DOCTOR OF PHILOSOPHY

Corporate Governance and Executive Renumeration in Banking

Cardias Williams, Maria de Fatima

Award date:
2016

Awarding institution:
Bangor University

DOCTOR OF PHILOSOPHY

Corporate Governance and Executive Renumeration in Banking

Cardias Williams, Maria de Fatima

Award date:
2016

Awarding institution:
Bangor University

CORPORATE GOVERNANCE AND EXECUTIVE REMUNERATION IN BANKING

MARIA DE FATIMA CARDIAS WILLIAMS

COLLEGE OF BUSINESS, LAW, EDUCATION and SOCIAL SCIENCES

BANGOR BUSINESS SCHOOL

BANGOR UNIVERSITY

BANGOR, GWYNEDD, U.K.

A thesis submitted in candidature for the degree of

DOCTOR OF PHILOSOPHY

at

BANGOR UNIVERSITY

2016

ABSTRACT

The thesis traces developments in executive compensation at a sample of American (US) and European banks from 1999 to 2013. Three investigative chapters examine developments in compensation arrangements in the boom period before the global financial crisis, during and following the crisis, and for cohorts of global-systemically-important-banks, EU banks, and US banks. The thesis reviews the value of banks' human capital endowment by considering the full C-suite of executive directors in comparison to studies that focus solely on CEOs. The analysis uses a carefully constructed dataset, which contains detailed compensation data for executive directors plus information on their biographical characteristics. The dataset includes bank-level financial statements data and stock data. The first investigative research (Chapter Two) provides an answer as to which factors affect executive compensation in banking. It shows the contrast in pay between bank CEOs and other executive roles. The analysis identifies which biographical characteristics, features of corporate governance structure, and bank-related factors exert most effect on executive compensation and its constituents. The second investigative study (Chapter Three) considers the issue of pay-for-performance in banking, following claims that pay-for-performance systems had become weaker over time, and that powerful firm executives were able to extract rents, which suggests compensation contracts had become sub-optimal for shareholders. It sheds light on the extent to which executive pay growth reflects changes in bank performance. The chapter considers the design of compensation contracts and estimates the strength of pay-for-performance relationships across different pay incentives. The third study (Chapter Four) considers the behaviour of top management teams and investigates whether the size of differences in pay (pay gaps) between the CEO and other C-suite executives affects firm performance, for which the Z-score is a measure of bank stability. A shared finding of this thesis is that heterogeneity matters and not one size fits all. Results often show intertemporal variation and variation between the three cohorts of banks. Larger compensation awards, and considerably larger portfolio holdings, are common at large, complex firms with wide ranging international operations. This suggests that there are selection effects at work with the biggest and most prestigious firms using compensation packages to attract talented and ambitious individuals.

ACKNOWLEDGMENTS

I would like to express my high appreciation to my husband Professor Jonathan Williams for his sweetness, constant support, unfailing encouragement, insightful criticism, patience and much kindness throughout this academic research. Thanks go to our sons whom direct or indirectly allow me to complete this study for their patience, for being supportive and understanding.

Special thanks go to my supervisors Professor Lynn Hodgkinson and Professor Owain ap Gwilym for their kind guidance, suggestions and attention during my studies. I would like to thank staff and students of Bangor Business School for their cordial friendship and technical assistance.

Sincere thanks are for my sponsors at the Economic and Social Research Council (Wales Doctoral Training Centre), United Kingdom, for the much-appreciated funding support. Special thanks go for my family and friends for their love and understanding of my absence throughout my studies. A great appreciation goes to my mother-in-law Catherine Williams for her support, kindness and for being always there for my family and me.

This thesis is in memory of my much-loved mother Clarinda Castro Cardias (1926-2011) and in memory of my father-in-law John Williams (1929-2012).

Contents

List of Tables

List of Figures

Chapter One

Introduction

1.1 Motivation

This thesis provides a panoramic view of corporate governance in an international setting with special reference to banks and the remuneration practices and incentive structures facing their top management teams. This study interweaves several strands of complementary literature. Using principal-agent theory as a cornerstone (e.g. Jensen and Meckling, 1976; Fama and Jensen, 1983), this study builds on corporate governance literature (e.g. Macey and O'Hara, 2003, 2016; Adams, Hermalin and Weisbach, 2010; Haan and Vlabu, 2013; Adams, de Haan, Terjesen and van Ees, 2015; Hagendorff, 2015; John, de Masi and Paci, 2016) and considers executive compensation. Specifically, it considers relations between executive pay and firm performance, noting that the structure of compensation reflects the pay incentives facing executives (e.g. Baker, Jensen and Murphy, 1988; Jensen and Murphy, 1990a, b; Barro and Barro, 1990; Core, Guay and Larcker, 2003). Incentive structures affect a firm's performance and also its risk-taking (e.g. Coles, Daniel and Naveen, 2006; 2008; Laeven and Levine, 2009; Bolton, Mehran and Shapiro, 2015; Srivastav and Hagendorff, 2016). Indeed, a firm's corporate governance practices and its executive compensation arrangements are indicative of its culture, which an evolving strand of recent literature suggests influences the behaviour of firm executives and hence firm performance (e.g. Acharya, Mehran and Sundaram, 2016; Lo, 2016; Pan, Siegel and Wang, 2016; Stulz, 2016; Thakor, 2016).

The global financial crisis that began in 2007 was a motivation for this study. A broad consensus suggests that executive compensation practices at banks encouraged excessive risk-taking, and was a causal factor of the crisis (e.g. Reinhart and Rogoff, 2009; Marques and Oppers, 2014; Brunnermeier, 2009; Ellul and Yerramilli, 2013; Bolton et al., 2015). Critics of compensation practices point to inefficiencies and faulty incentives in executive compensation contracts. The unintended outcome was that banks prioritised short-term outcomes over long-term sustainability (e.g. Bebchuk, Cohen and Spamann, 2010; DeYoung, Peng and Yan, 2013; Bhagat and

Bolton, 2014; Bennett, Guntay and Unal, 2015; Cheng, Hong and Scheinkman, 2015).

The response of regulators on either side of the Atlantic has been to pass laws relating to executive pay. Government intervention in pay-setting arrangements can occur if the outrage constraint is breached (e.g. Jensen and Murphy, 1990a; Murphy, 2012, 2013a; Adams and Giannetti, 2012). Outrage reflects political and public anger at events such as banking crises and corporate scandals.[1] Normally, the prospect of a breach of the outrage or political constraint acts to limit the rate of growth in executive compensation. A breach of the constraint could force government to take legislative action, which is what has happened to compensation practices, especially in the financial sector, following the global financial crisis. Initially, a raft of temporary legislation across countries emphasised concerns over compensation arrangements in banks. In the UK, there was the announcement on 9 December 2009 of a tax to be levied on bankers' bonus payments by (then) Chancellor of the Exchequer, Alistair Darling. Permanent legal actions have produced Say on Pay requirements amongst others in the Dodd-Frank Act of 2010 in the US, and the bonus cap in the Capital Requirements Directive IV of 2014 in the EU (Correa and Lel, 2016; Murphy 2013b).

Notwithstanding, the debate on the reform of compensation practices maintains the principle that executive pay should be positively related to firm performance. This implies that principal-agent theory remains at the heart of contractual arrangements that aim to align the interests of principals (shareholders) and their agents (CEOs and other leading executives). A hidden action model illustrates the potential for agency conflicts. A CEO is employed to run the firm on behalf of shareholders. This infers that the CEO should take actions to maximise shareholder wealth. A compensation contract is designed to provide incentives for the CEO to behave accordingly. However, the CEOs' actions are unobservable meaning it is impossible for shareholders to tell if the actions were appropriate (e.g. Murphy, 2012; 2013a, b). Hence, CEOs could behave in an opportunistic way and exploit the situation by

[1] The outrage constraint has suffered breaches since the bailout of banks in 2008 (Darling, 2008; Arnott, 2008). A series of scandals has engulfed the UK banking sector e.g., the behaviour of a CEO (Co-operative Bank, November 2013) to fines levied in the US on UK banks for money laundering (Standard Chartered on 10th December 2012; HSBC 10th and 11th December 2012). Others have been fined for rigging the LIBOR interest rate (Barclays 2nd July 2012), and multiple banks have been fined for rigging foreign exchange markets (20th May 2015 involving Barclays, JPMorgan, Citigroup, Royal Bank of Scotland, UBS, and Bank of America Merrill Lynch).

electing to make the least possible effort. This is the hidden action or moral hazard (e.g. Hart and Holmström, 1987; Murphy, 1999; Gibbons, 2005; Edmans and Gabaix, 2009, 2016). It also explains why stock returns are a common firm performance metric used in compensation arrangements because the variation in returns is an ex post indicator of whether the CEO took the right actions, that is, actions that realised increases in shareholder wealth.

Before the crisis broke in 2007, economists had been debating whether optimal, or efficient, contracting theory could explain developments in executive compensation. An optimal or efficient contract should control agency costs by providing incentives that motivate the CEO (and other executives) to maximise the long-term value of the firm (e.g. Core et al., 2003; Conyon, 2006). Compensation contracts "should therefore attract talented CEOs and incentivise them to exert effort, exploit growth opportunities, and reject wasteful projects, while minimising the cost of doing so" (Edmans and Gabaix, 2009, p. 486). The managerial power approach proposes an alternative view to efficient contracting (e.g. Bebchuk, Fried and Walker, 2002; Bebchuk and Fried, 2003, 2004, 2005). A priori powerful CEOs are able to influence the design of their compensation contracts and extract rents, implying that compensation arrangements favour executives but are sub-optimal for shareholders.

Notwithstanding criticism of the managerial power approach (e.g. Core, Guay and Thomas, 2005a, b), the debate between optimal contracting and managerial power reflects the fact that pay-for-performance relations had been weakening leading to claims that many features of observed pay packages were inconsistent with standard optimal contracting theories (Edmans and Gabaix, 2009). Since the crisis, scholars have been debating how to repair pay-for-performance relations and provide incentives for executives to improve long-term firm performance, which should make compensation arrangements closer to an optimum for shareholders (e.g. Bebchuk and Spamann, 2009; Bebchuk, 2010; Bebchuk and Fried, 2010a, b; Murphy and Jensen, 2011; Bolton et al., 2015; Edmans and Liu, 2011; van Bekkum, 2016; Acharya et al., 2016; Mehran and Tracy, 2016; Zalewska, 2016).

1.2 Developments in executive remuneration

Critics challenge what many consider are astronomical compensation packages awarded to the CEOs of large companies including banks. Historically, real executive pay levels had remained relatively flat following the Great Depression of the 1930s until the 1970s. CEOs were thought of as company men who had worked their way to the top. New appointees to CEO positions tended to be incumbents. This led to claims that CEOs in the US and the EU were paid like bureaucrats, with pay heavily weighted in salary with some bonus that did not vary with firm performance. A heavier weighting of salary is associated with fewer pay-for-performance incentives, which has implications for firm value leading to claims that executive compensation is not optimal (e.g. Hall and Liebman, 1998; Jensen and Murphy, 1990a; Conyon, Fernandes, Ferreira, Matos and Murphy, 2011).

Executive pay levels began to rise in the 1970s as firms grew larger and more complex. The demand for business education increased, particularly MBA programmes taught at leading business schools. This reflected a preference for general managerial skills over technical skills again because firms were becoming larger and complex due to technological developments and innovations in business practices (e.g. Murphy and Zabojnik, 2007; Frydman and Saks, 2010; Frydman and Jenter, 2010; Custódio, Ferreira and Matos, 2013). A strand of literature on managerial talent notes the rise to prominence of superstar CEOs with the demand for talented CEOs reflecting perceptions about CEOs and their skill-sets as drivers of firm performance (e.g. Bertrand and Schoar, 2003; Treviö, 2008; Malmendier and Tate, 2009; Custódio and Metzger, 2013, 2014; Cremers and Grinstein, 2014; Quigley and Hambrick, 2015; Miller, Xu and Mehrotra, 2015; Falato, Li and Milbourn, 2015; Nguyen, Hagendorff and Eshraghi, 2015). Firms started to use heavier weightings of incentive pay in compensation based on the premise that higher pay for better performance will more effectively align the interests of executives and shareholders and limit agency costs.

Disparities in pay emerged in the 1980s as executive pay growth outpaced average earnings growth in developed countries (Mishel and Davis, 2015; Girma, Thompson and Wright, 2002). In the 1990s, there was little difference in executive pay between financial and non-financial firms (Kaplan and Rauh, 2010), with similar sized non-financial firms offering larger incentives through equity-linked pay than financial firms. One impact of the financial deregulation process was the erosion of differences in incentives by the 2000s (Becher, Campbell and Frye, 2005), and the acceleration in executive pay at financial firms over non-financial firms before 2007. Leading financial sector executives, notably in investment banking and funds management, commanded a premium of 250 percent by 2006 with average financial sector wages at a premium of 50 percent (Philippon and Reshef, 2012). At end-2006, the average total compensation for a CEO at a US BHC (bank holding company) was $7,800,000 and over 90 percent of total pay was performance-based. CEOs held large equity stakes in their banks that was expected to produce a strong incentive effect. On average, the value of a CEO's equity portfolio was $87,500,000 or 10 times larger than total pay and over 20 times the value of annual equity-based pay (Tung, 2011).

1.3 Financial deregulation and executive compensation

Historically, and until fairly recently, banking has been a heavily regulated industry. Pay-performance sensitivities in regulated (or less competitive) industries tend to be lower (Joskow, Rose and Shepard, 1993). This could be because firms were subject to close scrutiny by regulators and supervisors, and these entities did not view shareholder wealth creation as the leading measure of firm performance. Taking the argument a step further, Jensen and Murphy (1990b, p. 44) explain that "a highly sensitive pay-for-performance system will cause high quality people to self-select into a company". The prospect of selection effects is consistent with the managerial talent hypothesis. Ambitious and talented CEOs demand larger incentive structures in compensation contracts, that is, a higher proportion of performance-based pay in total compensation (Smith and Watts, 1992). Conversely, a risk averse CEO, say in a regulated industry, may prefer a contract with minimal incentive structure and less sensitivity to performance. This risk differential hypothesis predicts the opposite to the managerial talent hypothesis. The banking industry in general has been facing a gradual process of financial deregulation. In the US, the process started in the early 1980s.[2] In the European Union (EU), deregulation has created the Single Market in Financial Services (effective from 1993), European Monetary Union and the single currency (in 1999). Deregulation has shifted the banking industry from heavily to considerably less regulated status. The organisational complexity of banks,

[2] Notable acts of financial deregulation include: the Depository Institution Deregulation and Monetary Control Act (DIDMCA) of 1980 - which allowed non-bank depository institutions to offer a wider range of products and phased out interest rate ceilings; the Garn-St. Germain Depository Institutions Act of 1982 - which allowed commercial banks to issue new asset and deposit products; the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 – repealing all state-level branching restrictions; and the Gramm-Leach-Bliley Financial Services Modernization Act of 1999 – which repealed the 1933 Banking Act (Glass-Steagall) and ended functional separation between commercial and investment banking (see Tung, 2011).

especially large institutions, has grown as former lines of demarcation such as the functional separation of commercial and investment banking disappeared. Executives have had to manage more complex firms under increasingly competitive conditions, and to make decisions and take risks that generate wealth for bank shareholders.

Arguably, financial deregulation has intensified trends in executive compensation for financial firms like banks. The deregulation hypothesis suggests that deregulation unleashed competitive forces, such as financial innovation and internationalisation of financial markets, which increased demand for talented executives to manage risks. Deregulation resulted in increases in skill intensity and job complexity at financial firms (DeYoung et al., 2013) and it changed finance into a high-skill-wage industry (Frydman and Saks, 2010).

The deregulation hypothesis suggests that executive compensation grows more sensitive to performance as management becomes less regulated. Evidence supports the deregulation hypothesis and managerial talent hypothesis (e.g. Crawford, Ezzell and Miles, 1995; Hubbard and Palia, 1995; Becher et al., 2005; Cuñat and Guadalupe, 2009). The studies test for changes in incentive structures and pay-performance sensitivities after deregulatory acts repealed barriers to competition in US banking. Deregulation and a competitive environment are associated with increased pay-performance sensitivities and demand for a larger proportion of performance-based pay. In response to contractual risk-taking incentives, bank boards changed compensation arrangements to encourage executives to exploit new growth opportunities created by deregulation and debt securitization, which resulted in an increase in bank risk-taking (DeYoung et al., 2013). However, recent evidence suggests that rewarding non-CEO executives with bank stock raises the probability of bank failure because non-CEOs take risks to increase the value of their stock (Berger, Imbierowicz and Rauch, 2016).

1.4 Executive compensation and the structure of incentives

The structure of executive compensation contracts reflects implicit incentives that are expected to motivate executives to improve firm performance and maximise shareholder wealth. Executives receive an annual total remuneration or compensation or total pay. Total pay can be divided into constituents. Salary is an annual payment, which accounts for a small proportion of the total pay of bank executives. It represents the fixed component of executive pay and is an award that does not depend on firm performance. Higher levels of salary in total pay are consistent with weaker pay-performance systems and are likely to be preferred by relatively risk averse individuals. A competitive benchmarking process based primarily on industry-specific surveys influences fixed pay (Murphy, 1999).

Bonus is a contractual annual payment that reflects an executive’s ability to achieve objectives set at the start of the year. The size of bonus directly scales in proportion to an executive’s capacity to thrive. Bonus can vary greatly among job functions, across lines of business, and between banks. The evidence is unclear whether pay incentives in the form of cash bonuses mitigate or prevent CEOs and top management teams from engaging in either excessive or less risk taking (Bosma and Koetter, 2013; Duru, Mansi and Reeb, 2005; Fahlenbrach and Stulz, 2011). Bonus could reduce the probability of bank default (or insolvencies) if it lowers executives’ risk preferences since bonus is payable only in a state of solvency, and provides an incentive to avoid bankruptcy (e.g. John and John, 1993; Balachandran et al. 2010; Vallascas and Hagendorff, 2013). Cash compensation equals salary plus bonus.

Equity-linked pay is the annual award of stock and options. Typically, this type of pay is very heavily weighted in total pay because it ties executive pay to stock prices. Risk averse managers with a certain amount of equity can have powerful incentives even when the fractional holdings are small, that is, a small fraction of firm value translates into a large fraction of CEO wealth (Hall and Liebman, 1998). However, this could create a problem. Namely, when an executive’s total wealth is not diversified and is tied in up the firm, the executive may pass up risk increasing positive net present value projects that would benefit shareholders (Smith and Stulz, 1985). Shareholders can minimise this eminent risk-related agency problem by arranging earnings incentives to be a convex function of firm performance, by the use of stock options to make executives’ expected wealth an increasing function of volatility (e.g. Smith and Stulz, 1985; Guay, 1999; Hayes, Lemmon and Qiu, 2012). Firms often use stock option schemes to attract employees who are less risk averse and have optimistic beliefs about their firm’s prospects, or to attract certain types of employees (e.g. Oyer and Schaefer, 2005; Core et al., 2003). Equity-linked pay provides executives with equity incentives, which have been linked to risk-taking decisions by bank CEOs prior to the global financial crisis, specifically at US banks that later received TARP support (Troubled Asset Relief Program) (e.g. Fahlenbrach and Stulz, 2011; Hagendorff and Vallascas, 2011). The evidence implies the presence of important heterogeneity across banks in risk-taking behaviour with persistent compensation practices that emphasized short-term pay in the form of bonus and options (Cheng, Hong, and Scheinkman, 2015).

Annual pay provides different incentives from the value of cumulative holdings over time of stock, options and long-term incentive plans or total accumulated wealth. Wealth is the accumulation of past grants of unexercised options and unsold investments in firm stock or portfolio holdings of an executive that provide portfolio incentives. Whilst equity incentives are larger than other incentives provided by annual total pay, portfolio incentives are larger still. Indeed, changes in the value of CEO portfolio holdings drive the strong relationship between firm performance and CEO compensation (e.g. Hall and Liebman, 1998; Core et al., 2005a).

1.5 Research objectives

This thesis consists of three empirical chapters book-ended by this Introduction and a Conclusion. The overarching objective of this study is to examine contemporary developments in executive compensation in the banking industry. The examination covers a period characterised by the effects of financial deregulation, the most severe financial and economic crisis since the 1930s, and an initial recovery alongside reforms to compensation arrangements. Whereas the bulk of compensation studies in banking investigate only the CEO, this study will consider the (chief) C-suite of executives, which includes the important roles of chief operating officers, chief financial officers, and chief risk officers among others (e.g. Demsetz and Saidenberg, 1999; Ang, Lauterbach and Schreiber, 2002; Chava and Purnanandam, 2010; Feng, Ge, Luo and Shevlin, 2011). Therefore, this study will account for the importance of director heterogeneity within and across boards of directors at banks (e.g. Adams et al., 2015; Adams and Ferreira, 2009, 2012; Adams and Funk, 2012; Anderson, Mansi and Reeb, 2004; Anderson, Reeb, Upadhyay and Zhao, 2011; Byrd, Cooperman and Wolfe, 2010; Coles et al., 2008; Dhir, 2015; Estélyi and Niser, 2016; King, Srivastav and Williams, 2016). There is a scarcity of literature investigating top management teams in the banking industry and this study is an attempt to fill that gap.

Chapters Two to Four provide the empirical contributions of this study. The objective of Chapter Two is to investigate determinants of executive compensation in banking. Noting the importance of pay incentives, this chapter will decompose total pay into constituents; namely, fixed pay (salary), cash compensation (salary plus bonus), equity-linked pay (stock and options); variable pay (bonus plus equity-linked pay), and portfolio holdings (total accumulated wealth). This chapter will classify each executive into ten categories of professional status, which reflects roles and organisational hierarchies in the C-suite and means that this chapter will provide evidence on the variation of compensation and its structure across professional roles. Using a carefully constructed dataset with executive-level and bank-level variables and covering the period from 1999 to 2013, this chapter uses a sample of 71 banks that provide detailed information on executive compensation. Recognising heterogeneity across banks, this study will analyse three cohorts of banks: G-SIBs (a sample of global-systemically-important-banks as identified by the Financial Stability Forum and the largest and most complex financial firms in the world); EU banks (European banks from nine countries); US banks (banks based in the US). Sub-sampling is used to divide the period into time intervals that represent the pre-crisis deregulation-induced boom (1999-2006); crisis episode (2007-09), and post-crisis partial recovery (2010-13). Therefore, this chapter will show trends in executive compensation in banking. It will examine the determinants of total pay, and its constituents, by professional status after controlling for director-level heterogeneity and bank-level factors, for three cohorts of banks and across three time intervals.

The objective in Chapter Three is to estimate pay-for-performance sensitivities, that is, elasticities, in the banking industry. This chapter will establish the nature of the pay-performance relation in banking before the crisis, which could shed some light on the debate between optimal contracting theory and the managerial power approach. It will also provide evidence on any decoupling of pay-performance relations following the global financial crisis, and offer an early insight into whether pay-performance relations have recovered since the crisis and where they stand in relation to pre-crisis levels. Post-crisis developments in pay-performance relations might be a first indication of an impact of legislative reforms. The empirical analysis will follow the same structure as Chapter Two. This chapter will provide estimates of pay-for-performance elasticities for each category of professional status. It will provide evidence across the three cohorts of banks and for the three time intervals. The analysis will control for director-level heterogeneity and bank-level factors.

The objective of Chapter Four is to examine the effect that pay differentials in the top management team have on bank stability. This investigation considers the proposition of tournament theory, which suggests that differences in pay, or pay gaps, create a tournament whereby employees compete for the prize of promotion and higher monetary reward (e.g. Lazear and Rosen, 1981; Rosen, 1986). The size of pay gaps increase the further an employee ascends the hierarchical levels within a firm. The motivating factor for the employee to expend effort is the prospect of higher pay (e.g. Rosen, 1982 and 1986; Main, O'Reilly and Wade, 1993; Eriksson, 1999; Conyon and Sadler, 2001; Lin, Yeh and Shih, 2013). Firms that use tournaments in their pay setting arrangements expect that large pay gaps will motivate effort, which in turn will realise improvements in firm performance. Alternatively, behavioural theory and/or sabotage theory suggests that pay gaps should be relatively small in order to induce teamwork and comradeship, and to prevent politicking or undermining of colleagues, which could adversely affect firm performance by reducing effort (e.g. Lazear, 1989; Milgrom and Roberts, 1988; Cowherd and Levine, 1992; Henderson and Fredrickson, 2001; Harbring and Irlenbusch, 2011; Chowdhury and Gürtler, 2015). This chapter will investigate the effect of pay gaps with the advantage of using executive-level data (Vieito, 2012), which will provide early evidence from the banking industry. The preferred indicator of bank performance is the Z-score, a commonly used measure of bank stability (e.g. Laeven and Levine, 2009; Bertay, Demirgüç-Kunt and Huizinga, 2013; Vallascas and Hagendorff, 2013; Anginer, Demirgüç-Kunt, Huizinga and Ma, 2014; Fang, Hasan and Marton, 2014; Schaeck and Cihák, 2014). The Z-score has an added advantage because it decomposes into constituents that measure profitability, leverage and the volatility of profit. Therefore, this chapter will determine whether pay practices in banking follow either the tournament perspective or behavioural/sabotage perspective. It will estimate the effect of executive pay gaps on bank stability and its constituents, across cohorts of banks and time intervals, and after controlling for director heterogeneity and bank-level factors.

The contribution of this thesis can be summarised as follows. It reviews matters relating to executive compensation in the banking industry, which became an urgent matter for government and regulators due to the severity of the global financial crisis. This thesis provides a snapshot of developments in compensation leading up to the crisis, during and following the crisis. This thesis examines compensation arrangements at an international sample of banks whereas much of the compensation literature is US-centric. Therefore, this thesis provides a cross-country analysis in addition to the intertemporal analysis. Furthermore, this thesis treats as a separate cohort a sample of the largest and most complex banks in the world, which the Financial Stability Board has identified as posing a threat to systemic stability.

In contrast to other compensation studies that consider CEOs or the five highest paid executives, this thesis considers the full C-suite of executives. It offers early evidence on differences in compensation and incentive structures within banks, that is, across professional status, as well as between banks. Using a carefully constructed dataset, which varies by executives and between banks, this thesis employs appropriate statistical methods to account for these sources of heterogeneity.

This thesis estimates the pay-for-performance relationship in banking for the recent period. It can provide insights into whether executive compensation contracts in banking are tilted in favour of executives or shareholders or neither. The results will show the relative strength of pay-performance relations before and following the crisis. This should help to identify potential pre-crisis problems and if the reforms are having an impact on resolving such matters. That the debate on how to reform executive compensation emphasises the notion of pay-for-performance simply underscores the importance of this thesis.

The thesis offers early evidence on the effect of pay gaps in the banking industry. Exploiting the properties of the carefully constructed dataset means this thesis is among a few studies that examine pay gaps using director-level information. Indeed, this thesis is probably the first application of its kind to the global banking industry. Its results provide an indication of the effect of how pay policy affects the working of top management teams in the banking industry.

1.6 Contribution

This thesis offers a panoramic view of developments in executive compensation in the banking industry over the most recent economic cycle. It investigates the period from 1999 to 2013 that includes the pre-crisis boom (1999-2006) characterised by an intertwining of financial deregulation and financial innovation. It also covers the crisis episode (2007-09) and subsequent nascent recovery (2010-2013). Hence, the length of the period under review in this thesis is noticeably longer than some related studies, which for various reasons are limited in duration to a small time frame (e.g. Ang et al, 2002; Berger et al, 2016).

The importance of this study is exemplified by the fact that the severity of the crisis breached an outrage constraint, which resulted in governments on both sides of the Atlantic urgently passing legislation that is intended to prevent such crisis events from occurring again in the future, including actions relating to compensation arrangements in the financial sector. Therefore, this thesis offers some of the earliest analysis of executive compensation in banking across this most interesting of times in economic history. Thus, this thesis offers an update of compensation trends in the financial services industry, which complements analysis elsewhere on US firms (e.g. Kaplan and Rauh, 2010) and European firms (e.g. EBA, 2015). More specifically, the results have bearing to literature that is debating how to reform executive compensation arrangements in the financial sector, and the broader debate on the reform of corporate governance standards in banking (e.g. Bebchuk and Spamann, 2009; Bebchuk and Fried, 2010a, b; Murphy and Jensen, 2011; Edmans and Liu, 2011; van Bekkum, 2016; Zalewska, 2016).

A novelty of this thesis is the construction and use of a database comprising of both executive-level and bank-level dimensions. This is a contribution to a literature that focuses mostly on CEOs only, or the CEO plus one or two executives at most (e.g. Chava and Purnanandam, 2010; Feng et al, 2011). Thus, this thesis fills a gap in the literature by investigating top management teams or C-suite of bank executive directors. It does this by classifying bank executives into ten professional roles ranging from the CEO to chief legal officer. Only a few studies have attempted to examine banks' management teams (e.g. Demsetz and Saidenberg, 1999; Ang et al, 2002). This thesis considers individual bank executives rather than using aggregate measures of executive compensation, which is common to studies using data on the five highest paid US bank executives. Through the novel database, this thesis actions recommendations made in a strand of corporate governance literature, which emphasises the importance of director heterogeneity within and across boards (e.g. Adams et al, 2015; Anderson et al, 2004, 2011; Hagendorff, 2015; Estélyi and Niser, 2016; King et al, 2016).

Unlike the bulk of earlier studies on executive compensation in banking, this thesis is not US-centric. Instead, it considers an international sample of mostly large banks, thereby offering early cross-border insights. Through the use of sub-sampling, this thesis constructs three cohorts of banks to account for heterogeneity across banks. Two cohorts offer a geographical dimension; namely, the US banks and European banks. A third cohort includes global-systemically-important banks as identified by the Financial Stability Board. These banks are the largest and most complex financial institutions in the world, and they pose a threat to systemic risk. This thesis is one of the earliest to consider this sub-set of banks in formal empirical analysis. The use of sub-samples and three time intervals demonstrates this thesis does not consider that one-size-fits-all and that appropriate statistical methods should be used to account for the different sources of heterogeneity.

The first investigative research (Chapter Two) identifies factors that affect executive compensation in banking. It quantifies the amount and the structure of compensation paid to bank executives. In so doing, the Chapter draws upon seminal studies that decompose total pay into constituents; fixed pay, bonus, and equity-linked pay (e.g. Murphy, 1999; 2000), and identify the relevant incentives associated with each constituent (e.g. Jensen and Murphy, 1990a; Hall and Liebman, 1998; Guay, 1999; Coles et al, 2006). The Chapter complements empirical studies, which investigate the relationship between the structure of executive compensation and bank performance and bank risk-taking (e.g. Vallascas and Hagendorff, 2013; Bosma and Koetter, 2013; Duru et al, 2005), and studies that investigate if excessive executive pay was a causal factor in the 2007 crisis (e.g. Fahlenbrach and Stulz, 2011).

The Chapter confirms the bulk of executive pay in banking takes the form of variable or performance-related pay. It shows how banks incentivise executives to maximise stock returns by rewarding executives with bank stock and options. Using regression analysis to contrast pay differences between executives (and the CEO as baseline), the Chapter reveals there are differences in the proportion of performance-related pay-to-total pay across cohorts, and is more important at G-SIBs followed in turn by US banks and EU banks. Together with the fact that average executive total pay is highest at the G-SIBs (£12.2 million) followed by US banks (£7.5 million) and EU banks (£1.9 million), this suggests selection effects are in evidence with talented and ambitious individuals opting to work for the most prestigious banks. Therefore, this Chapter affirms that executive pay in banking is consistent with the predictions of the managerial talent and deregulation hypotheses. Unsurprisingly, executive pay in the banking industry fell following the crisis. Current (2010-13) pay remains below pre-crisis levels, reflecting the troubles banks that continue to face.

This Chapter offers robust empirical evidence of significant differences in total pay between groups of executives when the grouping is based on professional status. It identifies and quantifies the hierarchical nature of compensation arrangements in banking. The highest paid group of executives includes the CEO, chief operating officer, and senior executives. This Chapter also identifies which biographical characteristics of directors and which bank-level factors most affect executive compensation. However, the effects vary across banks and time. Chapter Two has two important implications for corporate governance structures. Both greater board independence and greater board diversity are associated with lower levels of total (and variable) pay, which suggests these factors improve the monitoring function or control any propensity for powerful CEOs to self-deal by capturing the remuneration setting process. Thus, this Chapter offers empirical evidence to complement studies on board diversity (e.g. Adams et al, 2015), and board independence (e.g. John and Senbet, 1998; Bhagat and Black, 2002; Weisbach, 1988).

Chapter Three offers up-to-date estimates of pay-for-performance elasticities in banking. It shows the pay-for-performance relationship characterises executive pay at banks between 1999 and 2013. However, results are time varying and vary across cohort. Following an empirical approach consistent with Murphy (1985) and Jensen and Murphy (1990a), this Chapter confirms the result that it matters more how banks pay executives rather than how much do they pay. Irrespective of cohort, mean elasticities are considerably larger for equity-linked pay (equity incentives) and total accumulated wealth (portfolio incentives), demonstrating the importance of equity incentives and portfolio incentives in compensation policy. That pay-for-performance elasticities are larger at bigger banks, the G-SIBs, implies the presence of an implicit relationship between CEO skill and compensation, and bank size (found at US banks in the 1980s and 1990s by Barro and Barro, 1990; Demsetz and Saidenberg, 1999).

This Chapter provides estimates of pay-for-performance elasticities by professional status. Few studies offer this information due in the main to data availability issues. This Chapter finds elasticities vary between professional roles, across cohorts, and over time. Whereas elasticities close to unity indicate that pay growth closely mirrors firm performance gains, and suggests incentives inherent in compensation contracts are effective, larger elasticities infer that pay growth was greater than performance gains alone would suggest. In contrast, elasticities of lower magnitude imply that executive pay growth is insufficiently tied to performance gains, which questions the effectiveness of compensation contracts. The results on pay-for-performance can inform the debate on how to reform executive compensation, and shed light on the debate between optimal contracting (e.g. Core et al, 2005a, b) and managerial power (Bebchuk and Fried, 2003, 2004, 2005). The pay-for-performance relation did decouple during the crisis. Although it is re-forming at some cohorts, one interesting issue for future research would be to determine how the Dodd Frank Act in the US and CRD IV in the EU are affecting pay-for-performance elasticities in banking.

Chapter Four offers early evidence that shows the effect of compensation policy on bank stability. In general, it shows that larger executive pay gaps, measured as the difference between the total pay of the CEO and each executive (following Vieito, 2012), are associated with higher levels of bank stability (measured by the Z-score, see also Nash and Sinkey, 1997; Berger et al, 2009; Laeven and Levine, 2009; Schaeck and Cihák, 2014; Fang et al. 2014). Decomposing the Z-score shows the pay gap affects bank stability by improving bank profitability, and reducing both leverage and volatility. The Chapter complements studies by Ang et al (2002), Bebchuk et al (2011), Bai and Elyasiani (2013), and Burns et al (2016), though only the latter consider an international sample. The Chapter tests the propositions of tournament theory (e.g. Lazear and Rosen, 1981; Rosen, 1986) versus behavioural theory (see Henderson and Fredrickson, 2001), which boils down to a firm believing that either large pay gaps or small pay gaps are sufficient motivation for executives to expend effort to improve firm performance. For all banks, the results infer that tournament incentives can improve bank stability. However, and consistent with the evidence in this thesis, the relationship between bank stability and executive pay gaps shows intertemporal and inter-bank variation. Thus, this Chapter recommends that bank regulatory and supervisory agencies should examine the features of compensation policy at banks.

Chapter Two

Executive Compensation in Banks: An International Comparison

2.1 Introduction

A broad consensus suggests that the level and structure of executive compensation at banks encouraged excessive risk taking by top executives and was a causal factor behind the global financial crisis of 2007-08 (Reinhart and Rogoff, 2009; Marques and Oppers, 2014; Brunnermeier, 2009; Ellul and Yerramilli, 2013; Bolton, Mehran and Shapiro, 2015). The response of regulators on both sides of the Atlantic has been to pass laws relating to executive remuneration (Murphy, 2013b). Recently, there is growing interest in the impact of corporate culture in banking in terms of reviving trust in banks and maintaining financial stability (Thakor, 2016); how leaders transmit culture (Lo, 2016); and interactions between governance, risk-management and culture in banks (Stulz, 2016). Proposals on reforming compensation practices at banks (Bebchuk, 2010; Bebchuk and Fried, 2010a, b; Acharya, Mehran and Sundaram, 2016; Mehran and Tracy, 2016; van Bekkum, 2016), and issues on corporate governance at banks (John, de Masi and Paci, 2016; Macey and O'Hara, 2016) are complements and building blocks for this strand of literature.

Executive pay levels began to rise in the 1970s as firms became increasingly larger and complex. The managerial talent hypothesis suggests CEOs (chief executive officers) became important actors and the demand for talented CEOs reflected perceptions of CEOs as drivers of firm performance (Quigley and Hambrick, 2015). Firms began to use heavier weightings of incentive pay in compensation structure, based on the premise of higher (CEO) pay for better (firm) performance to align executive and shareholder interests (Murphy, 1986; Frydman and Saks, 2010; Frydman and Jenter, 2010). Disparities in pay emerged in the 1980s as executive pay growth outpaced average earnings growth in developed countries (Mishel and Davis, 2015; Girma, Thompson and Wright, 2002).

Arguably, developments in executive compensation had a greater effect on financial firms because they coincided with financial deregulation. The deregulation hypothesis suggests deregulation unleashed competitive forces, such as financial innovation and globalisation of financial markets, which increased demand for talented executives to manage risks. Whereas executive pay in finance differed little from non-financial firms in the 1990s (Kaplan and Rauh, 2010), leading financial sector executives, in investment banking and fund management, commanded a premium of 250 percent by 2006 with average financial sector wages a premium of 50 percent (Philippon and Reshef, 2012). Deregulation resulted in increases in skill intensity and job complexity at financial firms (DeYoung, Peng and Yan, 2013) and it changed finance into a high-skill-wage industry (Frydman and Saks, 2010).

