10% increase in annual shareholder return. If assessed relative to the 2007 median actual bonus pay of £469,500 it is equivalent to an increase of between £80,848 and £128,267.

[66] $[(e^{(0.1 \times 1.589)} - 1) \times 100 = 17.22\%]$
[67] $[(e^{(0.1 \times 2.415)} - 1) \times 100 = 27.32\%]$

The random-effect regressions, Table 7.9, also indicate a positive impact of EPS performance on actual bonus pay as predicted by hypothesis 3a. The RE models 3a, 3c and 3h report a significant positive association between EPS and actual bonus pay. Specifically according to model 3h, which reports the highest between variation explanatory power of 16.3%, a £0.10 increase in EPS is related to a 7.48%[68] increase in actual bonus. In terms of pay this is equivalent to an additional £35,119 if assessed relative to 2007 medium actual bonus.

Of the few studies that analyse annual bonus as a separate component of pay most find only a small or insignificant association between performance and actual bonus. For example McKnight et al. (2000), McKnight and Tomkins (1999, 2004) and Bruce et al. (2007) do analyse annual bonus payments, in a UK context, and report much smaller elasticities. According to their results, a 10% increase in shareholder returns would increase annual bonus payments by around only 2%. Murphy (1985), in an analysis of US executive actual bonus pay, is the only study to report shareholder return coefficients of a similar magnitude to those reported here (between 1.2 and 1.4).

The majority of executive pay studies, particularly in the UK, report total cash compensation, which in addition to actual bonus includes' basic pay and other cash payments. For example, Benito and Conyon (1999) using the same measure of shareholder return as employed here, report a coefficient of 0.08 on total cash compensation. In a US study, Hall and Liebman (1998) regress cash compensation on shareholder return and report coefficients of between 0.06 and 0.16. The coefficients are much smaller than the firm performance coefficients reported here for actual bonus pay alone.

The separate analysis of actual bonus demonstrates the importance of examining the impact of performance on the individual elements of executive compensation. In this study, the magnitude of the elasticity coefficients of firm performance for

[68] $[(e^{(0.1 \times 0.721)} - 1) \times 100 = 7.48\%]$

actual bonus pay is nearly 100 times greater than the coefficients of shareholder return in the basic pay regressions.

Turning now to market peer group performance, the hypothesis 3b proposes a negative association between short-term FTSE-350 market and sector performance with actual bonus pay. The measure of market performance, median annual FTSE-350 shareholder return, is significant and negative providing strong evidence of RPE (coefficient of -2.773, and p-value of < 0.05). The null hypothesis 3b is rejected. When the peer group consists of firms in the FTSE-350 industry sector, the coefficient is as predicted, negative, but not significantly different from zero (coefficient of -0.875, and p-value of > 0.10).

Following Albuquerque (2009, p.80), the impact of peer group performance on chief executive actual bonus pay is assessed relative to a "typical shock" to firm performance. A typical shock is regarded as a one standard deviation change in market peer group performance. Holding firm size and firm performance constant, the change in actual bonus pay is estimated in relation to a 28.0%[69] change in market peer group performance. If peer group performance increases (decreases) by 28.0% and firm performance remains constant, then actual bonus pay decreases (increases) by 54.0%.[70] In money terms, this is equal to a reduction in the 2007 median actual bonus pay of £253,530.

Whilst research has found support for RPE in executive cash and total cash compensation, confirmation for the RPE hypothesis in chief executive *actual bonus pay,* measured on its own, is a new finding in the literature. Until now research has focused on total cash or total compensation where the findings are mixed. Jensen and Murphy (1990), Conyon and Leech (1994) and Conyon (1998) find no significant evidence of RPE in executive cash compensation. On the other hand, Gibbons and Murphy (1990) do report a significant negative association between industry and market value weighted returns and total cash compensation. Hall and Liebman

[69] The standard deviation of firm annual shareholder return in 2007 is 0.280.
[70] $[(e^{(0.280 \times -2.773)} - 1) \times 100 = -54.00\%]$

(1998) also find evidence of RPE in total cash compensation. In the UK, Liu and Stark (2009) find no evidence when using peer group stock market performance but evidence of RPE using peer group pre-tax accounting earnings.

The RE models 3e and 3g introduce the peer group performance dummy variables which position each firm relative to either bottom quartile peer group performance, second quartile peer group performance, third quartile peer group performance or top quartile peer group performance.

The RE model 3g shows that after holding stock market performance and peer group market performance constant, a second quartile-performing firm will realise the chief executive a multiple of 1.46[71] times the level of actual bonus pay received by the chief executive of a firm performing in the bottom quartile.

The RE model 3e reports a similar result for sector performance. In both models 3e and 3g the third quartile and fourth quartile dummy variables are not significant. This implies that there is no significant evidence to suggest that superior performance above and beyond second quartile performance results in additional compensation, which is a potential concern for investors. It indicates that on average chief executives of top performing firms are awarded no higher compensation than firms performing below median.

The RE model 3h includes both the sector and market peer group performance variables. The market peer group performance variable remains significant and negatively related to actual bonus pay. The second quartile industry sector performance dummy variable is also significant providing further evidence that chief executives can appreciably increase actual bonus pay by performing above bottom quartile industry sector performance.

In all random-effect regressions the company sales variable remains highly significant, consistent with the hypothesis that firm size is positively related to actual bonus. The hypothesis 3c is rejected. The magnitude, direction and

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[71] $[(e^{(0.900)} - 1) = 1.46]$

significance of this effect differ substantially between the random and fixed-effect estimations. In the former, which the Hausman test suggests is more efficient, the coefficient of sales ranges from a statistically significant 0.221 ($p < 0.05$) to a statistically significant 0.366 ($p < 0.01$). Specifically, according to RE model 3h, which reports the highest between variation explanatory power of 16.3%, a 10% increase in firm size corresponds to a 3.12%[72] increase in actual bonus pay. This is equivalent to an increase of £14,648 when assessed against the median actual bonus pay in 2007, which was £469,500.

The control variables, CEO age and tenure, are not significantly associated with actual bonus pay. This is in contrast to the finding for target bonus pay where CEO tenure is significant.

The year dummy variables are positive and significant for all models. Therefore, in addition to the strong association between firm performance and CEO actual bonus pay; pay is also positively influenced by time-varying factors not associated with firm performance, such as price inflation and general pay trends.

7.4.5 Concluding remarks about short-term pay

Together the analysis of target and actual bonus show the importance of measuring actual pay in order to appreciate how performance influences chief executive pay. This study finds a weak and small positive association between annual shareholder return and target bonus but a strong and large positive association between firm performance (EPS and shareholder return) and actual bonus pay.

The findings for actual bonus pay are a reversal of nearly all-previous studies, which typically find company size to be the most economically significant positive determinant of chief executive pay, with only a weak and economically small relationship between corporate performance and pay. Further, a new finding of this research is the significant evidence of RPE in chief executive annual bonus pay.

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[72] $[(e^{(0.1 \times 0.307)} - 1) \times 100 = 3.12\%]$

The positive association between EPS and actual bonus pay is consistent with the actual performance measures used in annual bonus plans. The bonus plan design analysis, Section 6.3.1, shows EPS to be frequently employed as a performance measure in annual bonus plans. Since firms do not report to using market-based performance measures in the annual bonus plan, these findings suggest that strong absolute accounting performance translates into strong relative market performance.

The analysis continues in the following section with the regression results for long-term pay.

7.5 CEO long-term pay

This section presents the random and fixed-effects regression results and analysis for target and actual long-term incentive pay. Target long-term incentive pay is the cash value of all performance-contingent long-term incentive grants.[73] Actual long-term incentive pay is the cash value of all performance-contingent awards, which vested in the current year (but were granted in a prior year), plus the grant value of non-performance contingent awards.[73]

7.5.1 Target long-term incentive regression results

Chief executive target long-term incentive pay is granted in the form of performance-options, performance-shares or a long-term performance-cash plan during the financial year and is typically expressed as a multiple of basic pay. Therefore, akin to basic pay and target bonus, target LTI pay is assumed to be associated with the previous year's financial performance, rather than related contemporaneously with firm performance. For this reason the performance variables and company size variable are lagged one year to correctly estimate the association between corporate performance and target LTI pay.

[73] Share options are valued at 25% of grant/exercise price. Shares are valued at 100% of year-end share price.

The random and fixed-effect regression estimates for target long-term incentive pay are shown in Table 7.12 and 7.13 respectively. Hypothesis 4a predicts short-term performance is positively related to chief executive target LTI pay. Hypothesis 4b predicts short-term peer group performance is negatively related to target LTI pay. Hypothesis 4c predicts company size is positively related to target LTI pay.

The Hausman (1978) test statistic for each regression model is reported in Table 7.12. The test is not significant for RE models 4a to 4f. The null hypothesis of no systematic difference between the two models is not rejected and therefore random-effect estimates are more efficient than fixed-effects (Wooldridge, 2009).

Table 7.12

Random-effect regressions of chief executive target long-term incentive[a]

Variable	RE model 4a[a]	RE model 4b[a]	RE model 4c[a]	RE model 4d[a]	RE model 4e[a]	RE model 4f[a]
$S.EPS_{t-1}$	-0.134		-0.107			-0.107
	(-1.18)		(-0.95)			(-0.95)
$S.RET_{t-1}$		-0.108	-0.094	-0.160*	-0.137	-0.142
		(-1.28)	(-1.12)	(-1.69)	(-1.45)	(-1.47)
$S.IN.RET_{t-1}$				0.186		0.207
				(1.33)		(1.27)
$S.MK.RET_{t-1}$					0.132	-0.041
					(0.80)	(-0.21)
$SALES^{a}_{t-1}$	0.426***	0.417***	0.421***	0.417***	0.416***	0.422***
	(10.48)	(10.01)	(10.27)	(10.06)	(9.97)	(10.29)
AGE	-0.004	-0.005	-0.004	-0.005	-0.005	-0.004
	(-0.38)	(-0.51)	(-0.40)	(-0.52)	(-0.50)	(-0.42)
TEN	0.023*	0.024*	0.024*	0.024*	0.024*	0.024*
	(1.87)	(1.89)	(1.89)	(1.88)	(1.89)	(1.87)
YR.2004	0.245***	0.269***	0.268***	0.244***	0.252***	0.245***
	(3.21)	(3.52)	(3.52)	(3.19)	(3.13)	(3.08)
YR.2005	0.571***	0.597***	0.604***	0.553***	0.564***	0.565***
	(6.77)	(7.05)	(7.13)	(6.22)	(5.87)	(5.87)
YR.2006	0.766***	0.784***	0.797***	0.740***	0.756***	0.756***
	(9.48)	(9.72)	(9.77)	(8.42)	(8.33)	(8.11)
YR.2007	0.842***	0.854***	0.872***	0.813***	0.823***	0.836***
	(9.26)	(10.02)	(9.64)	(8.93)	(8.41)	(8.02)

Variable	RE model 4a[a]	RE model 4b[a]	RE model 4c[a]	RE model 4d[a]	RE model 4e[a]	RE model 4f[a]
Intercept	6.855***	7.010***	6.911***	7.015***	7.017***	6.914***
	(10.18)	(10.14)	(10.18)	(10.16)	(10.13)	(10.17)
Wald $\chi 2$	310.38	323.71	321.05	326.45	327.38	328.64
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
Hausman $\chi 2$	7.76	3.69	7.56	7.78	8.10	12.65
	($p = 0.26$)	($p = 0.72$)	($p = 0.37$)	($p = 0.35$)	($p = 0.32$)	($p = 0.18$)
R^2 within	0.336	0.334	0.338	0.335	0.335	0.339
R^2 between	0.371	0.378	0.372	0.381	0.379	0.376
R^2 overall	0.360	0.363	0.360	0.366	0.364	0.363
Observations	694	694	694	694	694	694

This table reports random-effect regressions clustered by year and CEO-firm pair with robust standard errors. Target long-term incentive is the natural logarithm of the cash value of annual performance-option grant, plus annual performance-share grant, plus long-term cash plan (in all cases the payout is contingent on future performance conditions). S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. AGE is the age of the CEO in number of years. TEN is the number of years since being appointed CEO. YR is a set of year dummy variables. z-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.13

Fixed-effect regressions of chief executive target long-term incentive[a]

Variable	FE model 4a[a]	FE model 4b[a]	FE model 4c[a]	FE model 4d[a]	FE model 4e[a]	FE model 4f[a]
$S.EPS_{t-1}$	-0.317**		-0.285*			-0.282*
	(-2.05)		(-1.94)			(-1.93)
$S.RET_{t-1}$		-0.114	-0.085	-0.147	-0.136	-0.114
		(-1.29)	(-1.02)	(-1.47)	(-1.36)	(-1.15)
$S.IN.RET_{t-1}$				0.120		0.114
				(0.82)		(0.66)
$S.MK.RET_{t-1}$					0.098	-0.016
					(0.59)	(-0.08)
$SALES^{a}_{t-1}$	0.316**	0.283*	0.315**	0.287*	0.284*	0.319**
	(2.18)	(1.94)	(2.16)	(1.96)	(1.95)	(2.17)
YR.2004	0.281***	0.300***	0.302***	0.284***	0.288***	0.288***
	(3.60)	(3.81)	(3.84)	(3.59)	(3.49)	(3.51)
YR.2005	0.653***	0.659***	0.681***	0.630***	0.635***	0.657***
	(7.28)	(7.43)	(7.53)	(6.73)	(6.51)	(6.56)
YR.2006	0.885***	0.873***	0.911***	0.843***	0.852***	0.886***
	(9.67)	(9.66)	(9.76)	(8.59)	(8.77)	(8.62)
YR.2007	0.997***	0.969***	1.021***	0.940***	0.946***	0.997***
	(8.90)	(9.28)	(9.06)	(8.50)	(8.46)	(8.20)

Variable	FE model 4a[a]	FE model 4b[a]	FE model 4c[a]	FE model 4d[a]	FE model 4e[a]	FE model 4f[a]
Intercept	8.313***	8.725***	8.318***	8.671***	8.710***	8.273***
	(4.13)	(4.32)	(4.10)	(4.27)	(4.29)	(4.06)
F-test	27.77	29.02	24.63	25.22	25.19	19.58
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
R^2 within	0.339	0.335	0.341	0.335	0.335	0.342
R^2 between	0.320	0.355	0.323	0.359	0.356	0.328
R^2 overall	0.320	0.337	0.322	0.340	0.338	0.326
Observations	694	694	694	694	694	694

This table reports fixed-effect regressions clustered by year and CEO-firm pair with robust standard errors. Target long-term incentive is the natural logarithm of the cash value of annual performance-option grant, plus annual performance-share grant, plus long-term cash plan (in all cases the payout is contingent on future performance conditions). S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level.
[a]variable in natural logarithms.

7.5.2 Target long-term incentive analysis and discussion

The results of the hypothesis tests regarding target LTI pay are summarised in Table 7.14. In this study, target LTI is not considered a pay outcome since the vesting of the long-term incentives, included in this variable, is in all cases contingent on future firm performance. However, awarding long-term incentives with vesting criteria is a more recent phenomenon, which is not widespread practice outside of the UK and only prevalent in the UK since the Greenbury Report (1995). Therefore in the early literature that quantifies long-term compensation, researchers' measure pay outcomes, since at the time of the research there were no performance conditions on vesting. Performance-options and performance-shares are now extensively employed in UK executive compensation and therefore recent studies, all of which focus on grant data (effectively target incentives), measure target LTI and not necessarily actual pay outcomes. The target LTI results presented here are therefore comparable to Conyon et al. (2001) and Ozkan (2007) who report the elasticity of new long-term incentive grants on firm performance.