Executive compensation is an important corporate governance mechanism to minimise conflicts of interest between managers and shareholders over the distribution of corporate funds (Jensen and Meckling, 1976). The board of directors determine corporate governance practices at firms. Agency theory suggests a high absolute pay and performance incentive in executive compensation contracts reflects the intense corporate competition for the best managerial talent, and the objective to align the interests of managers and shareholders. Under conditions of perfect or complete information about a CEO’s activities and the investment opportunities available to him/her, a bank’s shareholders could design a contract specifying and enforcing the managerial actions for the CEO to take. Information asymmetries between shareholders and the CEO mean the former lack complete information about which actions the latter can take, or if such actions could increase shareholder wealth. The conflict of interest between shareholders and CEOs represents a classic example of the principal-agent problem.

Some suggest that agency theory cannot explain salient facts about CEO remuneration. In the managerial power approach, Bebchuk, Fried and Walker (2002) and Bebchuk and Fried (2004) contend that powerful CEOs control their boards and set their own compensation limited only by an outrage constraint, which reflects what the market will tolerate (Murphy, 1985; Jensen and Murphy, 1990a; Adams and Giannetti, 2012). In this view, shareholders will react only if they perceive executive pay growth to be excessive, and governments will react only after corporate scandals or crises resulting from breaches of corporate governance including excessive executive remuneration. Murphy (1999, 2012) offers examples of government intervention into the pay setting process after corporate scandals. Murphy (2013a) reports on regulatory actions imposed on the financial sector in the US and EU following the global financial crisis of 2007-08. Notwithstanding, firms tend to circumvent regulatory restrictions on executive compensation by altering the structure of incentive pay. Kroszner and Strahan (1999, 2001, 2011) consider regulatory changes in the US. They argue that much of the deregulation in banking in the past thirty to forty years and its timing is attributable to the power that private interests have in pressing for or stalling regulatory change, and that banks have adapted to this evolution.

The focus of this chapter is to explore the pay level and pay structure of top executives at an international sample of banks from the US and EU from 1999 to 2013. The trends and intertemporal variation in remuneration of top-level executives may correlate well with the loosening of regulations on banks since the 1980s and following the global financial crisis of 2007-08. The study considers the effect of heterogeneity in terms of the demographic and biographical characteristics of top management team members upon executive compensation, and the influence of bank-level factors on governance and aspects of firm activities and performance. The inclusion of bank-level effects proxies for the presence of corporate cultures or identities that can vary across firms. The aims of this chapter are as follows:

a) To review changes in the level and structure of executive compensation between cohorts of banks and across time;

b) To examine heterogeneity across executive directors by professional status within and across different cohorts of banks;

c) To examine intertemporal variation in compensation structure to isolate effects of the global financial crisis and subsequent regulatory actions; and

d) To serve as a basis for subsequent research on executive compensation.

This chapter contributes to the non-mutually exclusive approaches of optimal contracting and managerial power by examining and understanding the breadth of CEO and non-CEO compensation in banking from 1999 to 2013. The aim is to differentiate the magnitude and incentive structure of compensation at a sample of 71 international and mostly large banks (hereafter “all banks”). Evidence suggests that the rise in CEO compensation was driven by large complex enterprises because the talent pool becomes more valuable to firms as they increase in size (Gabaix and Landier, 2008; Cremers and Grinstein, 2013). Not only does size and complexity present a considerable challenge for bank regulators but for corporate governance as well. Due to heterogeneity across banks, and to distinguish pay practices at banks with shared characteristics, this study partitions the sample into three cohorts. The first cohort is a sample of international financial conglomerates that the Financial Stability Board (FSB) classifies as too-systemically-important-to-fail and term global systemically important banks (G-SIBs). The second cohort is a sample of (non G-SIB) European Union (EU plus Switzerland) banks many of which are large and well known, though it includes some smaller-sized firms. Though the banks originate from different EU member states, they are subject to EU regulations. The third cohort is a sample of (non G-SIB) US banks that includes large regional and investment banks.

Initially, an in-depth analysis of descriptive statistics provides information on (a) board characteristics (e.g. board size and board independence), and (b) the biographical profiles of executives. The purpose is to differentiate executive diversity based on age, gender, nationality, education and tenure. The study examines the influence of executive diversity, biographical characteristics, and bank-level factors on compensation to provide insights on similarities and differences across cohorts.

This study provides broad coverage of all C-suite bank executives for a lengthy time span (1999-2013). Earlier contributions rely exclusively on statistics on CEOs and/or the 3 to 5 highest paid executives (Ang, Lauterbach, and Schreiber, 2002; Vieito, 2012; Bebchuk et al. 2011; Burns et al., 2016). Haldane (2015) claims that the global financial crisis uncovered a systemic governance failure. Executives in this study include some of the top 0.1% of highest earners in EU Member States (remunerated at €1,000,000 or more per financial year under Article 75(3) of CRD IV – Capital Requirements Directive), and highly paid US bank executives. Furthermore, there is scarce literature on non-CEO officers.

This chapter provides compensation and biographical information on all C-suite executives in the sample banks. One of the most puzzling aspects of executive remuneration is the differences in pay across professional status or hierarchies. To fill this gap in the literature, this study differentiates pay across executive roles [i.e., CEO, Chair; Chief Operating Officer (COO); Chief Financial Officer (CFO); Chief

Administrative Officer (CAO); Chief Risk Officer (CRO), Chief Legal Officer (CLO), and junior, middle and senior management].

The chapter considers a lengthy time span of 14 years (1999-2013) and examines intertemporal variation based on different phases of the economic cycle (pre-crisis, 1999-2006; crisis, 2007-09; post-crisis, 2010-13). A limitation of some studies is a focus on short periods lacking in intertemporal dynamics (e.g., 1-3 years, Ang, Lauterbach, Schreiber, 2002; Conyon and Murphy, 2000; Ozkan, 2007; Berger et al, 2016). Through intertemporal analysis, this study can consider suggestions of a direct correlation between financial deregulation and the global financial crisis. Arguably, looser regulations affected the value of instruments that banks used to remunerate executives, which encouraged risk-taking (Reavis, 2009).

The structure of executive compensation reveals information on the incentives facing bank executives. An executive receives total annual compensation (hereafter, total pay). Compensation takes the form of salary (fixed pay), bonus, and equity-linked pay (stock and options). To align interests, the bulk of total pay is in the form of variable pay (bonus and equity-linked pay), which varies according to firm performance. By rewarding an executive in firm stock and options, compensation contracts contain incentives for executives to take actions to raise the stock price and increase shareholder wealth (Murphy, 1986). Equity-linked pay, therefore, offers an equity incentive. Total accumulated wealth represents the portfolio holdings of an executive and is the cumulative of total annual compensation net of equity transactions. This component offers portfolio incentives. Studies report the power of equity incentives and portfolio incentives in terms of improving pay-for-performance relations (Hall and Liebman, 1988; Core, Guay and Thomas, 2005a).

This chapter studies developments in compensation for C-suite executives at banks by their professional status. The analysis accounts for heterogeneity between different cohorts of banks, and for differences across intervals of time. It considers total pay and wealth and the constituents that indicate incentive structure. The analysis accounts for biographical characteristics that vary across executives over time, and bank-level factors that vary between banks over time. Therefore, the chapter will use hierarchical linear models to exploit heterogeneity in the data.

Next, section 2.2 presents the motivation based on the background literature and introduces whenever necessary the remuneration variables to reiterate the importance of the study. Section 2.3 formulates the hypotheses. Section 2.4 discusses the sample and dataset construction. Section 2.5 provides the statistical design. Section 2.6 presents the exploratory descriptive data analysis. Section 2.7 presents the empirical results. Section 2.8 provides the result summary and discussion. Section 2.9 concludes.

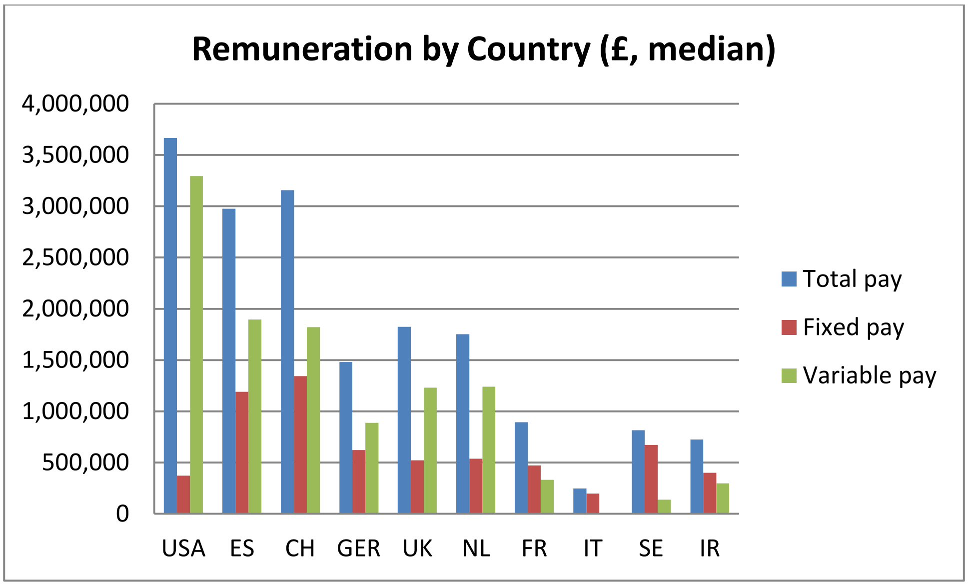
2.2 Literature

2.2.1 Executive remuneration: pay level and structure of incentives

Excess remuneration of top management executives is one of the most relevant and unresolved issues in the financial sector. Executive pay arrangements in the banking sector are multifaceted and directors play a critical role in overseeing the affairs of the bank. The board among other duties is responsible for evaluating the performance of the CEO and approving the CEO's and other executive officers' compensation. However, a variety of factors may facilitate management control over the board, including CEO dominance about the selection process, inefficient monitoring, complexity of a firm's operations linked to firm size and aggressive risk-taking. For instance, the managerial power approach suggests that opportunistic CEOs could pursue an expansionary strategy to increase the size of the bank in order to demand higher pay (Bebchuk, Fried and Walker, 2002). Thus, managerial self-exploitation (rent seeking) plays a part in explaining top executive earnings (Bebchuk and Fried 2004). The authors argue that executive compensation is set by CEOs themselves rather than board on behalf of shareholders because, as explained by Edmans and Gabaix (2009), many features of observed pay packages may appear inconsistent with standard optimal contracting theories.

Investigation of the top end of the income distribution of US executives between 1994 and 2004 reveals that all top executive earnings increased but the earnings of Wall Street executives (investment bankers and hedge; private equity; and mutual funds) grew more than non-financial firm executives (Kaplan and Rauh, 2010). Mishel and Davis (2015) find that CEO compensation in the US grew faster than pay of the other top earners (0.1% of high earners) and does not simply reflect the increased value of talented highly paid professionals. Arguably, this trend extends to the EU financial sector and is more prominent in larger firms. Reports on remuneration of high earners (EBA 2011, 2012, 2015) show higher-ranking senior executives (2013: 0.106% of EU staff high earners) receive bigger salaries in UK banking as well as at foreign bank subsidiaries in the UK in comparison to other EU members. EBA (2015) finds remuneration practices within institutions differ significantly across both Member States and firms. This might suggest remuneration differs within the banking industry (by type of bank) and by economic environment (jurisdiction), which makes this study even more appealing. Figure 2.1 graphs average (median) executive pay by country over 1999-2013. Fixed pay is salary. Variable pay is bonus plus equity-linked pay.

Figure 2.1 Executive pay: By country and structure, all banks - 1999-2013



Source: BoardEx; own calculation

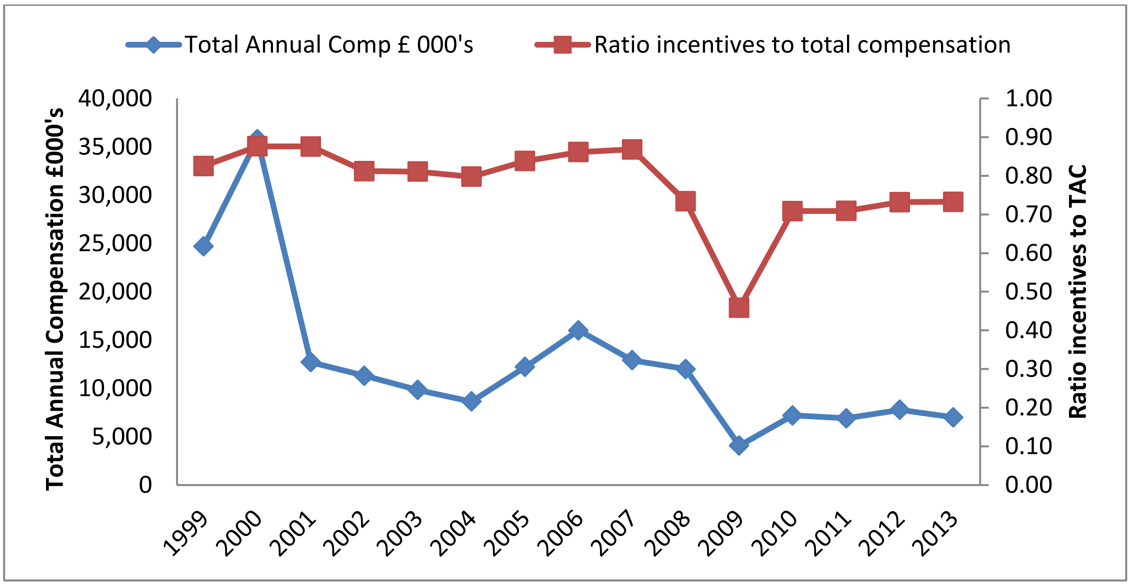
The level and structure of pay varies by jurisdiction. The median bank executive in the US receives larger compensation than in the EU. At US banks, variable pay has a much greater weighting in total pay, which ties executive pay to firm performance more stringently than in other jurisdictions. However, the relatively heavy weighting of performance-based pay is risk bearing, and for accepting this risk, the overall level of pay should be higher at US banks. Fixed pay has a greater weighting in the EU though cross-country differences are apparent. Conyon et al (2011) suggest that European CEOs, in general, are paid like bureaucrats since the bulk of compensation is in salary with only a minimal proportion in equity-linked pay. Certainly, fixed pay is lower in proportion to total pay at British and Dutch banks and higher at banks in

France, Italy, Sweden and Ireland. This chapter contributes to the emerging literature that attempts to identify patterns in workers' remuneration by including higher earners in the top 0.1% (e.g. remunerated EUR 1 million or more per financial year under Article 75(3) of CRD IV) and on executives in the banking industry.

There are complex governance issues in understanding the relation between CEO and non-CEO executive compensation and firm performance. For instance, total annual compensation in this chapter is the sum of payments relating to salary, bonus, defined contribution pension, and other benefits plus equity-linked pay. Equity-linked pay is the value of shareholdings; long-term incentive plans (LTIPs). A large proportion of executive remuneration depends upon the value of the firm's shares because retained equity-linked pay culminates into total accumulated wealth (portfolio holdings) (Murphy, 1999). Abowd and Bognanno (1995, p. 67) report that because the gains associated with stock options typically accrued during the five to ten years that preceded announcements by firms of the compensation packages of the five highest paid employees, every year there are cases of CEOs having exceptionally large income in a year in which the firm has done poorly. In the US, the pay growth of top CEOs surpasses stock gains and salaries (Mishel and Davis, 2015). The authors examine CEO compensation relative to other high earners (0.1% of highest earners), finding that CEO compensation grew far faster than other top earners. This does not simply reflect the increased value of highly paid professionals in the market for talent, but reflects the presence of rents. This chapter considers differences in the level and structure of pay between CEOs and non-CEOs.

Banks tend to reward executives with high proportions of variable pay. Figure 2.2 shows average total pay for CEOs at G-SIBs over 1999-2013. The figure also shows incentives facing CEOs in the ratio of variable pay-to-total pay. Average total pay falls spectacularly between 1999 and 2001, which coincides with several corporate scandals in the US. Total pay is stable until 2006 within the range of £8-16 million. Following the global financial crisis, average CEO pay bottoms out in 2009 at around £5 million before rebounding to around £7 million in 2010-13, which is below pre-crisis. Figure 2.2 shows a change in incentives over time. Pre-crisis, the ratio of variable pay-to-total pay for the average G-SIB CEO ranges between 80-90 percent. During the crisis, the ratio drops to 40-50 percent before rising to roughly 70 percent from 2010 onward. Arguably, the crisis event demonstrated that banks (and other financial sector firms) should realign incentive pay to reflect executives' positions and material responsibility to their banks. It is interesting to consider whether pre-crisis incentives were faulty, which would suggest a need to reform executive compensation contracts (Bebchuk, 2010; Bebchuk and Fried, 2010a, b). Some believe that senior management in banks and investment firms did not fully understand the highly complex models, instruments and financial strategies of pre-crisis banks, which in combination with incentive pay resulted in excessive risk-taking (Reavis, 2009; DeYoung et al, 2013).

Figure 2.2 Average total pay and incentives for CEOs: G-SIBs, 1999-2013



Source: BoardEx; own calculation

This chapter provides background information whenever possible on fixed and variable pay practices to deepen understanding of changes associated with remuneration structures. Since 2014, data disclosure regarding higher earners in the EU follows Directive 2006/48/EC (effective under Directive 2013/36/EU, CRD IV). The EBA now benchmarks remuneration trends and publishes aggregated data on high earners (earning €1 million or more per financial year). As part of CRD IV, and effective from 1 January 2014, banks operating in the EU are liable to a bonus cap that sets the ratio of variable-to-fixed pay at 100 percent (1:1). A bank can set a ratio of 2:1 providing shareholders approve (Murphy, 2013b).

2.2.1.1 Fixed pay

Studies of the relationship between salary and/or pension benefits with firm performance and risk taking actions are scarce in the banking industry (Srivastav and Hagendorff, 2016). Most of the empirical work on the causes of the global financial crisis focuses on assessing the importance of incentives. The prevalence in banking for executive compensation to have heavier weighting in incentive (variable) pay is still receiving criticism (Treanor, 2016). Such criticism reflects facts: executive pay has tripled over the past 18 years; pay inequality is increasing between executives and ordinary staff (Mishel and Davis, 2015) and across countries (OECD, 2011). Critics blame pay practices in financial services for promoting the excessive risk-taking that they claim led to the global financial crisis (Kirkpatrick, 2009).

Base salary represents the fixed component of executive pay. It denotes an award that does not depend on firm performance. Executives can defer pay if the fixed component is a pension scheme. A competitive benchmarking process based primarily on industry-specific surveys influences fixed pay (Murphy, 1999). It also reflects the type and size of a firm, country and/or citizenship of the executive. The combination of compensation consultants and board committees plays a part in the widely recognised “ratcheting up” of executive salaries (Murphy, 1999; Bebchuk and Fried, 2003). Companies employ outside consultants to provide pay compensation data that are most useful for justifying a higher level of pay (Bebchuk and Fried, 2003). Bizjack, Lemmon and Naveen (2008) report on the compensation committees in 100 large companies and find that 96 used peer groups to set pay up at or above the fiftieth percentile of the peer group.

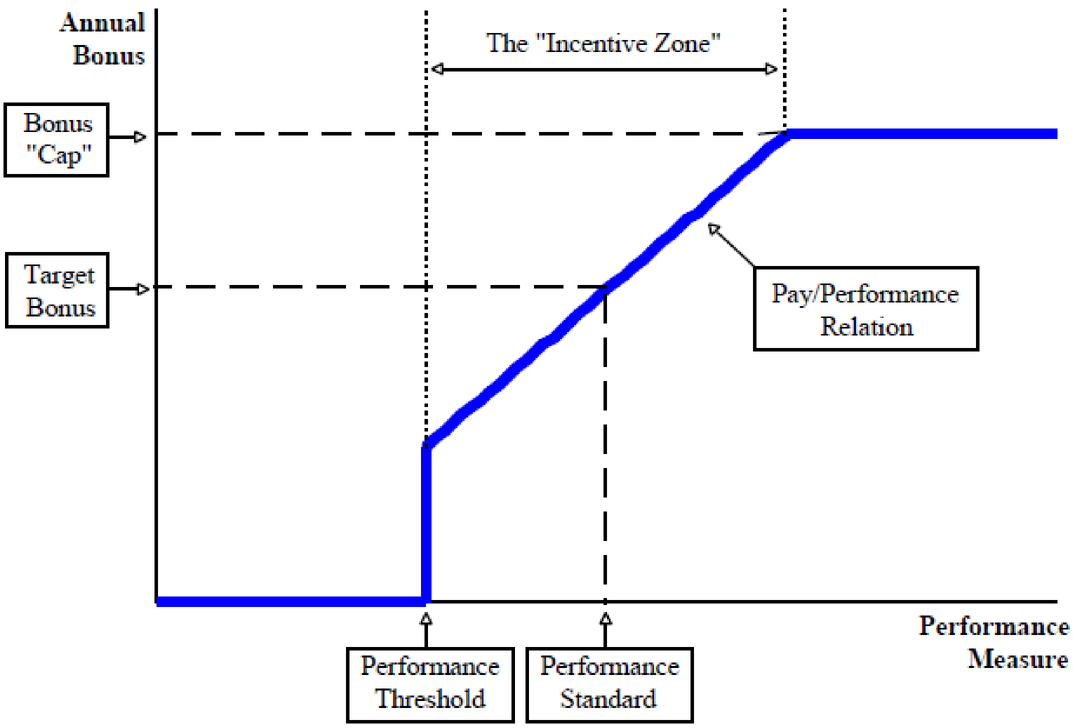
The investment banking business employs over 80% of the highest earners in the UK for whom variable pay incentives considerably outweigh fixed pay (EBA, 2011, 2012, 2015). The average salary for identified staff (risk-takers) and the ratio of variable-to-fixed pay differs significantly between institutions and across business areas. For instance, the decrease in fixed remuneration for some categories of identified staff in the EU higher earners is most likely a result of the identification of additional staff with lower remuneration levels (EBA, 2015). At country level, remuneration depends on the sector, age, gender and region. In the UK, average salaries are significantly larger in London and the South East than elsewhere in the country (ONS, 2012). In

Switzerland, pay differentials reflect whether a worker resides in a French/Italian speaking or a German-speaking region (OECD, 2013).

2.2.1.2 Bonus

Bonus pay reflects an executive's ability to achieve objectives set at the beginning of the year. The size (magnitude) of the bonus directly scales in proportion to an executive's capacity to thrive. Bonus can vary greatly among job functions, across lines of business, and between banks. Evidence is unclear whether pay incentives in the form of cash bonuses mitigate or prevent CEOs and top management teams from risk-taking. Contracts explicitly tie compensation to performance targets and do not pay out below the lower threshold or hurdle level.

Figure 2.3 Schematic representation of traditional annual bonus plan



Source: Murphy (2000)

There are several lines of research usually based on performance, the risk-taking attitude of CEOs, and on the capital structure linking banking risk factors to leverage concepts (Blundell-Wignall and Roulet, 2013). The impact of cash bonus on managerial risk-taking is puzzling. Murphy (1999, 2000) categorises executive bonus plans in terms of three components: performance measures; performance standards; and the structure of pay-performance relation. Figure 2.3 depicts a typical bonus plan. Bonus is payable only after performance reaches the minimum or hurdle threshold. The amount of bonus increases during the “incentive zone”, which may be linear, concave or convex. It is normal to express threshold performance as a percentage of the performance standard, and minimum bonus as a percentage of the target bonus. Firms pay target bonus when executives achieve the performance standard. Firms express the cap on bonus as a percentage or multiple of the target bonus (Murphy, 2000, 2013b).

Cash bonus payments can exert either a risk increasing and/or a risk reducing effect depending on whether the bank is solvent or close to default (Balachandran et al. 2010; Vallascas and Hagendorff, 2013), or whether bonus encourages executives to engage in excessive risk-taking (Bosma and Koetter, 2013) or less risk taking (Duru, Mansi and Reeb, 2005). Cash bonus based on a matrix of performance measures can either be financial and non-financial. Whereas some firms rely on single performance measure in their incentive plans, most companies use two or more measures (Murphy, 1999). Companies commonly use accounting measures, such as, revenues, net income, operating profits or economic value added. Bonus often depends on the dollar-value of profits, on profits measured on per-share basis (e.g., earnings per share, EPS), or as a margin or return (e.g., income/sales, ROA, ROE). Measurements of firm performance are often in growth rates (e.g., EPS growth). The performance standard structure as described by Murphy (1999) falls into two sub-categories: first, prior-year performance and second, economic value added (EVA) defined as the company’s cost of capital. The pay-performance structure is based on a threshold measure where bonus is capped (Figure 2.3). For instance, under a modal plan of, for example 80/120, bonus is not paid unless performance exceeds 80% of the performance standard, and bonuses are capped once performance exceeds 120% of the performance standard (Murphy 1999).

Bonus could reduce the probability of bank default (or insolvencies). Bonus may lower executives’ risk preferences because bonus is payable only in a state of solvency. Thus, bonus is an incentive to avoid bankruptcy (John and John, 1993). Bank insolvency has substantial welfare costs (Hoelscher and Quintyn, 2003). For instance, in the global financial crisis the cost of government interventions in setting up bad banks in that period (i.e. last six years) had disastrous consequences for the global economy as a whole. For instance, to March 2009, the cost of bailout in the US was equivalent to 6.8 percent of GDP. Bailout costs for the UK are 19.8 percent of GDP (Stewart, 2009; Konzelman Fovargue-Davies and Schnyder, 2010). In Germany and between 2008 and 2011, the cost of setting up bad banks was 1.8 percent of GDP. In Ireland (2008 to 2011), bailout cost exceeded 40 percent of GDP, and exceeded more than a quarter of GDP in Greece (Klaus and Schäfer 2013).

Bonus payments lower risk preferences since they depend on solvency. Executives in financially distressed banks seek to maximise the value of their firms by engaging in risk-shifting activities in a gamble for resurrection. Vallascas and Hagendorff (2013) analyse US and European banks and find that the risk reducing effect of cash bonus disappears as banks move closer to the point of default. At the most risky banks, bonus payments promote rather than mitigate risk-taking. The authors show the risk-reducing effect of bonus holds after controlling for other types of incentive pay, and CEO heterogeneity. Fahlenbrach and Stulz (2011) find that CEO cash bonus payments did not affect the performance of US banks in 2007-08. In relation to risk-taking, Bosma and Koetter (2013) find that higher pre-crisis bonus pay for bank non-CEOs did realise an increase in systemic risk-taking in-crisis.

2.2.1.3 Equity-linked pay

Option contracts are a type of financial security. There is conflicting evidence if a firm awards a share option plan to employees to incentivise risk-taking. Expectations are that high risk taking (due to pressure from shareholders) will raise short-term earnings (and increase share prices). Thus, firms use high compensation to attract talented executives with higher risk preferences. According to agency theory, the role of stock and stock options plans is to align the interests of managers and shareholders to achieve higher economic returns. There are different types of equity-linked pay: options, long-term incentive plans (LTIPs) – share plan or cash plan (deferred compensation). The discussion below refers mainly to stock and options.

Smith and Stulz (1985) find that when an executive’s total wealth is not diversified and is tied in up the firm, the executive may pass up risk-increasing positive net present value projects that would benefit shareholders. Shareholders can minimise this eminent risk-related agency problem by arranging earnings incentives to be a convex function of firm performance, by the use of stock options to make executives' expected wealth an increasing function of volatility (Hayes, Lemmon and Qiu, 2012). Hall and Liebman (1998) argue that risk averse managers with a certain amount of equity can have powerful incentives even when the fractional holdings are small i.e. a small fraction of firm value translates into a large fraction of CEO wealth. Firms can use stock option schemes to attract employees who are less risk-averse and have optimistic beliefs about their firm's prospects (Oyer and Schaefer, 2005) or to selectively attract certain types of employees (Core, Guay and Larcker, 2003).

Firms grant stock options as incentives for executives to improve firm performance though the size of rewards is often discretionary. Guay (1999) finds that stock options significantly increase the sensitivity of CEO wealth to equity risk. He shows that firms' stock return volatility is positively related to the convexity provided to managers, suggesting that convex incentive schemes influence investment and finance decisions (see also Smith and Stulz, 1985; Jensen and Meckling, 1976).

In financial firms, stock and stock options are incentives driven by variation in the value of an executive's stock holdings and portfolio holdings. Directors are attracted by the increase in stock price as a wealth maximisation process (Hall and Liebman, 1998; Jensen and Murphy, 1990a). In non-financial firms or in non-price based incentives (e.g. non-financial performance measures like innovation, sales, customer loyalty etc.), CEO incentives are not as economically large as compared with equity holdings based on price-driven incentives (Core, Guay and Verrecchia, 2003; Core, Guay and Larcker, 2003). Executives could become increasingly risk-averse in order to preserve their wealth if their equity holdings are sufficiently large. Rajgopal and Shevlin (2002) examine a sample of 117 companies in the oil and gas industry from 1993-1997 and find that stock options encourage managers to invest in higher risk, higher return projects.

The risk impact of stock based compensation on corporate decisions (e.g. on the capital structure of firms, on dividend policy and repurchases) has received a great deal of attention and contradictory insights (see Murphy, 1999; Core and Guay, 2001; Oyer and Schaefer, 2001; Core, Guay and Larcker, 2003; Mehran and Rosenberg, 2008). For insights on stock option grants linking future corporate decisions with performance, see Guay (1999), and Coles, Daniel and Naveen (2006).

Harjoto and Mullineaux (2003) examine the compensation strategies of commercial bank holding companies (BHCs) during 1992-2000. They find a strong link between growth options and CEO compensation with pay-performance sensitivities markedly larger for BHCs that participate in underwriting business. The authors also find some evidence suggesting that pay-performance sensitivities decline as return variability increases. Mehran and Rosenberg (2008) use a sample of 549 bank-years for public traded banks from 1992 to 2002. They find that stock option grants lead CEOs to undertake riskier investments. The authors demonstrate that increases in CEO and employee stock option grants result in increased bank capital levels, and argue that option grants create a contingent liability (liabilities of uncertain timing or amount) for the firm that needs to be funded in advance. Under corporate legislation, liabilities must be disclosed in a balance sheet via an explanatory note.

In the US, equity-based pay (stock and stock options) has been linked to risk-taking decisions by CEOs prior to the global financial crisis, specifically at banks that later received TARP support (Troubled Asset Relief Program) (Fahlenbrach and Stulz, 2011; Hagendorff and Vallascas, 2011). Cheng, Hong, and Scheinkman (2015) investigate the link between compensation and risk-taking in financial firms during 1992-2008. They find a positive relation between equity-based pay and risk-taking. Cheng et al. (2015) explain that the positive relation between total CEO pay and stock price volatility is not due to corporate entrenchment per se but rather because of a higher demand for risk by institutional investors. The authors conclude that there is important heterogeneity across firms in risk-taking behaviour with persistent compensation practices that emphasize short-term pay in the form of bonus and options. In contrast, Dold and Knopf (2012) find that higher stock and option awards to CEOs reduced the likelihood of failure of institutions during 2008-2010. Their sample includes 766 public traded banks and thrift institutions (a financial institution focusing on taking deposits and originating home mortgages) in the US.

DeYoung, Peng and Yan (2013) use two proxy measures to examine CEO incentives at large US commercial banks between 1994 and 2006. Pay-performance sensitivity (delta) is the change in CEO wealth with respect to changes in the bank's stock price, and pay-risk sensitivity (vega) is the change in CEO wealth with respect to changes in stock return volatility. CEOs take more risk in response to contractual risk-taking incentives. DeYoung et al. (2013) claim bank boards changed CEO compensation to encourage executives to exploit new growth opportunities created by deregulation and debt securitization. Consequently, CEOs took more risk.

DeYoung et al. (2013) claim that there is little difference in how large industrial firms and large commercial banks rewarded top executives in the 1990s and early 2000s. They suggest that boards gave bank CEOs the incentives necessary to exploit new growth opportunities in the markets. The absence of disciplining macroeconomic stress at this time allowed risk to build up on the balance sheets of both banks and borrowers. The bursting of the housing bubble in the US did expose the risks. They conclude that on average during 1995-2006, banks in which the CEOs had high pay risk sensitivity (high vega banks) had substantially larger amounts of both systematic and idiosyncratic risk. They attribute higher risks to the shift from a traditional commercial bank business model to a modern model relying on innovative financial products. This argument is consistent with claims of a direct correlation between banking sector deregulation and the global financial crisis (Reavis, 2009).

2.2.2 Risk-taking by banks

Banks as levered firms tend to encourage excessive risk-taking aimed towards maximizing shareholders' wealth. A strand of literature considers the reform of incentive structures and advocates tying pay to realised long-term firm performance (Bebchuk and Spamann, 2009; Bebchuk and Fried, 2010a; Bebchuk, 2010). Others advocate increasing the amount of inside debt (deferred compensation) in total pay (Edmans and Liu, 2011; Srivastav, Armitage and Hagendorff, 2014; Bolton, Mehran and Shapiro, 2015; Bennett, Guntay and Unal, 2015; Van Bekkum, 2016). The regulatory response has focused on curbing excesses. Regulators in the US have introduced mandated deferrals of performance-related pay with explicit malus and clawback provisions.[3] Regulators in the EU in addition have introduced a bonus cap on the ratio of variable-to-fixed pay (Murphy, 2013b; Kleymenova and Tuna, 2015).

Risk propensity differs across executive roles and jurisdictions. Following the global financial crisis, regulatory bodies are identifying and assessing material risk takers whose professional activities have material impact on firm risk profiles (EBA 2013a; 2013b). In the EU, revisions of corporate governance codes include developments in

[3] Malus is the forfeiture of all or part of a bonus or long term incentive award before it has vested and been paid. Clawback is the recovery of variable remuneration, which has already been paid.

executive compensation arrangements. Until the mid-2000s, for instance, disclosure requirements on options grants to executives were largely discretionary in some EU countries, which is challenging for remuneration studies (EBA, 2014). In Europe, "the comply or explain approach" (a government regulation that lets the market decide if a set of standards is appropriate for individual firms) is widely used (e.g. in the UK, Germany, and the Netherlands). However, EU recommendations have proved insufficient to encourage boards to monitor and prevent excessive risk-taking (Kirkpatrick, 2009). Studies on non-CEO board member behaviour/profile are in the infancy. This chapter includes the full C-suite of executive officers, addressing individuals with influence in banks' decision-making processes. Previous work suggests that executives other than CEOs affect the performance of firms (Custódio and Metzger, 2013; Nguyen, Hagendorff and Eshraghi, 2015).

Studies of executive compensation find increases in executive pay are associated with a heavier weighting of incentive pay, especially stock and options (Jensen and Murphy, 1990a; Murphy, 1999; Barro and Barro, 1990; Hall and Liebman; 1998; Demsetz and Saidenberg, 1999; Core, Guay and Larcker, 2003). However, tying executive pay to the value of the firm (shareholder wealth indicating performance) could exacerbate risk-taking behaviour.

The combination of low salary-high variable pay had been common practice at investment bank partnerships in the 19th and 20th centuries (Morrison, 2010). Salary was kept below the competitive market level and variable pay took the form of a cash bonus based on realised profits. This pay structure would keep remuneration low in years of low profitability rather than as act as an incentive. Since cash bonus is larger during years of higher profitability, and tends to zero when profits fall, compensation is cyclical, and conditional on bank solvency. The principle remained after investment banks began to convert from partnerships to public companies in 1970-71 (Morrison, 2010). However, developments in compensation policy saw banks increasingly using stock, restricted stock and stock options as incentive pay with cash bonus losing its former significance. Furthermore, financial deregulation meant that banks could combine investment banking and commercial banking under one roof. An unintended outcome of universal banking is that the investment banking pay model seeped into commercial banking where it is not as appropriate (Murphy, 2013b). Larger proportions of executive pay now depend on stock price movements that also affect accumulated wealth. Some question the effectiveness of the association between incentive pay and firm performance. Firm stock prices could rise due to positive developments in the economy rather than because of the efforts of CEOs and executives. This suggests executives could obtain “windfall” benefits due to luck and not skills and effort (Bertrand and Mullainathan, 2001; Fahlenbrach and Stulz, 2011; Beltratti and Stulz, 2012).

Notwithstanding, the value of a firm should reflect the impact of C-suite executives, because executive decisions matter for the economic outcomes of a firm, especially if the firm is large and complex. In support of this line of reasoning, Larker, Miles and Tayan (2014) contend that the board should be heavily involved in succession planning. To make an informed decision, management should possess a range of behavioural attributes (such as, ethics, cultural fit, work style, risk tolerance, competitiveness, and leadership) beyond the skills and experience required.

An emerging body of research examines the evolution of executive compensation. It suggests that the financial sector has become a high-skill-wage industry (Philippon and Reshef, 2012); the rise in CEO compensation is driven by large complex enterprises; and talent is the most important trait to hire and retain executives (Gabaix and Landier, 2008; Cremers and Grinstein, 2013; Ellul and Yerramilli, 2013; King, Srivastav and Williams, 2016). On the other hand, large-scale retention of earnings (often identified as excess pay) encourages risk-taking behaviour. Shareholders, especially institutional investors, often pressurise CEOs to take higher risks in expectation of boosting short-term earnings (and raising stock prices). Executives that own significant amounts of vested stock and options have a strong incentive to take actions to increase short-term profits and benefit by liquidating their holdings at the higher (stock) price. Compensation based on short-term performance might indicate aggressive risk-taking that is a product of flawed incentives (Bebchuk and Spamann, 2010; Bebchuk, 2010).

Bhagat and Bolton (2014) propose the managerial incentives hypothesis that incentives can create risk-taking that benefits executives over shareholders. If the weighting of executive pay is heavy in stock and stock options and the vesting period is long, executives will identify more closely with creating long-term shareholder value. In contrast, if the vesting period is short, executives have an incentive to concentrate on short-term earnings at the expense of long-term value. Bhagat and Bolton (2014) examine the buying and selling activity of CEOs in their own bank's stock over 2000-08. CEOs at 14 too-big-to-fail banks receiving TARP support had cash inflows of $1,771 million from their net trades. Together with cash compensation (salary and bonus) over the period, the payoff to this group of CEOs stood at $2,662 million, which is the money "CEOs took "off the table" as their banks continued with the high risk but negative net present value trading/investment strategies during 2000–2008. However, the high risk but negative net present value trading/investment strategy would ultimately lead to a large negative outcome — namely, the large loss of $2,013 million in 2008" (Bhagat and Bolton, 2014, p. 324). Bebchuk, Cohen and Spamann (2010) use a similar exercise for the failed Bear Stearns and Lehman Brothers. For the top five executives, remuneration from equity sales and bonus received over 2000-08 stood at around $1.4 billion (Bear) and $1 billion (Lehman), which is approximately $250 million per executive. The CEOs took more: James Cayne (Bear) and Richard Fuld (Lehman) received around $380 million and $520 million, respectively. The evidence strongly supports the managerial incentives hypothesis that incentives do matter; and there is a correlation between incentives generated by executive compensation contracts and excessive risk-taking by banks.

2.2.3 Director heterogeneity

There are complex factors of cognition, culture and risk-taking attitudes and behaviour that influence boardroom composition and the effectiveness of a firm. Yet, there is limited empirical evidence on the role of board diversity in determining firm performance. Hagendorff (2015) reviews two arguments: ethical and economical. The ethical approach centres on promoting equality of opportunity for all irrespective of age, race, sex and other biographical attributes. The economic approach of diversity (even though vague) centres on the fact that heterogeneity enhances the functional ability of the board; for example, its ability to engage in complex problem solving, decision-making, and management monitoring (Forbes and Milliken, 1999).

Anderson et al. (2011) study board heterogeneity (i.e., differences in director education, experience, profession, gender, ethnicity and age), using 1000 industrial firms for 2003 and 2005. They find that board heterogeneity is aligned with managerial power and is directly related to the complexity of the firm. Boards are more heterogeneous at firms characterised by greater operational intricacy, although powerful CEOs appear to restrict heterogeneity. On the other hand, heterogeneity may not improve board efficacy and performance. Furthermore, Anderson et al. (2011) find that occupational heterogeneity (based on director education, experience and profession) seems to be more sensitive to firm performance than social heterogeneity (based on gender, ethnicity and age).

Board composition, function and impact are endogenously determined by the structural setting in the firm (Adams, Hermalin and Weisbach, 2010; Pathan and Skully, 2010). Pathan (2009) finds that board structure is an important determinant of risk-taking by banks based on a sample of 212 large US BHCs over 1997 to 2004. Stronger bank boards (smaller boards, reflective of shareholder interests) are positively associated with risk-taking whilst board independence is not, which possibly reflects the role of independent directors in balancing interests of shareholders and other stakeholders. However, more powerful bank CEOs mitigate risk-taking arguably on grounds that their wealth is undiversified. Pathan and Faff (2013) study US BHCs over 1997 to 2011 and conclude that board size and board independence are associated with weaker bank performance. CEO power could originate from two sources: duality, that is, when CEO chairs the board (Hermalin and Weisbach, 1998); if the CEO is internally hired (Adams, Almeida and Ferreira, 2005). Powerful dual CEOs can adversely affect the monitoring function of the board by restricting the flow of information to other directors, which limits the board's independent oversight of management. An internally hired CEO may influence the board decision-making process (Pathan, 2009).

Adams, de Haan, Terjesen and van Ees (2015) review literature on board diversity. Whilst diversity can improve board independence and in turn the effectiveness of the monitoring function, it can lead to higher decision-making costs and increase the likelihood of conflicts between members. Therefore, the effects of diversity on firm performance are unclear. Nevertheless, the make-up of boards is relatively stable with boards tending to be homogenous. Westphal and Zajac (1995) investigate whether increased demographic similarity affects the decision-making of boards with respect to CEO compensation. Using data on 413 Fortune/Forbes 500 companies from 1986 to 1991, Westphal and Zajac find that a greater demographic similarity between CEO and board is likely to lead to generous CEO compensation contracts.

The likelihood for appointing an individual to a board appears contingent on the social compatibility of the appointee with powerful actors in the firm. Powerful CEOs are likely to appoint new board members who are demographically similar. Social compatibility could include demographic similarities, and shared functional and socio-economic background (Westphal and Zajac, 1995).

There is little empirical evidence on non-CEOs' demographic distinctions. This chapter identifies a range of biographical traits of C-suite executives and investigates the effect on remuneration. A combination of income, occupation and education are conceptualized in the psychological literature as the social standing based on privilege, power, and control (Rijsenbilt, 2011). Hillman (2015) argues that much of the work on diversity might benefit from studies of ethnicity, nationality, and functional types. This fact makes this chapter more appealing.

2.2.4 Occupational heterogeneity

There is scarce information on the leadership skills of top management teams. CEOs can exercise power across a wide spectrum of decisions, such as, remuneration, corporate strategy, operations, acquisitions, organisational design, culture and governance (Finkelstein, 1992; Larcker and Tayan, 2012). Finkelstein (1992) identifies four spectrums of power: structural power, ownership power, expert power and prestige power, which are not mutually exclusive. These intertwined relations of power derive from the position (or amount of titles) that an executive occupies in the organizational hierarchy to the size of equity stake or voting rights, press mentions, quality of educational experience, and outside affiliations (Finkelstein, 1992; Larcker and Tayan, 2012). The discussion should not ignore the fact that other top executives can significantly influence board decision-making (Bebchuk and Fried, 2004).

Results on the effect of powerful CEOs on firm performance are mixed. There are positive and negative socio-economic aspects on persons exerting influence in the boardroom. A powerful CEO has the potential to abuse the position and to extract personal benefits or engage in excessively risk-taking activities (Larcker and Tayan, 2012). Adams, Almeida and Ferreira (2005) find that firms run by powerful CEOs have greater variance in performance, which is a type of risk for investors and employees (Larcker and Tayan, 2012). Adams et al (2005) identify powerful CEOs in both the best and worst performing firms and suggest that the interaction between executive characteristics and organizational variables has important consequences for firm performance. Belliveau, O'Reilly, and Wade (1996) find that CEOs with greater social similarity and status relative to other board and compensation committee members tend to receive larger compensation packages. Equally, compensation is higher when directors are beholden to the CEO for their position (Core, Holthausen, and Larcker, 1999).

Normally, incumbent CEOs are heavily involved in succession planning for top executives. CEO succession planning is among the most important issues facing board of directors, along with strategy risk management and executive compensation. Indeed, succession planning requires the board to be heavily involved in selecting potential candidates. However, selection of the next CEO is still under the preference of the assigned actual CEO (Larcker, Miles and Tayan, 2014).

In fact, there is mounting evidence that corporate decisions of CEOs as well as non-CEOs play a part in the success and/or failure of financial institutions (Reavis, 2009). Feng, Ge, Luo and Shevlin (2011) examine CFO account manipulation in a sample of 86 firms between 1982 and 2005 based on AAERs (Accounting and Auditing Enforcement Releases) issued by the SEC. Their results demonstrate that CFOs who manipulate accounts do so under pressure from CEOs who orchestrate the manipulation. In comparison to CEOs at non-manipulating firms, CEOs at manipulating firms have higher pay-for-performance sensitivities and equity incentives, they hold a larger share of the total remuneration of the five highest paid firm executives, and their power stems from duality. Feng et al (2011) find little difference between CFOs at manipulating firms and non-manipulating firms. CFOs at manipulating firms bear the costs of enforcement, which can include dismissal, debarring from office, in addition to financial penalties arising from criminal charges, yet they do not benefit from their actions in financial way. Chava and Purnanandam (2010) examine the importance of CEO and CFO power on corporate risk-taking decisions. Whereas CEOs and CFOs significantly influence their firms' financial policies, CFOs' risk-decreasing (-increasing) incentives are associated with safer (riskier) debt-maturity choices and higher (lower) earnings smoothing through accounting accruals.

Aebi, Sabato and Schmid (2012) examine if risk-management corporate mechanisms of governance, such as the presence of a CRO, and whether the CRO reports to either the CEO or board, affected bank performance in 2007-08. Banks in which the CRO directly reports to the board and not to the CEO show significantly higher (less negative) performance in terms of stock returns, ROA, and ROE in-crisis. Ellul and Yerramilli (2013) study the strength of risk management and performance of 74 large US BHCs from 1995 to 2010. They construct a risk management index (RMI) and find that banks with high RMI value have lower tail risk (less risky) and better performance (higher ROA). Their evidence suggests a strong and independent risk management function can kerb risk exposure at banks. Although the literature has established a connection between governance characteristics of executives and their influence on bank success (failure), few studies investigate all C-suite officers. An exception underlines the importance of examining all executive. Berger et al (2016) show that non-CEO stockholdings have a direct impact on bank failure; higher equity holdings induce non-CEO managers to take high risks due to moral hazard incentives. However, the study is US-centric and period of analysis relatively short.

2.2.5 Firm size

Prior literature reports a positive relationship between firm size and wage premium (Oi and Idson, 1999; Ang, Lauterbach, and Schreiber, 2002; Coles, Daniel and Naveen, 2008; Gabaix and Landier, 2008; Cremers and Grinstein, 2013). Ang et al (2002) examine the remuneration of top management teams at 166 US banks from 1993 to 1996. In addition to depending on hierarchical rank order and firm performance, firm size does affect executive compensation. Oi and Idson (1999) report that the size-wage premium relation, is larger for males and at US firms. Larger firms demand higher quality labour in terms of tenure and education, and effort. This implies that larger firms require diversity in human resources (Diversity Report, 2013). A behavioural explanation contends that larger firms match productive employees with able entrepreneurs to minimise the sum of wages and monitoring costs. Larger firms use compensation policy to deter shirking behaviour, and compensation policy is discretionary to allow the board to share rents. A productivity explanation contends that larger firms set higher performance standards to raise productivity. Productivity growth, however, requires a wage premium as an incentive (Oi and Idson, 1999).

Larger complex firms drive the growth in CEO compensation. In choosing a CEO, the board must balance the skills and experience needed to run the firm with attributes associated with behavioural traits. Attributes include ethics, cultural fit, work style, risk tolerance, competitiveness and leadership (Larcker and Tayan, 2010). The attributes the board favours reflect the corporate practices and identity of the firm, which implies there is an association between the size (and age) of a firm and its compensation policy. Indeed, the traits are the most valuable element in the employment relationship as firms increase in size (Gabaix and Landier, 2008; Cremers and Grinstein, 2013). Whilst larger firms demand high quality employees, the ever-increasing CEO premium reached 183 times the average employee in 2014 (High Pay Centre, 2015). This suggests that the structure of executive compensation is beyond the principle of pay-for-performance.

Larger banks tend to be more complex and often are engaged in substantial cross-border operations (Focarelli and Pozzolo, 2000). Selection effects are important as these banks demand high-quality employees, and suitably qualified individuals with an appetite for risk wish to work for them. This feeds into compensation. Yet, Berger, DeYoung, Genay and Udell (2000) note the possibility of operational diseconomies of distance, which suggests costs increase the further away is a bank subsidiary from the home-country headquarters. Arguably, efficient banks from competitive and well-regulated home markets are more likely to export these efficiencies and outperform domestic banks. Nevertheless, the complex operations of larger banks pose challenges in terms of monitoring due to potentially bigger agency problems.

2.2.6 The outrage constraint

Murphy (1986), Jensen and Murphy (1990a), and Adams and Giannetti (2012) note the importance of a breach of the outrage constraint. Typically, corporate scandals and/or financial crises result in political intervention and acts of reform (see Murphy, 1999, 2012). Correa and Lel (2016) consider the effect of say-on-pay laws on a sample of firms in 38 countries from 2001 to 2012. Passage of say-on-pay laws realises a decline in CEO pay growth rates and improvement in pay-for-performance sensitivity. Impact is greater at firms with high excess pay, a tradition of shareholder dissent, lengthy tenure of the CEO, busy (multiple role) and less independent boards prior to legal changes. The proportion of total executive remuneration captured by the CEO is lower after the passage of say-on-pay laws.

Sheehan (2007) and Kollewe and Davies (2016) offer supporting evidence. Sheehan states that the advisory vote on the Directors' Remuneration Report in the UK provides empirical evidence on the effect of the outrage constraint on subsequent remuneration arrangements for FTSE 100 companies for the first 3 years of vote (2003 to 2005). In May 2016, US investors rejected the remuneration plan of Goldman Sachs; 51.9 percent of shareholders at Deutsche Bank voted against a new pay scheme for top managers (Kollewe and Davies, 2016). It appears that compensation arrangements are becoming more visible to investors and shareholders. It has been suggested that in the past shareholders did not take into account all available information on executive remuneration (as long as revenue is maximised), and that firms use camouflage such that the media generally quotes annual compensation and ignores deferred compensation and other benefits. Bebchuk and Fried (2004) provide evidence that firms work to disguise the magnitude of CEO pay, which demystifies optimum contract theory.

2.3 Hypothesis development

This chapter investigates trends in, and determinants of, executive pay using a unique dataset of 71 banks from 10 countries from 1999-2013. In recognition of possible heterogeneity across the 71 banks, an initial step groups the banks into three cohorts. The first cohort includes G-SIBs (global systemically important banks), which the Financial Stability Board (FSB) identifies as posing a potential threat to systemic risk. These banks are the largest and most complex banking firms in the world. The G-SIBs cohort includes 23 (of 30) banks reported in the most recent FSB list (30 November 2015). The cohort comprises US and EU banks. Geography defines the second and third cohorts. The second cohort includes EU banks (from eight EU member states and Switzerland) and US banks make up the third cohort. This study will determine if executive compensation is comparable (differs) across cohorts irrespective of executives' professional status, which leads to hypothesis 1:

Hypothesis (1): Executive pay is comparable between cohorts across 1999-2013

Hypothesis (1a): Executive pay at G-SIBs differs from EU banks

Hypothesis (1b): Executive pay at G-SIBs differs from US banks

Hypothesis (1c): Executive pay at EU banks differs from US banks

The analysis initially uses pairwise comparisons of means to determine if there are significant differences in executive pay between banks during 1999-2013. The analysis extends beyond total pay to consider compensation structure and associated incentives. Therefore, the chapter repeats pairwise comparisons for total annual compensation (total pay), fixed pay (salary), cash compensation (salary plus bonus), equity-linked pay, variable pay (bonus plus equity-linked pay), total accumulated wealth, and the ratio of variable-to-fixed pay.

Studies document that executive pay practices vary between firms, industries and countries and across time. Levels of executive pay fell during the Great Depression of the 1930s and remained flat until the 1970s. Since then, executive pay has increased substantially albeit with widening disparities, and firms have made increasing use of incentive pay to reward executives (Murphy, 1999; Demsetz and Saidenberg, 1999; Frydman and Saks, 2010; Frydman and Jenter, 2010). The discussion above suggests that deregulation exacerbated trends in executive compensation in the financial sector (Philippon and Reshef, 2012; Kaplan and Rauh, 2010). Nevertheless, evidence is suggestive of poor remuneration practices before and during the global financial crisis especially at banks afflicted by weak financial performance (Bebchuk and Spamann, 2009; Bebchuk, 2010; Financial Services Authority, 2010, p.8; McKee and Monteleone, 2010). Events suggest that executive pay could show intertemporal variation that in turn could affect firm performance.

The period 1999-2013 includes three intervals that proxy for distinctive economic cycles (i.e. pre-crisis, 1999-2006, the boom period; an in-crisis event, 2007-09; and post-crisis, 2010-2013, a period of partial recovery). In a boom, the financial sector tends to grow richer and more influential as reductions in regulation result in improvements in financial sector profitability albeit at the expense of greater crisis risk for society (Reinhart and Rogoff, 2011). In this context, executive pay awards should align with the economic cycle and reflect a competitive equilibrium in the market for managerial talent. The structure of compensation contracts should include sufficient incentives for executives to maximise firm value. Similar to events in the 1930s, expectations are that executive compensation falls in-crisis. Whilst pay levels could rise post-crisis, the extent of any rebounding is uncertain and likely to vary across banks. This leads to the formulation of the following hypotheses:

Hypothesis (2): Executive pay does not show intertemporal variation.

Hypothesis (2a) Executive pay is sensitive to crisis events, that is, pay falls between 1999-2006 and 2007-09.

Hypothesis (2b) Executive pay recovers at a slow pace, that is, post-crisis pay (2010-13) is below pre-crisis (1999-2006).

Hypothesis (2c) Executive pay rebounds in recovery, that is, post-crisis pay (2010-13) exceeds crisis levels (2007-09).

Pairwise comparison tests will evaluate the hypotheses. The tests will apply to total pay and its constituents plus total accumulated wealth.

The next set of hypotheses considers the effect of professional status on executive compensation. Ang et al (2002) establish that the compensation of top management teams in banks depends on hierarchical rank order. Hambrick (2007) draws from the upper-echelons perspective (Hambrick and Mason, 1984) that executives' background characteristics affect their interpretation of situations. In turn, interpretation affects choices that influence firm performance and total pay. Carpenter, Geletkanycz and Sanders (2004) emphasise the importance for the firm to consider the universality of top management teams for three reasons. First, the strategic choices made in firms reflect the values and cognitive bases of powerful actors. Second, the values and cognitive bases of such actors are a function of observable characteristics such as education and experience. Third, significant outcomes are associated with observable characteristics of those actors.

Section 2.2.3 discusses director heterogeneity. It notes that heterogeneity enhances the functional ability of the board to solve complex problems and engage in effective strategic decision-making (Forbes and Milliken, 1999). It also highlights benefits of diversity including promotion of equality of opportunity (Singh, Vinnicombe and Johnson, 2001). Advantages of greater diversity include wider access to talent, better market intelligence, and enhanced innovation nurtured by collective difference (Hunt, Layton and Prince, 2015). Furthermore, well connected firms or individuals learn from the experience of others. Sharing information about strategies can have an effective impact on firm performance and minimise the complexities of managing larger banks.

Section 2.2.5 introduces the executive-level and bank-level variables used in this chapter to control for the relationship between total pay and professional status. Biographical characteristics and intrinsic differences in corporate governance vary between executives within firms and between firms. Variation may depend on geographical location and cultural differences. Bank financial profile is highly dependent on economic environment and may dictate employee behaviour.

The discussion of heterogeneity leads to the formulation of the following hypotheses:

Hypothesis (3): Executive earnings do not vary across professional status.

Hypothesis (3a): Executive earnings vary by professional status at larger, complex banks i.e. G-SIBs.

Hypothesis (3b) Executive earnings vary by professional status at EU banks.

Hypothesis (3c): Executive earnings vary by professional status at US banks.

An emerging strand of literature considers the impact of biographical characteristics, such as, age, education, experience, tenure, ethnicity, power and networking.[4] Since there is little evidence on non-CEO bank executives, the analysis will focus on explaining peculiarities in executive earnings resulting from executive-level and bank-level factors. This leads to the formulation of the following hypothesis:

Hypothesis (4): Director and bank-level factors affect executive pay in banking.

2.4 Sample and Dataset

2.4.1 Sample of firms and dimensions of data

This section discusses the dataset constructed to perform the empirical analysis associated with the research aims and objectives. The dimensions of the data comprise executive *i* of bank *j* at time *t*. There are several constraints to constructing a sample of banks to investigate executive compensation arrangements. The study

[4] See, for example, Adams, Hermalin and Weisbach (2010); Shakir (2009); Anderson et al (2011); McNulty, Florackis and Ormrod (2012); Cabo, Gimeno and Nieto (2012); Palvia, Vähåmaa and Vähåmaa (2014); Nguyen et al (2015); King, Srivastav and Williams (2016); Sila, Gonzalez and Hagendorff (2016); Estélyi and Nisar (2016).

requires inter-temporal information on executive officers. The information should yield the title or position within a bank of each executive. Indeed, one contribution of this study arises from considering executives other than the CEO. The BoardEx database is the principal source of executive-level data. The choice of sample banks reflects availability of data, notably the compensation of individual executives. Utilising search criteria within BoardEx identifies banks for which executive compensation data is available. Ultimately, this limits the sample to a selection of banks from the US and Western Europe. Nevertheless, it is possible to identify the level and structure of executive compensation at banks from 1999 to 2013. BoardEx supplements compensation data with information on the biographical characteristics of bank executives. The information relates to an executive's experience (time in company, position, board), age, gender, nationality and education. In cases of missing observations, internet searches obtain the information wherever possible. I complete the construction of the dataset by sourcing firm-level data from the BankScope database, which contains the annual financial statements of banks. The final step is to collate the data sourced from different databases and deflate all monetary values into pounds sterling at 2013 prices using the UK GDP deflator from the ONS (Office for National Statistics).[5]

The original dataset includes executive-level information on 71 banks. The sample banks are from ten different countries and they employ executive directors from 47 countries. Some of these firms provide financial services in more than 80 countries and their asset size ranges from £106 million to £2.6 trillion. Of the sample, 52.34% (34 banks) reside in the US and 47.66% in Europe. Of the European banks, 12.84% are British (14 banks) with the remaining firms located in France (4 banks), Germany (4 banks), Ireland (2 banks), Italy (5 banks), The Netherlands (2 banks), Spain (3 banks), Sweden (1 bank) and Switzerland (2 banks). Due to bank failures along with mergers and acquisitions, the panel is unbalanced.

The sample includes 23 of 30 banking firms, which the Financial Stability Board currently (as at November 2015) classifies as global and systemically important banks (G-SIBs). Herring and Carmassi (2015) explain that in the aftermath of the 2007-09 crisis, an early action of the G20 Group of Countries was to transform the

[5] The GDP deflator is the ONS Quarterly National Accounts implied deflator at market prices, series L8GG. http://www.ons.gov.uk/ons/datasets-and-tables/data-selector.html?cdid=L8GG&dataset=qna&table-id=N

Financial Stability Forum into the Financial Stability Board (FSB), and to confer responsibility on the FSB to identify global systemically important banks, which commentators deemed to have become too-big-to-fail (TBTF).[6] G-SIBs are large complex, diversified banking groups: sixteen have headquarters in Europe, eight in the US (with three in Japan and one in China). On average in 2015, the balance sheet total of a G-SIB was around £1,026,896 million with the largest banks around £1.48 trillion (HSBC and Barclays in the UK; BNP Paribas and Crédit Agricole in France; JPMorgan Chase and Bank of America in the US; and Deutsche Bank in Germany). Statistics help to illustrate the complexity of the G-SIBs, which, on average in 2015 have 90 shareholders and 2,084 subsidiaries. The international dimension of the G-SIBs is best gleaned from the percentage of assets they hold in foreign subsidiaries (a mean of 42%) and the percentage of net revenues sourced from foreign subsidiaries (a mean of 49%) (source: BankScope).

To account for the obvious heterogeneity in the sample, binary indicators identify the three cohorts of G-SIBs, US banks (excluding US G-SIBs) and EU banks (excluding EU G-SIBs and including Swiss banks).

2.4.2 Categorisation of professional status for executives

The makeup of the dataset comprises five stages of construction and compilation. The dataset construction process begins by identifying a sample of suitable banks. The second stage identifies director profile and individual roles. BoardEx reports the profile of executives and their individual roles within a bank. It identifies whether a director is an executive director (ED) or a supervisory (independent) director (SD). BoardEx defines an executive director as a full time employed individual who belongs to the company's board of directors. A supervisory director is a non-executive director sitting on the board yet is not an employee of the company. Mostly in the case of US banks, BoardEx also reports on disclosed earners some of whom it identifies also as an executive director. This chapter treats disclosed earners as executives nominally because a full set of compensation information is available. In a limited number of cases, for instance, a Dutch bank for one year only, a European

[6] Previously, the Bank of England and the IMF had identified 16 Large Complex Financial Institutions (LCFIs) (Herring and Carmassi, 2010). In April 2009, the Financial Stability Board replaced the Financial Stability Forum (founded in 1999). The FSB identified 28 financial firms it considers G-SIBs based on five categories: size, interconnectedness, lack of readily available financial institution infrastructure, global (cross-jurisdictional) activity, and complexity (Herring and Carmassi, 2015). As of November 2015, the list contains 30 G-SIBs.

bank shows a disclosed earner. The dataset contains executive-year information on 14,279 directors: 3,889 are executive directors and 10,390 are supervisory directors.

A careful process manually checks the names of each executive. For some executives, BoardEx may specify an abbreviation of a first name in one year and the full name the next. Anthony (Tony) Di Iorio held the position of CFO at Deutsche Bank in 2007; Tony Di Iorio appears as a supervisory director at Barclays in 2013. In the absence of the manual checking process, this one individual would twice enter the dataset due to the inconsistency in recording his first name, which is unavoidable if BoardEx transcribes information as reported in company annual reports. A similar problem occurs when an executive receives a title or a female executive marries. The use of accents in non-English names presents a challenge. Although BoardEx contains numerical identifiers for executives, manual checking of each director ensures accuracy.

The dataset identifies executives belonging to the C-Suite of banks. The letter “C” stands for Chief, which identifies the rank-order of executives within the firm. This study identifies the specific roles of the chief-officer function. The large, complex make-up of the sample banks recognises that management hierarchies differ due to institutional and cultural peculiarities. The process of classifying specific C-suite roles to particular executives is not straightforward. BoardEx uses 344 director titles and reports the title used in a bank’s annual report. It does not use homogenous titles, which leaves the task of establishing comparativeness to the researcher.

Whereas may appear straightforward to identify a CEO, there are instances when this task is difficult. For instance, the dataset begins in 1999 and runs through to 2013. For some European banks in the earlier years, it was common for an annual report to refer the leading bank executive as a “Managing Director”. The terminology of some roles in the C-Suite like the Chief Financial Officer (CFO) appears to be relatively recent at some banks. Formerly, the descriptor for this role might be “Financial Director”. Other examples include the use in the early years of the dataset of “Company secretary”, which could later become Chief Legal Officer, or “Director – HR”, which could become Chief Administrative Officer. To simplify the intricacy of roles found in BoardEx, a sorting of data on individual executives, reveals whether the terminology of the description of their roles changes over time. A crosschecking manual process remedies any inconsistencies in the description of the role of an executive. This process identifies what turns out to be ten professional status dummy variables, which signal equivalence in roles across banks.

This chapter identifies the head of a bank's senior management team as the CEO. Whilst it is good corporate governance practice for a bank not to combine the CEO role with another senior role, there are instances of duality that combine the roles of CEO and Chair. One should note also the combination of the roles of CEO and bank president, and even the triple combination of CEO-Chair-President, which is a feature more common at US banks. Since the global financial crisis, and under the pressure of political, public and legal scrutiny, several large US banks did separate the roles of CEO and Chair.

The categorisation of "professional status" uses a vector of binary variables ranging from one to ten to identify specific C-Suite roles based on the various descriptors found in BoardEx. The roles are Chair; Chief Operating Officer (COO); Chief Financial Officer (CFO); Chief Administrative Officer (CAO); Chief Risk Officer (CRO) and Chief Legal Officer (CLO). It is not possible for this categorisation to classify accurately the many distinct role titles in BoardEx: for example, classifying a "regional CEO" from a "division CEO", or comparing a "vice-president" at a US bank to an executive at a European bank. Therefore, this study uses a procedure to categorise hard-to-classify roles based on the total remuneration of an executive. On the premise that senior executives earn more, this study classifies "senior management", "middle management", and "junior management" as executives with total remuneration above or equal to the 75th percentile, below the 75th but above the 25th percentiles, and below or equal to the 25th percentile.

The third feature of the dataset is information on director experience and cultural profile. Specifically, BoardEx is the source of the following executive-level data: (a) age (in years); (b) tenure (in terms of (i) time in role; (ii) time on board; and (iii) time in organisation); (c) number of qualifications; (d) gender and (e) nationality. The variables are key characteristics pertaining to board diversity that varies not only across countries but also between and within banks.

BoardEx is the source of data on the level and structure of executive remuneration. For each executive, BoardEx provides a value for Total Annual Compensation or total pay. The constituents of total pay are (1) total direct compensation, which comprises payments relating to salary, bonus, defined contribution (D.C.) pension, and other benefits; and (2) total equity-linked compensation, which comprises the value of shareholdings, long-term incentive plans (LTIPs), and intrinsic shares under option and estimated shares under option. In addition, BoardEx provides information on the accumulated wealth of an executive, and divides accumulated wealth into the same constituent parts as equity-linked compensation. Although it appears that an exhaustive amount of pay-related data is available for the executives at our sample banks, this is not the case. To explain, the structure of executive pay exhibits both intertemporal and cross-border heterogeneity. Whereas it is common for banks in the US to remunerate executives with option contracts, this practice is largely uncommon at banks in many European countries at least until relatively recently, with the UK being a notable exception. Differences in pay structures, particularly in terms of equity-linked pay, reflect not only differences between countries but also differences in disclosure requirements pertaining to executive remuneration, which also change on an intertemporal basis. Murphy (2013a) and Conyon, Fernandes, Ferreira, Matos and Murphy (2011) explain in detail the evolution of executive pay in the US and Europe, respectively.

In the light of recent regulatory developments in Europe, we adopt a backward-looking approach and define fixed pay as equivalent to the salary value obtained from BoardEx. For robustness, cash compensation is a second measure of fixed pay and equals the sum of the values from BoardEx for an executive's salary and bonus. The value that BoardEx provides for equity-linked pay plus bonus is a measure of variable pay. In addition to fixed and variable pay, we gather information whenever possible on the accumulated wealth of bank executives. BoardEx defines wealth as the value of cumulative holdings over time of stock, options and LTIPs, and it includes a measure of the liquid wealth of individual executives. However, the BoardEx data contains certain peculiarities. BoardEx computes the value of options granted using the closing stock price on the last trading day of the fiscal year rather than the stock price on the grant data. This procedure can produce different values to alternative sources of data that use grant date prices like ExecuComp (Conyon et al, 2011, p. 41). Similarly, BoardEx computes the value of share plans based on the maximum (rather than the target or minimum) that could be awarded; Conyon et al (2011 p. 41) notes that this practice will overstate the value of performance share.

Comparing executive compensation across countries is a difficult task. Disclosure requirements remain inconsistent. For instance, according to regulations in Switzerland, companies must disclose the pay of the highest-paid executive (who might not be CEO). Other databases like ExecuComp report remuneration data for the five highest paid executives in a firm only. Notwithstanding potential problems that data availability might pose, this study has constructed an original dataset using all available compensation data and biographical information for all executives (supplemented by internet searches where necessary). Limiting this study to the banking industry partially addresses the issue of heterogeneity in the sample of firms, and this study takes further steps in this direction by dividing the sample into the G-SIBs cohort, and the US and EU cohorts.

2.4.3 Executive-level and firm-level variables

Boardroom executives vary across a range of parameters (e.g. number, age, gender, ethnicity, education, experience, tenure). This makes studies of executive performance quite complex by virtue of the hierarchical role and responsibilities of the board. This section describes the executive-level and firm-level variables that this chapter, and subsequent chapters, use as variables in the empirical analyses to follow. The executive-level and firm-level variables implicitly proxy for corporate cultures in banking.

Board of directors: The board controls the processes by which top executives are hired, promoted, assessed, and dismissed if necessary (Adams, Hermalin and Weisbach, 2010). Their responsibility is monitoring and management oversight and to align board and shareholder interests. There is mixed evidence whether larger or small boards provide an efficient monitoring capability. Larger boards in complex firms are more likely to be more diversified and more leveraged with firm performance increasing with board size (Coles et al, 2008). Complex firms require a higher level of advising requirements than smaller firms. This challenges the notion that restrictions on board size and on the number of managers on a board enhance firm value. Either very small or very large boards are optimal for board effectiveness suggesting a non-linear relationship between firm performance and board size.

However, larger boards could face coordination problems, rendering them less effective (Coles et al, 2008). Several studies confirm an inverse relationship between board size and firm value (Yermack, 1996; Jensen, 1993; Bhagat and Black, 1999). Smaller boards are associated with effective coordination and monitoring (i.e., less free riding by individual directors), which improves firm performance. In cases of distress, smaller boards are more likely to avoid bankruptcy (Fich and Slezak, 2008). McNulty, Florackis and Ormrod (2012) find that financial risk-taking at UK listed companies is lower when boards are smaller (fewer than 8 directors).

Age: Knowledge and experience increase with age. Studies demonstrate a positive relationship between age and earnings, and age and intellectual capabilities. Yet, older (and wealthier) executives could become less risk averse (Lazear, 1979; Rhodes, 1983; Lewellen, Loderer, and Martin, 1987; McKnight, Tomkins, Weir, and Hobson, 2000). Age plays a vital role in shaping an executive's strategic actions that affect firm performance. Yet, it is ambiguous whether the incremental effect of age increases or decreases pay. Deckop (1988) finds that the relationship between age and cash remuneration is not meaningful, in contrast to Hogan and McPheters (1980). McKnight, Tompkins, Weir and Hobson (2000) examine 100 public firms in the UK from 1992 to 1996. The relationship between CEO salary and age is significantly related, though the association weakens over time. The authors also find evidence of a non-linear relationship, which suggests that at around age 53, the proportion of bonus as a percentage of salary begins to decrease at an increasing rate. Some evidence suggests that younger executives face larger incentives to increase job security by taking on risk-taking activities, which jeopardises firm value (Nguyen et al, 2015). MacCrimmon and Wehrung (1990) study the risk-taking abilities of 500 top-level executives. The most successful executives are the biggest risk takers, but more mature executives are the most risk averse. This contrasts with the result in Chok and Sun (2007) that risk increases with executive age.

Education: The number of qualifications an executive has is a normal proxy for education. Education (and tenure or experience) captures variation in the level of an individual's investment in formal education and/or professional qualifications. Education can proxy for cognitive ability, which is associated with mental capacity and higher lifetime incomes (Lubinski and Humphreys, 1997). Becker (1975) claims that greater levels of education and work experience warrant higher pay. Likewise, Lazear (1979) claims that the managerial labour market adjusts personal earnings to reflect human capital capabilities, which is enhanced by educational knowledge and on-the-job experience. Empirical research links education with high capacity for information processing, tolerance and leadership style, and it can positively influence strategic decision-making (Hambrick and Mason, 1984). King, Srivastav and Williams (2016) demonstrate that the quality of an education, particularly high quality management education, positively affects bank performance.

Tenure: Two variables measure aspects of tenure. Time in the role is the number of years an executive has spent in their current role whereas time on the board is the number of years spent on the board of directors. Tenure is a proxy for previous experience, which shapes an executive's ability and conditions their decision-making skills. King et al (2016) find that greater executive experience helps to realise superior bank performance. However, lengthier tenure could signal entrenchment and a lower dynamism of the board (Shleifer and Vishny, 1997), and complacency (Shakir, 2009), which act as constraints on strategic decision-making (Adams, Hermalin and Weisbach, 2010; McNulty, Florackis and Ormrod, 2012). There is a saying that bankers who survive a crisis tend to be more conservative but their successors gradually seek more risk (Hawkins and Turner, 1999, p.15). Indeed, Fernandes, Ferreira, Matos, and Murphy (2013) find that European banks whose directors had more professional experience and longer tenure were relatively better performers in the global financial crisis.

Gender: This is capture as a dummy variable equal to one if the executive is female and zero otherwise. An established literature considers whether gender affects firm risk-taking. This literature contends that males are more prone to confident or aggressive behaviour, which makes them less risk-averse and confirms other evidence showing females to be more risk-averse and conservative in decision-making. However, Adams and Funk (2012) claim that once females gain access into a male-dominated environment, like banking, their aversion to risk vanishes and females may assume greater risk than males. Evidence suggests that in finance, females are no less confident than males. Berger, Kick and Schaeck (2014) find that increases in the proportion of females on boards is associated with increases in portfolio risk at German banks. Adams and Ragunathan (2015) find that during the 2007-08 crisis the amount of risk-taking did not differ across US banks irrespective of the proportion of female board members. However, bank performance was superior at firms with a larger amount of females on boards. Palvia, Våhåmaa and Våhåmaa (2015) find that smaller US banks with females in CEO and chair positions had a lower likelihood of failure during the global financial crisis. Adams and Ragunathan (2015) suggest that greater female representation conditions the behaviour of male counterparts, with females more likely to assume a monitoring role (Adams and Ferreira, 2012). Sila, Gonzalez and Hagendorff (2016) examine the gender-risk relation based on a sample of 1,960 US firms from 1996 to 2010. Their results show that greater female representation on corporate boards does not lead to more or less risk-taking. The result holds for a sub-sample of BHCs.

Differences between the pay of males and females widen as executives move up the hierarchical ladder, with females finding it harder to secure top executive positions (Kogut, Colomer and Belinky, 2014). This suggests that businesses are missing out in terms of ethical management culture. Daily, Certo and Dalton (1999) examine diversity in Fortune 500 firms. Whereas women have made “significant” progress in assuming seats on boards, their ascent to the position of CEO is wanting. A survey on gender diversity by the Pew Research Center (2015) reports a similar result. There is scarce information on women directors on corporate boards. In 2011, there is only 1 woman for 7 board members (13.7%) in Europe’s top companies, slightly up from 11% in 2010 (European Commission, 2012). On FTSE 100 boards, 2% of chair positions are held by women (Business, Innovation and Skills, 2011 p.11, The Davies Report), with the percentage of female executive directors on these boards standing at 5.5%. In comparison to male counterparts, females tend to assume lower hierarchical duties and receive less pay than males performing equal duties (Pew Research Center, 2015).