Table 7.14

Target long-term incentive: summary hypothesis results[a]

Independent Variable	Hypothesis	Prediction	Outcome
Short-term EPS	H_A4a	$\beta_1 > 0$	Not significant
Short-term shareholder return	H_A4a	$\beta_1 > 0$	Not significant
Short-term FTSE-350 industry sector return	H_A4b	$\beta_2 < 0$	Not significant
Short-term FTSE-350 market return	H_A4b	$\beta_2 < 0$	Not significant
Net sales	H_A4c	$\beta_3 > 0$	Significant (+)

[a]Statistical significance determined by the random-effect estimates.

There is no evidence, with respect to EPS or shareholder return, to support the alternate hypothesis 4a that firm performance is positively associated with target LTI pay. Similarly, there is also no significant association between FTSE-350 sector or market performance and target LTI pay and so there is no evidence that relativities play a role in target setting. The null hypothesis 4b is retained.

However, an unexpected finding according to the fixed-effect estimates reported in Table 7.13, is that EPS is significantly and negatively related to target LTI pay. This finding is replicated in the random-effect estimates in Table 7.12, which are also negative, though not significant. The FE Models 4a, 4c and 4f report a significant negative association between EPS and target LTI pay. Specifically, according to FE model 4f, which reports the highest within variation explanatory power of 34.2%, a £0.10 decrease in EPS is related to a 2.86%[74] increase in target LTI pay. This result implies that in response to a reduction in prior year EPS a chief executive can expect to increase maximum incentive opportunity by £21,499, if assessed relative to the 2007 median target LTI pay of £751,708.

This finding is consistent with Ozkan (2007) who also finds a negative but insignificant association between firm performance, measured using EPS or stock return, and the value of long-term incentive grants. At first sight this finding seems irrational; a decrease in firm performance prior to target setting corresponds with an increase in chief executive target pay. However the outcome may be an indication that, if recent performance is poor, the remuneration committee increase chief executive long-term pay opportunity in order to provide an incentive to improve performance. Murphy (1985, p.29) also finds a negative association between shareholder return and option grants and suggests the result, "may reflect that corporate boards of directors are more likely to award options during low-performance years".

An illustration of this effect is provided by the Royal Bank of Scotland. In 2008 it was part nationalised to protect it from failure. Then, in 2009 the incoming chief executive, Stephen Hester, was awarded 10.4m performance-contingent shares to improve the performance of the state controlled bank (The Guardian, 2009).

In contrast to the findings of this current study and those of Ozkan (2007); Conyon et al. (2001) find a large significant positive association between shareholder return

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[74] $[(e^{(-0.1 \times -0.282)} - 1) \times 100 = 2.86\%]$

and long-term incentive grants for executive directors of 150 of the largest UK firms in 1997-98.

The different findings may be due to the cross-sectional approach employed by Conyon et al. (2001), which exposes the pay-performance estimates to omitted variable bias (Murphy, 1985). Alternatively the results of this study may suggest a change in UK executive long-term incentive practice. Since share options, restricted shares and long-term cash incentives are issued with performance vesting criteria, remuneration committees may be content to issue large incentive awards regardless of past performance, or perhaps because of poor past performance.

In common with basic pay and target bonus pay the firm size sales variable remains highly significant in all random-effect regressions. The null hypothesis 4c is rejected. The estimated coefficient of firm sales is around 0.42 (p-value < 0.01). According to RE model 4f, which reports the highest between variation explanatory power of 33.9%, a 10% increase in firm size will be associated with a 4.31%[75] increase in target LTI pay. This is equivalent to an increase of £32,399 when assessed against the median target LTI pay in 2007, which was £751,708.

In the random-effects model the control variable CEO tenure is significant and positively related to target LTI pay. Similarly to target bonus but in contrast to basic pay, CEO age is not significantly related to target LTI pay.

The coefficients on the year dummy variables are positive and significant for all models. The ever increasing size of the coefficients, throughout the years, reflects the substantial year on year growth in target LTI pay, which is not related to firm performance or firm size but likely due to the changing pay trends described in Section 6.4. According to Figure 6.4, median target LTI pay increased from 36% of the median CEO target pay mix in 2003 to 42% in 2007. The following section analyses the actual payouts from long-term incentive awards.

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[75] $[(e^{(0.1 \times 0.422)} - 1) \times 100 = 4.31\%]$

7.5.3 Actual long-term incentive regression results

Chief executive actual LTI pay is determined at the end of a pre-determined performance period, which may or may not be the fiscal year-end. Actual LTI pay is typically reported in the year, which it is paid and based on the previous three years corporate performance. For this reason the three-year performance variables are lagged one year to correctly estimate the association between corporate performance and actual LTI pay.

The results for the random-effect and fixed-effect regressions of actual long-term incentive pay are presented in Table 7.15 and Table 7.16 respectively. Hypothesis 5a predicts long-term performance is positively related to chief executive actual long-term pay. Hypothesis 5b predicts long-term peer group performance is negatively related to actual long-term pay. Hypothesis 5c predicts company size is positively related to actual long-term pay.

The Hausman (1978) test statistic for each regression model is reported in Table 7.15. The test is not significant for RE models 5a to 5f. The null hypothesis of no systematic difference between the two models is not rejected and therefore random-effect estimates are more efficient than fixed-effects (Wooldridge, 2009).

Table 7.15

Random-effect regressions of chief executive actual long-term incentive[a]

Variable	RE model 5a[a]	RE model 5b[a]	RE model 5c[a]	RE model 5d[a]	RE model 5e[a]	RE model 5f[a]
$L.RET_{t-1}$	2.117***	2.649***	0.848	2.262***	0.373	0.463
	(4.87)	(5.15)	(1.14)	(4.65)	(0.54)	(0.58)
$L.IN.RET_{t-1}$		-1.834**	-0.116			-0.858
		(-2.20)	(-0.13)			(-0.93)
$Q2.L.IN.RET_{t-1}$			1.183*			1.000
			(1.67)			(1.25)
$Q3.L.IN.RET_{t-1}$			2.096**			0.705
			(2.46)			(0.76)
$Q4.L.IN.RET_{t-1}$			2.845**			1.237
			(2.57)			(1.15)
$L.MK.RET_{t-1}$				-1.565	0.780	1.318
				(-1.23)	(0.60)	(0.91)
$Q2.L.MK.RET_{t-1}$					0.519	0.019
					(0.83)	(0.03)
$Q3.L.MK.RET_{t-1}$					2.567***	1.993**
					(2.93)	(1.97)
$Q4.L.MK.RET_{t-1}$					3.078***	2.245*
					(2.69)	(1.82)
$SALES^{a}_{t-1}$	0.521***	0.533***	0.570***	0.527***	0.576***	0.582***
	(3.44)	(3.42)	(3.47)	(3.49)	(3.78)	(3.56)
AGE	-0.038	-0.030	-0.029	-0.038	-0.032	-0.027
	(-1.32)	(-1.06)	(-0.99)	(-1.31)	(-1.09)	(-0.91)
TEN	0.085***	0.090***	0.100***	0.085***	0.101***	0.105***
	(2.64)	(2.85)	(3.10)	(2.67)	(3.11)	(3.26)

Variable	RE model 5a[a]	RE model 5b[a]	RE model 5c[a]	RE model 5d[a]	RE model 5e[a]	RE model 5f[a]
YR.2004	0.042	0.086	0.102	0.101	0.036	0.099
	(0.08)	(0.16)	(0.20)	(0.19)	(0.07)	(0.19)
YR.2005	-0.766	-0.514	-0.439	-0.563	-0.441	-0.357
	(-1.20)	(-0.78)	(-0.69)	(-0.85)	(-0.69)	(-0.55)
YR.2006	-0.232	0.442	0.561	0.459	0.391	0.573
	(-0.42)	(0.68)	(0.87)	(0.56)	(0.51)	(0.71)
YR.2007	-0.286	0.601	0.596	0.628	0.537	0.698
	(-0.45)	(0.77)	(0.76)	(0.61)	(0.55)	(0.68)
Intercept	4.658**	4.137*	1.878	4.695**	1.780	1.163
	(1.98)	(1.75)	(0.71)	(1.98)	(0.75)	(0.45)
Wald χ2	59.79	66.36	67.85	59.87	71.76	77.44
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
Hausman χ2	10.33	10.01	13.75	9.60	11.81	16.28
	($p = 0.11$)	($p = 0.19$)	($p = 0.18$)	($p = 0.21$)	($p = 0.30$)	($p = 0.30$)
R^2 within	0.102	0.113	0.143	0.104	0.137	0.155
R^2 between	0.183	0.186	0.176	0.186	0.206	0.194
R^2 overall	0.149	0.161	0.171	0.152	0.183	0.191
Observations	466	466	466	466	466	466

This table reports random-effect regressions clustered by year and CEO-firm pair with robust standard errors. Actual long-term incentive is the natural logarithm of the cash value of performance-options vesting in the current year, plus performance-shares vesting in the current year, plus long-term cash plan vesting in the current year, plus the grant value of time-vesting options, plus the grant value of time-vesting shares. Includes zeros for when minimum performance conditions have not been satisfied. L.RET is the three-year change in the natural logarithm of the return index. L.IN.RET is the median three-year return of the FTSE-350 share sector index. Q_.L.IN.RET is a set of dummy variables which indicate three year firm performance relative to FTSE-350 sector performance. Q1.L.IN.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.L.IN.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.L.IN.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.L.IN.RET takes on the value of 1 for top-quartile performance and 0 otherwise. L.MK.RET is the median three-year return of the FTSE-350 share index. Q_.L.MK.RET is a set of dummy variables which indicate three year firm performance relative to FTSE-350 performance. Q1.L.MK.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.L.MK.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.L.MK.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.L.MK.RET takes on the value of 1 for top-quartile performance and 0 otherwise. SALES are the natural logarithm of total company sales. AGE is the age of the CEO in number of years. TEN is the number of years since being appointed CEO. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.16

Fixed-effect regressions of chief executive actual long-term incentive[a]

Variable	FE model 5a[a]	FE model 5b[a]	FE model 5c[a]	FE model 5d[a]	FE model 5e[a]	FE model 5f[a]
$L.RET_{t-1}$	1.726***	2.369***	0.294	1.879***	0.020	-0.073
	(3.18)	(3.70)	(0.35)	(3.04)	(0.03)	(-0.08)
$L.IN.RET_{t-1}$		-2.023**	0.117			-0.600
		(-2.29)	(0.12)			(-0.57)
$Q2.L.IN.RET_{t-1}$			1.792**			1.709**
			(2.46)			(2.14)
$Q3.L.IN.RET_{t-1}$			2.740***			1.665*
			(3.07)			(1.82)
$Q4.L.IN.RET_{t-1}$			3.485***			2.259**
			(3.02)			(2.01)
$L.MK.RET_{t-1}$				-1.068	1.346	1.714
				(-0.76)	(0.94)	(1.05)
$Q2.L.MK.RET_{t-1}$					0.874	-0.080
					(1.39)	(-0.12)
$Q3.L.MK.RET_{t-1}$					2.800***	1.597
					(2.87)	(1.54)
$Q4.L.MK.RET_{t-1}$					3.423**	1.869
					(2.59)	(1.36)
$SALES^{a}_{t-1}$	1.461	1.607	0.809	1.429	0.748	0.690
	(1.16)	(1.28)	(0.68)	(1.15)	(0.65)	(0.58)

Variable	FE model 5a[a]	FE model 5b[a]	FE model 5c[a]	FE model 5d[a]	FE model 5e[a]	FE model 5f[a]
YR.2004	-0.044	0.005	0.121	-0.003	0.006	0.123
	(-0.08)	(0.01)	(0.23)	(-0.01)	(0.01)	(0.23)
YR.2005	-0.559	-0.301	-0.093	-0.433	-0.174	-0.034
	(-0.78)	-(0.42)	(-0.14)	(-0.56)	(-0.23)	(-0.05)
YR.2006	-0.175	0.556	0.890	0.271	0.424	0.738
	(-0.24)	(0.72)	(1.15)	(0.26)	(0.43)	(0.74)
YR.2007	-0.203	0.767	0.997	0.389	0.598	0.863
	(-0.22)	(0.81)	(1.06)	(0.29)	(0.47)	(0.68)
Intercept	-10.024	-12.000	-3.000	-9.499	-2.119	-1.795
	(-0.57)	(-0.69)	(-0.18)	(-0.55)	(-0.13)	(-0.11)
F-test	5.05	5.02	3.79	4.33	3.88	3.01
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
R^2 within	0.106	0.117	0.147	0.107	0.139	0.160
R^2 between	0.076	0.081	0.125	0.083	0.164	0.143
R^2 overall	0.081	0.087	0.144	0.086	0.158	0.164
Observations	466	466	466	466	466	466

This table reports fixed-effect regressions clustered by year and CEO-firm pair with robust standard errors. Actual long-term incentive is the natural logarithm of the cash value of performance-options vesting in the current year, plus performance-shares vesting in the current year, plus long-term cash plan vesting in the current year, plus the grant value of time-vesting options, plus the grant value of time-vesting shares. Includes zeros for when minimum performance conditions have not been satisfied. L.RET is the three-year change in the natural logarithm of the return index. L.IN.RET is the median three-year return of the FTSE-350 share sector index. Q_.L.IN.RET is a set of dummy variables which indicate three year firm performance relative to FTSE-350 sector performance. Q1.L.IN.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.L.IN.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.L.IN.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.L.IN.RET takes on the value of 1 for top-quartile performance and 0 otherwise. L.MK.RET is the median three-year return of the FTSE-350 share index. Q_.L.MK.RET is a set of dummy variables which indicate three year firm performance relative to FTSE-350 performance. Q1.L.MK.RET is the base variable and takes on the value of 1 for bottom-quartile performance and 0 otherwise. Q2.L.MK.RET takes on the value of 1 for lower-quartile performance and 0 otherwise. Q3.L.MK.RET takes on the value of 1 for upper-quartile performance and 0 otherwise. Q4.L.MK.RET takes on the value of 1 for top-quartile performance and 0 otherwise. SALES are the natural logarithm of total company sales. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

7.5.4 Actual long-term incentive analysis and discussion

The results reported in Tables 7.15 and 7.16 find industry sector peer group returns are significant and negatively related to actual long-term pay whilst firm shareholder return is significant and positively related to actual long-term pay. This is consistent with the RPE hypothesis and a principal-agent model of incentives designed to align the interests of executives and their shareholders. This is the first study to find evidence of RPE in executive long-term compensation and emphasizes the value of analysing actual long-term pay as a separate category of CEO pay. Some studies have also separated long-term pay, with respect to target pay, but when it is identified as an individual component of pay there is no evidence of RPE. For example, Garvey and Milbourn (2006) find no evidence of RPE in share option grants. Thus an important contribution of this study is the finding that payouts are positively related to firm performance and also determined relative to industry peer group performance. The hypothesis findings are summarised in Table 7.17.

Table 7.17

Actual long-term incentive: summary hypothesis results[a]

Independent Variable	Hypothesis	Prediction	Outcome
Long-term shareholder return	H_A5a	$\beta_1 > 0$	Significant (+)
Long-term FTSE-350 industry sector return	H_A5b	$\beta_2 < 0$	Significant (-)
Long-term FTSE-350 market return	H_A5b	$\beta_2 < 0$	Not significant
Net sales	H_A5c	$\beta_3 > 0$	Significant (+)

[a]Statistical significance determined by the random-effect estimates.

The Hausman test shows that the random-effect estimates are more efficient and therefore preferred to the fixed-effects. Although there are small differences in the size of the estimates the results are largely comparable between both estimation methods. The random-effects model finds company sales are significant and positively related to actual long-term pay while the fixed-effects model finds company sales is not significant. The hypothesis 5c is rejected on the basis of the more efficient random-effect estimates.