Nationality: The number of nationalities on the board of directors. Culture is defined as those customary beliefs and values that ethnic, religious, and social groups transmit unchanged from generation to generation (Guiso, Sapienza and Zingales, 2006). Cultural origin can affect economic outcomes. Pan, Siegel and Wang (2016) study CEO cultural heritage and corporate acquisitions and demonstrate that CEOs’ culturally inherited attitudes towards uncertainty and risk negatively affect corporate acquisitiveness. Furthermore, CEOs hailing from more risk-averse and uncertainty-avoiding cultures try to reduce risk by choosing targets with higher diversification potential and by using equity financing. Much of the social transmission of risk attitudes occurs through national culture rather than religion, and cultural differences with respect to risk preferences persist over multiple generations (Pan et al. 2016). Individuals have less control over their culture than over other social capital (Becker, 1996): individuals cannot alter their ethnicity, race or family history; only with difficulty can they change country or religion. Cultural origin is a durable and reliable trait. Its inherited effect shows a low depreciation rate over an individual's lifetime.

Size: The natural logarithm of total assets indicates firm size is a proxy for the complexity of a bank. Larger banks are likely to attract relatively more talented individuals as executives and to provide them with higher pay. The size of pay gaps is increasing in the number of hierarchical levels in a firm. One potential outcome of the consolidation process in banking is that larger banks might eventually behave less competitively (Boyd and De Nicolò, 2005). Whereas Stiroh and Strahan (2003) find that successful banks survive and increase market share, the empirical evidence on whether larger banks are more efficient gives mixed results.

SD-to-ED (Board independence): The ratio of the number of independent or supervisory directors-to-executive directors to proxy board independence. A larger proportion of outsiders' signals greater board independence and could increase the monitoring of the executive team on behalf of shareholders (John and Senbet, 1998). Outside directors could bring additional skills and experience, which contributes towards more effective decision-making. Weisbach (1988) finds that CEOs are more likely to resign following a poor performance when outsiders dominate the board. Anderson, Mansi and Reeb (2004) report that the cost of debt financing for S&P 500 firms is inversely related to both board independence and board size, because debtors realise that director characteristics could influence the financial accountability process. Bhagat and Black (2002) find that firms with low profitability tend to increase the proportion of independent directors but this strategy fails to improve long-term profitability. Bebchuk and Fried (2003, 2004, 2005) contend that powerful CEOs can influence the appointment of outsiders, which could produce agency conflicts between outsiders and principal as the former collude with the CEO.

M&A: A dummy variable that is equal to unity if a firm engages in mergers and acquisitions activity during the year, and zero otherwise. The managerial power approach suggests that opportunistic CEOs could pursue an expansionary strategy to increase the size of the firm in order to demand higher pay (Bebchuk, Fried and Walker, 2002). This empire-building strategy could mean that the bank becomes too-big-to-fail. In turn, this could increase the size of pay gaps.

Growth opportunities: The market-to-book ratio of equity is a proxy for a firm's investment opportunities (Barclay and Smith, 1995). The charter value hypothesis suggests that greater competition in banking causes the market value of a bank, reflecting the capitalised charter value, to fall relative to the book value of bank equity (which does not reflect charter value). Thus, the decline in market-to-book ratio signals an increase in bank default risk through an increase in risky assets (Keeley, 1990). Increases in competition result from acts of financial deregulation that lessen charter values and increase risk-taking. Bank charter value increases during expansionary periods reflecting growth opportunities, which provides banks with relatively easy access to equity markets (Saunders and Wilson, 2001). Similarly, Harris and Marston (1994) suggest that the ratio is a proxy for a firm's beta and growth forecasts. Of relevance to this study, Jordan, Rice, Sanchez and Wort (2011) find that distressed banks in the US, (that is, banks in receipt of TARP assistance) had lower market-to-book ratios.

Diversification: The ratio of non-interest income-to-total operating income is a proxy for a bank's business model. Financial deregulation encouraged banks to diversify activities in terms of products and geography. In the case of US banks, Stiroh (2006), and Stiroh and Rumble (2006) find that the increase in non-interest income activities did realise product diversification benefits but the gains were offset by increased exposure to more volatile activities, which adversely impacted risk-adjusted bank performance. LePetit, Nys, Rous and Tarazi (2008) confirm the association between greater income diversification and risk at European banks, especially smaller firms. In an international study, Elsas, Hackethal and Holzhauser (2010) find that product and geographical diversification creates market value, a conglomerate premium, because of cost and revenue economies of scope.

Leverage: The ratio of total assets-to-equity. A criticism of banks following the global financial crisis was that they had excessive leverage before the crisis (Haldane, 2012). The argument contends that banks were providing shareholders with substantial gains due purely to leverage rather than the efforts of executives. Higher returns to shareholders (say, as ROE) lead to higher levels of executive pay, and could widen pay differentials within the C-suite. Adrian and Shin (2010) show that leverage is pro-cyclical and always large for larger-sized banks.

Liquidity: The ratio of cash and securities-to-total assets. This variable is an indicator of a bank's business model on the assets side of the balance sheet. A priori a bank should be able to unwind its securities positions in the event of distress.

Cost-income: The ratio of overhead cost (staffing and non-interest expense)-to-gross income is a proxy for bank efficiency. Larger cost-income ratios indicate relatively poorer performance and vice-versa.

ROE: The ratio of profit before tax-to-equity, revealing returns to shareholders. ROE seems to be influenced by quite strong seasonal factors (ECB 2010). They contend that the global financial crisis of 2007-08 shows that ROE failed to discriminate the best performing banks from others. Yet, studies of firm performance (profitability) commonly use ROE (Fahlenbrach and Stulz, 2011).

Z-score: Commonly used in banking research as a bank stability indicator, for instance, to examine the relationship between competition and stability (Berger, Klapper and Turk-Ariss, 2009; Laeven and Levine, 2009; Schaeck and Cihák, 2014). The inverse of the Z-score is proxy for bank insolvency risk. Later in Chapter Four, the Z-score is used as a dependent variable with additional detail on its construction.

2.5 Statistical design

The choice of the methodology applied in Chapter Two is based on the need to determine if executive pay is comparable (differs) between cohorts across 1999 to 2013. The mean differences in executive pay (and other bank variables) among cohorts of banks, and over time intervals are performed using pairwise comparisons across the levels of categorical variables. The pairwise comparisons of Tukey's methodology allow multiple comparisons. To test differences (similarities) across professional status, the choice of the slope comparison model allows for the assessment of pay level differentials across professional status from the CEO (as the baseline). It is followed by pairwise comparisons, which show differences in mean values across professional status at the 95 percent confidence interval. The hierarchical linear model (HLM) is used to assess the proportion of variance or degree of heterogeneity in the population this is attributed to differences between banks or within banks between directors. The choice of the hierarchical methodology is based on the clustering nature of the data.

The descriptive statistical procedures focus on exploring the measure of central tendency and dispersion of variables. The coefficient of variation (CV) expresses the ratio of the standard deviation to the mean. For each variable, the CV describes the dispersion (or relative variability) that does not depend on the variable measurement unit. The multiple pairwise comparison procedure is based on Tukey's test, and comparison is also performed by two-sided independent sample t-tests whenever necessary to assess statistical significance of parameters. Pearson pairwise correlation analysis at the 95 percent confidence level examines relations among variables for all banks over 1999 to 2013. Comparisons between bank cohorts (G-SIBs, EU banks and US banks) and across time intervals (pre-crisis, crisis, and post-crisis) are used to test the propositions of hypotheses 1a to 1c and 2a to 2c. The executives' remuneration profile is according to the slope comparison model specified in Equation [2.1]:

$$\left(Pay_{ijt}\right) = \beta_0 + \beta_k \sum_{k=10} D_k + \varepsilon_{ijt} \qquad [2.1]$$

Where the dependent variable is the pay (in £ sterling at 2013 prices) of executive *i* of bank *j* at time *t*. Equation [2.1] is estimated several times for the following dependent variables: Total pay (sum of salary, bonus and equity-linked pay); Cash compensation (salary plus bonus); Salary; Equity-linked pay (value of shareholdings, long-term incentive plans (LTIPs), and intrinsic shares under option and estimated shares under option); Variable pay (sum of bonus plus equity-linked compensation); Total accumulated wealth (equity held plus estimated value of options held plus LTIPs held); and ratio of Variable-to-fixed pay;

β_0 is the overall mean across banks;

$\beta_k \sum_{k=10}^{n} D_k$ is a vector of professional status categorical dummy variables equal to one and zero otherwise. CEO is the omitted baseline category;

ε_{ijt} is the error term.

A pairwise comparison is run after each regression. It shows differences in mean values across professional status at the 95 percent confidence interval.

The pay level differential across professional status using the slope comparison model [Equation 2.1] tests how much higher (lower) the intercept is for executives belonging to different roles in relation to the coefficient of the CEO (reference group). Somewhat similar arithmetic average results are found when the pay components are analysed using either Bonferroni's and/or Tukey's pairwise comparison methods. Due to a higher proportion of overlap in the pair comparisons of coefficients (means), the approach in this study is to highlight and declare significantly different means if the intervals do not overlap, and to present the CV from each sample. Results from pairwise comparisons (irrespective of cohort) are grouped in tables by letters (A to F onwards), where letter (A) is the smallest (or bottom) value group.

Equation [2.2] specifies the full hierarchical linear model (HLM). Level 1 represents the executive-level and level 2 represents the firm-level variables.

$$\left(Pay_{ijt}\right) = \beta_0 + \beta_k \sum_{k=10} D_k + \beta_m X1_{it} + \beta_n X2_{jt} + u_{0j} + \varepsilon_{ij} \qquad [2.2]$$

Where the dependent variables are the total pay of executive *i* of bank *j* at time *t* in pounds sterling, fixed pay (salary) and variable pay (bonus plus equity-linked pay);

β_0 is the intercept which is allowed to vary across banks;

$\beta_k \sum_{k=10}^{n} D_k$ is a vector of executives' professional status categorical variables;

$\beta_m X1_{it}$ is a vector of executive-level biographical characteristics (age, gender, nationality, education, tenure);

$\beta_n X2_{jt}$ is a vector of bank-level variables (board independence; size, growth opportunities, diversification, leverage and ROE);

u_j is the bank-level error term;

e_{ij} is the variation between executives within each bank;

$u_j \sim N(0,\sigma^2)$, $e_{ij} \sim N(0, \sigma^2)$ are the variance components.

The assumption is that the residuals at the lowest level e_{ij} have a normal distribution with a mean of zero and a common variance σ^2 in all groups. The second level residuals u_j are assumed to be independent of the lowest level errors e_{ij} and have a multivariate normal distribution with means of zero. The proportion of variance or degree of heterogeneity in the population is attributed to differences between banks (σ^2_u) or within banks between directors (σ^2_e) which is explained by the clustering structure measured by the variance partitioning coefficients (VPC = σ^2_u / σ^2_u + σ^2_e). Thus, the estimate of the total variance is made up of the partitioning variation across levels i.e. the sum of the variance of the second-level residuals $\sigma^2 u$ (between bank variance) and the variance of the first-level residuals $\sigma^2 e$ (within bank-between executives' variance). Note that the term intra-class correlation interchanges with VPC to measure the reliability (ρ). We report results for rho as equivalent to the VPC.

Country-year effects are the source of the variation in the regressions, except where noted. Robust standard errors are clustered by firm.

2.6 Exploratory data analysis

This section reports executive- and bank-level descriptive statistics in sub-sections for simplicity. Table 2.1 shows the number of director-year observations (executives and non-executive or independent) by country for all banks and by cohort. The dataset contains 14,279 director-year observations of which 3,889 are on executive directors. The US is the country with the largest number of observations followed in descending order by the UK, Germany, Italy and the Netherlands. For G-SIBs, there are 755 US observations followed by 310 at UK banks and 173 at Dutch banks. For EU banks, there are 349 observations on UK banks followed by 156 and 147 at Italian and German banks, respectively. The full sample distribution of 3,889 observations comprises 41.78 percent of observations at G-SIBs, 20.24 percent at EU banks, and 37.98 percent at US banks.

Executives in US banks (including G-SIBs) receive the highest total pay that on average is £6,970,259 (median £3,666,496). In comparison, the median total pay at Spanish and Swiss banks is around 80 percent of payments to US bankers (roughly £3,000,000). Bankers in Germany, the UK and Netherlands receive 40-50 percent of the median pay of US executives, that is, between £1,500,000 and £1,800,000. French, Swedish and Irish banks pay between 20 to 24 percent of their US counterparts, that is, between £724,000 and £893,000. Italian banks are the poorest payers. Median total pay is 7 percent of US total pay, that is, £247,000. Across the industry, equity incentives in compensation contracts drive trends in remuneration.

Table 2.1: Number of director-year observations: by country

	All banks			EU banks		
Countries	**Non-Executive**	**Executive**	**Total**	**Non-Executive**	**Executive**	**Total**
US	5,276	2,232	7,508			
UK	1,181	659	1,840	501	349	850
FR	991	139	1,130	229	27	256
IT	781	202	983	451	156	607
GER	650	223	873	371	147	518
ES	389	126	515	34	9	43
NL	327	173	500			
IR	339	99	438	339	99	438
CH	265	18	283			
SE	191	18	209			
Total	10,390	3,889	14,279	1,925	787	2,712
	G-SIBs			**US banks**		
Countries	**Non-Executive**	**Executive**	**Total**	**Non-Executive**	**Executive**	**Total**
US	1,694	755	2,449	3,582	1,477	5,059
UK	680	310	990			
FR	762	112	874			
NL	327	173	500			
ES	355	117	472			
IT	330	46	376			
GER	279	76	355			
CH	265	18	283			
SE	191	18	209			
Total	4,883	1,625	6,508			

Source: BoardEx

For purposes of brevity, this section discusses pairwise comparisons of means: first, by cohort over 1999-2013; and second by three time intervals (pre-crisis; crisis; post-crisis).[7] Table 2.2.1a reports results on total pay. Mean total pay is £7,867,563 at G-

[7] A full set of descriptive statistics is available in the Appendix on total pay and other dependent variables: salary; cash compensation (salary plus bonus); equity-linked pay; variable pay; total accumulated wealth and variable-to-fixed pay ratio. Tables show distributional statistics by year for each cohort.

SIBs, £795,786 at EU banks, and £1,525,772 at US banks. Pay is significantly higher at G-SIBs than either EU banks or US banks at the 1 percent level of significance. The difference between mean pay at EU and US banks is insignificant in statistical terms. In terms of time interval, total pay for all banks is significantly higher pre-crisis (1999-2006) than in either the crisis (2007-09) or post-crisis (2010-13) at the 1 percent level. Whilst mean total pay falls between the crisis and post-crisis periods, the change is insignificant (Table 2.2.1b).

Cash compensation equals salary plus bonus. Consistent with results on total pay, average cash compensation is higher at G-SIBs (£2,445,378) in comparison to EU banks (£635,035) and US banks (£730,983), and the differences are significant at the 1 percent level. The difference between EU banks and US banks is insignificant (Table 2.2.2a). Cash compensation is significantly larger pre-crisis (£1,758,472). Although cash compensation rebounds in 2010-13 (£1,061,779) from 2007-09 (£1,023,006) the change is insignificant (Table 2.2.2b). Whereas the pattern holds for salary by cohort, statistically meaningful increases in salary occur over time (Table 2.2.3a, b). Mean salary for all banks increases from £452,138 (pre-crisis) to £510,410 (crisis) to £637,553 (post-crisis). Each increase is significant at the 1 percent level. In contrast, equity-linked pay falls over time from £4,788,638 to £4,138,261 to £3,741,520. However, neither change is significant. There are significant differences in equity-linked pay by cohort (Table 2.2.4a, b).

From the discussion, it is unsurprising to observe similar patterns in the variable-to-fixed pay ratio (Table 2.2.5a, b). The ratio for G-SIBs (17.43) is significantly larger than EU banks (1.00) and US banks (2.41) at the 1 percent level with the difference between the latter cohorts insignificant. The ratio is statistically equal pre-crisis (13.42) and in-crisis (12.15). However, the post-crisis ratio (6.82) is significantly lower at the 1 and 5 percent levels, respectively. The pattern repeats again for total accumulated wealth (Table 2.2.6a, b). The average wealth of G-SIB executives is £45,700,000 and towers above EU banks (£2,894,737) and US banks (£3,968,505). A comparison of average pre-crisis wealth (£37,900,000) best illustrates the effect of the crisis on wealth, which falls to £19,900,000 (crisis) and £19,500,000 (post-crisis).

Table 2.2.1a: Pairwise Comparison of Means: by Cohort, 1999-2013 – Total Pay (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	7,867,563	295,447	26.63	0.000	7,288,157	8,446,970
(2) EU banks	795,786	640,717	1.24	0.214	-460,735	2,052,307
(3) US banks	1,525,772	610,259	2.50	0.012	328,983	2,722,562
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-7,071,777	705,555	-10.02	0.000	-8,726,585	-5,416,969
3 vs 1	-6,341,791	678,016	-9.35	0.000	-7,932,009	-4,751,573
3 vs 2	729,986	884,836	0.82	0.688	-1,345,308	2,805,280

Table 2.2.1b Pairwise Comparison of Means: by Time – Total Pay (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	5,662,018	218,685	25.89	0.000	5,233,251	6,090,785
(2) 2007-2009	4,324,375	363,773	11.89	0.000	3,611,141	5,037,610
(3) 2010-2013	4,133,828	362,763	11.40	0.000	3,422,574	4,845,081
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-1,337,643	424,446	-3.15	0.005	-2,332,851	-342,435
3 vs 1	-1,528,190	423,580	-3.61	0.001	-2,521,369	-535,012
3 vs 2	-190,548	513,739	-0.37	0.927	-1,395,124	1,014,028

Table 2.2.2a: Pairwise Comparison: by Cohort, 1999-2013 – Cash compensation (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	2,445,378	58,937	41.49	0.000	2,329,794	2,560,962
(2) EU banks	635,035	126,913	5.00	0.000	386,142	883,928
(3) US banks	730,983	120,880	6.05	0.000	493,922	968,045
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-1,810,343	139,931	-12.94	0.000	-2,138,539	-1,482,147
3 vs 1	-1,714,395	134,483	-12.75	0.000	-2,029,813	-1,398,976
3 vs 2	95,949	175,268	0.55	0.848	-315,129	507,026

Table 2.2.2b: Pairwise Comparison of Means: by Time – Cash compensation (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	1,758,472	45,301	38.82	0.000	1,669,651	1,847,293
(2) 2007-2009	1,023,006	74,957	13.65	0.000	876,040	1,169,971
(3) 2010-2013	1,061,779	74,749	14.20	0.000	915,221	1,208,336
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-735,467	87,583	-8.40	0.000	-940,825	-530,108
3 vs 1	-696,694	87,405	-7.97	0.000	-901,635	-491,753
3 vs 2	38,773	105,858	0.37	0.929	-209,436	286,982

Table 2.2.3a: Pairwise Comparison of Means: by Cohort, 1999-2013 – Salary (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	643,044	9,994	64.34	0.000	623,444	662,643
(2) EU banks	415,604	21,549	19.29	0.000	373,344	457,863
(3) US banks	446,716	20,490	21.80	0.000	406,531	486,900
				Tukey	Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-227,440	23,753	-9.58	0.000	-283,152	-171,729
3 vs 1	-196,328	22,798	-8.61	0.000	-249,799	-142,858
3 vs 2	31,112	29,736	1.05	0.548	-38,630	100,854

Table 2.2.3b: Pairwise Comparison of Means: by Time – Salary (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	452,138	7,548	59.90	0.000	437,339	466,937
(2) 2007-2009	510,410	12,494	40.85	0.000	485,913	534,908
(3) 2010-2013	637,553	12,460	51.17	0.000	613,124	661,982
				Tukey	Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	58,272	14,597	3.99	0.000	24,045	92,499
3 vs 1	185,415	14,568	12.73	0.000	151,258	219,572
3 vs 2	127,143	17,645	7.21	0.000	85,769	168,516

Table 2.2.4a: Pairwise Comparison: by Cohort, 1999-2013 – Equity-linked pay (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	6,485,008	722,523	8.98	0.000	4,935,350	8,034,665
(2) EU banks	897,646	111,311	8.06	0.000	658,908	1,136,384
(3) US banks	3,446,695	300,171	11.48	0.000	2,802,892	4,090,498
				Tukey	Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-5,587,362	773,486	-7.22	0.000	-7,246,325	-3,928,399
3 vs 1	-3,038,313	687,786	-4.42	0.001	-4,513,467	-1,563,158
3 vs 2	2,549,049	325,774	7.82	0.000	1,850,333	3,247,765

Table 2.2.4b: Pairwise Comparison of Means: by Time– Equity-linked pay (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	4,788,638	236,814	20.22	0.000	4,324,289	5,252,987
(2) 2007-2009	4,138,261	399,150	10.37	0.000	3,355,601	4,920,921
(3) 2010-2013	3,741,520	392,350	9.54	0.000	2,972,194	4,510,845
				Tukey	Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-650,377	797,368	-0.82	0.418	-2,243,789	943,036
3 vs 1	-1,047,119	772,743	-1.36	0.180	-2,591,323	497,086
3 vs 2	-396,742	500,022	-0.79	0.430	-1,395,956	602,472

Table 2.2.5a: Pairwise Comparison: by Cohort, 1999-2013 – Variable-to-fixed pay

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	17.43	1.25	13.90	0.000	14.97	19.89
(2) EU banks	1.00	2.70	0.37	0.711	-4.30	6.30
(3) US banks	2.41	2.57	0.94	0.349	-2.63	7.45
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-16.43	2.98	-5.51	0.000	-23.41	-9.44
3 vs 1	-15.02	2.86	-5.25	0.000	-21.73	-8.31
3 vs 2	1.41	3.73	0.38	0.925	-7.34	10.15

Table 2.2.5b: Pairwise Comparison of Means: by Time – Variable-to-fixed pay ratio

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	13.42	0.89	15.02	0.000	11.67	15.17
(2) 2007-2009	12.15	1.48	8.22	0.000	9.25	15.05
(3) 2010-2013	6.82	1.47	4.62	0.000	3.93	9.71
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-1.27	1.73	-0.73	0.743	-5.32	2.78
3 vs 1	-6.60	1.72	-3.83	0.000	-10.65	-2.56
3 vs 2	-5.33	2.09	-2.55	0.029	-10.23	-0.44

Table 2.2.6a: Pairwise Comparison: by Cohort, 1999-2013 – Total acc. wealth (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	45,700,000	2,313,362	19.76	0.000	41,200,000	50,200,000
(2) EU banks	2,894,737	6,803,801	0.43	0.671	-10,400,000	16,200,000
(3) US banks	3,968,505	4,841,368	0.82	0.412	-5,526,589	13,500,000
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-42,800,000	7,186,331	-5.96	0.000	-59,700,000	-26,000,000
3 vs 1	-41,700,000	5,365,676	-7.78	0.000	-54,300,000	-29,200,000
3 vs 2	1,073,769	8,350,482	0.13	0.991	-18,500,000	20,700,000

Table 2.2.6b: Pairwise Comparison of Means: by Time – Total accumulated wealth (£)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	37,900,000	1,761,291	21.53	0.000	34,500,000	41,400,000
(2) 2007-2009	19,900,000	2,962,703	6.70	0.000	14,000,000	25,700,000
(3) 2010-2013	19,500,000	2,903,640	6.70	0.000	13,800,000	25,200,000
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-18,100,000	3,446,702	-5.24	0.000	-26,100,000	-9,984,400
3 vs 1	-18,500,000	3,396,067	-5.44	0.000	-26,400,000	-10,500,000
3 vs 2	-395,950	4,148,341	-0.10	0.995	-10,100,000	9,331,058

Table 2.3 provides descriptive statistics for executive-level and some bank-level variables by cohort over 1999-2013. The median board size is 20 members except at EU banks where boards are smaller (17 members). The coefficient of variation is higher for EU banks. Board size at G-SIBs and US banks varies from 9 to 35 and 8 to 36 directors, respectively, in comparison to 7 to 50 at EU banks. The ratio of non-executives-to-executives is a proxy for board independence with larger values signalling greater independence. The mean values indicate that boards are relatively more independent at G-SIBs (4.28) followed in descending order by EU banks (3.88) and US banks (2.66). The US cohort has the least variability in board independence as measured by the coefficient of variability.

Table 2.3 also reports descriptive statistics on the biographical characteristics of bank executives. The average (mean and/or median) bank executive is between 52 and 54 years of age. Whereas the youngest executives are either 33 or 34 years, the oldest executives work for US banks (83) then EU banks (81) and G-SIBs (79). Two variables measure tenure. For all banks, the average executive spends 3.47 years (time) in role and 5.62 years on the board. Whilst time in role is broadly consistent across cohorts, time on board is longer at US banks (7.51 years) and least at EU banks (3.95 years) with G-SIBs in the middle position (5.78 years). Unsurprisingly, the average executive at G-SIBs has stronger education (2.12 qualifications) over 1.88 and 1.76 at US and EU banks, respectively. However, board diversity in terms of the number of nationalities on the board is highest at EU banks (16.88) followed by G-SIBs (11.34). Table 2.4 shows the age range of bank CEOs using cumulative frequency. For all banks, bank CEOs are ages 56-65 (45.32 percent) and 46-55 (41.58 percent). At US banks, the majority of CEOs are 56-65 (54.26 percent) whereas CEOs are younger, 46-55, at EU banks (47.18 percent). Similarly, there are CEOs at US banks over age 76 whilst there are no equivalents at EU banks.

Tables 2.5a-d show the means (and number of observations) of the biographical variables by professional status for all banks and the three cohorts over 1999-2013. For all banks, the average age of a CEO is 56 years with the chair older at 63 years. Executives in other roles tend to be slightly younger than the CEO at between 52 to 54 years. (On average CFOs are younger at 50 years and CLOs older at 57 years.)

The age profile of non-CEOs is consistent with the notion of internal appointments and succession planning. The age profile is common across cohort. CEOs and Chairs at US banks tend to be slightly older (at 57 and 66 years, respectively).

For all banks, the number of nationalities on boards is 47. In the full sample, 55 percent of CEOs are American, 15 percent British, 6–7 percent French and Italian, and 3–4 percent Irish and Spanish. At US banks, the majority (94 percent) of CEOs are domestic with the remainder comprising five nationalities: 2.4 percent Japanese; and three nations (the UK, Canada and India) less than 1.5 percent each of the 414 CEOs. Similarly, at UK banks the majority (82 percent) of CEOs are British with non-domestic CEOs hailing from five countries (US, Canada, India, New Zealand and Portugal). At EU banks and G-SIBs, CEOs come from 17 and 15 nationalities, respectively. At G-SIBs, the most prevalent nationalities are American, British, French and Spanish. In contrast, the mean number of nationalities (2) is very low in US banks.

Table 2.3: Descriptive Statistics: bank and director-level variables, 1999-2013

Variable	Mean	S. D.	min	Median	max	CV	N
Board size	**Number of executive and non-executives or supervisory directors**						
G-SIBs	20.32	5.01	9	20	35	0.25	6508
EU banks	20.24	9.23	7	17	50	0.46	2712
US banks	20.15	4.59	8	20	36	0.23	5059
All banks	20.24	5.93	7	20	50	0.29	14279
Board independence	**Ratio of supervisory-to-executive directors**						
G-SIBs	4.28	4.35	0.67	2.71	28.00	1.02	6310
EU banks	3.88	4.65	0.57	2.25	25.00	1.20	2671
US banks	2.66	1.20	0.83	2.60	17.00	0.45	5059
All banks	3.62	3.70	0.57	2.60	28.00	1.02	14040
Age	**Age of an executive in years**						
G-SIBs	53.72	6.75	34	54	79	0.13	1608
EU banks	52.76	8.63	34	52	81	0.16	774
US banks	54.01	7.27	33	54	83	0.13	1476
All banks	53.64	7.37	33	53	83	0.14	3858
Nationality	**Number of directors from different countries**						
G-SIBs	11.34	13.44	1	8	45	1.18	1625
EU banks	16.88	9.26	1	22	46	0.55	786
US banks	1.60	3.75	1	1	47	2.34	1477
All banks	8.76	11.56	1	1	47	1.32	3888
Time in role	**The length of time (year) an executive has been in the current role**						
G-SIBs	3.35	3.31	0	2.4	25.9	0.99	1519
EU banks	3.10	3.16	0	2.2	25.4	1.02	741
US banks	3.79	3.56	0	2.8	24.5	0.94	1386
All banks	3.47	3.39	0	2.5	25.9	0.98	3646
Time on board	**The length of time (years) an executive has sat on the board**						
G-SIBs	5.78	6.57	0	3.8	50.4	1.14	1069
EU banks	3.95	3.70	0	2.9	25.4	0.94	735
US banks	7.51	7.66	0	4.9	36.9	1.02	552
All banks	5.62	6.27	0	3.7	50.4	1.12	2356
Education	**Number of qualifications**						
G-SIBs	2.12	1.06	0	2	8	0.50	1594
EU banks	1.76	1.11	0	2	6	0.63	768
US banks	1.88	0.97	0	2	4	0.52	1475
All banks	1.96	1.05	0	2	8	0.53	3837

Note: S.D. is standard deviation; median is the $p50^{th}$ percentile; CV is coefficient of variation measured by the ratio of the standard deviation to the mean; N is number of observations.

Source: BoardEx; own calculation.

Table 2.4: CEOs age range; by cohort, 1999-2013

	All banks: CEOs			EU banks: CEOs		
Age (years)	**Freq.**	**Percent**	**Cum.**	**Freq.**	**Percent**	**Cum.**
<=40	16	2.14	2.14	12	3.56	3.56
41-45	31	4.14	6.28	26	7.72	11.28
46-55	311	41.58	47.86	159	47.18	58.46
56-65	339	45.32	93.18	116	34.42	92.88
66-75	47	6.28	99.47	24	7.12	100.00
>=76	4	0.53	100.00	337	100.00	
Total	748	100.00		12	3.56	3.56
	G-SIBs: CEOs			**US banks: CEOs**		
<=40	7	2.10	2.10	4	0.97	0.97
41-45	13	3.90	6.01	5	1.22	2.19
46-55	143	42.94	48.95	152	36.98	39.17
56-65	151	45.35	94.29	223	54.26	93.43
66-75	19	5.71	100.00	23	5.60	99.03
Total	333	100.00		4	0.97	100.00

Source: BoardEx; own calculation.

Education is the count of all degree level and professional qualifications. 288 executives possess no qualifications of which 64 are from the EU, 54 from the UK and 170 from US banks. A sole individual holds 8 qualifications (from EU). The majority of executives (1,739) have 2 qualifications and the average number of qualifications does not vary across professional status. Whilst the pattern repeats across cohort, it is noticeable that the mean number of qualifications is lower for some roles at EU banks. Figure 2.4 depicts earnings by the number of qualifications at all banks. There is no specific pattern, but executives with fewer qualifications receive higher equity-linked pay.

The length of time that an executive has spent in the current role is on average 3 years, 4 years for CEO and 5 years for Chair. Similarly, CEOs spend longer on the board (7 years) as do Chairs (13 years) than the average executive (6 years). At G-SIBs, on average CEOs spend less time in role (3 years) and on the board (6 years), which is comparable to the average executive. On average, CEOs at EU banks spend 3 years in the role and 8 years on the board. CEOs at US banks have longer tenure: 5 years in role and 10 years on the board. This is longer than other executives serve. Figure 2.5a shows the mean structure of executive compensation by tenure (time in role) for all banks across 1999-2013. There is a consistent increase in salary as time in role increases though salary is the smallest component of total pay. Average equity-linked pay is marginally higher in the earlier years in a role whereas there is no obvious pattern in bonus.

The polynomial function in Figure 2.5b indicates that the relationship between tenure and salary decreases with seniority in the job. The 1-3 years tenure is paid £63,436 higher salary than the 0-1 year executive tenure group; salary for the 3-7 years group is £21,568 higher than the 1-3 years tenure and so on. Conversely, the results show that if an executive spends more than 10 years in role, the prediction is that his or her salary will be £40,903 lower than the 7 to 10 years tenure.

Table 2.5a: Descriptive statistics: All banks, 1999-2013

Professional status		Age (yrs)	Nation. (#)	Edu. (#)	Time in role (yrs)	On board (yrs)	In firm (yrs)
CEO	Mean	56	10	2	4	7	12
	N	750	754	749	714	702	714
Chairman	Mean	63	15	2	5	13	17
	N	182	183	180	162	162	162
COO	Mean	52	8	2	3	4	11
	N	291	293	291	273	199	273
CFO	Mean	50	6	2	3	3	7
	N	560	560	556	527	243	527
CAO	Mean	53	8	1	4	6	13
	N	103	104	101	99	49	99
CRO	Mean	52	6	2	3	2	10
	N	129	130	128	121	34	121
CLO	Mean	57	2	2	4	7	7
	N	49	49	49	48	7	48
Junior	Mean	53	13	2	3	4	7
	N	377	381	380	380	265	380
Middle	Mean	53	8	2	4	5	11
	N	789	790	790	790	445	790
Senior	Mean	54	8	2	3	4	10
	N	628	644	613	532	250	532
New CEO	Mean	53	10	2	1	3	9
	N	127	127	127	126	119	126
Duality	Mean	59	5	2	4	9	15
	N	364	364	363	349	349	349
Total	Mean	54	9	2	3	6	10
	N	3858	3888	3837	3646	2356	3646

Source: BoardEx; own calculation.

Table 2.5b: Descriptive statistics: G-SIBs, 1999-2013

Professional status		Age (yrs)	Nation. (#)	Edu. (#)	In role (yrs)	On board (yrs)	In firm (yrs)
CEO	Mean	55	15	2	3	6	11
	N	333	337	332	315	305	315
Chairman	Mean	63	16	2	6	17	20
	N	89	90	87	80	80	80
COO	Mean	52	11	2	3	3	11
	N	148	149	148	139	101	139
CFO	Mean	51	6	2	3	4	7
	N	197	197	194	186	113	186
CAO	Mean	53	14	2	4	13	15
	N	35	35	34	34	12	34
CRO	Mean	52	9	2	3	2	10
	N	34	34	33	32	17	32
CLO	Mean	59	1	2	5	16	8
	N	20	20	20	20	3	20
Junior	Mean	55	17	2	3	4	9
	N	75	75	75	75	62	75
Middle	Mean	53	15	2	4	5	12
	N	268	269	269	269	228	269
Senior	Mean	52	7	2	3	3	10
	N	409	419	402	369	148	369
New CEO	Mean	53	11	2	1	3	10
	N	51	51	51	51	47	51
Duality	Mean	58	9	2	4	7	12
	N	157	157	156	147	147	147
Total	Mean	54	11	2	3	6	11
	N	1608	1625	1594	1519	1069	1519

Source: BoardEx; own calculation.

Table 2.5c: Descriptive statistics: EU banks, 1999-2013

Professional status		Age (yrs)	Nation. (#)	Edu. (#)	In role (yrs)	On board (yrs)	In firm (yrs)
CEO	Mean	54	17	2	3	5	8
	N	140	140	140	133	131	133
Chairman	Mean	60	24	2	5	9	13
	N	55	55	55	51	51	51
COO	Mean	48	13	2	3	3	8
	N	43	44	43	43	43	43
CFO	Mean	48	14	2	3	3	4
	N	110	110	109	105	105	105
CAO	Mean	51	15	1	3	2	14
	N	21	22	20	19	19	19
CRO	Mean	51	23	2	2	2	4
	N	13	14	13	13	13	13
CLO	Mean	59	26	0	1	1	5
	N	1	1	1	1	1	1
Junior	Mean	53	19	1	3	3	6
	N	178	182	181	181	180	181
Middle	Mean	51	11	2	3	3	8
	N	138	138	138	138	135	138
Senior	Mean	58	22	1	3	3	6
	N	75	80	68	57	57	57
New CEO	Mean	51	20	2	0	2	5
	N	31	31	31	30	29	30
Duality	Mean	64	10	1	5	6	6
	N	16	16	16	16	16	16
Total	Mean	53	17	2	3	4	7
	N	774	786	768	741	735	741

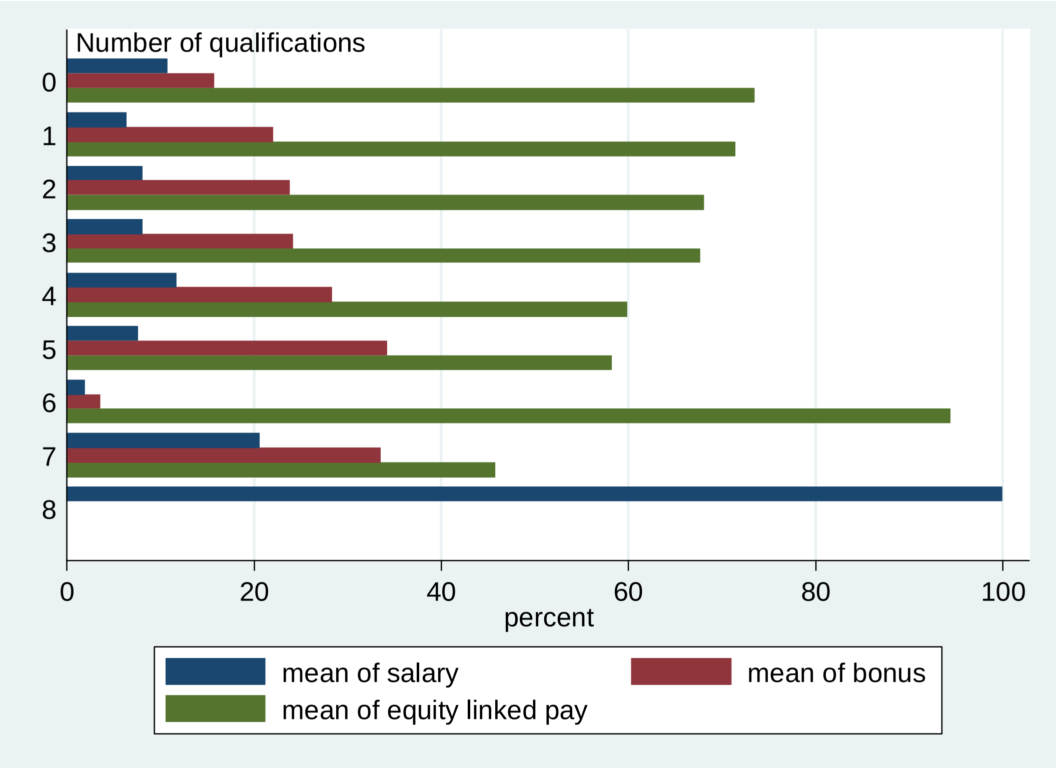
Source: BoardEx; own calculation.

Table 2.5d: Descriptive statistics: US banks, 1999-2013

Professional status		Age (yrs)	Nation. (#)	Edu. (#)	In role (yrs)	On board (yrs)	In firm (yrs)
CEO	Mean	57	2	2	5	10	16
	N	277	277	277	266	266	266
Chairman	Mean	66	4	2	2	11	14
	N	38	38	38	31	31	31
COO	Mean	53	1	2	2	5	11
	N	100	100	100	91	55	91
CFO	Mean	51	1	2	3	2	8
	N	253	253	253	236	25	236
CAO	Mean	55	1	2	4	4	10
	N	47	47	47	46	18	46
CRO	Mean	52	1	2	4	1	10
	N	82	82	82	76	4	76
CLO	Mean	56	1	2	4	1	6
	N	28	28	28	27	3	27
Junior	Mean	52	2	1	4	4	7
	N	124	124	124	124	23	124
Middle	Mean	54	1	2	4	4	10
	N	383	383	383	383	82	383
Senior	Mean	55	2	2	3	5	13
	N	144	145	143	106	45	106
New CEO	Mean	55	3	2	1	4	10
	N	45	45	45	45	43	45
Duality	Mean	58	1	2	5	12	18
	N	191	191	191	186	186	186
Total	Mean	54	2	2	4	8	11
	N	1476	1477	1475	1386	552	1386

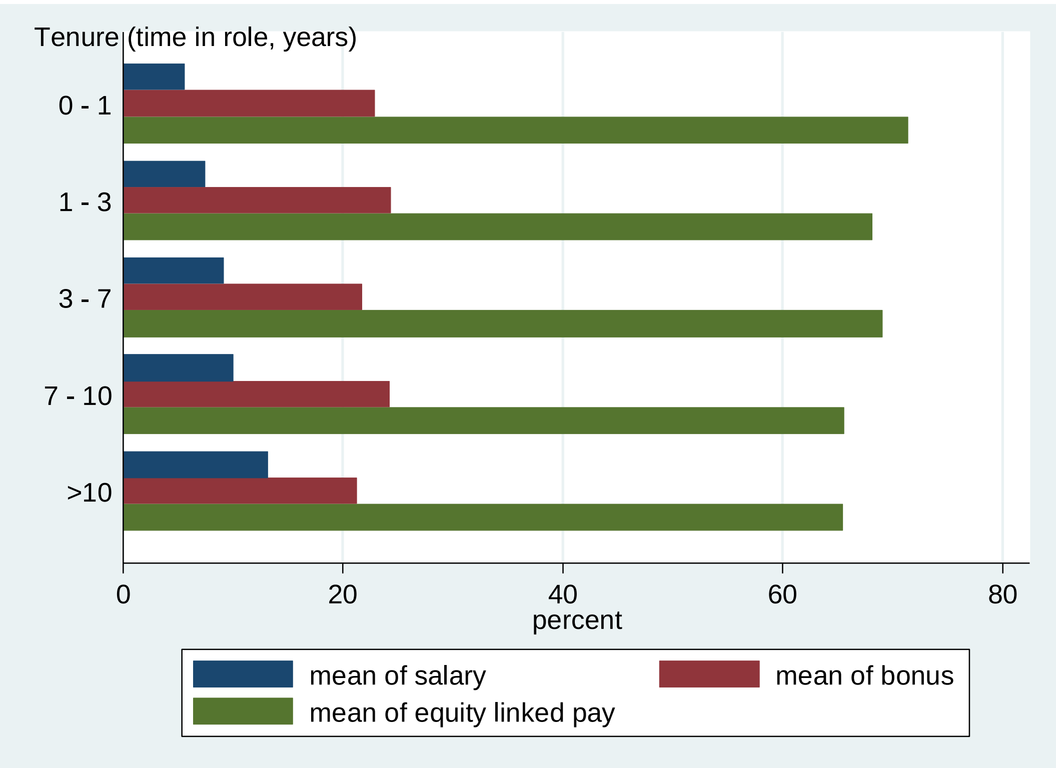
Source: BoardEx; own calculation.

Figure 2.4 Compensation structure: by number of qualifications: All banks, 1999-2013



Source: BoardEx; own calculation

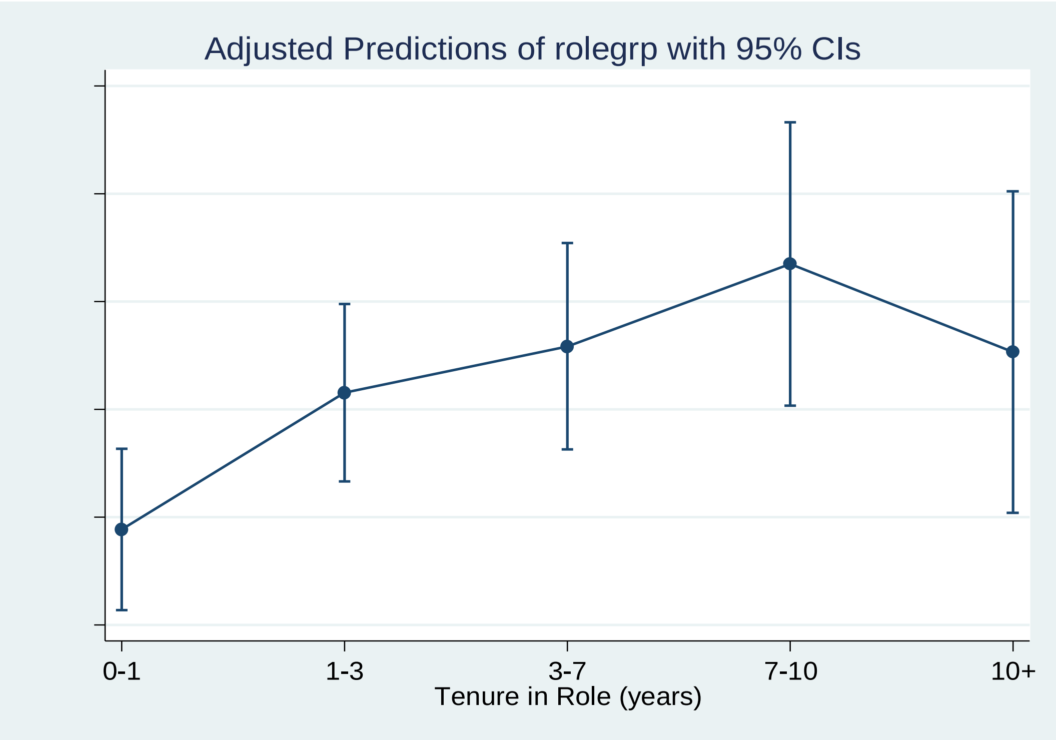
Figure 2.5a Earnings by tenure (time in role): All banks, 1999-2013



Source: BoardEx; own calculation

The gender of bank executives is predominantly male (95 percent) and this pattern repeats across countries. The sample has only one female CEO. Beth E. Mooney became CEO of KeyCorp, a US bank, on 1st May 2011. She is the first woman to become CEO of a top-20 US bank. Female participation is greatest when board size is around 19 members: 25 of 305 bank-year observations are on female executives. Female participation falls to zero when board size is less than eight members. Figure 2.6 depicts gender participation in bank boardrooms at all banks for 1999-2013. It shows that females participate more as independent directors than as executives. Nevertheless, the data suggest that banking is a male-dominated industry.

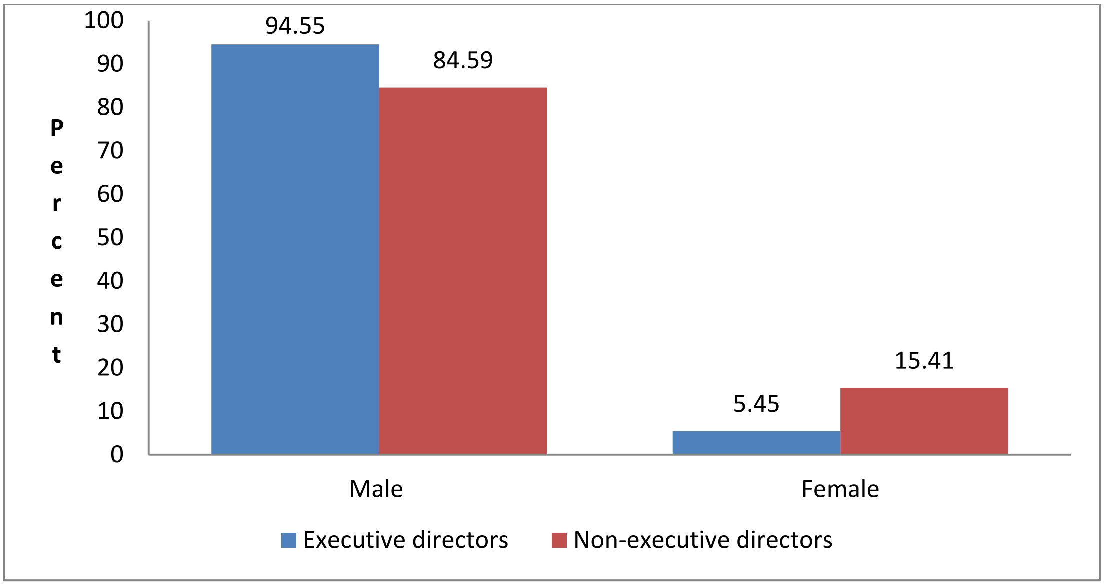
Figure 2.5b: All banks executives: means of salary vs tenure, 1999-2013



Source: BoardEx; own calculation

Table 2.6a shows pay differentials between male and female bank executives. It presents total pay and its constituents together with total accumulated wealth (portfolio holdings). It reports differences between means and shows whether differences are statistically significant based on a t-test. Table 2.6 clearly shows that males earn significantly more than females (except bonus). On average, total pay differs across gender by £1,547,404. The incentive structure favours males. On average, the average equity incentive for males is £2,015,483 above females, and portfolio incentives (total accumulated wealth) are £15,900,000 higher. The results reject the null hypothesis that the variances in pay are equal (bar bonus). A test of medians (not reported) confirms this. Table 2.6b repeats the analysis for G-SIBs. Whilst pay is higher than for all banks, differentials tend to be smaller and less important in terms of statistical significance. On average, female executives earned more bonus though the difference is insignificant.

Figure 2.6: Gender participation: All banks, 1999-2013



Source: BoardEx; own calculation

Table 2.6a: Executive remuneration; by gender, all banks - 1999-2013

Earnings	Male (mean £)	Female (mean £)	Difference	t	P(T >t)
Total pay	5,108,495	3,561,092	1,547,404	5.08	0.000
Salary	495,492	426,986	68,507	3.05	0.001
Bonus	1,416,969	1,174,710	242,260	1.59	0.057
Equity-linked pay	4,557,818	2,542,335	2,015,483	7.21	0.000
Total acc. wealth	31,300,000	15,400,000	£15,900,000	7.75	0.000

Table 2.6b: Executive remuneration; by gender, G-SIBs - 1999-2013

Earnings	Male (mean £)	Female (mean £)	Difference	t	P(T >t)
Total pay	7,532,851	6,584,350	948,501	1.56	0.060
Salary	664,845	579,172	85,673	1.71	0.046
Bonus	2,157,344	2,403,836	-246,492	-0.90	0.815
Equity-linked pay	6,313,185	4,762,719	1,550,466	2.59	0.005
Total acc. wealth	41,600,000	34,100,000	7,516,637	1.90	0.029

Five bank-level variables that vary within and between banks complete the vector of covariates. Pairwise comparisons show differences in each variable by cohort and time interval. On average, total assets (size) for a G-SIB is £710,287 million, which is significantly larger than EU and US banks (£204,604 million and £65,519 million, respectively). Differences are significant at the 1 percent level (Table 2.7a-b). Average bank size increases following the global financial crisis. From a pre-crisis mean of £242,727 million, the average bank has assets worth £525,025 million and £527,710 million in 2007-09 and 2010-13, respectively. Size in both intervals is significantly larger than pre-crisis at the 1 percent level, whilst the difference between crisis and post-crisis is insignificant. Arguably, developments in size reflect consolidation arrangements due to the crisis.

There is no significant difference in growth opportunities (market-to-book value of equity) between the cohorts. However, growth opportunities are significantly greater pre-crisis (Table 2.7c-d). Similarly, diversification (non-interest income-to-total operating income) does not vary significantly across cohorts. Diversification is higher in-crisis in comparison to either pre-crisis or post-crisis. Indeed, the difference between pre-crisis and post-crisis is insignificant (Table 2.7e-f). Table 2.7g-h presents leverage (total assets-to-equity). US banks are significantly less levered than either G-SIBs or EU banks at the 1 percent level. Though leverage increases in-crisis, the difference from pre-crisis levels is insignificant. However, leverage is significantly lower post-crisis in comparison to crisis and pre-crisis levels at the 1 percent level. Bank profitability (return on equity) at G-SIBs and US banks is significantly greater than EU banks at the 1 percent level though the difference between the former cohorts is insignificant. Profitability collapses in 2007-09. Although profitability rebounds in 2010-13 (and is significantly larger than 2007-09 at the 10 percent level), bank profit remains significantly below pre-crisis levels at the 1 percent level (Table 2.7i-j).

Table 2.7a: Pairwise Comparisons: by Cohort, 1999-2013 – Size (total assets, £ m)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	710,286.7	17,187.9	41.32	0.000	676,555.4	744,018.1
(2) EU banks	204,604.0	21,206.5	9.65	0.000	162,986.2	246,221.8
(3) US banks	65,518.9	18,748.8	3.49	0.000	28,724.4	102,313.5
				Tukey	Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-505,682.7	27,297.3	-18.53	0.000	-569,761.4	-441,604.0
3 vs 1	-644,767.8	25,435.1	-25.35	0.000	-704,475.1	-585,060.5
3 vs 2	-139,085.1	28,306.1	-4.91	0.000	-205,531.9	-72,638.3

Table 2.7b: Pairwise Comparison of Means: by Time– Size (total assets, £ m)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	242,726.9	17,909.6	13.55	0.000	207,579.2	277,874.6
(2) 2007-2009	525,024.7	31,750.4	16.54	0.000	462,714.5	587,334.9
(3) 2010-2013	527,709.8	28,711.9	18.38	0.000	471,362.7	584,056.8
				Tukey	Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	282,297.9	36,453.3	7.74	0.000	196,725.9	367,869.9
3 vs 1	284,982.9	33,839.7	8.42	0.000	205,546.2	364,419.7
3 vs 2	2,685.0	42,807.2	0.06	0.998	-97,802.4	103,172.5

Table 2.7c: Pairwise Comparisons: by Cohort, 1999-2013 – Growth opportunities

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	1.917	0.113	16.89	0.000	1.69	2.14
(2) EU banks	2.008	0.147	13.65	0.000	1.72	2.30
(3) US banks	1.746	0.125	13.98	0.000	1.50	1.99
				Tukey	Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	0.091	0.186	0.49	0.876	-0.35	0.53
3 vs 1	-0.171	0.169	-1.01	0.568	-0.57	0.23
3 vs 2	-0.262	0.193	-1.36	0.364	-0.72	0.19

Table 2.7d: Pairwise Comparison of Means: by Time – Growth opportunities

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	2.117	0.103	20.57	0.000	1.92	2.32
(2) 2007-2009	1.296	0.179	7.23	0.000	0.94	1.65
(3) 2010-2013	1.500	0.162	9.25	0.000	1.18	1.82
				Tukey	Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-0.821	0.207	-3.97	0.000	-1.31	-0.34
3 vs 1	-0.617	0.192	-3.21	0.004	-1.07	-0.17
3 vs 2	0.204	0.242	0.85	0.674	-0.36	0.77

Table 2.7e: Pairwise Comparison of Means: by Cohort, 1999-2013 – Diversification

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	0.5422	0.2163	2.51	0.012	0.1178	0.9666
(2) EU banks	0.8971	0.2668	3.36	0.001	0.3735	1.4208
(3) US banks	0.4025	0.2359	1.71	0.088	-0.0604	0.8655
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	0.3550	0.3434	1.03	0.556	-0.4512	1.1612
3 vs 1	-0.1396	0.3200	-0.44	0.900	-0.8908	0.6116
3 vs 2	-0.4946	0.3561	-1.39	0.347	-1.3306	0.3414

Table 2.7f: Pairwise Comparison of Means: by Time – Diversification

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	0.4769	0.1786	2.67	0.008	0.1264	0.8274
(2) 2007-2009	1.1576	0.3166	3.66	0.000	0.5362	1.7790
(3) 2010-2013	0.4102	0.2863	1.43	0.152	-0.1518	0.9721
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	0.6807	0.3635	1.87	0.147	-0.1727	1.5341
3 vs 1	-0.0667	0.3375	-0.20	0.979	-0.8589	0.7255
3 vs 2	-0.7474	0.4269	-1.75	0.187	-1.7496	0.2547

Table 2.7g: Pairwise Comparison of Means: by Cohort, 1999-2013 - Leverage

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	21.0393	0.4693	44.83	0.000	20.1182	21.9604
(2) EU banks	23.4068	0.5791	40.42	0.000	22.2703	24.5432
(3) US banks	11.1054	0.5120	21.69	0.000	10.1006	12.1101
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	2.3675	0.7454	3.18	0.004	0.6177	4.1173
3 vs 1	-9.9339	0.6945	-14.30	0.000	-11.5643	-8.3035
3 vs 2	-12.3014	0.7729	-15.91	0.000	-14.1159	-10.4870

Table 2.7h: Pairwise Comparison of Means: by Time - Leverage

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	18.8833	0.4439	42.54	0.000	18.0121	19.7544
(2) 2007-2009	19.5294	0.7870	24.82	0.000	17.9850	21.0738
(3) 2010-2013	15.8790	0.7116	22.31	0.000	14.4824	17.2756
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	0.6461	0.9035	0.72	0.755	-1.4748	2.7671
3 vs 1	-3.0043	0.8387	-3.58	0.001	-4.9732	-1.0354
3 vs 2	-3.6504	1.0610	-3.44	0.002	-6.1411	-1.1598

Table 2.7i: Pairwise Comparison of Means: by Cohort, 1999-2013 – Profitability (ROE)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	0.1384	0.0115	11.99	0.000	0.1158	0.1611
(2) EU banks	0.0794	0.0142	5.57	0.000	0.0514	0.1073
(3) US banks	0.1463	0.0126	11.62	0.000	0.1215	0.1710
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-0.0590	0.0183	-3.22	0.004	-0.1021	-0.0160
3 vs 1	0.0078	0.0171	0.46	0.890	-0.0323	0.0479
3 vs 2	0.0669	0.0190	3.52	0.001	0.0222	0.1115

Table 2.7j: Pairwise Comparison of Means: by Time – Profitability (ROE)

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	0.2017	0.0088	22.97	0.000	0.1845	0.2189
(2) 2007-2009	-0.0075	0.0156	-0.48	0.629	-0.0381	0.0230
(3) 2010-2013	0.0385	0.0141	2.74	0.006	0.0109	0.0661
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-0.2092	0.0179	-11.71	0.000	-0.2512	-0.1673
3 vs 1	-0.1632	0.0166	-9.84	0.000	-0.2022	-0.1242
3 vs 2	0.0460	0.0210	2.19	0.073	-0.0032	0.0953

Table 2.8 shows Pearson correlation coefficients for the covariates, which vary from 0.25 to 0.58. The correlations suggest that multicollinearity will not be a problem in the regressions to follow.

Table 2.8: Pearson correlation coefficients: Executive-level and bank-level covariates

	Age	*Female*	*Nationality*	*Education*	*Tenure*	*Independ.*	*Size*	*Growth*	*Diversification*	*Leverage*	*ROE*
Age	1										
Female	-0.1389*	1									
Nationality	0.1022*	-0.0591*	1								
Education	-0.0325*	0.0056	-0.0651*	1							
Tenure	0.2562*	-0.0194	0.1191*	-0.0073	1						
Independence	0.0466*	-0.0446*	0.2732*	-0.0131	0	1					
Size	0.0584*	-0.0244	0.2603*	0.1952*	-0.0601*	0.2059*	1				
Growth	-0.0853*	0.0113	-0.1588*	0.0138	-0.0117	-0.1272*	-0.2510*	1			
Diversification	-0.0772*	-0.0173	-0.1106*	0.0473*	-0.1054*	-0.0320*	0.2304*	0.1341*	1		
Leverage	-0.1403*	-0.0616*	0.3438*	0.0095	-0.0182	0.0483*	0.4273*	-0.0031	0.1657*	1	
ROE	-0.0585*	0.0075	-0.0969*	0.0225	0.0428*	-0.0625*	-0.0373*	0.5785*	0.2543*	0.0362*	1

Note: *statistically significant at the 5 percent level.

2.7 Results

As a prelude to the regression analysis, this section begins by presenting the evolution of average total pay by year across professional status for each cohort. The analysis also shows developments in total pay in relation to 2006, that is, immediately before the exogenous shock of 2007. The second section reports estimates from the slope comparison models, which show contrasts between CEO pay and the pay of other executives. The third section reports on the hierarchical linear model that specifies the vector of executive-level and bank-level factors.

2.7.1 Evolution of total pay by professional status by year

At the beginning of the period 1999-2013, average total pay is noticeably higher at G-SIBs and US banks. Arguably, corporate governance scandals in the US together with the onset of a recession in March 2001 brought to an end such high levels of total pay. Overall, boom and bust cycles drive an intertemporal variation in executive pay. Pay levels pick up in 2003 and peak in 2006. In 2006, total pay for a CEO at the average G-SIB stood at £12,900,000 in comparison to £2,578,397 at EU banks and £3,824,010 at US banks.

The data support the notion that CEOs as the most public executives were hardest hit by the breaching of the outrage constraint. At G-SIBs, average CEO total pay in 2007 and 2008 was equal to 80.6 percent and 75 percent of 2006 pay. In 2009, total pay bottoms out at 25.4 percent. From 2010 to 2013, CEO pay ranges between 43.1 and 48.5 percent of 2006 pay. Whereas total pay for other roles held up somewhat better in 2007 and 2008, the bottoming out in 2009-10 affects the chair, chief operating officer, and chief legal officer. Average total pay is gaining as a share of 2006 for the chief operating officer, chief finance officer and senior executives over 2010-13. Junior and middle executives, and to a lesser extent chief risk officers, have tended to fare best with total pay exceeding 2006 levels (Table 2.9a).

There are some differences in the development of total pay at EU banks. CEO pay tends to hold up better than at G-SIBs except in 2011, which likely reflects the Eurozone crisis though pay rises in 2012 and was equal to 97.3 percent of 2006 in 2013. In real terms, CEO pay in 2013 was broadly equivalent to pre-crisis (2006) levels at EU banks. Pay levels for chair, chief operating officer and chief finance officer fall off more than for CEOs, although pay either exceeds 2006 levels (chair) or moves towards this by 2012-13. Pay of a junior executive exceeds 2006 in all years bar two (Table 2.9b). At US banks, CEO total pay remains strong in 2009-10 before decreasing as a share of 2006 until 2013. A similar pattern exists for chief finance officers. Total pay for chief risk officer and a junior executive is above 2006 in all years bar one. The pay of middle and senior roles holds up relative to 2006 (Table 2.9c). Notwithstanding differences in the size of total pay at G-SIBs relative to EU and US banks, the global financial crisis appears not to affect US banks as much as it does G-SIBs and EU banks. Based on averages for 1999-2013, the total pay of CEOs at G-SIBs are 6.36 and 1.6 times greater than amounts paid at EU banks and US banks. US bank CEOs total pay is 3.97 times greater than EU banks.

2.7.2 Pay contrasts from slope comparison models

Equation [2.1] defines the slope comparison model that regresses professional status on executive compensation. Separate regressions are performed for each cohort over 1999-2013. There are six compensation variables and three cohorts resulting in 18 regressions. The estimated coefficients show the contrast in compensation between each role (professional status) and the CEO as baseline (denoted by the intercept). Table 2.10a reports estimated coefficients for each cohort over 1999-2013 when the dependent variable is total pay. The intercept terms show that average total pay for CEOs is £12,236,127 at G-SIBs, £1,899,880 at EU banks, and £7,491,199 at US banks. The negative signs on the contrast indicate that total pay for other executive roles is lower than CEOs. The majority of the contrasts are significant at the 1 percent level though there are some exemptions. At G-SIBs, the average chief operating officer and senior executive earn £3,147,728 and £94,772 less than the average CEO but the differences are insignificant. There is no significant difference in average total pay between CEOs and middle executives at EU banks and chief operating officers at US banks. Senior executives at EU banks and US banks receive higher total pay than CEOs (£3,678,727 and £1,866,134) with the former significant at the 1 percent level.

Table 2.9a: G-SIBs: Total pay (£) and (%) change in relation to 2006

G-SIBs	Chief Executive Officer		Chair person		Chief Operating Officer		Chief Finance Officer	
Year	**Total pay**	**% Change**	**Total pay**	**% Change**	**Total pay**	**% Change**	**Total pay**	**% Change**
	Mean, £	**from 2006**	**Mean, £**	**from 2006**	**Mean, £**	**from 2006**	**Mean, £**	**from 2006**
1999	24,900,000		2,189,059		20,800,000		8,117,477	
2000	35,800,000		1,488,043		10,200,000		2,976,591	
2001	12,700,000		2,317,942		11,200,000		3,250,657	
2002	11,300,000		4,385,917		6,634,989		4,581,079	
2003	9,830,772		10,300,000		8,122,619		4,817,459	
2004	8,631,878		4,469,129		6,831,212		4,727,518	
2005	12,200,000		5,555,821		8,493,451		5,568,146	
2006	16,000,000		8,120,663		13,500,000		7,732,751	
2007	12,900,000	80.63	10,100,000	124.37	12,400,000	91.85	7,573,706	97.94
2008	12,000,000	75.00	19,400,000	238.90	10,000,000	74.07	6,484,586	83.86
2009	4,064,864	25.41	3,751,366	46.20	3,159,910	23.41	4,557,573	58.94
2010	7,189,773	44.94	2,911,730	35.86	2,128,248	15.76	4,392,988	56.81
2011	6,889,944	43.06	2,326,834	28.65	6,935,865	51.38	4,797,405	62.04
2012	7,766,876	48.54	3,744,664	46.11	8,090,567	59.93	6,110,054	79.02
2013	6,992,130	43.70	1,570,750	19.34	9,961,571	73.79	6,202,929	80.22
Total	12,000,000		5,313,514		9,300,011		5,576,510	

Cont.

Table 2.9a: G-SIBs: Total pay (£) and (%) change in relation to 2006

GSIBs	C. Risk Officer		C. Legal Officer		Junior Executives		Middle Executives		Senior Executives	
Year	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Change From 2006**
1999					481,337		1,444,350		18,000,000	
2000			5,554,059		583,900		1,755,922		29,500,000	
2001			2,500,229		476,857		2,111,856		14,000,000	
2002	13,800,000		2,753,220		460,458		2,003,592		14,300,000	
2003	7,570,088		6,428,794		290,504		2,385,723		10,000,000	
2004	6,028,132		9,541,609		496,377		2,537,584		8,327,568	
2005	7,901,957		12,400,000		155,057		2,701,773		9,344,943	
2006	5,000,985		9,949,840		198,672		2,644,819		12,600,000	
2007	3,731,475	74.61	5,690,265	57.19	99,332	50.00	3,086,853	116.71	10,000,000	79.37
2008	1,305,909	26.11	3,552,116	35.70	363,786	183.11	2,079,517	78.63	10,900,000	86.51
2009	4,578,873	91.56	10,600,000	106.53	361,769	182.09	3,278,997	123.98	10,200,000	80.95
2010	5,378,715	107.55	1,078,778	10.84	531,372	267.46	2,862,990	108.25	7,855,856	62.35
2011	7,052,848	141.03	3,515,649	35.33	584,573	294.24	2,931,657	110.85	8,692,321	68.99
2012	3,233,720	64.66	5,472,657	55.00			3,322,576	125.63	8,808,969	69.91
2013	3,473,667	69.46	5,412,000	54.39	502,286	252.82	3,196,571	120.86	9,030,550	71.67
Total	5,124,066		5,788,748		445,571		2,461,511		12,000,000	

Source: BoardEx; own calculations.

Table 2.9b: EU banks: Total pay (£) and (%) change in relation to 2006

EU banks	Chief Executive Officer		Chair person		Chief Operating Officer		Chief Finance Officer		Junior Executives		Middle Executives	
Year	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Change From 2006**	**Total pay Mean, £**	**% Chg 2006**
1999	885,338		112,503		470,343		693,450		532,543		1,126,925	
2000	1,239,774		399,237				948,468		270,259		1,418,038	
2001	1,423,730		300,106		958,508		1,125,724		329,766		1,289,437	
2002	1,263,771		276,910		823,108		1,094,302		601,665		1,403,114	
2003	1,901,966		284,080		1,350,159		1,114,634		439,796		1,390,168	
2004	1,866,694		850,759		992,148		1,004,041		507,190		1,390,463	
2005	2,937,463		1,250,477		1,758,409		1,429,310		230,300		1,879,547	
2006	2,578,397		931,965		1,473,922		1,829,305		245,358		2,338,311	
2007	2,456,065	95.26	949,511	101.88	393,741	26.71	1,337,775	73.13	210,807	85.92	1,967,345	84.14
2008	1,658,384	64.32	620,663	66.60	436,215	29.60	578,409	31.62	362,546	147.76	1,393,070	59.58
2009	1,415,426	54.90	493,056	52.91	604,186	40.99	1,022,714	55.91	237,325	96.73	2,595,508	111.00
2010	2,572,230	99.76	445,160	47.77	508,730	34.52	1,450,062	79.27	357,575	145.74	4,400,333	188.18
2011	981,529	38.07	427,912	45.92	529,502	35.92	767,915	41.98	395,661	161.26	1,866,598	79.83
2012	2,169,902	84.16	1,090,669	117.03	726,266	49.27	1,157,247	63.26	569,052	231.93	826,388	35.34
2013	2,507,500	97.25	1,099,000	117.92	1,274,500	86.47	1,686,750	92.21	586,400	239.00	975,000	41.70
Total	1,888,180		690,260		1,008,862		1,174,004		344,124		1,705,355	

Source: BoardEx; own calculations.

Table 2.9c: US banks: Total pay (£) and (%) change in relation to 2006

US banks	Chief Executive Officer		Chief Operating Officer		Chief Finance Officer		Chief Administrative officer		Chief Risk Officer	
Year	**Total pay**	**% Change**	**Total pay**	**% Change**	**Total pay**	**% Change**	**Total pay**	**% Change**	**Total pay**	**% Change**
	Mean, £	**From 2006**	**Mean, £**	**From 2006**	**Mean, £**	**From 2006**	**Mean, £**	**From 2006**	**Mean, £**	**From 2006**
1999	7,886,033		1,615,702		2,637,714				619,443	
2000	11,800,000		7,032,941		3,582,040				2,382,620	
2001	9,135,512		5,682,491		2,332,152		1,527,663		1,872,120	
2002	7,817,113		11,200,000		2,489,410		1,858,344		1,988,996	
2003	9,492,871		10,600,000		4,485,610		3,677,089		1,868,057	
2004	5,532,968		8,115,047		2,673,944		3,276,818		2,202,447	
2005	11,100,000		8,251,432		6,420,802		2,452,887		1,621,939	
2006	6,699,711		5,975,136		2,634,947		4,765,822		1,284,015	
2007	5,731,893	85.55	2,850,168	47.70	1,763,743	66.94	3,265,878	68.53	1,530,548	119.20
2008	6,564,231	97.98	1,697,134	28.40	3,212,390	121.91	2,822,537	59.22	876,262	68.24
2009	6,667,657	99.52	2,959,134	49.52	1,984,227	75.30	1,989,996	41.76	2,152,580	167.64
2010	5,595,995	83.53	2,578,674	43.16	1,947,165	73.90	1,312,617	27.54	1,668,312	129.93
2011	5,049,838	75.37	3,181,888	53.25	2,624,634	99.61	2,334,531	48.98	1,739,867	135.50
2012	4,991,055	74.50	3,249,136	54.38	2,023,845	76.81	1,558,244	32.70	2,349,182	182.96
2013	6,801,000	101.51	2,940,500	49.21	2,930,538	111.22	1,877,333	39.39	1,966,600	153.16
Total	7,493,061		5,780,601		2,879,903		2,304,345		1,822,639	

Cont.

Table 2.9c: US banks: Total pay (£) and (%) change in relation to 2006

US banks	Chief Legal Officer		Junior Executives		Middle Executives		Senior Executives	
Year	**Total pay**	**% Change**	**Total pay**	**% Change**	**Total pay**	**% Change**	**Total pay**	**% Change**
	Mean, £	**From 2006**	**Mean, £**	**From 2006**	**Mean, £**	**From 2006**	**Mean, £**	**From 2006**
1999	3,430,655		619,443		2,721,752			
2000	3,150,893		392,500		2,708,624		7,952,639	
2001	1,099,735		302,067		2,884,242		7,964,155	
2002	541,752		460,400		2,240,165		8,021,704	
2003	901,349		342,202		2,011,442		14,400,000	
2004	661,432		449,288		2,230,200		8,429,918	
2005			437,318		2,208,395		13,700,000	
2006	3,824,010		433,720		2,044,028		8,241,373	
2007	1,094,260	28.62	501,544	115.64	2,334,686	114.22	7,175,339	87.06
2008	2,619,845	68.51	404,471	93.26	2,458,249	120.26	8,558,856	103.85
2009	1,350,534	35.32	468,214	107.95	2,294,785	112.27	9,755,567	118.37
2010	923,924	24.16	668,468	154.12	2,300,284	112.54	9,473,082	114.95
2011	982,042	25.68	563,879	130.01	2,020,089	98.83	5,637,763	68.41
2012	1,034,255	27.05			1,822,702	89.17	7,683,134	93.23
2013	977,000	25.55			2,021,783	98.91	9,790,000	118.79
Total	1,880,478		439,331		2,265,012		9,751,326	

Source: BoardEx; own calculations.

Table 2.10b shows pairwise comparisons of mean total pay by professional status for 1999-2013. For G-SIBs, there is overlap (no significant difference) between the total pay of CEOs (D), chief operating officers (BCD) and chief administrative officers (BC). The latter two roles overlap (B) with other roles (except middle executives, A). There is less overlap in total pay at EU banks. CEOs and middle executives form one group (C) into which chief risk officers' overlap (A, B and C). Senior executives form their own group (D). Total pay overlaps senior executives, chief operating officers and CEOs in US banks, and is significantly higher than other roles.

The regression is re-estimated using fixed pay (salary) as the dependent variable. Fixed pay for the average CEO at G-SIBs is £913,869, which is higher than the £655,573 and £637,877 at EU banks and US banks, respectively (Table 2.10c). CEOs earn higher fixed pay than other executive roles and the differences are very significant in most cases across cohorts at the 95 percent confidence interval. Table 2.10d shows mean comparisons. In terms of fixed pay, there is not a significant difference between CEO and chair at G-SIBs and US banks, and between CEO, chief risk officer and middle executive at EU banks. Fixed pay varies less across professional status at EU banks.

A third set of estimations uses variable pay (equity-linked pay plus bonus) as the dependent variable (Table 2.10e). Average CEO variable pay for the cohorts is £12,113,475 (G-SIBs), £1,610,935 (EU banks), and £7,125,587 (US banks). Senior executives at EU banks earn significantly higher variable pay than CEOs at EU banks. At US banks, the contrast between CEO variable pay and that of chair, chief operating officer and senior executive is insignificant, as is the contrast between CEO and chief operating officer and senior executives at G-SIBs. The pairwise comparisons indicate fewer significant differences in variable pay at US banks (A or B). At G-SIBs, mean variable pay is statistically equivalent for CEO, chief operating officer, and senior executives (E). At EU banks, mean CEO variable pay is equivalent to chief risk officer and middle executives (D) (Table 2.10f).