The CEO tenure variable, included in the random-effects model, is significant and positively related to actual long-term pay. An explanation for this finding is maybe that long-term incentives are typically paid out three years after the original award and therefore chief executives with longer tenure are more likely to be eligible for long-term incentive payouts.

Long-term shareholder return is significant and positively associated with actual long-term pay for RE models 5a, 5b and 5d, which is in keeping with the prediction from hypothesis 5a. The coefficients are large and range from 2.117 to 2.649. This result provides clear evidence of a strong relationship between long-term shareholder performance and actual long-term pay. The result infers that a chief executive will receive an increase of between 24%[76] and 30%[77] in actual long-term pay for a 10% increase in three-year shareholder return. Specifically, if calculated at the median long-term pay in 2007, which was £385,508, it equates to between £90,903 and £116,925 in additional pay.

The analysis of payouts from performance-options, performance-shares and long-term cash plans as a single measure of pay is a first in the executive pay literature. Therefore, the actual long-term incentive pay results of this study are not directly comparable to the literature.

A number of US studies use total compensation data from *Execucomp*, which includes payouts from long-term incentives, together with basic pay, annual bonus and share and option grants (for example, Aggarwal and Samwick, 1999b; Garvey and Milbourn, 2006; and Albuquerque, 2009). Previous studies, which isolate long-term compensation as a single construct of pay, measure new equity grants or the change in the value of the total holding of the firm stock. Further, most of the UK research does not consider LTIPs and instead focuses only on share options.[78] McKnight and Tomkins (1999, 2004) do not include LTIPs but do find a large and

[76] $[(e^{(0.1 \times 2.117)} - 1) \times 100 = 23.58\%]$
[77] $[(e^{(0.1 \times 2.649)} - 1) \times 100 = 30.33\%]$
[78] Primarily because share options were the main provision of long-term incentive compensation until recently.

significant positive association between shareholder return and the change in the value of share options held. However, as Murphy (1985, p.13) points out, the change in the value of "previously-held assets" is inherently linked to firm share price performance and therefore it is natural to find a high correlation between firm performance and the change in the value of share options held. In a study of performance-vested share options (PVSOs) versus time-vested share options (TSOs), Kuang and Qin (2009), find that when total pay comprises of PVSOs the association between shareholder return and total pay is much higher than with TSOs. In contrast, Buck et al. (2003) find the presence of LTIPs reduces the elasticity between shareholder return and total pay.

Turning now to market peer group performance the coefficient takes the correct sign but is not significant (coefficient of -1.565 and p-value of > 0.10). The measure of industry sector peer group performance is significant and negatively associated with actual long-term pay providing strong evidence consistent with RPE theory (coefficient of -1.834, and p-value of < 0.05). The null hypothesis 5b can be rejected.

The economic importance of industry sector performance on chief executive actual long-term pay is calculated in terms of a one standard deviation change in peer group performance whilst holding firm size and firm performance constant. According to Albuquerque (2009, p.80), this approach reflects a "typical shock" to industry sector performance. If peer group performance increases (decreases) by one standard deviation, 47.8%,[79] and firm performance remains constant, then actual long-term pay decreases (increases) by 58.4%.[80] In money terms, this is equal to a decrease in the 2007 median actual long-term pay of £225,060.

Evidence of RPE in chief executive long-term compensation has not been reported in the literature. Accordingly, the results of this study contribute to the literature as being the first to isolate robust evidence of RPE in long-term pay. Likely reasons for

[79] The standard deviation of firm three-year shareholder return in 2007 is 0.478.
[80] $[(e^{(0.478 \times -1.834)} - 1) \times 100 = -58.38\%]$

these new findings are that this is the only study to analyse the payouts from all long-term incentive schemes in a single construct of pay. Further, it is one of a small number of studies to measure performance over a period of greater than one year.

In the RPE literature long-term compensation is usually[81] an inclusive component of total compensation for which the previous evidence of RPE is not convincing. For example, Main et al. (1996) is the only UK executive relative performance study to include long-term incentives in their total pay measure but find no evidence of RPE. In the US Garvey and Milbourn (2006) also find no significant evidence of RPE in executive total compensation.

Another US study, Albuquerque (2009) does find evidence of RPE in chief executive total compensation using a variety of market-based peer group performance measures. They find the strongest evidence of RPE when using a peer group performance measure based on industry-size groups. Gibbons and Murphy (1990) and Rajgopal et al. (2006) also find evidence of RPE for US total compensation using both industry and market-based peer group performance measures. Both studies find the market index performance measure is a better filter for relative performance than the industry peer group measure. This study finds industry peer group as a better filter for actual long-term incentive pay but that market peer groups are better filters for actual bonus pay.

The RE models 5c, 5e and 5f include the peer group performance dummy variables, which position each firm relative to either bottom quartile peer group performance, second quartile peer group performance, third quartile peer group performance or top quartile peer group performance. Model 5c shows that after holding own firm performance and industry sector peer group performance constant, the chief executive of a second quartile-performing firm will realise 2.26[82] times more pay than the chief executive of a firm performing in the bottom quartile. Similarly, a

[81] In a US study, Garvey and Milbourn (2006) do test for RPE in share option grants but find no evidence.
[82] $[(e^{(1.183)} - 1) = 2.26]$

chief executive operating in the third quartile will realise 7.13[83] times the pay of a bottom quartile firm. Top quartile industry sector performance equates to 16.20[84] times the pay of bottom quartile performance. These results show that there is differentiation in payouts from long-term incentive awards according to how a firm compares to its industry sector. The upper quartile and top quartile market performance dummy variables are significant and positive in RE models 5e and 5f. Overall these results provide additional support for the relationship between relative corporate performance and long-term incentives and are consistent with RPE theory.

It is interesting to note that the year dummy variables are not significant, which suggests that unlike other elements of pay, actual long-term incentive pay has not simply increased due to macroeconomic factors such as price inflation and general pay trends.

7.5.5 Concluding remarks about long-term pay

In conclusion, the results for actual long-term pay provide strong evidence of RPE in UK chief executive pay, which is in addition to the strong findings reported for actual short-term pay. In particular these results illustrate the importance of measuring long-term pay with respect to the value of performance-vested awards rather than the grant value, in order to comprehend how performance influences actual pay.

Chief executive long-term incentive grants do not vary according to prior relative peer group performance and actually the fixed-effect estimates show that performance is negatively related to target long-term pay. Whereas, the analysis of long-term incentive payouts finds strong evidence that own firm performance is positively related to chief executive pay and payouts are determined relative to peer group performance.

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83 $[(e^{(2.096)} - 1) = 7.13]$
84 $[(e^{(2.845)} - 1) = 16.20]$

Collectively these findings are in accord with the descriptive analysis examined in Chapter Six, which portrays the use of RPE in the vesting criteria of long-term incentive plans. The final section analyses target total pay and actual total pay.

7.6 CEO total pay

Finally, this section presents an analysis of total pay over the sample period. The analysis begins by examining target total pay, which is the sum of basic pay, target bonus, target long-term pay and any other cash payments. Then the analysis turns to actual total pay, which is the sum of basic pay, actual bonus, actual long-term pay and other cash. Although the CEO total pay definitions used in this study do not mix contingent pay with realised pay, they do combine basic pay with short and long-term incentive pay. For this reason the analysis of actual total pay, in particular, may mask the large positive and significant pay-for-performance relationships already identified for actual bonus and actual long-term pay.

7.6.1 Target total pay regression results

Chief executive target total pay is assumed to be associated with the previous year's financial performance, rather than related contemporaneously with firm performance. For this reason the performance variables and company size variable are lagged one year to correctly estimate the association between corporate performance and total target pay.

The random-effects and fixed-effects estimates are presented in Table 7.18 and Table 7.19 respectively. Hypothesis 6a predicts short-term performance is positively related to chief executive target total pay. Hypothesis 6b predicts short-term peer group performance is negatively related to target total pay. Hypothesis 6c predicts company size is positively related to target total pay.

The Hausman (1978) test statistic for each regression model is reported in Table 7.18 and is not significant for any of the RE models. This indicates that there is systematic difference between the two models and therefore random-effect estimates are more efficient than fixed-effects (Wooldridge, 2009).

Table 7.18

Random-effect regressions of chief executive target total pay[a]

Variable	RE model 6a[a]	RE model 6b[a]	RE model 6c[a]	RE model 6d[a]	RE model 6e[a]	RE model 6f[a]
$S.EPS_{t-1}$	-0.048		-0.042			-0.037
	(-0.65)		(-0.59)			(-0.52)
$S.RET_{t-1}$		-0.022	-0.017	-0.040	-0.048	-0.043
		(-0.61)	(-0.50)	(-0.87)	(-1.07)	(-0.94)
$S.IN.RET_{t-1}$				0.059		0.002
				(0.91)		(0.03)
$S.MK.RET_{t-1}$					0.117	0.111
					(1.54)	(1.21)
$SALES^{a}_{t-1}$	0.335***	0.332***	0.334***	0.332***	0.332***	0.334***
	(14.93)	(14.00)	(14.80)	(14.04)	(13.96)	(14.74)
AGE	0.003	0.003	0.003	0.003	0.003	0.003
	(0.53)	(0.46)	(0.52)	(0.45)	(0.47)	(0.52)
TEN	0.013*	0.013*	0.013*	0.013*	0.013*	0.013*
	(1.71)	(1.71)	(1.71)	(1.71)	(1.71)	(1.71)
YR.2004	0.138***	0.141***	0.141***	0.134***	0.128***	0.128***
	(4.79)	(4.73)	(4.74)	(4.56)	(4.38)	(4.39)
YR.2005	0.311***	0.315***	0.317***	0.301***	0.286***	0.289***
	(8.22)	(7.76)	(7.86)	(7.00)	(6.48)	(6.57)
YR.2006	0.424***	0.425***	0.429***	0.411***	0.401***	0.406***
	(11.73)	(11.93)	(11.48)	(10.15)	(10.12)	(9.55)
YR.2007	0.524***	0.523***	0.529***	0.511***	0.496***	0.503***
	(10.93)	(11.68)	(10.58)	(10.60)	(10.25)	(9.27)

Variable	RE model 6a[a]	RE model 6b[a]	RE model 6c[a]	RE model 6d[a]	RE model 6e[a]	RE model 6f[a]
Intercept	9.063***	9.110***	9.073***	9.114***	9.114***	9.080***
	(24.65)	(23.62)	(24.54)	(23.67)	(23.57)	(24.52)
Wald χ2	731.45	741.25	731.90	765.18	762.20	759.19
	(p < 0.001)	(p < 0.001)	(p < 0.001)	(p < 0.001)	(p < 0.001)	(p < 0.001)
Hausman χ2	6.61	6.16	6.80	10.27	10.81	13.53
	(p = 0.36)	(p = 0.41)	(p = 0.45)	(p = 0.17)	(p = 0.15)	(p = 0.14)
R^2 within	0.392	0.392	0.393	0.392	0.393	0.394
R^2 between	0.523	0.524	0.523	0.525	0.525	0.524
R^2 overall	0.491	0.492	0.491	0.493	0.493	0.492
Observations	833	833	833	833	833	833

This table reports random-effect regressions clustered by year and CEO-firm pair with robust standard errors. Target total pay is the natural logarithm of the sum of basic pay, plus other cash, plus short-term performance-contingent pay, plus long-term performance-contingent pay. S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. AGE is the age of the CEO in number of years. TEN is the number of years since being appointed CEO. YR is a set of year dummy variables. z-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.19

Fixed-effect regressions of chief executive target total pay[a]

Variable	FE model 6a[a]	FE model 6b[a]	FE model 6c[a]	FE model 6d[a]	FE model 6e[a]	FE model 6f[a]
$S.EPS_{t-1}$	-0.074		-0.068			-0.063
	(-0.76)		(-0.72)			(-0.68)
$S.RET_{t-1}$		-0.022	-0.014	-0.031	-0.041	-0.031
		(-0.58)	(-0.43)	(-0.68)	(-0.91)	(-0.69)
$S.IN.RET_{t-1}$				0.032		-0.019
				(0.48)		(-0.23)
$S.MK.RET_{t-1}$					0.089	0.099
					(1.17)	(1.06)
$SALES^{a}_{t-1}$	0.221***	0.216***	0.222***	0.216***	0.218***	0.223***
	(2.76)	(2.65)	(2.76)	(2.64)	(2.66)	(2.76)
YR.2004	0.160***	0.163***	0.163***	0.159***	0.153***	0.154***
	(5.40)	(5.29)	(5.32)	5.22	(5.12)	(5.16)
YR.2005	0.355***	0.355***	0.359***	0.347***	0.333***	0.339***
	(9.15)	(8.77)	(8.71)	8.11	(7.87)	(7.81)
YR.2006	0.496***	0.491***	0.500***	0.484***	0.473***	0.483***
	(11.10)	(12.01)	(10.94)	10.57	(11.00)	(9.83)
YR.2007	0.623***	0.615***	0.627***	0.608***	0.594***	0.607***
	(9.72)	(11.01)	(9.57)	10.27	(10.49)	(9.02)

Variable	FE model 6a[a]	FE model 6b[a]	FE model 6c[a]	FE model 6d[a]	FE model 6e[a]	FE model 6f[a]
Intercept	10.850***	10.913***	10.842***	10.905***	10.887***	10.822***
	(9.80)	(9.70)	(9.77)	(9.66)	(9.64)	(9.70)
F-test	69.86	68.62	60.04	62.25	60.39	49.87
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
R^2 within	0.395	0.394	0.395	0.394	0.395	0.396
R^2 between	0.498	0.503	0.499	0.504	0.505	0.500
R^2 overall	0.459	0.462	0.460	0.463	0.464	0.461
Observations	833	833	833	833	833	833

This table reports fixed-effect regressions clustered by year and CEO-firm pair with robust standard errors. Target total pay is the natural logarithm of the sum of basic pay, plus other cash, plus short-term performance-contingent pay, plus long-term performance-contingent pay. S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

7.6.2 Target total pay analysis and discussion

The target total pay results, based on the random-effect estimates, are summarised in Table 7.20. There is no evidence that target total pay is associated with EPS, shareholder return or the relative market and sector performance measure and so hypotheses 6a and 6b cannot be rejected. Firm size is the only explanatory variable that is a significant determinant of target total pay and so hypothesis 6c is rejected. The estimated elasticity coefficient of firm sales is around 0.30 for all random-effect models and significant (p-value < 0.01). A 10% larger firm will pay its executives 3.05%[85] more. Specifically, a 10% increase in sales is associated with a further £56,820 in target total pay relative to the 2007 median target total pay, which was £1,862,942. Or conversely a 10% decrease in sales is associated with a comparable reduction in total pay.

In the random-effects model the control variable CEO tenure is significant and positively related to target total pay indicating that chief executive pay increases with acquired human capital. CEO age is not significantly related to target total pay.

The year dummy variables are positive and significant for all models and reflect the increase in target total pay over the sample period due to time-varying factors other than firm performance, firm size or human capital characteristics.

Table 7.20

Target total pay: summary hypothesis results[a]

Independent Variable	Hypothesis	Prediction	Outcome
Short-term EPS	H_A6a	$\beta_1 > 0$	Not significant
Short-term shareholder return	H_A6a	$\beta_1 > 0$	Not significant
Short-term FTSE-350 industry sector return	H_A6b	$\beta_2 < 0$	Not significant
Short-term FTSE-350 market return	H_A6b	$\beta_2 < 0$	Not significant
Net sales	H_A6c	$\beta_3 > 0$	Significant (+)

[a]Statistical significance determined by the random-effect estimates.

[85] $[(e^{(0.1 \times 0.300)} - 1) \times 100 = 3.05\%]$

These findings are in contrast to the results for basic pay and target bonus pay, which in addition to firm sales, are associated with own firm performance and relative peer group performance. The different findings may be explained by the inclusion of supplementary fixed other cash payments in target total pay. Further, target total pay also includes long-term contingent pay, which according to the earlier regression results is negatively related to firm performance. The diverse findings between target total pay and its components demonstrate the necessity to divide pay into its constituent parts in order to better comprehend how corporate performance influences chief executive incentives and actual pay.

A major contention of this study is that prior research frequently combined measures of contingent pay with realised pay and that this contributes to the mixed findings within the literature. It is for this reason that target total pay, which is purposely distinct from actual total pay, is not directly comparable to the extant literature. The measure of total pay used in the UK literature typically includes fixed pay elements (basic pay and other cash), realised pay (actual bonus and deferred bonus) and contingent pay (performance-options, performance shares and long-term cash plans). Prior research, particularly in the UK, frequently finds no association between firm performance and total compensation. Recently, Ozkan (2007) and Conyon et al. (2009), using a single cross-section approach find no association between shareholder return and total compensation. Ozkan (2009), using panel data, also find no association between shareholder return and chief executive total compensation for 390 large UK firms between 1999 and 2005. These studies include performance-share and performance-option grants in their measure of total pay, which is a likely reason for not finding a significant result. Ozkan (2009) then excludes long-term incentive grant data from total compensation and in doing so, finds a significant positive association between shareholder return and total cash pay. The following section considers actual total pay.

7.6.3 Actual total pay regression results

In this section the analysis first determines the impact of short-term performance on actual total pay and then the association between long-term performance and actual total pay. Random and fixed-effect regression estimates for performance over the short-term are shown in Tables 7.21 and 7.22 respectively. Chief executive actual total pay is assumed to be associated with the current financial year's performance since it includes actual bonus. Therefore, it is expected that the relationship between short-term corporate performance and actual total pay is contemporaneous. Hence the firm and peer group performance variables are not lagged.

The regression analysis is then repeated for long-term performance and the random-effect estimates are presented in Table 7.23 and the fixed-effect estimates in Table 7.24. Chief executive actual total pay is also assumed to be associated with the previous three years corporate performance since it includes actual LTI. The long-term performance variables are lagged one year to correctly estimate the association between long-term corporate performance and actual total pay.

Hypothesis 7a predicts short-term performance is positively related to actual total pay. Hypothesis 7b predicts short-term peer group performance is negatively related to actual total pay. Hypothesis 7c predicts long-term performance is positively related to actual total pay. Hypothesis 7d predicts long-term peer group performance is negatively related to actual total pay. Hypothesis 7e predicts company size is positively related to actual total pay.

The Hausman (1978) test statistic for each regression model is reported in Table 7.21 for the effect of short-term performance on actual total pay and Table 7.23 for long-term performance. The Hausman statistic is large and significant for RE models 7(S)a to 7(S)f. The null hypothesis of no correlation between random-effects and the independent variables is rejected. Random-effects are inconsistent, and therefore the consistent fixed-effects are preferred (Wooldridge, 2009). The test is not significant for RE models 7(L)a to 7(L)d. The null hypothesis of no systematic difference between the two models is not rejected and therefore random-effect estimates are more efficient than fixed-effects (Wooldridge, 2009).

Table 7.21

Random-effect regressions of chief executive actual total pay[a]

Variable	RE model 7(S)a[a]	RE model 7(S)b[a]	RE model 7(S)c[a]	RE model 7(S)d[a]	RE model 7(S)e[a]	RE model 7(S)f[a]
$S.EPS_t$	0.051		0.051			0.038
	(0.55)		(0.54)			(0.39)
$S.RET_t$		0.005	-0.002	0.061	0.093**	0.078
		(0.13)	(-0.06)	(1.23)	(2.18)	(1.65)
$S.IN.RET_t$				-0.168*		0.060
				(-1.86)		(0.48)
$S.MK.RET_t$					-0.383***	-0.425***
					(-3.60)	(-2.82)
$SALES^{a}_{t-1}$	0.280***	0.284***	0.280***	0.285***	0.286***	0.283***
	(11.89)	(11.61)	(11.81)	(11.68)	(11.71)	(11.96)
AGE	0.007	0.007	0.007	0.007	0.007	0.007
	(1.37)	(1.48)	(1.36)	(1.45)	(1.42)	(1.34)
TEN	0.024***	0.024***	0.024***	0.024***	0.024***	0.024***
	(3.29)	(3.22)	(3.28)	(3.27)	(3.27)	(3.32)
YR.2004	0.125***	0.127***	0.125***	0.149***	0.178***	0.175***
	(3.74)	(3.96)	(3.84)	(4.47)	(5.14)	(4.97)
YR.2005	0.218***	0.224***	0.218***	0.242***	0.256***	0.249***
	(5.62)	(6.31)	(5.72)	(6.77)	(7.20)	(6.57)
YR.2006	0.343***	0.352***	0.343***	0.367***	0.394***	0.387***
	(7.68)	(8.60)	(7.71)	(8.80)	(9.34)	(8.43)
YR.2007	0.499***	0.512***	0.499***	0.515***	0.519***	0.510***
	(9.77)	(10.52)	(9.76)	(10.67)	(10.85)	(10.13)

Variable	RE model 7(S)a[a]	RE model 7(S)b[a]	RE model 7(S)c[a]	RE model 7(S)d[a]	RE model 7(S)e[a]	RE model 7(S)f[a]
Intercept	9.251***	9.192***	9.253***	9.176***	9.197***	9.248***
	(26.95)	(25.83)	(26.55)	(25.78)	(25.83)	(26.58)
Wald $\chi2$	400.40	396.28	401.97	432.91	432.31	447.52
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
Hausman $\chi2$	18.65	17.14	21.23	22.96	22.70	29.03
	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)	($p < 0.05$)
R^2 within	0.418	0.419	0.418	0.424	0.432	0.432
R^2 between	0.438	0.431	0.438	0.429	0.428	0.433
R^2 overall	0.445	0.440	0.445	0.438	0.441	0.445
Observations	861	861	861	861	861	861

This table reports random-effect regressions clustered by year and CEO-firm pair with robust standard errors. Actual total pay is the natural logarithm of the sum of basic pay, plus other cash, plus short-term performance-realised pay, plus long-term performance-realised pay. S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. AGE is the age of the CEO in number of years. TEN is the number of years since being appointed CEO. YR is a set of year dummy variables. z-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.22

Fixed-effect regressions of chief executive actual total pay[a]

Variable	FE model 7(S)a[a]	FE model 7(S)b[a]	FE model 7(S)c[a]	FE model 7(S)d[a]	FE model 7(S)e[a]	FE model 7(S)f[a]
$S.EPS_t$	0.000		0.002			-0.013
	(0.00)		(0.02)			(-0.11)
$S.RET_t$		-0.010	-0.010	0.057	0.085*	0.081
		(-0.25)	(-0.25)	(1.14)	(1.90)	(1.64)
$S.IN.RET_t$				-0.198**		0.051
				(-2.21)		(0.44)
$S.MK.RET_t$					-0.402***	-0.446***
					(-3.70)	(-3.08)
$SALES^{a}_{t-1}$	0.306***	0.304***	0.304***	0.315***	0.301***	0.298***
	(2.87)	(2.87)	(2.87)	(3.01)	(2.86)	(2.86)
YR.2004	0.153***	0.154***	0.154***	0.179***	0.208***	0.208***
	(4.09)	(4.44)	(4.27)	(4.94)	(5.53)	(5.33)
YR.2005	0.277***	0.279***	0.279***	0.299***	0.313***	0.313***
	(5.79)	(6.74)	(5.96)	(7.11)	(7.60)	(6.75)
YR.2006	0.437***	0.439***	0.439***	0.455***	0.484***	0.488***
	(7.59)	(8.81)	(7.71)	(8.94)	(9.56)	(8.41)
YR.2007	0.624***	0.625***	0.624***	0.625***	0.634***	0.639***
	(9.76)	(11.42)	(9.78)	(11.59)	(11.98)	(10.22)

Variable	FE model 7(S)a[a]	FE model 7(S)b[a]	FE model 7(S)c[a]	FE model 7(S)d[a]	FE model 7(S)e[a]	FE model 7(S)f[a]
Intercept	9.346***	9.364***	9.366***	9.220***	9.442***	9.479***
	(6.36)	(6.40)	(6.40)	(6.38)	(6.50)	(6.58)
F-test	45.95	46.12	39.54	42.78	46.23	36.25
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
R^2 within	0.417	0.417	0.417	0.422	0.431	0.431
R^2 between	0.390	0.389	0.389	0.388	0.385	0.383
R^2 overall	0.413	0.412	0.413	0.411	0.413	0.412
Observations	861	861	861	861	861	861

This table reports fixed-effect regressions clustered by year and CEO-firm pair with robust standard errors. Actual total pay is the natural logarithm of the sum of basic pay, plus other cash, plus short-term performance-realised pay, plus long-term performance-realised pay. S.EPS is earnings per share. S.RET is the annual change in the natural logarithm of the return index. S.IN.RET is the median annual return of the FTSE-350 share sector index. S.MK.RET is the median annual return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.23

Random-effect regressions of chief executive actual total pay[a]

Variable	RE model 7(L)a[a]	RE model 7(L)b[a]	RE model 7(L)c[a]	RE model 7(L)d[a]
$L.RET_{t-1}$	0.118***	0.116***	0.115***	0.115***
	(3.75)	(3.05)	(3.42)	(3.03)
$L.IN.RET_{t-1}$		0.006		0.002
		(0.12)		(0.03)
$L.MK.RET_{t-1}$			0.025	0.024
			(0.28)	(0.23)
$SALES^{a}_{t-1}$	0.294***	0.294***	0.294***	0.294***
	(12.01)	(11.99)	(12.01)	(12.00)
AGE	0.006	0.006	0.006	0.006
	(1.17)	(1.17)	(1.17)	(1.17)
TEN	0.019***	0.019***	0.019***	0.019***
	(2.79)	(2.78)	(2.78)	(2.78)
YR.2004	0.141***	0.141***	0.140***	0.141***
	(4.28)	(4.27)	(4.26)	(4.23)
YR.2005	0.207***	0.207***	0.205***	0.205***
	(5.71)	(5.60)	(5.35)	(5.35)
YR.2006	0.290***	0.287***	0.279***	0.279***
	(6.98)	(6.37)	(4.99)	(5.00)
YR.2007	0.422***	0.419***	0.408***	0.408***
	(7.75)	(7.11)	(5.18)	(5.20)

Variable	RE model 7(L)a[a]	RE model 7(L)b[a]	RE model 7(L)c[a]	RE model 7(L)d[a]
Intercept	9.130***	9.131***	9.126***	9.127***
	(26.61)	(26.58)	(26.64)	(26.59)
Wald $\chi2$	450.43	449.96	453.11	452.49
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
Hausman $\chi2$	5.44	7.40	14.62	15.47
	($p = 0.49$)	($p = 0.39$)	($p < 0.05$)	($p = 0.05$)
R^2 within	0.431	0.431	0.431	0.431
R^2 between	0.472	0.473	0.473	0.473
R^2 overall	0.476	0.476	0.476	0.476
Observations	786	786	786	786

This table reports random-effect regressions clustered by year and CEO-firm pair with robust standard errors. Actual total pay is the natural logarithm of the sum of basic pay, plus other cash, plus short-term performance-realised pay, plus long-term performance-realised pay. L.RET is the three-year change in the natural logarithm of the return index. L.IN.RET is the median three-year return of the FTSE-350 share sector index. L.MK.RET is the median three-year return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. AGE is the age of the CEO in number of years. TEN is the number of years since being appointed CEO. YR is a set of year dummy variables. z-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

Table 7.24

Fixed-effect regressions of chief executive actual total pay[a]

Variable	FE model 7(L)a[a]	FE model 7(L)b[a]	FE model 7(L)c[a]	FE model 7(L)d[a]
$L.RET_{t-1}$	0.114***	0.120***	0.116***	0.120***
	(3.37)	(2.90)	(3.15)	(2.89)
$L.IN.RET_{t-1}$		-0.020		-0.020
		(-0.35)		(-0.31)
$L.MK.RET_{t-1}$			-0.015	0.001
			(-0.16)	(0.00)
$SALES^{a}_{t-1}$	0.245**	0.246***	0.245***	0.246***
	(2.66)	(2.68)	(2.66)	(2.68)
YR.2004	0.168***	0.168***	0.168***	0.167***
	(4.92)	(4.88)	(4.92)	(4.86)
YR.2005	0.263***	0.265***	0.264***	0.265***
	(6.60)	(6.61)	(6.48)	(6.51)
YR.2006	0.375***	0.381***	0.381***	0.381***
	(7.73)	(7.50)	(6.51)	(6.55)
YR.2007	0.535***	0.545***	0.544***	0.544***
	(9.06)	(8.71)	(6.98)	(7.02)

Variable	FE model 7(L)a[a]	FE model 7(L)b[a]	FE model 7(L)c[a]	FE model 7(L)d[a]
Intercept	10.190***	10.174***	10.194***	10.174***
	(8.00)	(7.99)	(8.02)	(8.00)
F-test	46.85	40.26	40.45	35.38
	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)	($p < 0.001$)
R^2 within	0.431	0.431	0.431	0.431
R^2 between	0.430	0.429	0.430	0.429
R^2 overall	0.444	0.443	0.444	0.443
Observations	786	786	786	786

This table reports fixed-effect regressions clustered by year and CEO-firm pair with robust standard errors. Actual total pay is the natural logarithm of the sum of basic pay, plus other cash, plus short-term performance-realised pay, plus long-term performance-realised pay. L.RET is the three-year change in the natural logarithm of the return index. L.IN.RET is the median three-year return of the FTSE-350 share sector index. L.MK.RET is the median three-year return of the FTSE-350 share index. SALES are the natural logarithm of total company sales. YR is a set of year dummy variables. t-statistics are in parentheses. *significant at better than the 10% level. **significant at better than the 5% level. ***significant at better than the 1% level. [a]variable in natural logarithms.

7.6.4 Actual total pay analysis and discussion

The results demonstrate only weak evidence that short-term shareholder return is related to actual total pay, but more consistent and strong evidence that long-term shareholder return is related to actual total pay. Evidence of RPE is restricted to the association between short-term peer group performance and actual total pay. There is no significant evidence of pay being determined relative to long-term performance. The hypothesis findings for actual total pay are summarised in Table 7.25.

Table 7.25

Actual total pay: summary hypothesis results

Independent Variable	Hypothesis	Prediction	Outcome
Short-term EPS[a]	H_A7a	$\beta_1 > 0$	Not significant
Short-term shareholder return[a]	H_A7a	$\beta_1 > 0$	Significant (+)
Short-term FTSE-350 industry sector return[a]	H_A7b	$\beta_2 < 0$	Significant (-)
Short-term FTSE-350 market return[a]	H_A7b	$\beta_2 < 0$	Significant (-)
Long-term shareholder return[b]	H_A7c	$\beta_1 > 0$	Significant (+)
Long-term FTSE-350 industry sector return[b]	H_A7d	$\beta_2 < 0$	Not significant
Long-term FTSE-350 market return[b]	H_A7d	$\beta_2 < 0$	Not significant
Net sales[ab]	H_A7e	$\beta_3 > 0$	Significant (+)

[a]Statistical significance determined by the fixed-effect estimates.
[b]Statistical significance determined by the random-effect estimates.

There is insufficient evidence that EPS is associated with actual total pay. However, consistent with the alternate hypothesis 7a, FE model 7(S)e does report a significant but small association between shareholder return and actual total pay. Thus, a 10% increase in shareholder return is associated with a 0.85%[86] increase in actual total pay. In terms of total pay this is equivalent to an increase of £11,497 in median actual total pay, which was £1,352,534 in 2007.