Table 2.10a: Contrast in total pay by professional status (£); by cohort, 1999-2013

	G-SIBs	**EU banks**	**US banks**
	Contrast/(t)	Contrast/(t)	Contrast/(t)
Chair	-7215624.0***	-1239167.1***	-4184376.2***
	(-4.49)	(-2.99)	(-3.33)
C. Operating Officer	-3147727.6	-916603.0**	-1750495.5
	(-1.19)	(-2.44)	(-0.88)
C. Finance Officer	-6267270.9***	-717501.5***	-4484152.9***
	(-3.15)	(-3.65)	(-6.37)
C. Administrative Off.	-5127003.9*	-1072737.0***	-5011082.7***
	(-1.87)	(-3.11)	(-5.48)
C. Risk Office	-5678023.9**	-793156.7	-5625813.0***
	(-2.77)	(-1.28)	(-5.75)
C. Legal Officer	-6645938.3**		-5424621.9***
	(-2.57)		(-5.86)
Junior executives	-12404273.3***	-1553823.5***	-7221143.5***
	(-4.20)	(-3.83)	(-6.47)
Middle executives	-10109277.7***	-217423.0	-5162407.4***
	(-4.17)	(-0.81)	(-5.09)
Senior executives	-94772.3	3678726.8***	1866133.7
	(-0.04)	(9.74)	(1.08)
INTERCEPT	12236127.0***	1899880.4***	7491199.3***
	(5.08)	(5.01)	(7.02)
Observations	1425	637	1360
R^2	0.137	0.371	0.233
Adjusted R^2	0.123	0.348	0.220

t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01. The source of variation is by year. Robust standard errors are clustered by firm.

Table 2.10b: Pairwise Comparisons of Means: Professional Status, Total pay (£)

Total pay vs Exec. role	**G-SIBs Mean (£)**	**G***	**EU banks Mean (£)**	**G***	**US banks Mean (£)**	**G***
CEO	12,200,000	CD	1,899,880	C	7,491,199	D
Chair	5,020,503	AB	660,713	AB	3,306,823	ABC
C. Operating Officer	9,088,399	BCD	983,277	B	5,740,704	BCD
C. Finance Officer	5,968,856	B	1,182,379	B	3,007,046	C
C. Administrative Off.	7,109,123	BC	827,143	B	2,480,117	BC
C. Risk Office	6,558,103	B	1,106,724	ABC	1,865,386	B
C. Legal Officer	5,590,189	B			2,066,577	BC
Junior executives	-168,146		346,057	A	270,056	A
Middle executives	2,126,849	A	1,682,457	C	2,328,792	BC
Senior executives	12,100,000	D	5,578,607	D	9,357,333	D

*sharing a letter in the group label are not significantly different at the 5% level.

Table 2.10c: Contrast in fixed pay by professional status (£); by cohort, 1999-2013

	G-SIBs Contrast/(t)	EU banks Contrast/(t)	US banks Contrast/(t)
Chair	-55301.7	-210907.9**	-100851.2*
	(-0.58)	(-2.53)	(-1.91)
C. Operating Officer	-312064.4***	-292303.0***	-243143.0***
	(-3.77)	(-3.29)	(-7.85)
C. Finance Officer	-384056.0***	-264840.1***	-337547.8***
	(-4.24)	(-3.54)	(-13.31)
C. Administrative Off.	-437174.8***	-305555.9***	-315793.9***
	(-4.94)	(-3.71)	(-7.44)
C. Risk Office	-435403.0***	-264035.6	-366385.1***
	(-3.74)	(-1.72)	(-12.17)
C. Legal Officer	-574922.7***		-376593.2***
	(-5.85)		(-14.73)
Junior executives	-601732.6***	-416930.2***	-394867.1***
	(-6.31)	(-3.55)	(-10.41)
Middle executives	-239062.0***	-132402.1*	-280726.8***
	(-3.97)	(-2.06)	(-9.30)
Senior executives	-403221.8***	-156498.5	-224144.2***
	(-6.07)	(-1.07)	(-7.53)
INTERCEPT	913869.2***	655572.5***	637877.0***
	(10.02)	(7.13)	(22.82)
Observations	1404	636	1358
R^2	0.256	0.308	0.509
Adjusted R^2	0.244	0.283	0.501

t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01. The source of variation is by year. Robust standard errors are clustered by firm.

Table 2.10d: Pairwise Comparisons of Means: Director Roles' Fixed pay (£)

Fixed pay vs Exec. roles	G-SIBs Mean (£)	G*	EU banks Mean (£)	G*	US banks Mean (£)	G*
CEO	913,869	G	655,573	D	637,877	E
Chair	858,568	FG	444,665	ABC	537,026	DE
C. Operating Officer	601,805	DE	363,270	B	394,734	C
C. Finance Officer	529,813	CDE	390,732	B	300,329	B
C. Administrative Off.	476,694	BC	350,017	B	322,083	ABC
C. Risk Office	478,466	BCDE	391,537	ABCD	271,492	AB
C. Legal Officer	338,947	AB			261,284	A
Junior executives	312,137	A	238,642	A	243,010	A
Middle executives	674,807	EF	523,170	CD	357,150	C
Senior executives	510,647	CD	499,074	B	413,733	CD

*sharing a letter in the group label are not significantly different at the 5% level.

Table 2.10e: Contrast in variable pay by professional status (£); by cohort, 1999-2013

	G-SIBs	EU banks	US banks
	Contrast/(t)	Contrast/(t)	Contrast/(t)
Chair	-6990425.6***	-771498.1**	-2339520.0
	(-4.42)	(-2.13)	(-1.44)
C. Operating Officer	-3326743.7	-978689.8**	-1788419.7
	(-1.23)	(-2.48)	(-0.90)
C. Finance Officer	-6480778.5***	-731771.2***	-4386734.1***
	(-3.07)	(-3.29)	(-6.14)
C. Administrative Off.	-5383604.9*	-973942.1***	-4955530.5***
	(-1.90)	(-3.52)	(-5.25)
C. Risk Office	-5751871.0**	-700324.2	-5529347.5***
	(-2.63)	(-1.16)	(-5.46)
C. Legal Officer	-6857912.1**		-5286288.1***
	(-2.47)		(-5.64)
Junior executives	-13474191.0***	-1379645.1***	-7095740.6***
	(-3.76)	(-3.97)	(-6.09)
Middle executives	-10500227.9***	-412817.8*	-5156343.2***
	(-4.14)	(-1.80)	(-4.94)
Senior executives	-480225.5	3211757.5***	1796828.6
	(-0.21)	(6.79)	(1.05)
INTERCEPT	12113475.0***	1610935.3***	7125587.0***
	(4.73)	(5.05)	(6.55)
Observations	1334	459	1319
R^2	0.135	0.353	0.230
Adjusted R^2	0.120	0.320	0.216

t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01. The source of variation is by year. Robust standard errors are clustered by firm.

Table 2.10f: Pairwise Comparisons of Means: Director Roles' Variable pay (£)

Variable pay vs Exec. roles	G-SIBs Mean (£)	G*	EU banks Mean (£)	G*	US banks Mean (£)	G*
CEO	12,100,000	DE	1,610,935	D	7,125,587	B
Chair	5,123,049	BC	839,437	ABC	4,786,067	AB
C. Operating Officer	8,786,731	CDE	632,245	BC	5,337,167	AB
C. Finance Officer	5,632,697	C	879,164	BC	2,738,853	A
C. Administrative Off.	6,729,870	CD	636,993	B	2,170,057	A
C. Risk Office	6,361,604	C	910,611	ABCD	1,596,239	A
C. Legal Officer	5,255,563	C			1,839,299	A
Junior executives	-1,360,716	A	231,290	A	29,846	
Middle executives	1,613,247	AB	1,198,118	CD	1,969,244	A
Senior executives	11,600,000	E	4,822,693		8,922,416	B

*sharing a letter in the group label is not significantly different at the 5% level.

Tables 2.10g-h and 2.10i-j show results when bonus and equity-linked pay are dependent variables. The bonus of CEOs at G-SIBs is £3,160,888, which exceeds payments at US banks (£1,332,620) and EU banks (£517,756). Significant contrasts occur between CEO bonus pay and other executives across cohort. Whereas some executive roles earn higher bonus than the CEO does, namely, chair (EU and US banks), chief operating officer (G-SIBs and US banks), and senior executives (G-SIBs and US banks), the contrasts are statistically insignificant. Table 2.10h shows pairwise comparisons of means across professional status for bonus payments. Bonus falls into five groups (A to E) at G-SIBs with CEO, chief operating officer and senior executives belonging to group E. At EU banks and US banks, there are four and three groups, respectively. In sum, the table shows significant differences in bonus payments across professional status albeit with some degree of overlap.

Table 2.10i shows contrasts in equity-related pay. On average, a CEO at a G-SIB receives £11,484,772 in equity-related pay in comparison with £7,022,831 at US banks and £1,479,588 at EU banks. The average equity-linked pay of non-CEOs is significantly less than the CEO (except senior executives at EU banks). In other cases, the contrast is insignificant; for example, senior executives (G-SIBs and US banks), chief risk officer (EU banks), and chair (US banks). Pairwise comparisons indicate a grouping of equity-linked pay at G-SIBs (six roles belong to or overlap with group C). Equity-linked pay falls into five groups (A to E) at both EU and US banks.

The final estimations specify total accumulated wealth as dependent variable. Table 2.10k shows that average total accumulated wealth for CEOs is £86,869,527 at G-SIBs, £9,970,270 at EU banks, and £63,791,813 at US banks. The total wealth of senior executives, though less in amount than CEOs, is not significantly different across cohorts. The same point holds for chairs at EU banks and US banks, and chief operating officers at G-SIBs and EU banks (and chief risk officer). The mean comparisons confirm the above result. At G-SIBs, total accumulated wealth overlaps for CEO, chair, chief operating officer and senior executives (D). A similar result is found at US banks (D) excluding chief operating officer. Fewer significant differences in wealth occur at EU banks (A and B) (see Table 2.10l).

Table 2.10g: Contrast in bonus pay by professional status (£); by cohort, 1999-2013

	G-SIBs Contrast/(t)	EU banks Contrast/(t)	US banks Contrast/(t)
Chair	-1116219.3*	290915.4	230027.3
	(-1.89)	(0.82)	(0.40)
C. Operating Officer	29403.1	-283727.4***	866990.7
	(0.03)	(-3.32)	(0.88)
C. Finance Officer	-1369678.2***	-215471.9***	-776429.9***
	(-3.64)	(-3.21)	(-3.50)
C. Administrative Off.	-1032516.4	-242610.7***	-1023047.2**
	(-1.60)	(-4.48)	(-2.52)
C. Risk Office	-1143929.4*	-367313.0*	-1032316.7**
	(-1.90)	(-1.84)	(-2.50)
C. Legal Officer	-1001735.0		-784867.5***
	(-1.59)		(-3.63)
Junior executives	-2918444.4***	-363361.8***	-1213716.3**
	(-4.08)	(-4.27)	(-2.62)
Middle executives	-2359794.5***	-36215.6	-923579.3**
	(-4.54)	(-0.40)	(-2.15)
Senior executives	481281.6	-118961.0*	75226.9
	(0.95)	(-2.12)	(0.29)
INTERCEPT	3160888.4***	517755.5***	1332620.0***
	(5.56)	(7.23)	(2.99)
Observations	1048	424	701
R^2	0.209	0.432	0.183
Adjusted R^2	0.191	0.401	0.155

t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01. The source of variation is by year. Robust standard errors are clustered by firm.

Table 2.10h: Pairwise Comparisons of Means: Director Roles' bonuses pay (£)

Bonuses pay vs Exec. role	G-SIBs Mean (£)	G*	EU banks Mean (£)	G*	US banks Mean (£)	G*
CEO	3,160,888	DE	517,756	CD	1,332,620	C
Chair	2,044,669	BCD	808,671	ABCD	1,562,647	ABC
C. Operating Officer	3,190,292	BCDE	234,028	AB	2,199,611	ABC
C. Finance Officer	1,791,210	C	302,284	B	556,190	AB
C. Administrative Off.	2,128,372	BCD	275,145	B	309,573	B
C. Risk Office	2,016,959	CD	150,442	ABC	300,303	B
C. Legal Officer	2,159,153	CD	0		547,753	AB
Junior executives	242,444	A	154,394	A	118,904	A
Middle executives	801,094	AB	481,540	D	409,041	B
Senior executives	3,642,170	E	398,794	CD	1,407,847	C

*sharing a letter in the group label is not significantly different at the 5% level.

Table 2.10i: Contrast in equity-pay by professional status (£); by cohort, 1999-2013

	G-SIBs	EU banks	US banks
	Contrast/(t)	Contrast/(t)	Contrast/(t)
Chair	-7476354.6***	-1283872.8***	-1750918.1
	(-4.18)	(-4.58)	(-1.19)
C. Operating Officer	-4717894.8*	-781060.8**	-2580924.8*
	(-2.03)	(-2.89)	(-1.77)
C. Finance Officer	-6905107.7***	-822258.0***	-4536485.0***
	(-3.31)	(-3.76)	(-6.68)
C. Administrative Off.	-6098298.8**	-928662.4***	-4960094.1***
	(-2.08)	(-4.64)	(-5.58)
C. Risk Office	-6121501.4***	-74769.9	-5587929.8***
	(-2.91)	(-0.10)	(-5.95)
C. Legal Officer	-7329224.2***		-5340653.5***
	(-2.94)		(-5.92)
Junior executives	-12586679.3***	-1056197.4***	-6821898.5***
	(-4.26)	(-5.67)	(-6.90)
Middle executives	-10309717.2***	-655658.1***	-5264824.2***
	(-4.11)	(-3.03)	(-5.44)
Senior executives	-2605595.6	2309465.6***	941521.8
	(-1.11)	(10.06)	(0.55)
INTERCEPT	11484772.0***	1479588.2***	7022830.8***
	(4.61)	(6.41)	(7.03)
Observations	1199	350	1240
R^2	0.128	0.473	0.230
Adjusted R^2	0.111	0.437	0.215

t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01. The source of variation is by year. Robust standard errors are clustered by firm.

Table 2.10j: Pairwise Comparisons of Means: Director Roles' Equity linked pay (£)

Equity linked pay vs Exec. roles	G-SIBs Mean (£)	G*	EU banks Mean (£)	G*	US banks Mean (£)	G*
CEO	11,500,000	D	1,479,588	E	7,022,831	E
Chair	4,008,417	BC	195,715	A	5,271,913	DE
C. Operating Officer	6,766,877	CD	698,527	BCD	4,441,906	BCDE
C. Finance Officer	4,579,664	C	657,330	CD	2,486,346	BCD
C. Administrative Off.	5,386,473	C	550,926	BC	2,062,737	C
C. Risk Office	5,363,271	C	1,404,818	ABCDE	1,434,901	B
C. Legal Officer	4,155,548	C			1,682,177	ABC
Junior executives	-1,101,907	A	423,391	AB	200,932	A
Middle executives	1,175,055	AB	823,930	D	1,758,007	BC
Senior executives	8,879,176	D	3,789,054		7,964,353	E

*sharing a letter in the group label is not significantly different at the 5% level.

Table 2.10k: Contrast in total acc. wealth by prof. status (£); by cohort, 1999-2013

	G-SIBs	EU banks	US banks
	Contrast/(t)	Contrast/(t)	Contrast/(t)
Chair	-38247760.4*	-8078540.2	-12174353.8
	(-1.74)	(-1.72)	(-0.53)
C. Operating Officer	-20516830.7	-8314316.5	-33503835.0**
	(-0.90)	(-1.66)	(-2.58)
C. Finance Officer	-60581297.4***	-8418347.2*	-53578698.7***
	(-3.02)	(-1.88)	(-3.25)
C. Administrative Off.	-50197420.7**	-7506721.5**	-55804075.9***
	(-2.08)	(-2.13)	(-3.30)
C. Risk Office	-53858902.9**	-9445947.8	-56361065.2***
	(-2.74)	(-1.27)	(-3.35)
C. Legal Officer	-53408648.6**		-55578276.4***
	(-2.23)		(-3.45)
Junior executives	-80789913.1***	-9075126.0*	-60115080.0***
	(-3.21)	(-1.91)	(-3.52)
Middle executives	-78147999.0***	-7404341.7*	-52930180.3***
	(-3.10)	(-1.82)	(-3.19)
Senior executives	-36780904.2	-3427806.3	-31991760.8
	(-1.70)	(-0.83)	(-1.64)
INTERCEPT	86869526.7***	9970269.8**	63791812.5***
	(3.52)	(2.44)	(3.72)
Observations	1370	476	1344
R^2	0.124	0.218	0.172
Adjusted R^2	0.109	0.180	0.158

t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01. The source of variation is by year. Robust standard errors are clustered by firm.

Table 2.10l: Pairwise Comparisons of Means: Director Roles' Total acc. wealth (£)

Acc. wealth pay vs Exec. roles	G-SIBs Mean (£)	G*	EU banks Mean (£)	G*	US banks Mean (£)	G*
CEO	86,900,000	D	9,970,270	AB	63,800,000	D
Chair	48,600,000	ABCD	1,891,730	A	51,600,000	ABCD
C. Operating Officer	66,400,000	BCD	1,655,953	A	30,300,000	ABC
C. Finance Officer	26,300,000	B	1,551,923	A	10,200,000	B
C. Administrative Off.	36,700,000	ABC	2,463,548	A	7,987,737	AB
C. Risk Office	33,000,000	BC	524,322	AB	7,430,747	AB
C. Legal Officer	33,500,000	ABC			8,213,536	AB
Junior executives	6,079,614	A	895,144	A	3,676,732	A
Middle executives	8,721,528	A	2,565,928	A	10,900,000	B
Senior executives	50,100,000	CD	6,542,464	B	31,800,000	CD

*sharing a letter in the group label is not significantly different at the 5% level.

2.7.3 Results from hierarchical models of executive pay

Equation [2.2] presents the hierarchical model that specifies the vector of professional status variables (CEO is baseline) and vectors of executive-level and bank-level factors for 1999-2013. The model is estimated for each cohort using three dependent variables, namely total pay, fixed pay, and variable pay. All models control for country-year effects (bar US, year effects only) and standard errors are clustered by firm.

Table 2.11a shows estimated coefficients for G-SIBs. The variation in pay is attributed to differences between firms (σ^2_u) and within firms between executives (σ^2_e). Recall that rho is the intra-class correlation. Model 1 shows that 29.6 percent of the variation in total pay is between banks and 79.4 percent within banks between executives. The significant differences in total pay between CEOs and other executive roles are confirmed. CEO pay differentials are least for chief operating officers and senior executives, and largest for chief legal officers and junior executives. Turning to the executive-level covariates, total pay has a quadratic relationship with age; total pay decreases with age until an executive reaches 46.5 years then increases. An increase in board diversity measured as a larger number of nationalities on boards is associated with significantly lower total pay. Similarly, an increase in board independence, which is considered a feature of good corporate governance, reduces total pay (at the 10 percent level). In terms of bank-level factors, total pay is significantly higher at larger banks, more diversified banks, and banks with better growth opportunities. In contrast, pay is significantly lower at highly levered banks.

Model 2 estimates Equation [2.2] using fixed pay as the dependent variable. In this model, rho shows that 59.5 percent of the variation in fixed pay is between banks with 40.5 percent within banks between executives. Similar to total pay, a quadratic relationship exists between fixed pay and age, with fixed pay turning up once executives reach 44.7 years. Tenure also has a quadratic relation with fixed pay. Fixed pay increases with time spent in role until the turning point at 7.3 years. In contrast to total pay, a larger number of nationalities is associated with higher fixed pay whilst greater board independence is associated with lower fixed pay. As with total pay, fixed pay is higher at larger and less levered G-SIBs. However, fixed pay is lower at more diversified firms.

Variable pay is the dependent variable in Model 3. Rho indicates that 29.6 percent of variation in variable pay is between banks; the majority of variation (79.4 percent) is within banks between executives. The coefficients show significant differences in variable pay across professional status. Whilst variable pay increases in age the relationship is no longer quadratic. The results show similarity with total pay, which is unsurprising since variable pay makes up the bulk of total pay. Variable pay is decreasing in ethnicity, board independence and leverage, and increasing in size, growth opportunities and diversification.

Table 2.11b repeats the same exercise for EU banks over 1999-2013. The dependent variable in Model 1 is total pay. In comparison to G-SIBs, the source of variation is different. Rho is larger for EU banks showing that 62.7 percent of variation in total pay is between banks and 37.3 percent within banks between executives. The professional status variables indicate lower levels of total pay across roles with the exception of senior executives who receive significantly higher total pay than CEOs. Ethnicity as the number of nationalities on the board, education and board independence are associated with lower total pay (at the 1, 10 and 10 percent levels, respectively). A quadratic relation exists with tenure as total pay increases until turning down after 10.2 years in a role. Larger EU banks pay more like the G-SIBs. Profitability enters the regression with a positive and significant sign. Model 2 focuses on fixed pay. In contrast, to Model 1 rho indicates the bulk of variation in fixed pay is due to within banks and between executives. Each professional status variable is significantly less than the CEO with the chair closest in amount. Ethnicity and highly levered banks award lower levels of fixed pay. A decrease in growth opportunities also reduces fixed pay. The quadratic relationship with age holds. Fixed pay increases until an executive spends 11 years in role. Consistent with the total pay regression, higher levels of profitability are associated with higher fixed pay.

Table 2.11c repeats the analysis for US banks. The bulk of variation in total pay is due to between banks (65.6 percent) rather than within banks between executives (34.4 percent). Total pay is consistently below CEO pay across professional status. Consistent with results on the other cohorts, ethnicity is inversely associated with total pay. Quadratic relations exist for age and tenure. The turning points (after which total pay decreases) are 50.5 years of age and 7 years in role. Greater board independence has an inverse relation with total pay as does growth opportunities (at the 10 percent level). Common to other cohorts, total pay is higher at bigger banks, at relatively more profitable banks, and at better-capitalised or prudent banks.

Model 2 shows coefficients from the fixed pay regression. In this model, the variation in fixed pay is evenly split between banks (49.5 percent) and rather than within banks between executives (50.5 percent). The significant differences across professional status hold, as do the quadratic relations with age (turning point 55.4 years) and tenure (11.3 years). Ethnicity retains a negative association with fixed pay. However, other results are contrary to previous. Board independence is associated with higher fixed pay (at the 10 percent level) whilst more levered banks and less profitable banks reward executives with lower fixed pay. Consistent with other results, fixed pay is higher at larger US banks.

The final estimation uses variable pay. Like total pay, much of the variation in variable pay is between banks (66.1 percent) rather than within banks between executives (33.9 percent). The US cohort is unique in the sense that age and tenure retain significant relations with different types of pay. Variable pay turns down when an executive reaches 50.4 years of age, and when tenure is 6.8 years in a role. Once more, a larger number of nationalities, greater board independence and limited growth opportunities are associated with lower variable pay. In contrast, larger bank size, greater levels of diversification, better capitalisation and superior profitability positively relate to variable pay.

Table 2.11a: G-SIBs: Total pay, fixed and variable pay regressions, 1999-2013

	Model 1		Model 2		Model 3	
VARIABLES	**Total pay**	z-statistics	**Fixed pay**	z-statistics	**Variable pay**	z-statistics
Chair	-7,315,970***	(-4.790)	-204,358***	(-5.946)	-7,261,085***	(-4.672)
C. Operating Officer	-3,696,142***	(-3.245)	-255,460***	(-9.957)	-3,255,452***	(-2.822)
C. Finance Officer	-6,473,811***	(-6.359)	-335,221***	(-14.929)	-6,096,550***	(-5.922)
C. Administrative Off.	-6,927,139***	(-3.489)	-395,578***	(-8.945)	-6,497,649***	(-3.253)
C. Risk Office	-5,855,488***	(-2.893)	-348,873***	(-7.777)	-5,457,769***	(-2.680)
C. Legal Officer	-10,319,230***	(-3.822)	-417,181***	(-6.962)	-9,965,932***	(-3.667)
Junior executives	-7,742,685***	(-5.008)	-499,659***	(-13.212)	-6,859,134***	(-4.168)
Middle executives	-6,556,173***	(-6.757)	-345,712***	(-15.885)	-6,209,986***	(-6.314)
Senior executives	-5,476,674***	(-5.836)	-357,914***	(-17.238)	-5,180,116***	(-5.480)
Age	-1,192,998**	(-2.068)	-25,014*	(-1.903)	-1,258,230**	(-2.156)
age^2	12,834**	(-2.425)	280**	(-2.322)	13,525**	(-2.525)
Female	-1,098,406	(-0.771)	-50,934	(-1.608)	-999,479	(-0.697)
Ethnicity (Nationality)	-123,432***	(-3.504)	2,958***	(-3.009)	-132,619***	(-3.682)
Education	-416,792	(-1.464)	6,976	(-1.085)	-405,051	(-1.408)
Tenure	-86,566	(-0.398)	41,583***	(-8.369)	-143,078	(-0.650)
Tenure^2	-5,511	(-0.387)	-2,850***	(-8.814)	-3,403	(-0.237)
Board independence	-353,681*	(-1.953)	-20,542***	(-3.778)	-328,641*	(-1.799)
Size	3,768,511***	(-4.783)	98,720***	(-3.59)	3,703,177***	(-4.666)
Growth	4,609,690***	(-4.858)	-38,847	(-1.184)	4,700,255***	(-4.917)
Diversification	13,455,865***	(-4.615)	-306,771***	(-3.087)	13,701,847***	(-4.653)
Leverage	-230,381***	(-3.778)	-4,166*	(-1.957)	-225,131***	(-3.634)
Profitability	3,734,480	-0.662	273,298	(-1.389)	3,680,689	(-0.647)
Constant	-69,765,092***	(-2.591)	-1,024,817	(-1.208)	-67,647,323**	(-2.494)
Observations	1,422		1,401		1,401	
Number of coyrid	314		311		311	
u_j	6,466,916***		263,026***		6,500,573***	
e_{ij}	9,973,022***		216,897***		10,029,145***	
ρ	0.296		0.595		0.296	

*** p<0.01, ** p<0.05, * p<0.1

Table 2.11b: EU banks: Total pay, fixed and variable pay regressions, 1999-2013

	Model 1		Model 2		Model 3	
VARIABLES	Total pay	z-statistics	Fixed pay	z-statistics	Variable pay	z-statistics
Chair	-599,929***	(-4.429)	-130,019***	(-3.366)	-499,982***	(-4.197)
C. Operating Officer	-854,080***	(-6.566)	-253,893***	(-6.608)	-568,333***	(-4.972)
C. Finance Officer	-994,449***	(-10.363)	-308,953***	(-10.785)	-677,824***	(-8.044)
C. Administrative Off.	-1,227,705***	(-6.603)	-385,813***	(-7.124)	-846,312***	(-5.182)
C. Risk Office	-1,056,246***	(-3.978)	-287,192***	(-3.682)	-724,420***	(-3.107)
Junior executives	-1,152,520***	(-12.872)	-378,164***	(-14.839)	-756,736***	(-9.582)
Middle executives	-885,634***	(-9.548)	-232,071***	(-8.702)	-651,929***	(-8.000)
Senior executives	1,767,405***	(4.737)	-320,242***	(-3.087)	2,059,787***	(6.279)
Age	24,747	(0.709)	869	(0.088)	16,069	(0.523)
age^2	-374	(-1.166)	-28	(-0.314)	-271	(-0.961)
Female	-8,777	(-0.055)	52,796	(1.187)	-69,364	(-0.494)
Ethnicity (Nationality)	-15,949***	(-2.795)	-6,565***	(-5.351)	-10,863**	(-2.118)
Education	-49,143*	(-1.734)	6,879	(0.836)	-54,731**	(-2.195)
Tenure	47,213**	(2.182)	33,229***	(5.881)	17,803	(0.929)
$Tenure^2$	-2,320*	(-1.720)	-1,510***	(-4.527)	-889	(-0.738)
Board independence	-40,373*	(-1.730)	6,501	(1.511)	-51,018**	(-2.323)
Size	223,663***	(4.792)	58,822***	(9.533)	166,802***	(3.725)
Growth	36,087	(0.413)	-47,359***	(-3.914)	75,840	(0.905)
Diversification	31,927	(0.076)	-90,443	(-1.533)	168,095	(0.417)
Leverage	4,813	(0.497)	-6,918***	(-5.300)	12,321	(1.330)
Profitability	1,350,863***	(2.728)	158,690**	(2.207)	1,067,029**	(2.256)
Constant	-3,927,395***	(-2.661)	-534,528*	(-1.837)	-3,215,622**	(-2.335)
Observations	627		626		626	
Number of coyrid	144		144		144	
u_j	812,383***		59,210***		790,795***	
e_{ij}	625,965***		190,111***		549,024***	
ρ	0.627		0.0884		0.675	

*** p<0.01, ** p<0.05, * p<0.1

Table 2.11c: US banks: Total pay, fixed and variable pay regressions, 1999-2013

	Model 1		Model 2		Model 3	
VARIABLES	Total pay	z-statistics	Fixed pay	z-statistics	Variable pay	z-statistics
Chair	-3,524,425***	(-5.000)	-73,364***	(-2.792)	-3,467,788***	(-4.947)
C. Operating Officer	-2,622,062***	(-6.455)	-203,407***	(-13.428)	-2,427,853***	(-6.008)
C. Finance Officer	-4,956,994***	(-16.775)	-328,256***	(-29.675)	-4,641,813***	(-15.788)
C. Administrative Off.	-5,226,272***	(-9.866)	-332,554***	(-16.850)	-4,901,471***	(-9.304)
C. Risk Office	-4,974,243***	(-11.543)	-362,636***	(-22.430)	-4,635,321***	(-10.756)
C. Legal Officer	-5,289,767***	(-7.901)	-358,605***	(-14.373)	-4,937,033***	(-7.408)
Junior executives	-4,364,374***	(-11.359)	-355,973***	(-24.847)	-4,047,294***	(-10.556)
Middle executives	-4,721,633***	(-17.706)	-299,612***	(-30.139)	-4,429,047***	(-16.696)
Senior executives	-5,582,747***	(-12.210)	-256,710***	(-15.501)	-5,351,145***	(-11.771)
Age	303,222**	(2.079)	17,494***	(3.246)	287,991**	(1.982)
age^2	-3,001**	(-2.289)	-158***	(-3.265)	-2,859**	(-2.190)
Female	-374,433	(-0.980)	-19,631	(-1.386)	-353,179	(-0.928)
Ethnicity (Nationality)	-120,625***	(-4.064)	-4,453***	(-4.058)	-115,972***	(-3.928)
Education	-7,219	(-0.067)	3,523	(0.881)	-2,780	(-0.026)
Tenure	138,221**	(2.059)	10,649***	(4.298)	128,745*	(1.928)
$Tenure^2$	-9,862**	(-2.422)	-471***	(-3.122)	-9,449**	(-2.332)
Board independence	-421,399*	(-1.649)	13,380*	(1.760)	-436,653*	(-1.705)
Size	1,466,584***	(4.716)	29,858***	(3.365)	1,425,500***	(4.565)
Growth	-740,163*	(-1.785)	-1,589	(-0.136)	-742,603*	(-1.784)
Diversification	3,195,930*	(1.758)	78,818	(1.541)	3,120,824*	(1.711)
Leverage	201,110***	(2.694)	-13,101***	(-6.186)	214,276***	(2.860)
Profitability	7,269,670***	(2.675)	-138,642*	(-1.813)	7,436,916***	(2.725)
Constant	-38,106,131***	(-4.720)	-490,411**	(-2.021)	-37,414,299***	(-4.624)
Observations	1,360		1,358		1,358	
Number of idyr	265		265		265	
u_j	4,180,747***		112,451***		4,200,133***	
e_{ij}	3,026,294***		113,525***		3,008,956***	
ρ	0.656		0.495		0.661	

*** p<0.01, ** p<0.05, * p<0.1

2.8 Results summary and discussion

Hypotheses 1a-c propose that there are differences in executive compensation across the three cohorts of banks for the period 1999-2013. The null hypothesis in H1 contends that executive pay is comparable across cohorts. This chapter offers plentiful evidence leading to the rejection of this hypothesis. Based on pairwise comparisons of means between cohorts, this chapter identifies statistically significant differences in mean total pay between G-SIBs and EU banks, and G-SIBs and US banks. This leads to the acceptance of H1a and H1b. However, the difference in total pay between EU banks and US banks is insignificant, which leads to the rejection of H1c. This pattern holds for cash compensation (salary plus bonus), fixed pay (salary), variable pay (bonus plus equity-linked pay) and total accumulated wealth. However, the equity-linked pay of US banks is significantly larger than EU banks, which leads to the acceptance of H1c for this type of compensation.

Hypotheses 2a-c propose that there is intertemporal variation in executive compensation. This study separates the data into three time intervals that are consistent with periods of the economic cycle; that is, pre-crisis (1999-2006), crisis (2007-09), and post-crisis (2010-2013). Pairwise comparisons test whether compensation differs across time intervals. The evidence leads to the rejection of H2 that pay does not exhibit intertemporal variation. Total pay for executives is significantly larger before the crisis episode. H2a contends that the crisis led to a significant reduction in executive pay, which the evidence supports. H2b considers the pace of recovery in executive compensation. Total pay in 2010-13 remains significantly below pre-crisis levels, which leads to the acceptance of H2b. H2c suggests that executive pay rebounds in recovery (2010-13) and is greater than in-crisis (2007-09). The evidence shows the difference in total pay is insignificant, leading to the rejection of H2c. The pattern repeats for cash compensation, variable pay and total accumulated wealth, but there are differences in salary and equity-linked pay. Salary grows across time. It is significantly higher in 2007-09 in comparison to 1999-2006, and in 2010-13 relative to 2007-09. Therefore, in the case of fixed pay, the data reject H2a-c. The data also reject H2a-c for equity-linked pay. It supports H2 in that equity-linked pay does not show intertemporal variation.

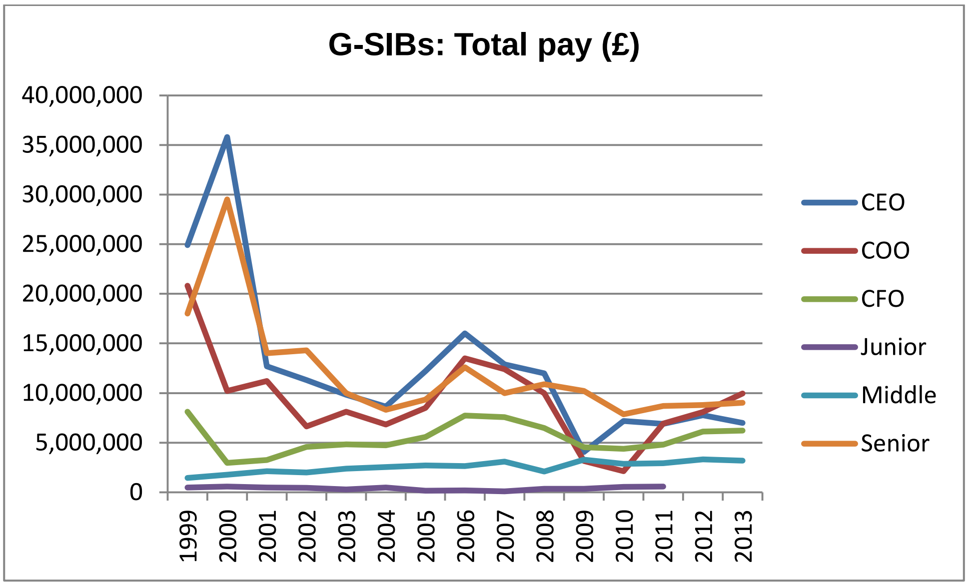
Two econometric models test the propositions of H3a-c and H4. The slope comparison model shown in Equation [2.1] tests whether executive pay varies across professional status. The hierarchical model in Equation [2.2] in addition to the professional status variables specifies vectors of executive-level and bank-level factors. The slope comparison models are estimated for each cohort over 1999-2013 using total pay, fixed pay, variable pay, equity-linked pay, and total accumulated wealth as alternative dependent variables. The models show contrasts between each executive role and the CEO. Collectively, the results lead to a rejection of H3 since it is clear that there are significant contrasts between the executive pay of bank CEOs and other executive roles. This pattern repeats irrespective of the type of pay. H3a-c contend that executive pay varies across professional status for each cohort. The results lead to an acceptance of the hypotheses. Pairwise comparisons provide further information and confirm the main results. Executive pay across professional status is considerably higher at G-SIBs followed in rank order by US banks and EU banks. The comparisons shows whether mean pay differs across professional status. Due to overlaps in the distribution of pay, the comparisons place executive pay into groups. Belonging to a group implies executive pay is not statistically different across professional status. In general, executive pay falls into groups that differ from one another. The pay of CEO, chief operating officer and senior executive commonly form a group that exists across cohorts. Pay for this group tends to be significantly larger than the next group. The chief finance officer, chief administrative officer, chief risk officer and chief legal officer tend to belong to the same group.

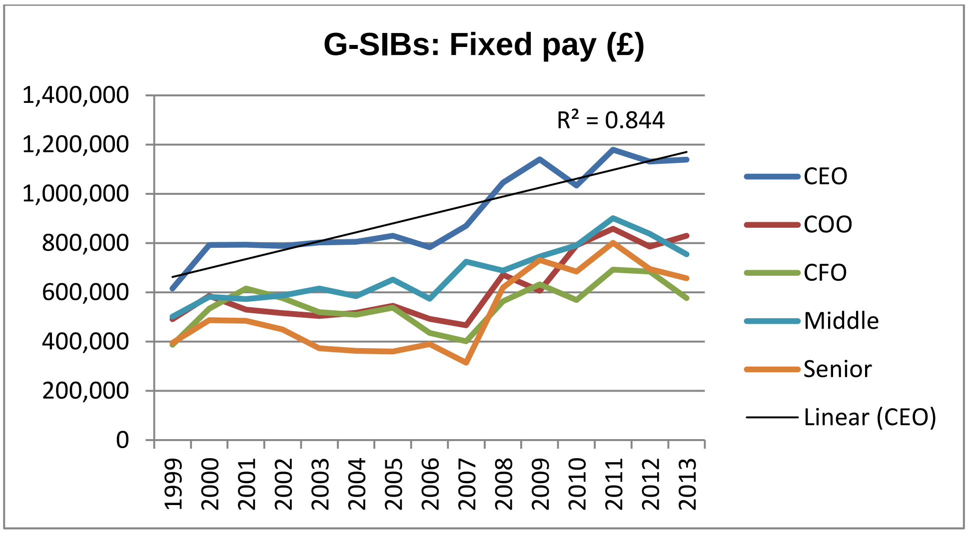
The hierarchical model in Equation [2.2] tests the effect of executive-level and bank-level factors on the variation in executive pay (total pay, fixed pay and variable pay) across cohorts. The results confirm the differences in average pay between bank CEOs and non-CEO positions. The intra-class correlation reveals a difference between G-SIBs and the two other cohorts. At G-SIBs, the main source of variation (roughly 70 percent) in total pay (and variable pay) is within banks and between executives. At EU banks and US banks, over 60 percent of variation is between banks with around 40 percent within banks between executives. The situation is more comparable for fixed pay: approximately 60 percent of variation in salary is between G-SIBs and roughly 50 percent between US banks. EU banks are dissimilar with over 90 percent of variation in fixed pay within banks and between executives.