Long-term stock-market returns are also significant and positively associated with actual total pay and therefore the null hypothesis 7c is rejected. The random-

[86] $[(e^{(0.1 \times 0.085)} - 1) \times 100 = 0.85\%]$

effects coefficient on shareholder return is around 0.12 for all models. This result indicates that a chief executive will receive an increase of 1.21%[87] in actual total pay for a 10% increase in three-year shareholder return. This is equal to an additional £16,366 if measured against 2007 median actual total pay. The elasticity is fractionally higher than the 0.28% reported for basic pay but substantially smaller than the 27% reported for both actual bonus and actual long-term pay. The elasticity estimated in the actual total pay equation is comparable with Gregory-Smith's (2009) estimate of 0.09 for chief executive total pay. For the US, Albuquerque (2009) estimated an elasticity of just above 0.20. A number of other UK studies find no association between firm performance and executive total pay. Recent examples include Guy (2005), Ozkan (2007), Conyon et al. (2009) and Guest (2009).

The hypothesis 7b proposes a negative association between short-term FTSE-350 market and sector performance with actual total pay. The fixed-effect regression, FE model 7(S)e, in Table 7.22 indicates that short-term FTSE-350 shareholder return is significant and negatively associated with actual total pay providing evidence of RPE (coefficient of -0.402, and p-value of < 0.01). The null hypothesis 7b can be rejected. This result is robust to estimation method as the random-effect coefficients are also significant and of similar magnitude (coefficient of -0.383, and p-value of < 0.01). In FE model 7(S)d sector peer group performance also reports a significant negative association with actual total pay (coefficient of -0.198, and p-value of < 0.05). There is no evidence of RPE for either peer group specification when performance is measured using long-term shareholder return and therefore the null hypothesis 7d is retained.

The hypothesis 7e predicts a positive association between company size and actual total pay. In each model, regardless of estimation method, the company sales variable is significant and positive. We can therefore reject the null hypothesis 7e. The fixed-effect estimates in Table 7.22 show the elasticity of actual total pay with respect to sales is around 0.30 for all models and significant (p-value < 0.01). A

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87 $[(e^{(0.1 \times 0.120)} - 1) \times 100 = 1.21\%]$

company that is 10% larger than another firm will pay its chief executive 3.05%[88] more. This is equivalent to an additional £41,252 if evaluated at the median actual total pay of £1,352,534 in 2007. The random-effect estimates in Table 7.23 find the elasticity of actual total pay with respect to sales is also close to 0.30 for all models and significant (p-value < 0.01).

The year dummy variables are positive and significant for all years and all models implying that total actual pay has increased during the sample period due to time-varying factors, other than those specified in the model, such as price inflation and general pay trends.

In the random-effect models CEO tenure is significant and positively related to actual total pay. CEO age is not significant in any of the random-effect models.

7.6.5 Concluding remarks about total pay

Overall the results for actual total pay are very similar to the extant literature but remarkably different to the results reported for actual bonus and actual long-term pay particularly in terms of the economic significance of the findings. It can be deduced from these results that it is imperative to divide chief executive compensation into its individual components in order to comprehend how corporate performance influences chief executive pay. Evidence of RPE is also altered by the inclusion of the different pay elements that are related to peer group performance in different ways.

7.7 Summary

The results of this study contribute to the executive pay literature in the following ways. First, it corroborates the US findings of Murphy (1985) and the UK findings of McKnight and Tomkins (1999, 2004) that it is important to divide total compensation into basic pay, annual bonus and equity-based incentives in order to comprehend exactly how corporate performance influences executive pay. The results show that corporate performance interrelates heterogeneously with the

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[88] $[(e^{(0.1 \times 0.300)} - 1) \times 100 = 3.05\%]$

different pay elements. This study extends the literature by expressing executive pay either as fixed pay, performance-contingent pay or performance-realised pay. Total shareholder return is shown to have only a small influence on basic pay but is statistically and economically very important in determining performance-realised pay. The elasticity of actual bonus pay and actual long-term pay with respect to shareholder return is around 2.5; which is nearly 100 times the elasticity of basic pay. Company size is the most significant factor in the determination of basic pay and contingent pay but has a much smaller relative economic significance in the determination of actual realised incentives compared to corporate performance.

Second and perhaps most importantly this is the first study to find implicit use of relative performance evaluation in basic pay, short-term pay and long-term incentive pay. The findings imply that remuneration committees consider own firm performance relative to peer group shareholder return when making adjustments to chief executive basic pay. Further, annual bonus plans are also designed with consideration to peer group performance so that the bonus payments are relative to benchmark market performance. A further original contribution of this study is the analysis of long-term incentive payouts and the finding that payouts are positively related to firm performance but also determined relative to industry peer group shareholder return.

The study also finds that firm performance influences chief executive pay in different ways. Short-term absolute shareholder return and market peer group performance influence short-term pay. While long-term absolute shareholder return and industry peer group performance influences long-term pay.

There are several factors, alongside dividing pay into its constituent parts and matching the performance period to elements of pay that may also contribute to the new findings of this study. First, the data collection process identified the individual chief executive and thus allowed for the regression model to control for chief executive and firm specific effects rather than just firm as in previous studies (for example, Benito and Conyon, 1999). Second, the use of median peer group performance measures, rather than the mean values used in previous research, better reflects the way remuneration committees employ RPE in practice.

Chapter Eight

Conclusion

8.1 Introduction

The purpose of this chapter is to summarise and emphasize the contribution of the research, consider the policy implications, evaluate the potential limitations and suggest an agenda for future research.

The chapter is organised as follows. To begin, the research problem that prompted the examination of firm performance and chief executive pay is restated. Next, the methodological and empirical contribution of this research to the executive pay literature is discussed. The overall findings are summarised with regard to the research purpose and research questions posed in this study. It is intended to be a synopsis and not a repeat of the analysis and discussion from the result chapters. This is followed by an outline of the policy implications drawn from the study. Finally, the limitations of the study and recommendations for future research are highlighted.

The global debate on executive pay revolves around the scale of executive pay and the pay-for-performance relationship and this study informs both elements of that debate. The study observes the growth in CEO pay during the sample period, particularly in relation to average employee pay. But the focus of the study is on the alignment of CEO pay with firm performance and it is here that the study makes a methodological and empirical contribution to the literature. Before that contribution is discussed the research problem is revisited below.

8.2 The pay-for-performance problem

Executive pay has been in the spotlight for several decades, but not more so than during the 2007-10 financial crisis and the demise of prominent financial institutions, like the Royal Bank of Scotland, that was part nationalised to prevent its failure. The financial crisis has prompted renewed calls for a clamp down on excessive executive remuneration and an end to supposedly irresponsible firm behaviour. At the moment, barely a week goes by without the media highlighting yet another example of, so called, unjustifiable executive rewards. Executive pay has been fundamentally criticised during these austere times but this renewed attack, provoked by the banking crisis, may not be entirely justified according to the findings of this study.

In the last twenty years the UK has made enormous progress in reforming the corporate governance regime. Reform started by addressing the recommendations of the Cadbury Report (1992) and subsequently those of the Greenbury Report (1995), the Hampel Report (1998), the Combined Code (1998) and the most recent publication of the UK Corporate Governance Code (2010). The previous UK government also enacted legislative provisions in relation to executive remuneration and Parliament passed the Directors' Remuneration Report Regulations (2002). Yet the criticism directed towards the top executives of UK firms from politicians, the media and the general public is more prominent than ever before.

Investors remain concerned, despite the many reforms implemented since the Cadbury recommendations. For example, in July 2007 Cable & Wireless came under enormous pressure from investors regarding planned changes to its incentive scheme (Judge, 2007). Sports Direct also faced a "pay revolt" over its directors' pay award, which the shareholder voting agency, Pirc, encouraged shareholders to resist (The Financial Times, 2007). A more recent example is the house building firm, Bellway, which was highly criticised by the Association of British Insurers (ABI) after paying out executive bonuses despite very poor share price performance (The Financial Times, 2009).

The literature review highlighted a weak association between corporate performance and executive pay and minimal evidence of relative performance evaluation (RPE) in executive pay. This research contributes to the literature and the broader discussion on executive pay by providing new evidence, from the UK, about the relationship between firm performance and CEO pay. The relationship between corporate performance and executive pay, in particular relative firm performance, is an unresolved problem. But the new findings presented in this study will go some way to assure stakeholders that corporate governance reforms intended to improve the link between executive pay and firm performance has delivered some success.

8.3 Methodological and empirical contribution

This section will address the important methodological and empirical contributions that this thesis makes to the executive pay literature. The theoretical foundation for the research is based on principal-agent theory and relative performance evaluation theory.

Methodologically, the study contributes to the extant literature by defining executive compensation in terms of performance-contingent pay and performance-realised pay. It is argued, here, that there is a much greater likelihood of uncovering a relationship between firm performance and executive pay using actual (realised) compensation measures, rather than measures of contingent or target incentive pay. The empirical results support the methodological divide of compensation in this way.

A contention of this study is that one of the reasons for the often inconclusive findings about pay and performance is because the research has failed to allow for the advent of performance conditions attached to the vesting of long-term incentive awards. To some extent this might matter less in the US where performance conditions on long-term awards are less prevalent. But in the UK, as shown in Chapter Six, performance conditions are extensively used in annual bonus and long-term incentive plans. The performance vesting criteria attached to awards of long-term pay, both shares and share options, has been widely implemented by remuneration committees since it was first suggested by the Greenbury Report (1995). The extant literature disregards these performance criteria and instead focuses on *target* long-term pay. That is, prior research focuses on the amount the executive can potentially receive if the performance criteria are met in full. The difference between the extant literature and the present study is, here, the focus is on *actual* long-term pay and *actual* performance.

For research to discount the performance conditions is to ignore how remuneration committees have, in part, responded to the recommendations of the various corporate governance reports. The following extract from Punch Tavern's 2005 remuneration report addresses this very point:

> *"It should be noted that the real value received by the Executive Directors under the share incentive arrangements will be dependent upon the degree to which the associated performance conditions have been satisfied at the end of the three year performance period and the share price of the Company at this time" (Punch Taverns, 2005, p.25).*

This study contributes to the empirical literature by being the first study to examine the relationship between firm performance and actual CEO long-term pay rather than target pay. All recent UK research, for example Ozkan (2007), Eichholtz et al. (2008), Conyon et al. (2009), Gregory-Smith (2009), Kuang and Qin (2009) and Ozkan (2009), measure target long-term pay and not actual pay. To emphasize the point the current study also tests the relationship between firm performance and target long-term pay and not surprisingly the insignificant results of this test replicate those of Ozkan (2007). In contrast, this study finds that firm performance is strongly related to actual long-term pay.

This study shows that the relationship between corporate performance and chief executive pay is different for fixed pay, incentive opportunity and actual incentive pay. Filatotchev et al. (2007, p.171) suggested that research should distinguish between 'potential' and 'actual' rewards, which is precisely what is done in this study. Liu and Stark (2009) also suggested that further RPE research consider dividing cash compensation into basic pay and actual bonus. Overall the findings of this study show that it is crucial to distinguish between incentive opportunities and the actual pay received. While firm performance is strongly related to actual pay, it is at most only weakly related to target pay. The findings also show that total actual pay obscures the relationship between performance and pay since it combines different elements of pay, which are related to performance in different ways.

The existence of RPE in the determination of executive compensation is an important empirical question with important practical implications given that the Combined Code (2003) recommended that executive pay should be linked to firm peer group performance. A further substantive contribution of this research is the finding that RPE is an important factor in explaining the variation in CEO compensation. Overall the results of this study find substantial support for the proposition that *actual* CEO pay is determined by relative firm performance. In particular, the results show that *actual* bonus pay is determined relative to overall FTSE-350 market performance and *actual* long-term pay is determined relative to FTSE-350 sector performance. This is the first UK study to provide strong evidence of the relationship between peer group performance and executive pay and as such these findings contribute to the understanding of the association between firm performance and CEO pay. It would be surprising if the results of this study were any different, after considering the important changes to corporate governance prior to the period of investigation.

A further contribution is that different elements of CEO pay are based on different corporate performance outcomes. In an extensive review of the executive compensation literature, Devers et al. (2007) suggested that future research must provide greater justification for the measures employed. This has been achieved by matching the measures used in this study to those employed by remuneration committees. Earnings Per Share (EPS) and Total Shareholder Return (TSR), the measures used in this study, are widely employed in executive annual bonus and long-term incentive plans. In this study firm performance is measured over one-year since target incentives are set annually and bonuses are usually based on annual performance. Actual long-term performance is measured over three-years since this is the time period over which the vast majority of long-term incentive awards vest. The findings show that short-term performance is associated with actual bonus and long-term performance is associated with actual long-term pay.

Further, while actual bonus is determined relative to overall FTSE-350 market performance; actual long-term pay is determined relative to FTSE-350 sector performance.

8.4 Practical implications and policy recommendations

As well as the methodological and empirical contributions discussed above, this study also has important practical implications. Institutional policy recommendations are proposed founded on observed weaknesses of the existing UK Corporate Governance Code (2010) and the Directors' Remuneration Report Regulations (2002). These are discussed next.

Investors, investor organisations and legislators are primarily concerned with the link between firm performance and executive pay. While other stakeholder groups focus attention on the scale of pay. The findings of this study suggest there is a strong link between absolute and relative firm performance and CEO pay, which is in accordance with the principles of the UK Corporate Governance Code and is in line with investor expectations. This suggests that remuneration committees are adhering to this aspect of the UK Corporate Governance Code.

While there is strong evidence of the association between firm performance and CEO pay there are also important observations regarding the level and growth of pay. The evidence from the analysis provided in Chapter Six shows that CEO pay is many times greater than average employee pay and continued to outpace increases in average employee pay during the sample period. This finding is at odds with one of the supporting principles of the UK Corporate Governance Code, which suggests that remuneration committees should be mindful of levels of employee pay when determining executive pay. Thus while remuneration committees adopt performance-pay practices in line with investor expectations and the UK Code, they also seem to ignore another important recommendation of that code.

There are appeals from some stakeholder groups in the UK, that new legislation is required to curb the level of executive pay compared to average employee pay. For example, an independent review of pay in the UK public sector has suggested that top executive pay in the public sector should not exceed the lowest employee pay by a factor of 20 (BBC News, 1st December, 2010).

Evidence from this study suggests that the Directors' Remuneration Report Regulations (2002) can be strengthened with respect to its disclosure requirements. The Directors' Remuneration Report Regulations (2002) and the UK Code do not provide specific advice on pay levels nor require remuneration committees to *justify* changes to executive remuneration policy. However, shareholders must approve new long-term incentive arrangements and can vote in favour or against the annual remuneration report. The UK Code does recommend that compensation should not be excessive and that remuneration committees should be mindful of all employee pay when considering changes to executive pay. But the UK code also recognises that firms will want to provide competitive remuneration packages in order to secure and retain talented executives. This is a difficult equilibrium for firms to manage since remuneration committees may choose to offer competitive remuneration, which is simultaneously considered excessive compared to all employee pay.

While it is not realistic for corporate governance reports to provide specific advice on pay levels, or for legislation to restrict executive pay, for public listed companies it is desirable to require more detailed disclosure with regard to the rationalization for adjusting executive pay.

Here, it is proposed that the Directors' Remuneration Report Regulations (2002) ought to require an explanation for increases to executive director basic pay; increases in short and long-term performance-contingent pay (the maximum award receivable upon the realisation of predetermined performance conditions); and justification for the provision of any other cash payments such as a housing allowance. In addition it could be made mandatory for remuneration reports to include a graph illustrating the average growth of executive director pay over five years versus the average pay of all other employees and versus a measure of price inflation. Such a graphical representation would provide shareholders with a transparent overview of the growth of executive pay versus other key reference points.