Hypothesis 4 proposes that executive-level and bank-level factors influence pay. The presented evidence leads to a general acceptance of H4. Some findings have implications for corporate governance. Greater board independence (a higher ratio of independent directors-to-executive directors) is associated with significantly lower total and variable pay at G-SIBs, EU banks and US banks. This suggests that independent directors are effective in monitoring executive behaviour and controlling pay awards. A more diverse board with a larger number of nationalities appears effective in controlling executive pay across cohorts (except fixed pay at G-SIBs). Age shows a quadratic relationship with executive pay at G-SIBs and US banks. However, pay turns up earlier in the career of a G-SIB executive (between 44.7 and

46.5 years) than a US counterpart (50.4 to 55.4 years). Tenure shows a quadratic relation with pay mostly at US banks and EU banks. Total pay turns down after seven years in a role at US banks whilst the corresponding time is 10.2 years at EU banks. Across cohorts, larger banks award higher compensation. Other results are less consistent across cohorts. Diversification positively affects total and variable pay at G-SIBs and US banks but has no effect at EU banks. Similarly, growth opportunities boost total and variable pay at G-SIBs but the opposite effect occurs at US banks. Leverage and profitability produce contrasting effects. Better-capitalised US banks and more profitable EU and US banks reward executives with higher pay, whereas pay is significantly lower at more highly levered G-SIBs. Figure 2.7a-c to Figure 2.9a-c show the evolution of executive pay by type across cohort and time.

Figure 2.7a-c: Executive pay by professional status; G-SIBs, 1999-2013 (means)





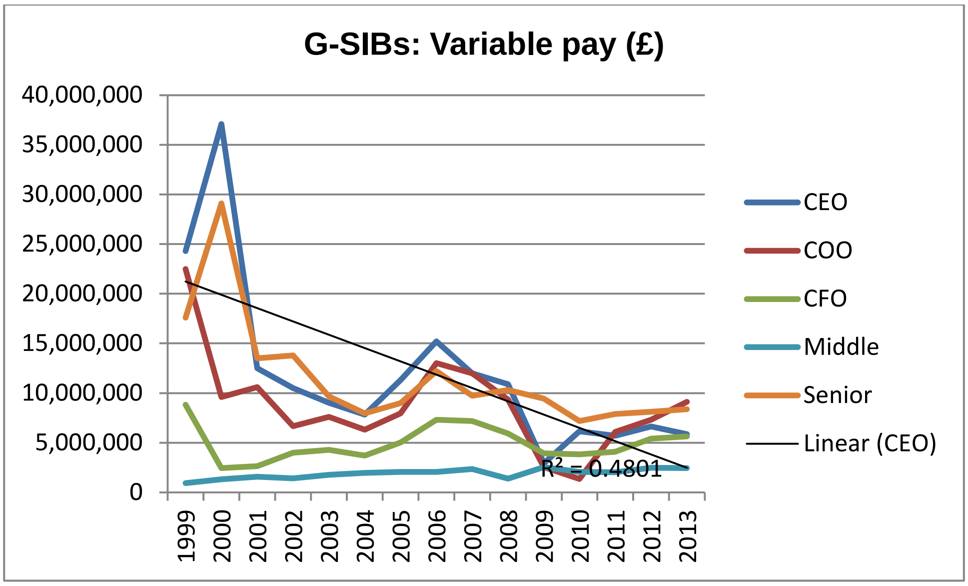
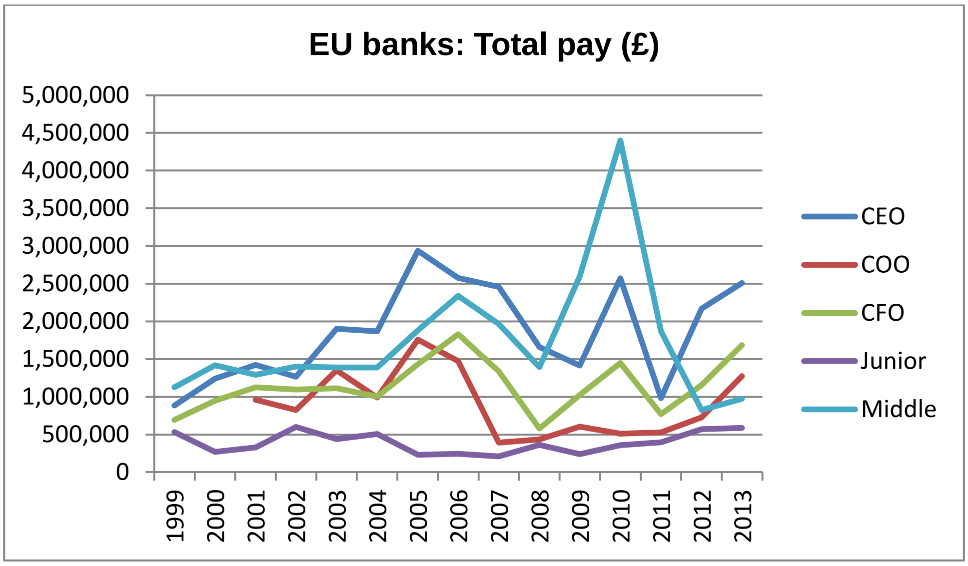
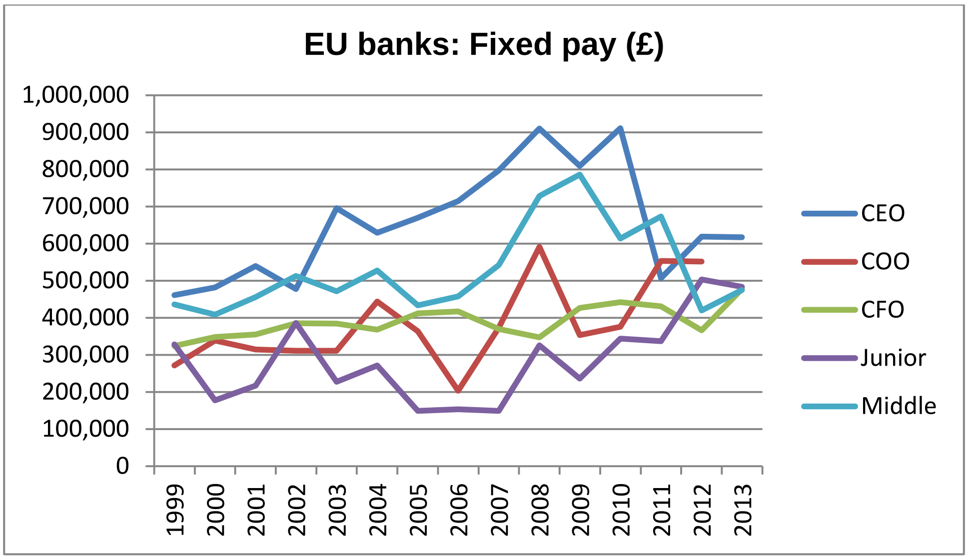


Figure 2.8a-c: Executive pay by professional status; EU banks, 1999-2013 (means)





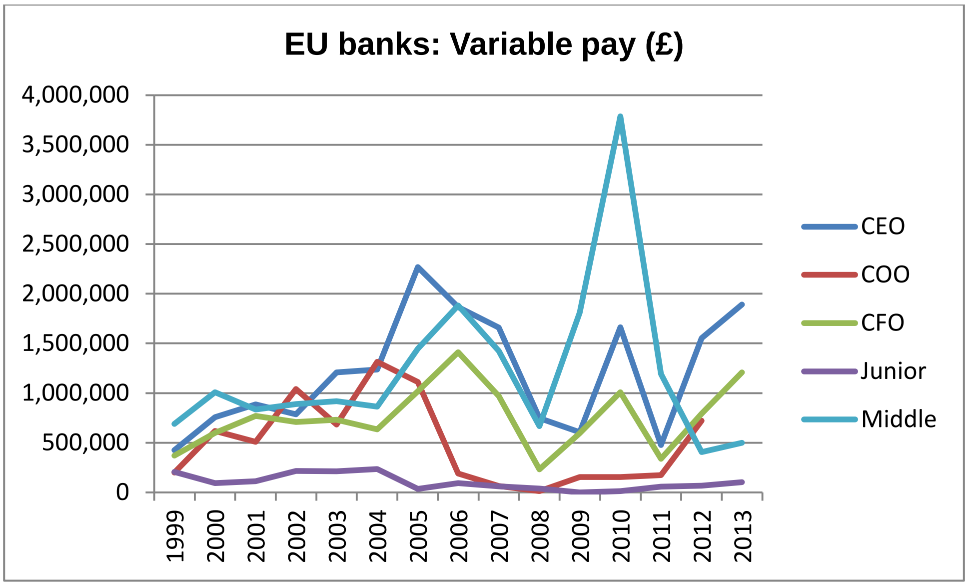
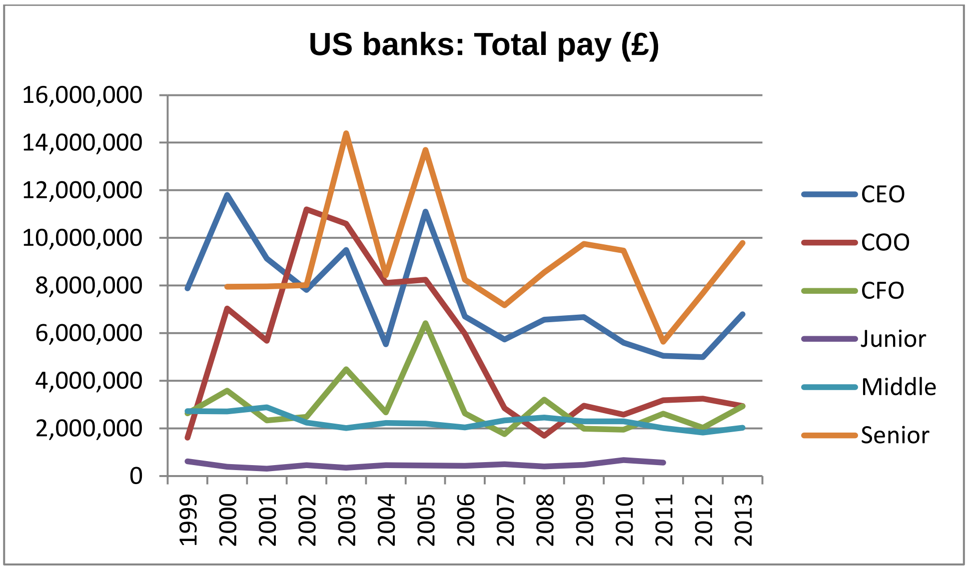
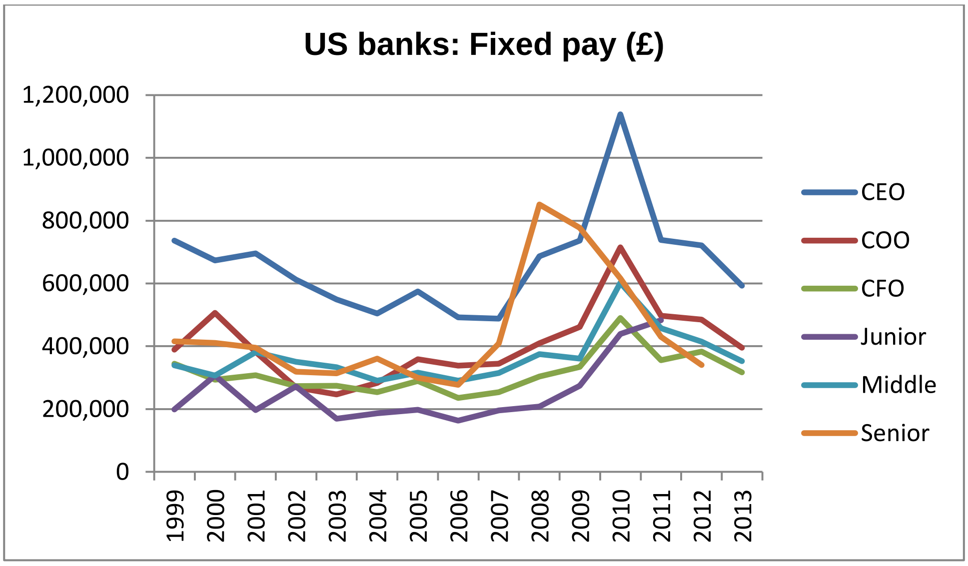
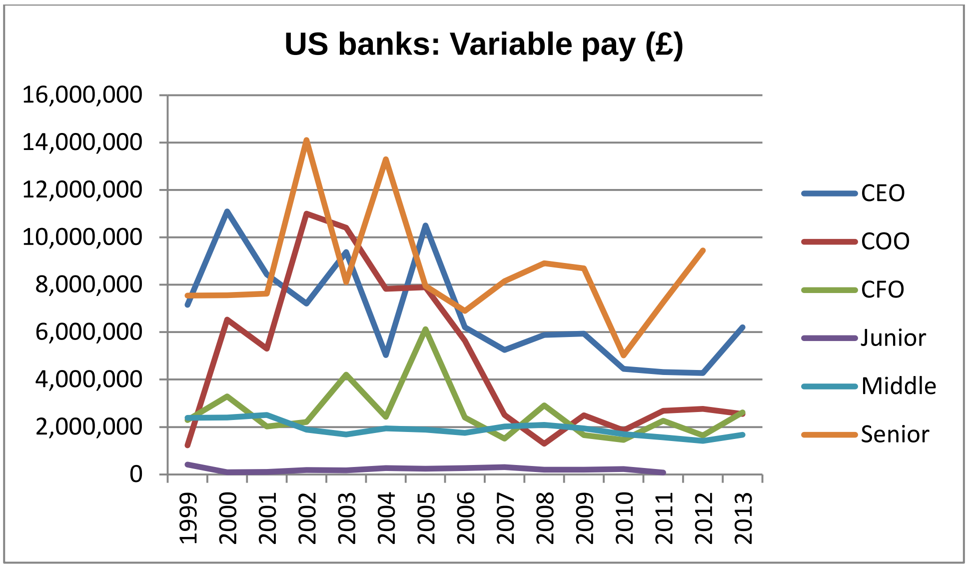


Figure 2.9a-c: Executive pay by professional status; US banks, 1999-2013 (means)







2.9 Conclusion

This chapter provides an international comparison of executive pay in banking. Pay varies within banks, between banks, and across time. Executives receive larger compensation awards, and hold considerably larger portfolio holdings, at bigger, complex firms with wide ranging international operations (G-SIBs). This suggests there are selection effects at work with talented and ambitious individuals opting to work for prestigious firms. Geography matters. Executive pay is higher at US banks in comparison with EU banks. At all banks, there is a heavier weighting of variable pay in total pay, mostly as equity-linked pay. The proportion of performance-related pay is larger at G-SIBs followed by US banks and EU banks. Executive pay has fallen following the crisis and current (2010-13) pay remains below pre-crisis reflecting the troubles banks continue to face. Significant differences in total pay exist between groups of executives based on professional status. The pay of CEOs, chief operating officers and senior executives commonly form a group that exists across cohorts, and tends to be significantly larger than the next group. The results on the determinants of pay have implications for corporate governance structures. Greater board independence (a larger number of supervisory directors-to-executive directors) and greater board diversity (a larger number of nationalities on boards) are associated with lower levels of total (and variable) pay, which suggests these factors improve the monitoring function.

APPENDIX

Table A1: G-SIBs, Total pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	11,600	20,100	77	796	3,530	15,200	132,000	1.7362	68
2000	15,000	38,600	167	1,192	2,422	18,300	355,000	2.5785	98
2001	8,296	8,369	29	2,090	3,856	14,700	38,600	1.0087	101
2002	7,498	9,952	74	1,807	3,393	11,800	79,900	1.3273	108
2003	7,018	7,646	198	2,356	4,414	9,871	58,100	1.0896	109
2004	5,733	5,449	195	2,144	3,922	7,814	31,300	0.9504	112
2005	7,548	7,117	155	2,861	4,856	10,400	40,200	0.9428	105
2006	9,793	11,700	42	2,980	5,799	12,800	93,400	1.1933	108
2007	8,158	9,335	83	3,347	5,469	9,093	60,900	1.1442	111
2008	7,926	9,933	111	1,612	4,018	10,800	52,600	1.2532	86
2009	5,286	5,213	82	911	4,155	8,514	26,200	0.9861	89
2010	5,097	4,255	90	1,378	4,188	7,369	20,300	0.8347	88
2011	5,939	4,306	376	2,732	4,718	7,662	18,600	0.7249	80
2012	6,867	4,413	368	3,645	5,664	9,755	19,100	0.6427	76
2013	6,349	5,434	150	2,623	5,820	8,169	26,400	0.8558	86
Total	*7,868*	*13,400*	*29*	*2,114*	*4,435*	*9,680*	*355,000*	*1.7017*	*1,425*

Notes: G-SIBs is global systemically important banks; S.D. is standard deviation; p25 is 25th percentile; p50 is median; p75 is 75th percentile; CV is coefficient of variation; N is number of executive-year observations.

Table A2: EU banks, Total pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	641	604	113	325	390	800	1,925	0.9424	7
2000	570	967	42	54	264	631	3,780	1.6952	14
2001	412	357	54	64	358	626	1,215	0.8657	18
2002	629	430	241	288	452	774	1,346	0.6845	9
2003	846	548	10	496	686	1,405	1,814	0.6479	12
2004	740	380	68	591	681	788	1,807	0.5134	17
2005	1,516	2,000	64	524	1,058	1,684	11,000	1.3196	29
2006	1,127	1,017	36	94	1,073	1,711	3,809	0.9031	30
2007	987	936	22	125	1,032	1,374	3,770	0.9479	40
2008	795	731	49	198	603	1,189	3,116	0.9193	35
2009	477	606	20	141	387	477	3,290	1.2711	31
2010	543	573	70	386	446	508	3,120	1.0559	25
2011	387	146	19	428	428	428	590	0.3766	12
2012	599	202	298	502	661	665	1,091	0.3382	13
2013	636	234	302	356	711	728	1,099	0.3686	11
Total	*796*	*944*	*10*	*263*	*544*	*1,070*	*11,000*	*1.1866*	*303*

Table A3: US banks, Total pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	739	302	282	495	659	1,002	1,572	0.4080	22
2000	1,095	516	329	790	996	1,304	2,335	0.4710	32
2001	1,500	1,194	575	866	1,304	1,682	7,679	0.7961	36
2002	1,284	499	481	897	1,245	1,510	2,288	0.3883	33
2003	1,468	1,061	109	627	1,318	1,957	4,775	0.7223	40
2004	1,386	903	194	706	1,133	1,930	3,584	0.6512	32
2005	1,774	1,306	131	310	1,831	2,445	4,145	0.7364	30
2006	2,188	1,713	140	637	2,009	3,203	7,577	0.7829	33
2007	1,817	1,694	127	354	1,180	3,264	5,997	0.9319	20
2008	766	705	143	215	383	1,386	2,292	0.9208	11
2009	1,530	1,515	64	212	337	3,135	3,327	0.9902	11
2010	2,600	2,760	68	364	572	4,759	7,882	1.0615	11
2011	1,071	963	227	352	640	1,704	2,947	0.8994	8
2012	1,948	2,588	391	424	788	3,438	7,285	1.3289	7
2013	2,627	2,840	455	692	1,398	3,880	8,622	1.0812	8
Total	*1,526*	*1,358*	*64*	*579*	*1,155*	*1,984*	*8,622*	*0.8901*	*334*

Table A4: G-SIBs, Cash compensation (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	3,457	3,689	77	775	1,553	5,091	13,800	1.0671	61
2000	3,703	4,122	167	978	1,755	7,162	17,600	1.1131	93
2001	2,804	3,051	510	857	1,346	3,284	16,200	1.0881	96
2002	2,271	1,835	142	916	1,703	3,258	8,906	0.8080	107
2003	2,879	2,785	198	1,033	2,168	3,976	21,000	0.9674	109
2004	2,665	1,997	195	1,035	1,916	4,251	9,994	0.7495	111
2005	3,261	2,598	37	1,237	2,609	4,386	13,700	0.7966	105
2006	3,291	3,637	42	994	2,038	3,741	16,600	1.1051	107
2007	2,572	3,108	83	455	1,502	3,074	15,200	1.2082	111
2008	1,333	1,460	82	514	745	1,501	8,870	1.0951	86
2009	1,231	1,379	82	394	702	1,294	8,064	1.1202	89
2010	1,667	1,328	90	606	1,063	2,604	6,411	0.7964	88
2011	1,782	1,150	330	850	1,369	2,593	4,626	0.6456	80
2012	1,693	1,247	262	696	1,384	2,079	5,583	0.7366	76
2013	1,588	1,358	45	540	1,088	2,154	6,032	0.8552	86
Total	*2,445*	*2,639*	*37*	*774*	*1,487*	*3,109*	*21,000*	*1.0790*	*1,405*

Note: Cash compensation is salary plus bonus.

Table A5: EU banks, Cash compensation (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	502	289	113	325	390	800	950	0.5758	7
2000	355	340	42	54	264	427	1,074	0.9579	14
2001	347	309	54	64	280	575	1,215	0.8912	18
2002	396	156	241	288	334	437	686	0.3938	9
2003	695	527	10	349	518	1,052	1,814	0.7588	12
2004	639	308	68	505	591	788	1,240	0.4821	17
2005	890	703	31	375	724	1,629	2,501	0.7905	29
2006	895	772	36	94	659	1,616	2,717	0.8631	30
2007	825	782	22	125	609	1,242	2,917	0.9477	40
2008	615	560	49	198	523	761	2,880	0.9118	35
2009	477	606	20	141	387	477	3,290	1.2711	31
2010	543	573	70	386	446	508	3,120	1.0559	25
2011	387	146	19	428	428	428	590	0.3766	12
2012	599	202	298	502	661	665	1,091	0.3382	13
2013	636	234	302	356	711	728	1,099	0.3686	11
Total	*635*	*589*	*10*	*255*	*476*	*771*	*3,290*	*0.9268*	*303*

Table A6: US banks, Cash compensation (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	513	188	282	362	466	648	1,067	0.3665	22
2000	571	178	286	439	576	657	1,124	0.3113	32
2001	702	273	98	551	698	828	1,373	0.3888	36
2002	708	256	295	518	700	878	1,274	0.3620	33
2003	658	353	109	377	675	897	1,595	0.5362	40
2004	788	414	194	473	751	1,036	2,075	0.5255	32
2005	824	513	131	310	836	1,183	2,179	0.6228	30
2006	987	583	140	499	1,031	1,408	2,706	0.5904	33
2007	1,015	880	127	274	714	1,579	3,140	0.8663	20
2008	455	321	105	143	383	684	1,133	0.7056	11
2009	858	766	64	212	337	1,790	1,867	0.8924	11
2010	514	264	68	364	572	650	1,076	0.5137	11
2011	570	258	227	352	631	661	1,046	0.4516	8
2012	636	263	391	424	483	826	1,078	0.4137	7
2013	968	857	136	445	675	1,303	2,761	0.8858	8
Total	*731*	*465*	*64*	*408*	*647*	*928*	*3,140*	*0.6357*	*334*

Table A7: G-SIBs, Salary (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	471	227	57	253	474	600	1,049	0.4811	61
2000	564	244	57	427	520	723	1,357	0.4332	93
2001	593	218	199	451	530	698	1,332	0.3680	96
2002	579	273	52	396	525	661	1,976	0.4710	107
2003	566	312	121	351	518	700	2,273	0.5524	109
2004	577	314	129	367	521	684	2,284	0.5453	111
2005	597	321	37	408	534	691	2,260	0.5372	105
2006	539	333	42	329	473	650	2,213	0.6171	107
2007	558	412	19	283	455	708	2,720	0.7381	111
2008	727	525	82	427	620	837	3,900	0.7216	86
2009	757	650	82	385	564	816	3,674	0.8578	89
2010	742	507	59	399	580	1,025	3,423	0.6827	87
2011	873	478	268	496	821	1,140	3,277	0.5475	80
2012	842	490	42	481	686	1,144	3,147	0.5823	76
2013	773	448	45	451	617	1,031	1,925	0.5797	86
Total	*643*	*411*	*19*	*394*	*539*	*787*	*3,900*	*0.6392*	*1,404*

Table A8: EU banks, Salary (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	301	168	113	195	253	534	538	0.5560	7
2000	246	200	42	54	246	283	680	0.8115	14
2001	277	247	54	64	235	333	1,010	0.8888	18
2002	312	83	232	268	288	312	469	0.2656	9
2003	476	456	10	288	343	530	1,814	0.9577	12
2004	381	158	68	309	359	387	729	0.4138	17
2005	390	309	31	258	387	397	1,685	0.7926	28
2006	353	324	36	93	356	373	1,730	0.9181	30
2007	384	355	22	125	380	439	1,664	0.9224	40
2008	546	428	49	198	521	628	2,095	0.7826	35
2009	431	409	20	141	387	477	1,880	0.9476	31
2010	483	330	70	386	446	508	1,782	0.6832	25
2011	387	146	19	428	428	428	590	0.3766	12
2012	574	197	298	468	623	623	1,091	0.3433	13
2013	584	218	302	356	628	628	1,099	0.3729	11
Total	*416*	*329*	*10*	*208*	*374*	*517*	*2,095*	*0.7912*	*302*

Table A9: US banks, Salary (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	380	106	264	285	386	407	664	0.2787	22
2000	395	123	210	310	388	438	741	0.3101	32
2001	442	160	98	347	443	510	791	0.3615	36
2002	473	160	173	379	471	546	838	0.3374	33
2003	430	216	62	276	435	610	916	0.5023	40
2004	463	207	134	327	455	587	981	0.4467	32
2005	472	250	87	298	460	645	1,023	0.5297	30
2006	478	236	58	332	433	657	1,019	0.4936	33
2007	479	308	70	199	482	681	1,088	0.6421	20
2008	409	336	39	143	274	684	1,133	0.8225	11
2009	448	316	35	212	337	663	1,098	0.7051	11
2010	450	300	68	208	364	650	1,076	0.6666	11
2011	468	293	227	236	346	652	1,046	0.6259	8
2012	479	289	195	239	458	483	1,078	0.6030	7
2013	466	315	58	233	475	598	1,061	0.6757	8
Total	*447*	*220*	*35*	*296*	*422*	*603*	*1,133*	*0.4921*	*334*

Table A10: G-SIBs; Equity-linked pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	11,800	21,000	115	369	5,225	12,300	123,000	1.782	49
2000	16,500	42,500	1	835	5,357	15,100	338,000	2.573	68
2001	5,925	6,426	29	1,455	2,968	9,182	34,100	1.085	96
2002	6,095	9,727	74	780	2,291	8,277	78,000	1.596	93
2003	5,185	5,837	308	1,349	3,034	6,715	37,100	1.126	87
2004	3,684	4,446	58	1,102	1,970	5,055	26,000	1.207	94
2005	5,115	5,788	74	1,240	3,128	5,731	30,200	1.132	88
2006	7,349	11,000	87	1,593	3,635	9,110	92,800	1.495	96
2007	5,850	7,495	168	1,440	3,613	7,171	52,400	1.281	106
2008	7,268	10,500	28	774	1,932	10,900	51,800	1.441	78
2009	6,332	5,254	37	2,022	5,822	8,830	25,900	0.830	57
2010	4,312	4,044	1	1,043	3,935	6,043	20,100	0.938	70
2011	4,751	3,802	507	1,936	3,946	6,533	17,600	0.800	70
2012	5,618	3,775	5	2,827	4,758	7,947	18,200	0.672	70
2013	5,317	4,650	42	2,022	4,945	6,739	21,800	0.875	77
Total	*6,485*	*13,100*	*1*	*1,254*	*3,732*	*7,691*	*338,000*	*2.018*	*1,199*

Table A11: EU banks, Equity-linked pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	298	185	149	206	239	342	975	0.619	20
2000	581	549	26	233	482	617	2,708	0.944	34
2001	831	1,229	114	295	660	890	7,580	1.480	36
2002	587	357	79	396	544	753	1,379	0.608	36
2003	815	733	25	378	619	1,036	3,787	0.899	42
2004	632	535	15	209	521	822	1,955	0.846	33
2005	1,261	1,716	56	270	1,007	1,615	10,400	1.360	37
2006	1,195	1,093	56	137	870	1,982	4,871	0.915	39
2007	751	742	54	109	492	1,320	2,858	0.989	30
2008	423	530	18	18	117	814	2,109	1.253	23
2009	1,479	426	1,181	1,260	1,345	1,379	2,229	0.288	5
2010	4,589	1,260	3,787	3,877	4,109	4,368	6,806	0.274	5
2011	1,335	511	910	910	1,193	1,901	1,901	0.382	3
2012	4,593	2,282	2,979	2,979	4,593	6,207	6,207	0.497	2
2013	2,655	2,136	473	946	2,821	3,172	5,861	0.805	5
Total	*898*	*1,133*	*15*	*238*	*585*	*1,159*	*10,400*	*1.262*	*350*

Table A12: US banks, Equity-linked pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	2,584	2,404	252	1,244	1,903	2,887	9,022	0.930	16
2000	5,188	5,202	256	1,925	3,700	6,033	24,000	1.003	79
2001	3,770	4,640	16	1,169	2,611	4,757	29,400	1.231	91
2002	3,420	4,610	9	833	1,942	3,877	20,700	1.348	89
2003	5,028	9,596	15	1,051	1,661	3,784	65,600	1.909	93
2004	2,807	4,294	12	709	1,456	2,766	25,800	1.530	96
2005	5,713	11,800	20	906	2,073	4,553	85,400	2.073	97
2006	3,243	3,800	3	678	2,030	4,148	18,500	1.172	116
2007	2,542	2,795	3	473	1,770	3,364	14,200	1.100	112
2008	3,281	4,312	4	534	1,969	4,046	23,500	1.314	84
2009	2,846	3,657	46	901	1,743	3,497	25,700	1.285	77
2010	2,155	2,569	189	532	1,062	3,084	12,300	1.192	71
2011	2,377	2,115	11	834	1,854	3,105	10,700	0.890	75
2012	2,336	2,230	287	653	1,411	2,770	9,166	0.954	77
2013	3,243	3,632	600	1,171	1,999	4,261	21,200	1.120	67
Total	*3,447*	*5,558*	*3*	*823*	*1,922*	*3,749*	*85,400*	*1.613*	*1240*

Table A13: G-SIBs, Variable pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	12,300	20,900	0	454	4,839	16,700	131,000	1.6956	61
2000	15,200	39,500	0	750	2,117	18,200	354,000	2.6066	93
2001	8,090	8,403	183	1,584	3,697	14,500	37,700	1.0388	96
2002	6,989	9,952	0	1,160	2,529	11,400	79,500	1.4240	107
2003	6,452	7,669	0	1,731	3,692	9,521	57,400	1.1886	109
2004	5,115	5,492	0	1,601	3,202	7,376	30,700	1.0737	111
2005	6,951	7,181	0	1,953	4,197	9,911	39,700	1.0330	105
2006	9,342	11,800	0	2,220	4,865	13,100	92,800	1.2592	107
2007	7,601	9,420	0	2,672	4,792	8,752	60,900	1.2394	111
2008	7,198	9,973	0	928	3,287	10,400	51,800	1.3854	86
2009	4,529	5,182	0	0	3,400	6,940	25,800	1.1443	89
2010	4,412	4,248	0	561	3,789	6,811	20,100	0.9628	87
2011	5,066	4,279	0	1,713	3,955	6,817	17,700	0.8446	80
2012	6,025	4,444	0	2,980	4,864	8,957	18,200	0.7375	76
2013	5,576	5,347	0	1,827	5,066	7,611	25,200	0.9590	86
Total	*7,320*	*13,500*	*0*	*1,523*	*3,879*	*9,165*	*354,000*	*1.8405*	*1,404*

Notes: Variable pay is cash compensation plus equity-linked pay.