It is further recommended that the Directors' Remuneration Report Regulations (2002) must be updated to require enhanced disclosure for annual bonuses so that disclosure regulations are aligned between short and long-term incentive pay. Buck et al. (2007) also suggest that disclosure must be improved for annual bonus plans. Currently remuneration committees are obliged to disclose very detailed information on share option plans and LTIPs, but only limited information on annual bonus arrangements. This would improve transparency of annual bonus awards, which is important since according to this study target annual bonus represented 30% of the median CEO target pay mix in 2007 (Figure 6.4, Section 6.4).

While the policy recommendations outlined above would increase disclosure requirements it is also recognised that remuneration reports are already very long and frequently not particularly easy to assimilate. So while enhanced disclosure is necessary it is also very important that firms simplify the presentation of the information. One way to do this is to standardise the layout of a remuneration report so that *all* pay data is tabulated and presented in a consistent manner. This would also require the use of standardised compensation definitions so that tables could be more easily compared between firms. Currently there are discrepancies with the way firms report the same information. For example some firms report payouts from long-term incentive schemes in the emoluments table and others report this in a separate table.

Overall the results of this study confirm that changes to improve corporate governance practice in the field of executive pay are working to the benefit of shareholders but as outlined above there is scope for further enhancement to the Directors' Remuneration Report Regulations (2002) and the UK Corporate Governance Code. Various groups, including institutional investors, the government and the media, require that chief executive pay is determined by corporate performance. This study shows that a positive relationship exists between corporate performance and actual CEO pay. These findings will be of particular importance to investors who expect the interests of executives to be aligned with those of the company shareholders, via an incentive contract that rewards executives for enhanced corporate performance.

Finally, the evidence provided in this study can be useful to informing the debate surrounding the scale of executive pay and the disparity that exists between the earnings of executives from the UK's largest firms and the average pay of employees.

8.5 Limitations and agenda for further research

This final section will address the potential limitations of the research and suggest opportunities for further investigation.

The results of this study are applicable to large UK publicly listed companies and cannot necessarily be generalised beyond. A further study would benefit from repeating this analysis for smaller UK firms in order to test the findings reported here. It would also be interesting to replicate the study in other countries particularly where performance conditions are widely used in long-term incentive plans.

A limitation of this study is the omission of certain variables that are expected to correlate with both corporate performance and executive compensation. Omitting confounding variables such as ownership concentration can potentially bias estimates of the pay-performance relationship. Further work ought to include additional explanatory variables to limit the possible bias. One particular variable to consider is institutional ownership concentration because there is an expectation that institutions or other large blockholders can serve as better monitors of executive actions, which is likely to reduce the sensitivity of pay to firm performance (Hartzell and Starks, 2003; Dong and Ozkan, 2008; Ozkan, 2009). Other variables also to consider, for the same reason, are the proportion of non-executives on the board, board size and non-executive share ownership (Ozkan, 2009). The inclusion of these omitted variables may achieve more secure results.

This study only spans a period of five years immediately after the Directors' Remuneration Report Regulations (2002). It would be valuable to extend the sample beyond 2007 to 2010 in order to capture the recent downturn in the economy and the impact of the corresponding financial crisis on the association between relative firm performance and executive pay. The compensation data used for this current study was hand collected from company remuneration reports, rather than from a commercial database, in order to facilitate the precision and detail necessary to construct the compensation variables. Other readily available data sources, such as *Datastream* or *Manifest*, currently do not provide the necessary detail to construct the compensation measures used in this study. Therefore in order to extend the database it would be again necessary to hand collect the additional data, which may not be feasible due to resource constraints. However, although this is an empirical question, RPE ought to be equally as important in a recessionary period as during a boom period since theoretically the use of RPE in executive pay should shield the executive from the common uncertainty associated with the market benchmark.

This study focuses on the compensation of the CEO, but as Liu and Stark (2009) identify in their study of RPE and executive board compensation, the CEO does not act alone but collectively with the board of directors. Further research might include total *actual* board pay. It is expected that the results of a further study would replicate the findings of this study since, although the relative magnitude of pay differs between executive directors within a firm, performance targets are often the same for each executive.

Another potential limitation of this study is the focus on purely financial performance measures. The analysis of performance measures used in CEO bonus plans highlighted the widespread use of non-financial measures. A further empirical study might consider constructing additional independent variables to capture the influence of non-financial measures on the determination of actual bonus pay.

The vast majority of executive pay research is based on a positivistic approach, which is most likely due to the availability of data for empirical quantitative analysis. An alternative interpretivist approach would surely enrich the executive compensation literature. First, one could gather qualitative data about executives' perceptions surrounding the definitions of pay used in this study. A study of this kind would, perhaps, confirm the methodological contribution of this study with regard to the conceptualisation of executive pay.

A second qualitative approach would be to study the content and complexity of remuneration reports. The data collection process highlighted a number of potential concerns around the reporting of executive compensation. The Directors' Remuneration Report Regulations (2002) require the detailed disclosure of executive and non-executive compensation and policy. However, the experience of collecting the data, required for this study, showed that while each firm adhered to the regulations there were important differences between firms. Some remuneration reports extended to 20 pages in length whilst others were only a few pages. The reports also differed in their complexity both with regard to the actual plans and the language used to describe incentive arrangements.

It could be argued that the complexity of remuneration reports is not helpful for the users of remuneration reports and research related to this issue might provide practical benefits for the user community.

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Appendix I

UK Executive Compensation Research: Pay Measure(s) and Findings

Study	Period	Cos	Unit of analysis	Compensation Measure(s)	Main Finding
Benito and Conyon (1999)	1985 to 1994	1,093	(i) HPD	(i) Cash compensation (includes salary, bonus and benefits)	Compensation is positively related to pre-dated shareholder return and company size. No evidence to support RPE.
Bruce, Skovoroda, Fattorusso and Buck (2007)	2001 to 2003	257	(i) CEO	(i) Relative bonus (salary plus bonus divided by salary)	Earnings per share and total shareholder return are positively associated with relative bonus.
Buck, Bruce, Main and Udueni (2003)	1997 to 1998	287	(i) CEO (ii) All execs	(i) Total rewards (includes salary, bonus, benefits, pensions, dividend income, changes in unrealised value of stocks and changes in the estimated value of LTIPs)	LTIPs increase total rewards and reduce the sensitivity of firm performance to pay.
Coakley and Iliopoulou (2006)	1998 to 2001	100	(i) CEO (ii) All execs	(i) Salary (ii) Bonus (iii) Salary and bonus (iv) Total board pay	Large boards with less independence award higher compensation following a merger or acquisition than more independent boards.
Conyon (1995)	1990 to 1994	28	(i) HPD	(i) Salary and bonus	No association between performance and pay.
Conyon (1997)	1988 to 1993	213	(i) HPD	(i) Cash compensation (includes salary and bonus)	Compensation is associated with current share holder returns but not pre-dated returns. No evidence of RPE (negative but not significant)
Conyon (1998)	1986 to 1994	184	(i) HPD	(i) Cash compensation (includes salary, bonus and benefits)	Compensation is associated with pre-dated shareholder returns but not the change in return. No evidence of RPE (negative but not significant). Size is more important than performance.

Study	Period	Cos	Unit of analysis	Compensation Measure(s)	Main Finding
Conyon and Leech (1994)	1983 to 1986	294	(i) HPD	(i) Cash compensation (includes salary and bonus)	Compensation is associated with pre-dated shareholder wealth but elasticity is small and firm size is more important. Weak evidence of RPE
Conyon and Murphy (2002)	1997	510	(i) CEO	(i) Salary and bonus	Significant positive association between shareholder return and pay.
Conyon and Nicolitas (1998)	1985 to 1992	39	(i) HPD	(i) Salary and bonus	Weak association between performance and pay in public companies.
Conyon and Peck (1998)	1991 to 1994	94	(i) HPD	(i) Salary and bonus	Performance is significantly associated with pay in all models. The pay-performance relationship is stronger in firms with a remuneration committee and non-executive dominated boards.
Conyon and Schwalbach (2000)	1969 to 1995	102	(i) HPD	(i) Salary and bonus	Significant positive association between shareholder return and pay using both fixed-effects and mean group estimator.
Conyon, Peck and Sadler (2000)	1985 to 1995	249	(i) HPD	(i) Salary, bonus and benefits (excludes pensions)	Total shareholder return is positively related to pay but earnings per share is not. The results did not change when performance was specified as change or level. The lagged and contemporaneous variables were also similar.
Conyon, Peck and Sadler (2001)	1997 to 1998	100	(i) CEO	(i) Total cash compensation is salary, bonus and other cash (ii) Incentive compensation is share option grants plus LTIPs (iii) Total compensation is salary, bonus, other cash, share option grants and LTIPs	Performance is significantly and positively related to all pay measures. Coefficient on performance is largest for incentive compensation.

Study	Period	Cos	Unit of analysis	Compensation Measure(s)	Main Finding
Conyon, Peck and Sadler (2009)	2003	229	(i) CEO	(i) Total compensation is the sum of salary, bonus, benefits, share options, restricted stock grants and other compensation. (ii) Equity pay mix is the value of options and restricted stock grants divided by the value of total compensation	No association between performance and pay. CEO pay is higher in firms that use compensation consultants. Higher levels of equity pay are associated with the use of compensation consultants.
Cosh (1975)	1969 to 1971	1,601	(i) HPD	(i) Mean value of remuneration over 1969 to 1971 (salary, bonus and other cash)	Profitability was significant in seven of the seventeen industry classifications.
Cosh and Hughes (1997)	1989 to 1994	64	(i) CEO	(i) Basic pay	Overall size is the most important predictor of level or changes in pay. Some evidence pay is associated with TSR and ROCE. No evidence of RPE.
Dong and Ozkan (2008)	2004	563	(i) CEO (ii) All execs	(i) Cash compensation (salary and bonus) (ii) Average cash compensation for all executive directors	Significant and positive association between firm performance and pay.
Eichholtz, Kok and Otten (2008)	1998 to 2003	39	(i) All execs	(i) Average value of executive cash compensation includes salary, bonus, benefits and pension payments (ii) Average value of executive long-term compensation includes share options, restricted shares and long-term cash incentives (plus profits on exercise of share options)	Stock market performance is positively and significantly associated with the log level of long-term compensation but not cash compensation. EPS is not significant. Changes in shareholder wealth are only weakly associated with changes in cash and long term compensation.
Ezzamel and Watson (2002)	1992 to 1995	199	(i) CEO (ii) Other executives	(i) Cash compensation (includes salary and bonus) (ii) Average cash compensation of other board members	External market and internal pay comparisons are important in determining CEO and other executives pay. Significant positive association between relative sector TSR (difference between firm and sector) and pay.
Girma, Thompson and Wright (2006)	1981 to 1996	1,593	(i) HPD	(i) Salary and bonus	Significant positive association between firm performance and pay. But only small effect.

Study	Period	Cos	Unit of analysis	Compensation Measure(s)	Main Finding
Girma, Thompson and Wright (2007)	1981 to 1996	992	(i) HPD	(i) Salary and bonus	Weak association between performance and pay. Firm size has increased in importance since the publication of Cadbury report.
Gregg, Jewell and Tonks (2005)	1994 to 2002	415	(i) CEO (ii) Total Board Pay	(i) HPD pay (salary, bonus and other cash emoluments) (ii) Total board pay (salary, bonus and other cash emoluments)	Firm size is more important than firm performance in explaining the variation in pay. "For both pay variables it seems that market adjusted returns makes very little difference to the significance, sign and size of the return coefficients" (p.21). No evidence of RPE.
Gregg, Machin and Szymanski (1993)	1983 to 1991	288	(i) HPD	(i) Salary plus bonus	The association between performance and pay is statistically insignificant over period 1983 to 1991. Positive and statistically significant, but weak, between 1983 to 1988. No relationship after 1988.
Gregory-Smith (2009)	1996 - 2005	523	(i) CEO	(i) Total pay (salary, bonus, other cash and equity incentives)	No evidence to support the rents capture model of executive pay.
Guest (2009)	1984 to 2001	2,471	(i) HPD	(i) Salary plus bonus	No significant association between firm performance and pay.
Guy (2000)	1972 to 1989	99	(i) HPD	(i) Salary plus bonus	"...strong positive relationship between CEO pay and within-company changes in shareholder returns, and no statistically significant relationship between CEO pay and within-company changes in accounting returns. Differences between firms in long-term average profitability do appear to have a substantial effect on CEO pay, while differences between firms in shareholder returns add nothing to the within-firm pay dynamics" (p.263)
Guy (2005)	1970 to 1990	191	(i) HPD	(i) Salary and bonus	No significant association between firm performance and pay.

Study	Period	Cos	Unit of analysis	Compensation Measure(s)	Main Finding
Ingham and Thompson (1995)	1986 to 1990	117	(i) HPD	(i) Absolute salary (ii) Relative salary	Weak evidence of association between profit and pay.
Johnston (2002)	1995 to 1996	220	(i) HPD	(i) Salary	Significant positive association between firm performance and pay. But only small effect.
Kuang and Qin (2009)	1999 to 2004	244	(i) All execs	(i) Total compensation is the sum of salary, bonus, pension, other cash compensation and changes in the unrealized value of executive wealth (options and shares) (ii) Change of total wealth is total compensation plus the estimated value of the change in cash compensation over the remaining life-span of the executive	Performance vested share options provide greater incentives than traditional share options.
Laing and Weir (1999)	1996	125	(i) HPD	(i) Salary and bonus	Significant positive association between firm performance and pay. But only small effect.
Liu and Stark (2009)	1971 to 1998	169	(i) Total board cash compensation	(i) Total board cash compensation	Positive association between pay and accounting/market performance. Weak negative association between pay and accounting based RPE. No evidence of pay and market based RPE.
Main and Johnston (1993)	1990	220	(i) HPD	(i) Current compensation is salary, bonus plus other cash (ii) Share option holding as a proportion of total pay (current pay plus share option holding)	No association between performance and pay. No evidence that a reported remuneration committee has a positive influence on the pay-performance association.
Main, Bruce and Buck (1996)	1983 to 1989	60	(i) HPD (ii) CEO (iii) Board	(i) Salary and bonus (ii) Total remuneration (includes emoluments and change in share option value)	Pay is significantly and positively related to performance. Shareholder return is found to be more important than sales when share options are included. No evidence of RPE.
McKnight (1996)	1993 to 1994	90	(i) HPD	(i) Percentage change in salary (ii) Bonus (expressed as a % of salary) (iii) Percentage change in salary plus annual bonus	Significant positive association between firm performance and bonus.

Study	Period	Cos	Unit of analysis	Compensation Measure(s)	Main Finding
McKnight and Tomkins (1999)	1992 to 1995	109	(i) HPD	(i) Salary (t-1) (ii) Bonus (expressed as a % of salary) (iii) Salary and bonus (iv) Change in the value of share options held (v) Total pay is the sum of salary, bonus and share options	Large significant positive association between shareholder return and share options. Association between shareholder return and total pay is also significantly positive but much smaller effect (still large compared to other research). Shareholder return is weakly associated with salary and salary and bonus. Change in turnover is main determinant of changes in salary. Shareholder return is significantly and positively associated with bonus.
McKnight and Tomkins (2004)	1992 to 1997	228	(i) CEO	(i) Salary (ii) Bonus (expressed as a % of salary) (iii) Salary and bonus (iv) Change in the value of share options held (v) Total pay is the sum of salary, bonus and share options	Changes in shareholder return are significantly and positively associated with changes in bonus and share options.
McKnight, Tomkins, Weir and Hobson (2000)	1992 to 1996	100	(i) HPD	(i) Salary (ii) Bonus (expressed as a % of salary) (iii) Change in the value of share options held (iv) Total pay is the sum of salary, bonus and share options	Changes in shareholder return are significantly and positively associated with changes in bonus, share options and total pay.
Ogden and Watson (2004)	1991 to 1999	na	(i) CEO	(i) Salary plus bonus	Performance is significantly and positively associated with the level of pay but coefficient is small and relationship is weak. No association between changes in performance and the changes in pay.
Ogden and Watson (2007)	1992 to 2001	10	(i) CEO	(i) Change in total cash (salary and bonus) between t and t+1	Accounting performance is significantly associated with pay.

Study	Period	Cos	Unit of analysis	Compensation Measure(s)	Main Finding
Ozkan (2007)	2003 to 2004	414	(i) CEO	(i) Cash compensation is salary plus bonus (ii) Equity compensation is share options plus LTIPs (iii) Total compensation is salary, bonus, share options plus LTIPs	No significant association between firm performance and pay.
Ozkan (2009)	1999 to 2005	390	(i) CEO	(i) Cash compensation is salary plus bonus (ii) Total compensation is salary, bonus, share options plus LTIPs	Firm performance is significantly associated with cash compensation but not total compensation.
Smith and Szymanski (1995)	1981 to 1991	51	(i) All execs	(i) Director's remuneration is salary, bonus and other cash for all directors	Performance is significantly and positively associated with pay.

Appendix II

Executive RPE Research: Performance Measure(s) and Findings

Study	Country	Period	Cos.	Unit of analysis	Performance Measure(s)	Main finding
Aggarwal and Samwick (1999a)	US	1993 to 1995	1,500	(i) Top 5 execs	(i) Total real dollar returns to shareholders (wealth) (t) (ii) Value-weighted average industry return (wealth) excluding own firm (t)	Own firm performance and rival performance is positive and significant (data supports Bertand competition model but not Cournot model or RPE). RPE is less evident in more competitive industries
Aggarwal and Samwick (1999b)	US	1993 to 1996	1,500	(i) Top 5 execs	(i) The dollar change in the market value of the firm over the year (t) (ii) The percentage returns to shareholders (t)	Pay related to performance but minimal evidence that the industry pay-performance sensitivity is negative. No support for strong form of RPE hypothesis
Albuquerque (2009)	US	1992 to 2005	2,374	(i) CEO	(i) Natural log of real total shareholder return (t) (ii) The equal weighted stock return portfolio of peer firms in the same two-digit SIC code (and size quartile), excluding the own-firm stock return (t) (iii) ROA is calculated as the natural logarithm of one plus annual income before extraordinary items divided by beginning-of-year total assets, both adjusted for inflation (t) (iv) The equal-weighted change in ROA portfolio of the peer firms in the same two-digit SIC code (and size quartile), excluding the own firm (t)	Using industry-size peer groups RPE is evident in executive compensation when firm performance is measured using stock returns but not when using accounting returns. Support is provided for the weak and strong form of RPE hypothesis.

Study	Country	Period	Cos.	Unit of analysis	Performance Measure(s)	Main finding
Antle and Smith (1986)	US	1947 to 1977	39	(i) Top 3 HPD's	(i) Annual return on assets (ROA) (t) (ii) Annual return on common stock (RET) (t) (iii) The portion of ROA uncorrelated over time with an index of the average ROA of firms in the industry (t) (iv) The portion of RET uncorrelated over time with an index of the average RET of firms in the industry (t)	Evidence to support strong form of RPE hypothesis for ROA measure but only weak form of hypothesis for stock return measure (for 16 of the 39 firms). Overall the sample provides weak support for RPE.
Benito and Conyon (1999)	UK	1985 to 1994	1,093	(i) HPD	(i) Change in the log of the return index (t-1) (ii) Average shareholder returns in the stock exchange industry (t-1)	Compensation is positively related to pre-dated shareholder return and company size. No evidence to support RPE.
Bertrand and Mullainathan (2001)	US	1984 to 1991	792	(i) CEO	(i) Operating income before extraordinary items (ii) Operating income to total assets (iii) Log of shareholder wealth (iv) Instrument for performance with the log of oil price (v) Instrument for performance with current and lagged appreciation and depreciation dummies and current and lagged exchange rate index growth (vi) Instrument for performance with the total assets-weighted average industry performance (excluding own firm)	No evidence of RPE in test of strong form of hypothesis. Pay for luck is equal in magnitude as pay for general performance. "Consistent with skimming, we generally find that the better governed firms pay less for luck" (p.903) Using accounting or market performance CEO pay is linked to the 'luck' of oil price movement. Using accounting or market performance CEO pay is linked to the 'luck' of exchange rate movements. Using accounting or market performance CEO pay is linked to the 'luck' of mean industry performance.
Conyon (1997)	UK	1988 to 1993	213	(i) HPD	(i) Change in the log of the return index (t), (t-1) (ii) Average shareholder returns in the Datastream industry (t), (t-1)	Compensation is associated with current share holder returns but not pre-dated returns. No evidence of RPE (negative but not significant)

Study	Country	Period	Cos.	Unit of analysis	Performance Measure(s)	Main finding
Conyon (1998)	UK	1986 to 1994	184	(i) HPD	(i) Change in the log of the return index (t-1) (ii) Log shareholder return (iii) Average industry shareholder return (t-1) (iv) Net market return (t-1) [Difference between own firm and industry]	Compensation is associated with pre-dated shareholder returns but not the change in return. No evidence of RPE (negative but not significant). Size is more important than performance.
Conyon and Leech (1994)	UK	1983 to 1986	294	(i) HPD	(i) Log shareholder wealth (t-1), (t-2) (ii) Change in log shareholder wealth (t-1) (iii) Industry change in log shareholder wealth excluding sample firm (t-1)	Compensation is associated with pre-dated shareholder wealth but elasticity is small and firm size is more important. Weak evidence of RPE.
Cosh and Hughes (1997)	UK	1989 to 1994	64	(i) CEO	(i) ROCE (ii) TSR (iii) Relative ROCE (firm ROCE minus median sample ROCE) (iv) Relative TSR (firm TSR minus median sample TSR)	Overall size is most important predictor of level or changes in pay. Some evidence pay is associated with TSR and ROCE. No evidence of RPE.
Crespi-Cladera and Gispert (2003)	Spain	1990 to 1995	113	(i) Board	(i) Log (1 + ROA) (t) (t-1) (ii) Log stock return (t-1) (t-2) (iii) Average industry (1 + ROA) (t) (t-1) (iv) Average industry stock return (t-2)	Positive association between ROA and stock return on pay although ROA is ten times stronger. Also find negative association between industry performance and pay. Size is significant but less important than performance (not significant using elasticity approach)
Dogan and Smyth (2002)	Malaysia	1989 to 2000	223	(i) Board	(i) Change in log of stockholder wealth (t-1) (ii) Log (1 + ROA) (t) (t-1) (iii) Change in log average sector stockholder wealth (t) (t-1) (iv) Log average sector (1 + ROA) (t) (t-1)	Shareholder wealth associated with board remuneration but ROA is not. No evidence of RPE using average sector shareholder wealth or average sector ROA.

Study	Country	Period	Cos.	Unit of analysis	Performance Measure(s)	Main finding
Ezzamel and Watson (2002)	UK	1992 to 1995	199	(i) All execs	(i) Log of actual firm TSR minus average sector TSR (t)	External market and internal pay comparisons are important in determining CEO and other executives pay. Significant positive association between relative sector TSR (difference between firm and sector) and pay.
Garvey and Milbourn (2003)	US	1992 to 1998	1,400	(i) CEO	(i) Change in shareholder wealth (t) (ii) CAPM benchmark (t) (iii) S&P 500 benchmark (t)	Limited evidence of RPE for average executive but "strong evidence of RPE for younger and less wealthy managers" (p.1559)
Garvey and Milbourn (2006)	US	1992 to 2001	na	(i) CEO	(i) Stock return is the one-year percentage return for the firm (t) (ii) Equal-weighted and value-weighted industry returns (t) (iii) Luck (exogenous factors are the predicted value of the firm stock return regressed on equal-weighted and value-weighted industry returns) (t) (iv) Skill (firm-specific component of firm performance is the residual value of the firm stock return regressed on equal-weighted and value-weighted industry returns) (t)	No support for RPE hypothesis. "...evidence that executives are in fact insulated from bad luck, while they are rewarded for good luck" (p.198)
Gibbons and Murphy (1990)	US	1974 to 1986	1,049	(i) CEO	(i) Change in log of firm shareholder wealth [firm's rate of return on common stock] (t) (t-1) (ii) Change in log of value-weighted market return [all 11,000 Compustat firms excluding sample firm] (t) (iii) Change in log of value-weighted industry return [excluding sample firm] (t) (t-1)	Strong evidence of weak form of RPE for both market and industry current performance. Market performance was more important than industry. No evidence for lagged industry returns.

Study	Country	Period	Cos.	Unit of analysis	Performance Measure(s)	Main finding
Gregg, Jewell and Tonks (2005)	UK	1994 to 2002	415	(i) CEO (ii) All execs	(i) Log total shareholder return (t) (ii) Firm market adjusted return (the firms abnormal return using expected returns from CAPM model) (iii) Firm industry adjusted return (the firms abnormal return using expected returns from industry CAPM model)	Firm size is more important than firm performance in explaining the variation in pay. "For both pay variables it seems that market adjusted returns makes very little difference to the significance, sign and size of the return coefficients" (p.21). No evidence of RPE.
Hall and Liebman (1998)	US	1980 to 1994	478	(i) CEO	(i) Firm return [changes in firm market value over the firm's fiscal year] (t) (t-1) (ii) S&P 500 return (t) (t-1)	Firm performance is significant and positively associated with pay. S&P market return is significantly negatively related to pay. Evidence of weak form of RPE. "...changes in direct pay, which do have a relative pay component, are tiny when compared with changes in the value of stock and share option holdings, which do not have a relative pay component" (p.683).
Ingham and Thompson (1995)	UK	1986 to 1990	117	(i) HPD	(i) ROA (t), (t-1) (ii) Industry ROA (t), (t-1)	Weak evidence of association between profit and pay.
Janakiraman, Lambert and Larcker (1992)	US	1970 to 1988	609	(i) CEO	(i) Change in ROE (ii) RET (the sum of capital gains and dividends divided by the stock price at the beginning of the year) (iii) Industry equal weighted market return index (excluding sample firm) (iv) Industry value weighted ROE index (excluding sample firm)	Positive association between pay and ROE and pay and RET. No evidence for strong form of RPE. Evidence for weak form of RPE hypothesis using market returns (not ROE).

Study	Country	Period	Cos.	Unit of analysis	Performance Measure(s)	Main finding
Jensen and Murphy (1990)	US	1974 to 1986	1,049	(i) CEO	(i) Change in shareholder wealth (t) (ii) Change in net accounting income (t) (ii) Change in wealth net of industry value-weighted return (t) (iii) Change in wealth net of market value-weighted return (t) [all NYSE stocks]	Shareholder wealth and accounting income are is positively and significantly associated with CEO pay. Relative industry and market measures of performance are not significant. "...pay changes are unrelated to relative value changes" (p.247)
Kerr and Kren (1992)	US	1986 to 1987	63	(i) CEO	(i) ROA (t-1) (ii) Market return (t-1) (iii) Mean ROA (t-1) (iv) Mean market return (t-1) (v) Performance relative to industry (t-1) [Difference between own firm and industry] (vi) Performance relative to prior fiscal year (t-1)	Relative CEO decision making moderates the relationship between corporate performance and CEO cash compensation but not for total compensation. Absolute and relative corporate performance is associated with cash compensation but not total compensation. Coefficients are negative but no significant evidence of RPE in cash and total compensation for market return or ROA.
Liu and Stark (2009)	UK	1971 to 1998	169	(i) All execs	(i) Change in cash stock market returns (t) (ii) Change in pre-tax accounting earnings (t) (iii) Value-weighted average cash stock market industry return (t) (iv) Value-weighted average industry return on book value (t)	Positive association between pay and accounting/market performance. Weak negative association between pay and accounting based RPE. No evidence of pay and market based RPE.
Main, Bruce and Buck (1996)	UK	1983 to 1989	60	(i) CEO (ii) HPD (iii) All execs	(i) Log shareholder return (t) (ii) Average industry sector return weighted by market capitalisation (t)	Pay is significantly and positively related to performance. Shareholder return is found to be more important than sales when share options are included. No evidence of RPE.

Study	Country	Period	Cos.	Unit of analysis	Performance Measure(s)	Main finding
Miller (1995)	US	1983 to 1989	1,061	(i) CEO	(i) ROE (ii) Net profit (net income divided by sales) (iii) EPS growth (iv) Firm performance divided by industry median performance (v) Ordinal rank based on a firm's relative position within reference group (industry or market)	Parametric models report significant negative association with firm performance and size. "...nonparametric models, comparing the ranks of firms within industries, more accurately reflect changes in CEO compensation" (p.1361)
Murphy (1985)	US	1964 to 1981	73	(i) Executive	(i) Change in log of stock index (t) (ii) Change in log of industry-relative performance index (t) [value-weighted-average industry rate of return realized by Compustat firms, excluding the sample corporation] (iii) Change in log of abnormal performance index (t) [equally-weighted-average return for all firms in a particular beta-ranked portfolio]	Positive association between absolute stock market performance and executive compensation. Industry relative performance is significantly and positively associated with bonus and deferred compensation but negatively related to salary.
Rajgopal, Shevlin and Zamora (2006)	US	1993 to 2001	403	(i) CEO	(i) Change in shareholder wealth-firm (firm market value times firm percent returns) (t) (ii) Change in shareholder wealth-industry (firm market value times industry percent returns) (t) (iii) Change in shareholder wealth-industry (firm market value times S&P 500 percent returns) (t)	Compensation committees do not use RPE (do not completely filter market/industry risk from CEO pay). "...the absence of RPE is systematically related to CEO talent" (p.1842). There is significant evidence of the weak form of RPE (partial filtering of market risk). The negative coefficient for market performance is larger than the negative coefficient for industry performance.
Tai (2004)	US	2000 to 2001	38	(i) CEO	(i) Return on assets (t) (t-1) (ii) Return on equity (t) (t-1) (iii) Holding period return (t) (t-1) (iv) S&P 500 return (t) (t-1)	Weak evidence of association between performance and pay. No significant evidence of RPE.

Study	Country	Period	Cos.	Unit of analysis	Performance Measure(s)	Main finding
Wade, Porac, Pollock and Graffin (2006)	US	1992 to 1996	278	(i) CEO	(i) ROE (t-1) (ii) Market return (t-1) (iii) Industry weighted market return (weighted by total assets) (t-1)	CEO certification has a positive influence on compensation when performance is high. Small significant association between market return and CEO compensation. No significant effect for ROE or industry return.

Appendix III

UK Executive Compensation Research: Performance Measure(s) and Findings

Study	Period	Cos.	Unit of analysis	Performance Measure(s)	Main Finding
Bruce, Skovoroda, Fattorusso and Buck (2007)	2001 to 2003	257	(i) CEO	(i) EPS (net income minus preferred dividends per share) (ii) TSR (capital gains plus dividends as a proportion of the initial value of shares)	Earnings per share and total shareholder return are positively associated with relative bonus.
Buck, Bruce, Main and Udueni (2003)	1997 to 1998	287	(i) CEO (ii) All execs	(i) Shareholder return (t)	LTIPs increase total rewards and reduce the sensitivity of firm performance to pay.
Coakley and Iliopoulou (2006)	1998 to 2001	100	(i) CEO (ii) All execs	(i) ROA is earnings per share times number of shares divided by the book value of total assets (t) (t-1) (ii) ROA growth (t-1) (iii) TSR (t) (t-1) (iv) Sales growth (t-1) (v) Margin is earnings per share times number of shares divided by sales (t-1) (vi) Margin growth (t-1)	Large boards with less independence award higher compensation following a merger or acquisition than more independent boards.
Conyon (1995)	1990 to 1994	28	(i) HPD	(i) Log total shareholder return (t) (ii) Return on shareholder equity (iii) Return on long-term capital (t-1) (iv) Net earnings per share (t-1)	No association between performance and pay.
Conyon and Murphy (2002)	1997	510	(i) CEO	(i) Change in log shareholder value is the continuously accrued rate of return on common stock (t)	Significant positive association between shareholder return and pay.

Study	Period	Cos.	Unit of analysis	Performance Measure(s)	Main Finding
Conyon and Nicolitas (1998)	1985 to 1992	39	(i) HPD	(i) Change in log profits per employee (t-1)	Weak association between performance and pay in public companies.
Conyon and Peck (1998)	1991 to 1994	94	(i) HPD	(i) Proportional change in return index (t)	Performance is significantly associated with pay in all models. The pay-performance relationship is stronger in firms with a remuneration committee and non-executive dominated boards.
Conyon and Schwalbach (2000)	1969 to 1995	102	(i) HPD	(i) Log of return index (t)	Significant positive association between shareholder return and pay using both fixed-effects and mean group estimator.
Conyon, Peck and Sadler (2000)	1985 to 1995	249	(i) HPD	(i) Change and level of shareholder return (log change in share price plus dividends) (t) (t-1) (ii) Change and level of EPS (t) (t-1)	Total shareholder return is positively related to pay but earnings per share is not. The results did not change when performance was specified as change or level. The lagged and contemporaneous variables were also similar.
Conyon, Peck and Sadler (2001)	1997 to 1998	100	(i) CEO	(i) Shareholder return (t)	Performance is significantly and positively related to all pay measures. Coefficient on performance is largest for incentive compensation.
Conyon, Peck and Sadler (2009)	2003	229	(i) CEO	(i) Shareholder return over three years (t) (ii) Book to market is the book value of assets divided by the market value of the company (t)	No association between performance and pay. CEO pay is higher in firms that use compensation consultants. Higher levels of equity pay are associated with the use of compensation consultants.
Cosh (1975)	1969 to 1971	1,601	(i) HPD	(i) Percentage return on net assets (t) [mean value 1969 to 71]	Profitability was significant in seven of the seventeen industry classifications.
Dong and Ozkan (2008)	2004	563	(i) CEO (ii) All execs	(i) Tobin's Q is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total asset (t)	Significant and positive association between firm performance and pay.

Study	Period	Cos.	Unit of analysis	Performance Measure(s)	Main Finding
Eichholtz, Kok and Otten (2008)	1998 to 2003	39	(i) All execs	(i) Total stock performance (t) (t-1) (ii) EPS (t-1) (iii) Dividend yield (t-1) (iv) Discount to asset value (t) (v) Change in shareholder wealth (t)	Stock market performance is positively and significantly associated with the log level of long-term compensation but not cash compensation. EPS is not significant. Changes in shareholder wealth are only weakly associated with changes in cash and long term compensation.
Girma, Thompson and Wright (2006)	1981 to 1996	1,593	(i) HPD	(i) Operating profit adjusted for depreciation per employee (t) (ii) Return on capital employed (t)	Significant positive association between firm performance and pay. But only small effect.
Girma, Thompson and Wright (2007)	1981 to 1996	992	(i) HPD	(i) Change in operating profits per employee (t)	Weak association between performance and pay. Firm size has increased in importance since the publication of Cadbury report.
Gregg, Machin and Szymanski (1993)	1983 to 1991	288	(i) HPD	(i) Change in shareholder return (log change in share price plus dividends) (t-1) (ii) Change in EPS (t-1)	The association between performance and pay is statistically insignificant over period 1983 to 1991. Positive and statistically significant, but weak, between 1983 to 1988. No relationship after 1988.
Gregory-Smith (2009)	1996 - 2005	523	(i) CEO	(i) Change in log of annual return index (t) (ii) EPS (t)	No evidence to support the rents capture model of executive pay.
Guest (2009)	1984 to 2001	2,471	(i) HPD	(i) ROA (t)	No significant association between firm performance and pay.

Study	Period	Cos.	Unit of analysis	Performance Measure(s)	Main Finding
Guy (2000)	1972 to 1989	99	(i) HPD	(i) Shareholder return (t) (t-1) (ii) Return on capital employed (t) (t-1)	"...strong positive relationship between CEO pay and within-company changes in shareholder returns, and no statistically significant relationship between CEO pay and within-company changes in accounting returns. Differences between firms in long-term average profitability do appear to have a substantial effect on CEO pay, while differences between firms in shareholder returns add nothing to the within-firm pay dynamics" (p.263)
Guy (2005)	1970 to 1990	191	(i) HPD	(i) ROCE (t)	No significant association between firm performance and pay.
Johnston (2002)	1995 to 1996	220	(i) HPD	(i) Pre-tax profits as a percentage of sales (t)	Significant positive association between firm performance and pay. But only small effect.
Kuang and Qin (2009)	1999 to 2004	244	(i) All execs	(i) Total shareholder return (t)	Performance vested share options provide greater incentives than traditional share options.
Laing and Weir (1999)	1996	125	(i) HPD	(i) Percentage return on capital employed is profit before interest and tax divided by capital employed (t-1)	Significant positive association between firm performance and pay. But only small effect.
Main and Johnston (1993)	1990	220	(i) HPD	(i) Stock market return (risk adjusted) (t)	No association between performance and pay. No evidence that a reported remuneration committee has a positive influence on the pay-performance association.
McKnight (1996)	1993 to 1994	90	(i) HPD	(i) Change in earnings per share (t-1) (ii) Change in operating profits (t-1) (iii) Change in sales (t-1) (iv) Change in shareholder returns (t-1)	Significant positive association between firm performance and bonus.

Study	Period	Cos.	Unit of analysis	Performance Measure(s)	Main Finding
McKnight and Tomkins (1999)	1992 to 1995	109	(i) HPD	(i) Change in log EPS (t) (ii) Shareholder return (log change in share price plus dividends) (t) (iii) Change in log sales (t)	Large significant positive association between shareholder return and share options. Association between shareholder return and total pay is also significantly positive but much smaller effect (still large compared to other research). Shareholder return is weakly associated with salary and salary and bonus. Change in turnover is main determinant of changes in salary. Shareholder return is significantly and positively associated with bonus.
McKnight and Tomkins (2004)	1992 to 1997	228	(i) CEO	(i) Shareholder return (log change in share price plus dividends) (t-1) (ii) Change in log sales (t-1)	Changes in shareholder return are significantly and positively associated with changes in bonus and share options.
McKnight, Tomkins, Weir and Hobson (2000)	1992 to 1996	100	(i) HPD	(i) Shareholder return (log change in share price plus dividends) (t-1) (ii) Change in log turnover (t-1)	Changes in shareholder return are significantly and positively associated with changes in bonus, share options and total pay.
Ogden and Watson (2004)	1991 to 1999	??	(i) CEO	(i) Shareholder return (t)	Performance is significantly and positively associated with the level of pay but coefficient is small and relationship is weak. No association between changes in performance and the changes in pay.
Ogden and Watson (2007)	1992 to 2001	10	(i) CEO	(i) Change in profit to equity ratio between t and t+1.	Accounting performance is significantly associated with pay.
Ozkan (2007)	2003 to 2004	414	(i) CEO	(i) Percentage stock return (return index) (t)	No significant association between firm performance and pay.
Ozkan (2009)	1999 to 2005	390	(i) CEO	(i) Stock return is the percentage change in annual stock price (t)	Firm performance is significantly associated with cash compensation but not total compensation.
Smith and Szymanski (1995)	1981 to 1991	51	(i) All execs	(i) Log of EPS (t)	Performance is significantly and positively associated with pay.

Appendix IV

Sample Firms

AEGIS GROUP	BG GROUP	CENTRICA	EMAP	HAYS
AGA RANGEMASTER GROUP	BHP BILLITON	CHARTER INTERNATIONAL	ENODIS DEAD	HEADLAM GROUP
AGGREKO	BODYCOTE	CHEMRING GROUP	ENTERPRISE INNS	HMV GROUP
AMEC	BOVIS HOMES GROUP	CHLORIDE GROUP	EXPRO INTERNATIONAL	HOMESERVE
ANGLO AMERICAN	BP	COBHAM	FILTRONA	HUNTING
AQUARIUS PLATINUM	BRITISH AIRWAYS	COMPASS GROUP	FINDEL	IMI
ARM HOLDINGS	BRITISH AMERICAN TOBACCO	COOKSON GROUP	FIRST GROUP	IMPERIAL TOBACCO
ARRIVA	BRITISH ENERGY GROUP	CRODA INTERNATIONAL	FKI	INCHCAPE
ASHTEAD GROUP	BRITISH SKY BCAST.GROUP	DAILY MAIL	FORTH PORTS	INFORMA
ASSOCIATED BRITISH FOODS	BRITVIC	DAIRY CREST	FOSECO	INTERCONTINENTAL HOTELS
ASTRAZENECA	BROWN (N) GROUP	DANA PETROLEUM	G4S	INTERNATIONAL POWER
ATKINS	BSS GROUP	DAVIS SERVICE GROUP	GALIFORM	INTERSERVE
AUTONOMY	BT GROUP	DE LA RUE	GALLIFORD TRY	INTERTEK GROUP
AVEVA GROUP	BUNZL	DEBENHAMS	GAME GROUP	INVENSYS
BABCOCK	BURBERRY GROUP	DIAGEO	GKN	ITE GROUP
BAE SYSTEMS	BURREN ENERGY DEAD	DIGNITY	GLAXOSMITHKLINE	JKX OIL & GAS
BALFOUR BEATTY	CADBURY	DIMENSION DATA	GO-AHEAD GROUP	JOHNSON MATTHEY
BARRATT DEVELOPMENTS	CAIRN ENERGY	DRAX GROUP	GREENE KING	JOHNSTON PRESS
BBA AVIATION	CAPITA GROUP	DSG INTERNATIONAL	GREGGS	KAZAKHMYS
BELLWAY	CARILLION	EASYJET	HALFORDS GROUP	KELDA GROUP
BERKELEY GROUP	CARPHONE WAREHOUSE	ELECTROCOMP	HALMA	KELLER

KESA ELECTRICALS	NEXT	THOMSON REUTERS	SMITH (DS)	VENTURE PRODUCTION
KIER GROUP	NORTHERN FOODS	REXAM	SMITHS GROUP	VICTREX
KINGFISHER	NORTHGATE	RIGHTMOVE	SOCO INTERNATIONAL	VODAFONE GROUP
LADBROKES	NORTHUMBRIAN WATER	RIO TINTO	SOUTHERN CROSS	VT GROUP
LAIRD	PEARSON	ROLLS-ROYCE GROUP	SPECTRIS	WEIR GROUP
LOGICA	PERSIMMON	ROTORK	SPEEDY HIRE	WETHERSPOON (JD)
LONMIN	PETROFAC	ROYAL DUTCH SHELL	SPIRAX-SARCO	WH SMITH
MARKS & SPENCER GROUP	PREMIER FARNELL	RPS GROUP	SPIRENT COMMUNICATIONS	WHITBREAD
MARSHALLS	PREMIER FOODS	SABMILLER	SSL INTERNATIONAL	WILLIAM HILL
MARSTON'S	PREMIER OIL	SAGE GROUP	STAGECOACH GROUP	WINCANTON
MCALPINE	PUNCH TAVERNS	SAINSBURY (J)	TATE & LYLE	WOLSELEY
MEGGITT	PZ CUSSONS	SCOTTISH & NEWCASTLE	TESCO	WPP
MICHAEL PAGE	QINETIQ GROUP	SCOT.& SOUTHERN ENERGY	TOMKINS	WSP GROUP
MILLENNIUM & COPTHORNE	RANDGOLD RESOURCES	SERCO GROUP	TRAVIS PERKINS	XSTRATA
MITCHELLS & BUTLERS	RANK GROUP	SEVERFIELD-ROWEN	TRINITY MIRROR	YELL GROUP
MITIE GROUP	RECKITT BENCKISER GROUP	SEVERN TRENT	TULLOW OIL	
MORGAN CRUCIBLE	REDROW	SHANKS GROUP	UK COAL	
MORGAN SINDALL	REED ELSEVIER	SHIRE	ULTRA ELECTRONICS HDG.	
MOUCHEL GROUP	REGUS	SIG	UNILEVER	
NATIONAL EXPRESS	RENTOKIL INITIAL	SIGNET GROUP	UNITED BUSINESS MEDIA	
NATIONAL GRID	RESTAURANT GROUP	SMITH & NEPHEW	UNITED UTILITIES GROUP	

Appendix V

CEO Compensation Data Elements

Data element	Description
Annual compensation data	
Basic pay (BP)[a]	The annual basic salary.
Other cash	Any other cash including the value of benefits in kind, pension allowance, car allowance or any other allowance.
Target bonus (T.BON)[a]	The cash value of annual maximum bonus incentive (including deferred bonus incentive compensation [to be paid in cash, options or shares] without additional performance conditions).
Paid annual bonus	The actual paid cash bonus.
Deferred bonus	Deferred bonus to be paid in cash, options or shares with no further performance conditions.
Actual bonus (A.BON)[a]	The cash value of paid annual bonus (including guaranteed deferred bonus compensation [paid in cash, options or shares] without additional performance conditions). Includes zeros for when minimum performance conditions have not been satisfied.
Long-term incentive grant data (for each new grant)	
Share options – number	The total number of share options granted.
Share options – performance criteria	A description of any performance conditions.
Share options – retesting facility	Is there a retesting facilty (Y or N).
Share options – grant date	The grant date.
Share options – exercise price	The exercise price.
Share options – vesting period	The vesting period in years.
Share options – term	The term of the share option in years.
Share options – performance-option grant value	25% of the value of the number of performance-options granted multiplied by the exercise price.
Share options – time-vesting option grant value	25% of the value of the number of time-vesting options granted multiplied by the exercise price.
Shares – number	The total number of shares granted.

Data element	Description
Shares – performance criteria	A description of any performance conditions.
Shares – grant date	The grant date.
Shares – share price at grant	The share price at the time of grant.
Shares – share price at year-end	The year-end closing share price.
Shares – vesting date	The vesting date.
Shares – performance-share grant value	The value of the number of performance-shares granted multiplied by the year-end share price.
Shares – time-vesting share grant value	The value of the number of time-vesting shares granted multiplied by the year-end share price.
Target Long-Term Incentive (T.LTI)[a]	The cash value of annual performance-option grant, plus annual performance-share grant, plus long-term cash plan (in all cases the payout is contingent on future performance conditions).
Long-term incentive vesting data (for each award)	
Share options – number	The total number of share options vesting.
Share options – performance criteria	A description of any performance conditions.
Share options – vesting date	The vesting date.
Share options – exercise price	The exercise price.
Share options – vesting period	The vesting period in years.
Share options – term	The term of the share option in years.
Share options – performance-option vesting value	25% of the value of the number of performance-options vesting multiplied by the exercise price.
Shares – number	The total number of shares vesting.
Shares – performance criteria	A description of any performance conditions.
Shares – vesting date	The vesting date.
Shares – share price at year-end	The year-end closing share price.
Shares – performance-share vesting value	The value of the number of performance-shares vesting multiplied by the year-end share price.
Actual Long-Term Incentive (A.LTI)[a]	The cash value of performance-options vesting in the current year, plus performance-shares vesting in the current year, plus long-term cash plan vesting in the current year, plus the grant value of time-vesting options, plus the grant value of time-vesting shares. Includes zeros for when minimum performance conditions have not been satisfied.
Target Total Pay (T.PAY)[a]	The sum of basic pay, plus other cash, plus target bonus, plus target LTI.
Actual Total Pay (A.PAY)[a]	The sum of basic pay, plus other cash, plus actual bonus, plus actual LTI.

[a] These are the dependent compensation variables used in this study.