Table A14: EU banks, Variable pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	340	476	0	108	131	354	1,387	1.4004	7
2000	324	814	0	0	0	303	3,100	2.5071	14
2001	135	193	0	0	0	205	707	1.4278	18
2002	317	393	0	0	220	506	1,058	1.2402	9
2003	370	318	0	160	288	579	970	0.8602	12
2004	359	248	0	237	308	428	1,078	0.6914	17
2005	1,154	1,974	0	106	666	1,294	10,600	1.7104	28
2006	774	832	0	0	585	1,299	3,007	1.0752	30
2007	603	673	0	0	595	953	2,922	1.1164	40
2008	249	453	0	0	18	314	2,108	1.8235	35
2009	45	253	0	0	0	0	1,410	5.5678	31
2010	60	268	0	0	0	0	1,338	4.4612	25
2011	0	0	0	0	0	0	0	.	12
2012	25	21	0	0	35	42	54	0.8459	13
2013	51	50	0	0	83	100	108	0.9675	11
Total	*380*	*822*	*0*	*0*	*17*	*434*	*10,600*	*2.1605*	*302*

Table A15: US banks, Variable pay (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	360	218	0	210	308	537	908	0.6067	22
2000	700	463	112	426	641	825	1,928	0.6618	32
2001	1,058	1,215	302	441	885	1,178	7,580	1.1487	36
2002	811	451	39	479	827	1,031	1,684	0.5565	33
2003	1,039	888	0	466	873	1,419	4,073	0.8550	40
2004	924	718	0	365	743	1,277	2,603	0.7770	32
2005	1,302	1,082	0	119	1,342	2,062	3,342	0.8306	30
2006	1,710	1,511	0	305	1,586	2,604	6,558	0.8838	33
2007	1,338	1,421	0	127	777	2,575	4,910	1.0622	20
2008	357	379	0	101	126	702	1,159	1.0621	11
2009	1,083	1,232	0	0	29	2,358	2,567	1.1382	11
2010	2,150	2,469	0	104	312	4,109	6,806	1.1481	11
2011	603	679	0	51	359	1,052	1,901	1.1262	8
2012	1,468	2,332	0	152	305	2,979	6,207	1.5884	7
2013	2,161	2,604	0	363	1,010	3,491	7,561	1.2049	8
Total	*1,079*	*1,206*	*0*	*297*	*731*	*1,415*	*7,580*	*1.1180*	*334*

Table A16: G-SIBs, Total Accumulated Wealth (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	99,900	197,000	221	1,652	20,700	107,000	1,060,000	1.9718	62
2000	97,200	189,000	284	2,707	18,700	127,000	1,420,000	1.9426	82
2001	69,600	159,000	636	3,387	14,700	83,900	1,340,000	2.2792	100
2002	49,300	93,300	25	2,822	12,900	44,600	643,000	1.8932	107
2003	47,800	88,000	6	4,162	16,000	51,100	607,000	1.8391	103
2004	39,400	74,300	42	4,671	12,500	40,400	541,000	1.8862	108
2005	51,900	107,000	58	5,583	16,400	48,100	659,000	2.0538	103
2006	47,600	72,900	7	6,429	15,000	70,100	501,000	1.5335	107
2007	36,600	62,300	75	8,072	16,300	40,000	456,000	1.7024	106
2008	27,700	45,200	149	3,151	8,168	28,200	247,000	1.6297	87
2009	25,400	43,500	40	4,964	12,400	26,200	289,000	1.7150	88
2010	27,900	43,900	2	3,661	12,700	31,200	271,000	1.5728	90
2011	22,000	28,900	1	5,810	12,600	26,700	182,000	1.3138	80
2012	25,300	35,900	89	8,802	14,200	29,800	243,000	1.4233	76
2013	29,600	48,200	8	5,347	16,400	33,200	331,000	1.6269	85
Total	*45,700*	*99,600*	*1*	*4,278*	*13,600*	*44,200*	*1,420,000*	*2.1792*	*1,384*

Table A17: EU banks, Total Accumulated Wealth (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	2,987	1,704	1,347	2,296	2,345	3,127	5,819	0.5706	5
2000	4,288	3,294	1,596	2,145	2,402	6,003	9,293	0.7681	5
2001	4,389	3,024	1,098	2,648	3,180	7,376	8,851	0.6889	6
2002	2,906	1,315	1,578	1,785	2,912	4,027	4,222	0.4525	4
2003	1,800	1,387	338	487	1,189	3,615	3,675	0.7706	7
2004	4,767	7,161	613	1,399	2,103	4,169	22,200	1.5022	8
2005	2,695	5,814	12	167	402	2,659	26,000	2.1569	21
2006	6,124	9,189	56	168	2,617	6,269	27,900	1.5006	17
2007	3,269	6,419	15	164	794	3,656	28,900	1.9636	22
2008	2,690	4,832	18	53	396	2,750	16,800	1.7962	23
2009	1,903	4,846	14	25	220	466	19,000	2.5461	16
2010	1,018	3,333	1	19	26	124	11,600	3.2731	12
2011	9	12	3	3	3	15	28	1.3333	4
2012	20	22	5	5	20	36	36	1.0607	2
2013	106	41	12	103	126	126	126	0.3892	8
Total	*2,895*	*5,476*	*1*	*92*	*486*	*3,018*	*28,900*	*1.8918*	*160*

Table A18: US banks, Total Accumulated Wealth (£000)

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	1,653	1,734	26	816	1,150	2,108	8,054	1.0495	22
2000	1,395	1,041	77	686	1,285	1,791	4,869	0.7460	32
2001	2,182	1,481	350	1,274	1,880	2,677	6,626	0.6788	36
2002	1,646	916	358	903	1,468	2,308	4,827	0.5566	33
2003	3,008	5,372	1	1,312	2,055	3,317	33,700	1.7859	37
2004	3,171	4,076	2	1,376	1,995	3,931	22,200	1.2852	30
2005	4,576	7,107	1	1,374	2,829	5,192	38,100	1.5530	29
2006	5,698	8,540	19	1,604	3,829	6,856	47,900	1.4989	31
2007	6,120	9,318	51	1,398	4,954	6,130	40,100	1.5227	17
2008	4,022	7,490	60	252	1,860	2,786	22,300	1.8623	8
2009	4,461	9,743	49	101	1,658	2,301	31,900	2.1844	10
2010	7,159	10,200	43	96	5,943	6,777	34,000	1.4292	10
2011	6,024	11,000	35	179	2,368	2,840	28,400	1.8270	6
2012	11,200	23,600	36	78	894	9,714	64,100	2.1028	7
2013	19,700	40,100	64	308	4,611	15,100	117,000	2.0357	8
Total	*3,969*	*9,327*	*1*	*883*	*1,892*	*3,670*	*117,000*	*2.3502*	*316*

Table A19: G-SIBs, Variable-to-fixed pay ratio

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	28.48	48.37	0.00	1.03	11.16	40.05	307.68	1.6982	61
2000	27.67	51.84	0.00	1.40	3.55	31.13	392.09	1.8735	93
2001	15.87	18.35	0.50	3.13	6.80	26.56	87.80	1.1565	96
2002	14.22	22.51	0.00	2.06	3.77	21.52	200.55	1.5824	107
2003	14.90	16.42	0.00	2.60	6.27	26.08	81.99	1.1016	109
2004	12.31	14.90	0.00	2.12	4.73	20.95	73.38	1.2101	111
2005	16.64	20.07	0.00	3.26	6.38	22.05	100.54	1.2061	105
2006	25.57	30.90	0.00	3.62	10.60	39.03	157.75	1.2085	107
2007	40.40	180.65	0.00	3.37	12.94	27.08	1,853.76	4.4720	111
2008	13.75	18.01	0.00	1.33	4.28	23.78	69.29	1.3098	86
2009	9.80	15.40	0.00	0.00	2.34	13.00	85.29	1.5703	89
2010	9.96	17.45	0.00	0.84	4.45	12.24	129.07	1.7512	87
2011	7.53	7.81	0.00	1.64	5.90	11.28	41.52	1.0366	80
2012	10.49	11.38	0.00	3.89	8.74	12.43	68.27	1.0858	76
2013	9.68	14.45	0.00	1.53	6.69	13.60	121.68	1.4919	86
Total	*17.43*	*56.52*	*0.00*	*1.95*	*5.82*	*21.37*	*1,853.76*	*3.2434*	*1,404*

Table A20: EU banks, Variable-to-fixed pay ratio

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	0.9162	0.9196	0.0000	0.4975	0.5079	1.8125	2.5768	1.0037	7
2000	0.6399	1.2234	0.0000	0.0000	0.0000	0.9029	4.5564	1.9118	14
2001	0.4295	0.5894	0.0000	0.0000	0.0000	0.8994	1.6749	1.3725	18
2002	0.9819	1.2540	0.0000	0.0000	0.6147	1.7209	3.6696	1.2772	9
2003	0.8901	0.5713	0.0000	0.6371	0.9696	1.1158	2.1253	0.6419	12
2004	0.8792	0.4427	0.0000	0.6453	0.9022	1.2314	1.4775	0.5036	17
2005	4.1513	9.1024	0.0000	0.1837	1.9837	3.2659	41.8462	2.1926	28
2006	1.9122	1.8153	0.0000	0.0000	2.1650	3.5870	6.0843	0.9493	30
2007	1.3383	1.3972	0.0000	0.0000	0.8769	2.3198	4.3212	1.0440	40
2008	0.4077	0.7520	0.0000	0.0000	0.0300	0.3746	2.7608	1.8446	35
2009	0.0242	0.1347	0.0000	0.0000	0.0000	0.0000	0.7500	5.5678	31
2010	0.0393	0.1552	0.0000	0.0000	0.0000	0.0000	0.7504	3.9528	25
2011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	.	12
2012	0.0412	0.0347	0.0000	0.0000	0.0604	0.0669	0.0865	0.8431	13
2013	0.0819	0.0793	0.0000	0.0000	0.1322	0.1592	0.1720	0.9675	11
Total	*1.0005*	*3.1001*	*0.0000*	*0.0000*	*0.0253*	*1.1926*	*41.8462*	*3.098659*	*302*

Table A21: US banks, Variable-to-fixed pay ratio

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	0.9170	0.4310	0.0000	0.7357	0.9285	1.1803	1.5308	0.4700	22
2000	1.7901	1.1610	0.2197	1.3008	1.6732	1.9711	4.7384	0.6486	32
2001	4.1271	12.5917	0.6878	1.0999	2.0499	2.6112	77.2933	3.0510	36
2002	1.8649	1.0693	0.0470	0.8830	1.7648	2.5778	5.0294	0.5734	33
2003	2.2787	1.4679	0.0000	1.5159	2.1990	3.1050	5.7982	0.6442	40
2004	1.7703	0.9825	0.0000	0.9254	1.8977	2.4592	4.4693	0.5550	32
2005	2.2794	1.6109	0.0000	0.6250	2.7328	3.4603	5.3863	0.7067	30
2006	3.0431	1.8977	0.0000	1.1291	3.1362	4.0000	6.4330	0.6236	33
2007	2.1332	1.6314	0.0000	0.7157	1.7007	3.9067	4.5135	0.7648	20
2008	0.9490	0.8761	0.0000	0.4000	0.8864	1.0256	3.1944	0.9231	11
2009	1.6222	1.7363	0.0000	0.0000	0.8182	3.7050	3.7813	1.0704	11
2010	3.1543	3.0526	0.0000	0.5556	1.2000	6.3264	6.5672	0.9677	11
2011	1.0181	0.7826	0.0000	0.2212	1.1973	1.7448	1.8184	0.7686	8
2012	2.2377	2.6901	0.0000	0.6316	0.9685	5.7549	6.4989	1.2022	7
2013	8.8134	16.8103	0.0000	1.0154	2.8488	6.3979	49.9828	1.9074	8
Total	*2.4076*	*5.1201*	*0.0000*	*0.8664*	*1.7169*	*2.8638*	*77.2933*	*2.1267*	*334*

Chapter Three

Pay-for-performance: Behind the C-suite

3.1 Introduction

This chapter considers pay-for-performance in banking between 1999 and 2013. It conjectures deregulation began a cycle in compensation arrangements that ended with the breaching of the outrage constraint in 2007-08. Critics of compensation practices in banking point to inefficiencies and a weakening in pay-for-performance relations, and wrong incentives in executive compensation contracts that led banks to focus on short-term outcomes over long-term sustainability (Bebchuk, Cohen and Spamann, 2010; DeYoung, Peng and Yan, 2013; Bhagat and Bolton, 2014; Bolton, Mehran and Shapiro, 2015; Bennett, Guntay and Unal, 2015; Cheng, Hong and Scheinkman, 2015). Notwithstanding, the on-going debate on the reform of executive compensation maintains the principle that pay should be positively related to firm performance. Much of the discussion centres on how to repair pay-for-performance relations by aligning incentives with long-term firm performance and making compensation arrangements more optimal for shareholders (Bebchuk and Spamann, 2009; Bebchuk, 2010; Bebchuk and Fried, 2010a, b; Bolton, Mehran and Shapiro, 2015; Edmans and Liu, 2011; van Bekkum, 2016; Acharya, Mehran and Sundaram, 2016; Mehran and Tracy, 2016; Zalewska, 2016).

This chapter will determine the extent to which executive pay is justifiable in terms of bank performance. The results provide early evidence on pay-performance in the post-crisis era. This chapter investigates pay-performance across the C-suite of bank executives rather than for CEO only. Scarce information exists on the remuneration arrangements of non-CEO bank executives. However, the available evidence shows compensation arrangements do produce different effects for CEOs and non-CEOs (Berger, Imbierowicz and Rauch, 2016; Fahlenbrach and Stulz, 2011; Bosma and Koetter, 2013). The notion of teamwork and benefits of diversity amongst executives (Rosen, 1981; Bertrand and Schoar, 2003; Gabaix and Landier, 2008; Falato, Li, and Milbourn, 2015) together with evidence on the contribution to corporate governance of other C-suite executives (Aebi, Sabato and Schmid, 2012; Ellul and Yerramilli, 2013; Keys, Mukherjee, Seru and Vig, 2009) endorses the decision to analyse C-suite executives.

Bank performance depends upon the capacity and skills of top management teams to generate sustainable levels of profit. To maintain ongoing profitability for investors, including shareholders and other important stakeholders, CEOs take an appropriate amount of risk and manage risks to deliver a fair return on investment decisions. Whereas all firms face possible conflicts of interest among stakeholders, the problem is worse in banking because of industry characteristics. The regulatory structure comprises deposit insurance, lender-of-last-resort facility, and implicit too-big-to-fail doctrine. Banks have high levels of leverage and opaque balance sheets that shroud a mismatch of assets and liabilities. These conditions not only create incentives for bank CEOs to engage in excessive risk-taking, but reduce the normal level of monitoring of CEO behaviour by the board acting on behalf of shareholders and other stakeholders. Macey and O'Hara (2003, p. 103) succinctly summarise the problem as follows: "As financial institutions become more complex and less centralized organizations, the risks they pose to the financial system also increase. Although regulators clearly have an important monitoring and oversight role, the concomitant role and responsibility of the board of directors cannot be ignored".

The separation of owner (principal) and manager (agent) produces the classic agency conflict between shareholders and CEO. The board of directors represents shareholders and monitors the behaviour of the CEO to ensure the agent acts in the interests of the principal. Compensation policy plays a crucial role in aligning the interests of CEO and shareholders. Compensation contracts should contain implicit incentives for executives to maximise shareholder wealth. The alignment of incentives is a dynamic process and an important strategy in corporate governance. Typically, firms are willing to award higher compensation if the actions and decision-making of the CEO delivers performance gains and raises shareholder value. This establishes the principle of pay-for-performance in compensation contracts that justifies relatively high levels of pay providing CEOs deliver performance gains. A leading question concerns how boards of directors incentivise CEOs to act in the best interests of shareholders, that is, to implement strategies that maximise profits and shareholder value. This issue lies at the heart of agency theory. It also draws attention to the incentive structure inherent in compensation arrangements. Demsetz and Saidenberg (1999) suggest compensation should be highly performance sensitive when the output of the CEO is difficult to monitor and when the effect of CEO actions and decision-making on firm profit is strong.

The banking sector has been one of the most heavily regulated industries because of the causal role of financial development in the economic growth process. From the late 1970s/early 1980s, a process of financial deregulation sought to increase the level of competition in financial markets with ambition to realise efficiency gains. The impact of deregulation on compensation policy deserves attention. Studies show executive pay is lower in regulated industries in comparison to competitive sectors, and the incentive structure of executive compensation is different (Joskow, Rose and Shepard, 1993). The pay of executives in regulated industries is less sensitive to firm performance and weighted heavily in salary. Thus, pay-performance sensitivity in regulated firms tends to be low, which raises suggestions executive compensation is not optimal. In the recent past, banks were subject to scrutiny by regulators and supervisors who use metrics other than shareholder value creation to measure firm performance. The risk differential hypothesis suggests a risk-averse CEO may self-select to work for a regulated firm and prefer a low risk contract that is heavily weighted in salary and insensitive to firm performance.

Deregulation unleashed competitive forces that affected compensation policy in the financial sector. The managerial talent hypothesis contends that competitive markets require CEOs with superior skills and talent to manage increasingly large and complex organisations (Rosen 1981; Gabaix and Landier, 2008; Frydman and Sachs, 2010). CEOs that exploit risk-taking opportunities to deliver value for shareholders demand compensation that is highly sensitive to firm performance. The incentive structure in such compensation contracts heavily weights equity-related pay such as stock and options to tie executive pay to the firm's stock price. As Jensen and Murphy (1990b, p. 44) note, "a highly sensitive pay-for-performance system will cause high quality people to self-select into a company". Talented CEOs receive higher pay for bearing the risk associated with performance-sensitive or incentive pay (Smith and Watts, 1992). This feature explains, to some extent, growth in the level of executive pay in recent years (Frydman and Saks, 2010).

Despite a general trend towards higher executive pay since the 1970s, and wider use of incentive pay to align interests and minimise agency costs, the level of executive compensation in banking had surpassed other sectors before the global financial crisis (Philippon and Reshef, 2012). A body of empirical evidence confirms the deregulation hypothesis that pay-performance sensitivities increase following deregulation (Crawford, Ezzell and Miles, 1995; Hubbard and Palia, 1995; Houston and James, 1995; Becher, Campbell and Frye, 2005; Cuñat and Guadalupe, 2009; DeYoung, Peng and Yan, 2013). The competitive doctrine considers the threat of takeover (or dismissal) resulting from poor CEO performance is a disciplining device to prevent executive entrenchment. Evidence shows a positive association between pay-performance sensitivity and CEO turnover (Hubbard and Palia, 1995).

The political constraint (*i.e.* pressure from government) acts to limit the rate of increase in executive pay (Jensen and Murphy, 1990a; Murphy, 2012; 2013a). This suggests firms and CEOs understand what the market will tolerate in terms of pay awards, and are careful not to breach what Murphy terms the outrage constraint. The sub-prime crisis of 2007 and global financial crisis of 2008 breached the outrage constraint. Compensation practices in banking fell under intense scrutiny and criticised as a causal factor behind excessive risk-taking. The outcome has been political intervention in compensation policy, for instance, Say on Pay requirements in the Dodd-Frank Act of 2010 in the US, and the bonus cap in the Capital Requirements Directive IV of 2014 in the EU (Correa and Lel, 2016; Murphy 2013b).

The managerial power approach (Bebchuk and Fried, 2004) questions whether CEOs automatically seek to maximise shareholder value, and whether the board of directors automatically seek to maximise shareholder value. It conjectures agency problems allow powerful CEOs to extract rents because the CEO controls the board. The unintended outcome is compensation arrangements favourable to executives but sub-optimal for shareholders (Bebchuk, Fried and Walker (2002), Bebchuk and Fried (2003, 2004, 2005). The managerial power approach suggests powerful CEOs camouflage rent extraction from inefficient compensation structures, which harms incentives and ultimately firm performance because it weakens pay-for-performance sensitivity. A weak or overly large board of directors relative to a powerful CEO could weaken sensitivity. Similarly, the absence of a large outside shareholder and fewer institutional shareholders influences pay-performance sensitivity. Sensitivity could weaken because of a ratcheting-up effect used by compensation consultants to justify pay arrangements (camouflaging rents) rather than optimising pay. The use of stealth compensation could decouple pay-for-performance relations, such as, the use of severance pay and golden handshakes to ensure a soft landing following a poor performance. Post-retirement perquisites and award of consultant contracts to former executives is a source of stealth compensation that could weaken sensitivity (Bebchuk and Fried, 2003, 2004, 2005).

Core, Guay and Thomas (2005a) agree compensation contracts could reflect CEO power, and relatively powerful CEOs receive higher pay, but they refute claims that CEO pay is not optimised for shareholders. Specifically, they differentiate the incentive effects of annual awards of stock and options to executives and large *holdings* of stock and options, which is the more important incentive. They emphasise a result in Hall and Liebman (1988) that changes in the value of CEOs holdings of stock and options drives the strong relationship between firm performance and CEO compensation. In short, incentives are larger from equity-related pay and due particularly to holdings or accumulated wealth, that is, the accumulation of past grants of unexercised options and unsold investments in firm stock. Core et al (2005a) refer to accumulated wealth as portfolio holdings, which generate portfolio incentives whereas they define pay incentives as arising from annual pay. Notwithstanding the discussion on pay-performance sensitivities, the debate on the reform of executive compensation does not challenge the notion that executives should receive pay commensurate with firm performance. The consensus suggests fixing executive compensation practices by modifying incentive structures (Bebchuk, 2010; Bebchuk and Fried, 2010a, b; Murphy, 2013; Srivastav, Armitage Hagendorff, 2014; van Bekkum, 2016).

This chapter builds on previous work on pay-performance sensitivities of bank executives (Demsetz and Saidenberg, 1999; Ang, Lauterbach and Schreiber, 2002). Each study is US-centric and data restrictions limit the number of executives. Both offer a short-run analysis of pay-performance for periods prior to the analysis in this chapter: a single year (1995) and three-years (1993-96). This chapter uses the dataset that was introduced in Chapter Two, which contains compensation data for the C-suite of bank executives and performance indicators for a sample of 71 banks from 1999 to 2013. This will allow this chapter to determine pay-for-performance relationships across professional status for the three cohorts of banks, namely, G-SIBS, EU banks and US banks, and for the three time intervals (pre-crisis, 1999-2006; crisis, 2007-09; post-crisis, 2010-13).

By way of preview, this chapter presents compelling evidence on pay-performance sensitivities in banking that are larger for incentive pay and weaker for fixed pay. Sensitivities show intertemporal variation and vary across cohorts. The global financial crisis affected sensitivities, which are yet to return to pre-crisis levels. The choice of performance metric also affects sensitivities.

The chapter is organised as follows. Section 3.2 reviews relevant literature. Section 3.3 formulates hypotheses. Section 3.4 describes methods and data. Section 3.5 presents empirical results and discussion. Section 3.6 concludes.

3.2 Literature

The section comprises three sub-sections. Section 3.2.1 presents the standard principal-agent model that identifies the pay-for-performance relationship. Section 3.2.2 discusses the optimal contracting and managerial power approaches. Lastly, section 3.2.3 offers a review of select empirical studies on pay-for-performance.

3.2.1 A theoretical review of the contracting problem

This sub-section reviews the standard principal-agent model, which identifies the pay-for-performance relationship. A hidden action model is the basis of the analysis, which reveals the trade-off between incentives and insurance (risk). Our review draws on several sources, notably Hart and Holmström (1987), Murphy (1999) and Gibbons (2005). Edmans and Gabaix (2016) review developments in the optimal contracting literature including dynamic moral hazard models of incentives.

In what follows, let us assume that the agent is a bank CEO and the principal is the bank's shareholders. The analysis begins with a hidden action model. There are four basic elements in the hidden action model: (1) the technology of production given by a production function; (2) the set of feasible contracts; (3) the expected payoffs to shareholders and CEO; and (4) the timing of events. Three variables are able to summarise the production process. First, the contribution of the CEO to shareholder value (the "output" of the CEO), denoted in what follows by x; second, the actions the

CEO takes to produce his output, i.e. denoted by *a*; and, third, events in the production process that are beyond the control of the CEO, i.e. denoted by ε.

The CEO takes actions, *a*, to produce stochastic shareholder value, *x(a)*. The shareholders as beneficiaries of the CEO's efforts must reward the CEO. Since it is costly for the CEO to take actions, the CEO requires a monetary reward. Therefore, the CEO receives a total compensation, denoted by *w*, for his actions, which is a function of shareholder value and other observable measures, *z*, in the compensation contract, denoted by *w(x,z)*. The CEO's utility function is *u(w,a)*, i.e. a function of his compensation and actions. The utility or the payoff to the CEO is the difference between his remuneration and the cost of his actions. A risk-averse CEO will seek to maximise the expected payoff or utility.

A production function links the CEO's actions to the output of the bank, given by *x* = *a* + ε, where *a* equals CEO effort and ε is (normally distributed) uncontrollable noise beyond the CEO's control, i.e. $\varepsilon \approx N(0, \sigma^2)$. Whereas both the bank shareholders and the CEO know what the CEO's utility function is, only the CEO knows the actual extent of his actions. The assumption here is that bank shareholders know which actions the CEO should take (to maximise shareholder value), even though they cannot observe if the CEO did take those actions. Therefore, the expected payoff (or profit) to shareholders is given by $\pi = x - w$ which infers that the optimal contract maximises shareholder objectives and is the difference between the value created for shareholders by the actions of the CEO less the total compensation awarded to the CEO. However, the optimal contract is subject to two constraints. First, an incentive compatibility constraint arises because the CEO must select actions that maximise utility, *u(w,a)*. Second, a participation constraint infers that the expected utility of the compensation contract for the CEO must exceed his reservation utility.

The model demonstrates a trade-off between risk and incentives. The value to bank shareholders is given by *x* = *a* + ε, that is, value is a function of CEO actions and uncontrollable or random events. Assume that the CEO's compensation contract is linear and is denoted by *w(x)* = *s* + *bx*, where *s* is fixed salary and *b* is the sharing rate (or "pay-for-performance sensitivity"). Assume that the CEO has exponential utility, $U(x) = -e^{r(W-c(e))}$, where *r* is the CEO's absolute risk aversion and *c(e)* is the convex disutility of effort, the optimal sharing rate is:

$$b = \frac{1}{1 + r\sigma^2 2c''}$$

From the equation above, the optimal pay-performance sensitivity will equal *b* = 1 when output is certain $(\sigma^2 = 0)$ or the CEO is risk-neutral (r = 0). Incentives will be weaker for a more risk averse CEO, i.e.$(\partial b/\partial r < 0)$, and will be weaker the greater the uncontrollable (by the CEO) noise in shareholder value, i.e. $(\partial b/\partial \sigma^2 < 0)$. A higher bonus rate, *b*, creates stronger incentives for the CEO but also imposes more risk. At the extreme case of *b=0* the agent bears no risk but has no incentive. At the other extreme of *b=1* the agent receives full title to the output but has no insurance against risk. Therefore, the efficient bonus rate lies between 0 and 1, depending on the amount of risk in *ε* and both the CEO's and bank shareholders' risk-aversions.

What are the implications of the hidden action model? The key feature is that bank shareholders are unable to observe the actual actions of the CEO, in other words, there is a problem of adverse selection. Therefore, and resulting from information asymmetries, the CEO could turn opportunistic and exploit the situation by electing to make the least possible effort, which is the hidden action or moral hazard. Thus, the behaviour of the CEO could become characterised by shirking or satisficing, that is, where the CEO does not make the best rational decisions for shareholders. The informativeness principle (following Holmstrom, 1979) acknowledges the fact that the payoff to bank shareholders depends on the likelihood that the CEO took the desired actions. Accordingly, bank shareholders must examine realised stock price returns to indicate if the CEO did take the appropriate actions, and use such returns as the basis for CEO remuneration. Basing executive pay on realised stock price returns reflects the information content of stock prices rather than shareholders' desire for price gains. Having made this point, it is possible that compensation contracts specify other performance indicators as incentives, for example, accounting-based measures such as return on equity providing that the indicator conveys information to indicate whether the CEO took the desired action or not.

Although the informativeness principle is intuitive, we should question the underlying assumptions. The hidden action model assumes that bank shareholders know which actions the CEO should take to maximise shareholder value. This assumption is too strong since it ignores the fact that shareholders delegate the running of their bank to the CEO because of an implicit belief that the CEO has superior skill of information in making investment decisions. Even if shareholders (or the board of directors) could directly monitor the (unobservable) actions of the CEO, it would be impossible for them to tell if the actions were appropriate given the circumstances. Murphy (2012, 2013a,b) and Murphy and Jensen (2011) show that actual compensation contracts are typically linear in stock prices, and the relationship between remuneration and stock-price performance predicted by the informativeness principle can be linear, convex, concave and need not be positive through its entire range. However, the principle does not adequately reveal which non-stock-based measures contain the most information about CEO actions when contracts are non-linear.

In the model, the CEO takes actions that contribute to shareholder value. Actions reflect effort, and the effort of the CEO extends beyond the number of hours worked. Effort should reflect whether the CEO makes the best decisions for shareholders, for instance, investing in projects with positive net present value that would increase value. Some decisions the CEO could take may have unintended consequences for shareholder value. For example, the CEO could increase bank earnings by working harder to control costs and/or maximise earnings, or the CEO could cut back on research and marketing costs, which could impair the bank's future earnings.

In a similar vein, whereas a linear contract can create uniform incentives, a non-linear contract could result in unintended incentives. In a non-linear contract, the CEO will not receive any bonus unless a lower performance or minimum threshold is met; that is, the hurdle bonus. Bonus plans stipulate an upper performance or maximum threshold. Beyond this point, the bank makes no further bonus payments irrespective of whether performance increases. The area between the lower and upper thresholds is the incentive zone, and it can be linear, convex or concave in shape. Murphy and Jensen (2011) review an actual case where the CEO faced such a bonus plan. The target was to achieve an ROE (return on equity) of 15% (upper performance threshold) for the year, which the CEO knew the firm could easily surpass. Murphy and Jensen (2011, p. 3) write "He told us, half seriously: "I'd have to be the stupidest CEO in the world to report an ROE of 18%. First, I wouldn't get any bonus for any results above the cap. Second, I could have saved some of our earnings for next year. And third, [the board of directors] would increase my target performance for next year." Murphy and Jensen surmise that such plans can create value-destroying incentives if total performance in the two years falls, for example, by the CEO stopping work in the first period or delaying sales to the second period.

3.2.2 Optimal contracting and the managerial power approach

This sub-section offers a synopsis of optimal contracting theory and the managerial power approach to executive compensation. The objective is to identify reasons why the pay-for-performance sensitivity might deviate or decouple from its optimal[8] or efficient point. Broadly speaking, decoupling largely results from agency conflicts. The potential for agency conflicts to arise because of the separation of ownership and control dates back to an observation by Adam Smith (1776) that owner-managers at firms expend greater effort in running their firms in comparison to employee-managers. Berle and Means (1932, p. 139) identify the source of the agency problem as arising if leading executives "while in office, have almost complete discretion". Jensen and Meckling (1976) build on the identification made by Berle and Means and formalise how the separation of ownership and control could cause principal-agent problems and create agency costs.

Holmstrom (1979) shows that moral hazard can arise when a CEO engages in risk sharing such that his private actions, which affect the probability distribution of the outcome, are unobservable to bank shareholders. Since the actions of the CEO are unobservable, it is not possible to write a contract on them. Therefore, a Pareto optimal or first best solution to the contracting problem of risk sharing is unavailable, because the contract will not induce proper incentives for taking correct actions. The result is a second best solution, "which trades off some of the risk-sharing benefits for provision of incentives" (Holmstrom, 1979, p. 74).

The source of the moral hazard is asymmetric information, that is, the unobservable actions of the CEO. This solution to the problem is to monitor the actions of the CEO and to use this information in the contract. A first best solution results providing perfect monitoring (of CEO actions) is possible, which implies optimal risk sharing, and the contract penalises inappropriate actions by the CEO. This result is difficult to find in reality meaning that the second best solution is normal. Thus, compensation

[8] The contracting literature uses the terms "optimal" contract and "efficient" contract interchangeably. An optimal or efficient contract does not imply that the contract is perfect. Rather, the firm will attempt to design the best contract it can in order to minimise agency costs (Conyon, 2006).

contracts aim to resolve a moral hazard problem, caused by asymmetric information over the actions of the CEO, which provides the CEO with an incentive to engage in opportunistic behaviour because of his low firm ownership i.e. ownership stake in the bank. Hence, compensation serves a dual purpose in allocating risks and rewarding the productive effort of the CEO. However, a tension between the two functions arises if the CEO is risk averse because the incentives for the CEO to work effectively mean that the CEO must bear unwanted risk. As a result, a risk averse CEO will require greater pay to bear greater incentive risk, that is, the risk associated with holding greater amounts of equity-linked pay such as stock and options.

In sum, contracting theory posits that compensation can limit the principal-agent problem by creating incentives that motivate the CEO to maximise the long-term value or earning potential of the bank. In other words, executive compensation is a mechanism for potentially encouraging effective leadership to improve performance. An alternative expression is the compensation of the CEO is equal to his reservation wage, or the value of the next best available opportunity, plus a premium for bearing the risks that result from incentives, which tie the wealth of the CEO to changes in shareholder value. If the success of the bank depends heavily on the decisions and effort of the CEO (and other leading executives and managers), then compensation contracts should be highly incentivised. Greater incentives implies higher pay for bearing risk. Therefore, the cost of paying for higher incentives is a transactions cost.

Core, Guay and Larcker (2003) define an optimal (efficient) contract as one that maximises the net expected economic value to shareholders after transactions costs and payments to employees. Transactions costs include contracting and monitoring costs, other costs borne in achieving compliance with shareholders' interests, and the costs of residual divergence. Thus, optimal contracting theory embodies the notion of agency cost with the efficient contract maximising shareholder value and minimising agency costs. Edmans and Gabaix (2009, p. 486) explain that compensation contracts "should therefore attract talented CEOs and incentivise them to exert effort, exploit growth opportunities, and reject wasteful projects, while minimising the cost of doing so".

Contracting costs vary over time due to changes in contracting technologies. Thus, the optimal contract is subject to intertemporal variation and inter-firm variability.

Furthermore, and in the context of an international study like the current study, contracting costs vary across countries. Differences in the quality of national legal systems affect the ability of insiders (agents) to expropriate outsiders (principals). Therefore, under relatively weak legal conditions and/or governance structures, contracting costs will be greater since the principal should write the contract to stop expropriation because the legal system (governance structure) does not. If shareholders recognise the greater agency costs, they will design contracts to constrain excess pay. However, if the contract is inefficient the agency costs will not be minimised and executives may receive excess pay (Core, Guay and Thomas, 2005a, b).

Conyon (2006) expounds on the definition of an efficient contract. He notes that an efficient contract, which lessens the probability for opportunistic behaviour, motivates the CEO to expend effort by providing incentives through risky compensation such as stock and options. Second, the efficient contract is a second best solution rather than a perfect contract, the design of which aims to limit opportunities for the CEO to shirk and/or satisfice. Third, the contract does not eliminate agency costs. Rather, the contract evaluates the benefits of implementation relative to the costs of doing so. The logical implication of the last point is that improvements in corporate governance or regulation could alter the relative costs and benefits, making different contracts desirable. For instance, Conyon cites improvements to the effective governance of boards by adding additional independent directors. However, he cautions that "what is efficient at one point in time may not be at another … Improvements in board governance, for example, by adding independent directors, may lead to different patterns of compensation, stock, and option contracts that are desirable for one firm but not another" (Conyon, 2006, p. 26). In summary, an efficient contract contains incentives for the CEO to maximise value for shareholders. In this sense, the contract is "optimal" and the notion that the CEO concentrates on maximising shareholder value is the founding principle of optimal contracting theory (see Mirrlees, 1976; Holmstrom and Milgrom, 1991). The board of directors monitors the CEO to ensure compliance with contractual obligations.

In a series of influential works, Lucien Bebchuk and Jesse Fried review the optimal contracting approach and propose that (then current US) executive compensation practices are inefficient and bad for shareholders because pay arrangements are the product of managerial power (Bebchuk, Fried and Walker, 2002; Bebchuk and Fried, 2003, 2004, 2005). The authors question the assumptions of the optimal contracting approach, namely, whether CEOs automatically seek to maximise shareholder value, and whether the board of directors automatically seek to maximise shareholder value. In brief, their conjecture is that agency problems allow powerful CEOs to extract rents because the CEO (and other leading executives) exercise control over the board of directors. The unintended outcome will be compensation arrangements that are favourable to executives but sub-optimal for shareholders. A limiting factor on the level of executive pay is the outrage constraint. A breach of the outrage constraint might cause reputational damage to the CEO and the board of directors that approved the compensation award (see Murphy 2012, 2013a for examples of breaches of the outrage constraint). In other words, compensation arrangements require plausible justification, which infers there are limits on what directors will agree to and what CEOs will ask them to approve.

Whereas the board of directors is responsible for hiring, compensating and firing the CEO, it is normal practice, at least at large firms, for a Compensation Committee to evaluate the CEOs performance when designing the compensation contract. In this set up, shareholders delegate responsibility to the Compensation Committee, on which outside (or non-executive or supervisory) directors represent the shareholders' interests. In some cases, larger and more powerful shareholders might sit on this committee. The pay setting process should be independent of any involvement by the CEO, which should remove any tendency for insider dealing. The agency conflict between board and shareholders arises because one objective of an outside director is to be re-appointed, which may enhance prestige, and business and social networks. Therefore, and given the leading role of a powerful CEO in nominating outside directors, a director may side with the CEO over shareholders particularly with respect to executive compensation arrangements. Indeed, the likelihood that a director with a reputation for haggling over executive compensation arrangements is re-appointed will be lower (Bebchuk and Fried, 2003, 2004, 2005).

The critical point is whether the incentives of the Compensation Committee members align with shareholders or the CEO. The managerial power approach suggests that Compensation Committee members could collude with powerful CEOs to promote the CEO's interests over shareholders. Therefore, powerful CEOs could extract rents from shareholders because the Compensation Committee is weak or inefficient and does little to protect the firm in its negotiations over pay with the CEO. The rent extraction hypothesis proposes that CEOs implement governance arrangements at the firm that allow CEOs to influence their own compensation packages and maximise personal wealth. Thus, the CEO holds greater power than shareholders do. The outcome is that CEO pay becomes inappropriately high and the incentives facing the CEO are inappropriately low.

The managerial power approach suggests that powerful CEOs can camouflage the extraction of rents from inefficient compensation structures, which harms incentives and ultimately firm performance because it weakens pay-for-performance sensitivity. Other factors could weaken this sensitivity (Bebchuk and Fried, 2003, 2004, 2005). A first factor is a weak board of directors relative to a powerful CEO. A board could be too large to coordinate and effectively monitor the CEO and other executives (Yermack, 1996; Bhagat and Black, 1999). A board could contain a higher proportion of outside directors that are nominees of the incumbent CEO. Outside directors might be too busy and serving on a number of other boards (Bhagat and Black, 2002). Duality refers to combining the roles of CEO and Chair. Whilst duality is associated with higher levels of CEO pay given the increase in relative power of the leading executive, nevertheless, it is perceived to be an example of poor corporate governance (Hermalin and Weisbach, 1998; Pathan, 2009; Adams, Hermalin and Weisbach, 2010; Bebchuk, Cremers and Peyer, 2011). A second factor is the absence of a large outside shareholder (Bebchuk and Fried, 2003). A lack of effective monitoring might afford executives greater influence over their compensation. Executives could benefit from luck-based pay, for instance, stock prices rise because of favourable economy wide factors, which translate into higher pay without reflecting performance gains that are wholly attributable to executive effort (Bertrand and Mullainathan, 2001). Lastly, Bebchuk and Fried (2003, p. 76) suggest that if regulators or firms introduce pay-for-performance systems, executives may use their power to “obtain substantial option pay without giving up corresponding amounts of their cash compensation”.

Institutional shareholding affects pay-performance sensitivity. Sensitivity tends to be greater the higher the proportion of institutional shareholders particularly when there is not any business relationship between the firm and the institutional shareholder

(Bebchuk and Fried, 2003, 2004, 2005). A CEO could pressurise the institutional shareholder when such a relationship does exist, which could weaken sensitivity. A fourth factor is anti-trust legislation, which offers a form of protection from takeover. Historically, banking has been a heavily regulated industry with fewer opportunities for mergers and acquisitions activity. Pay at protected firms tends to be higher than market levels.

Firms often employ compensation consultants in their negotiations with CEOs over pay arrangements. Sensitivity could weaken because of a ratcheting-up effect. The key question is whether the compensation consultant is justifying pay arrangements (camouflaging rents) rather than optimising pay. Consultants could argue that executive pay should reflect performance when the bank stock price is performing well, and if the stock price is underperforming the consultant could argue that executive pay should reflect industry norms. A potential conflict arises because normally a bank’s HR (human resources) function hires a compensation consultant even though the HR director is subordinate to the CEO. Lastly, the use of stealth compensation could decouple the pay-for-performance relation, for instance, the use of severance pay and golden handshakes to ensure a soft landing following a poor performance. Post-retirement perks and the award of consultant contracts to former executives is another source of stealth compensation that could weaken sensitivity (Bebchuk and Fried, 2003, 2004, 2005).

The managerial power approach argues that optimal contracting could lead to very large amounts of compensation for what tend to be risk-averse executives, if pay is an effective incentive to increase value for (risk neutral) shareholders. The approach claims there is at best a weak relationship between executive pay and firm performance. The structure of executive pay can explain this weak result. Sensitivity tends to be weaker when executive pay mostly takes the form of cash and bonus. Sensitivity may weaken when pay takes the form of stock and options. As noted earlier, executives could benefit from windfall payments due to strong economic conditions that are unrelated to their own efforts. The design of option plans should filter out windfall payments if possible. Although it is common practice in the US in the pre-crisis period, for option plans to use at-the-money options, there are advantages of using out-of-the-money options to increase sensitivity. Sensitivity weakens if executives are free to unwind their equity incentives, meaning that grants of new stocks and options would be needed to restore pay-for-performance sensitivity (Bebchuk and Fried, 2003).

Core et al. (2005a) challenge the argument of Bebchuk and Fried (2004) that executive compensation is inefficient pay without performance. Specifically, and of relevance to this study of the banking sector, Core et al. (2005a) differentiate the incentive effects of annual awards of stock and options to executives and large *holdings* of stock and options, which the authors argue is the more important incentive. They emphasise Hall and Liebman's (1988) result that changes in the value of CEO stock and option holdings drives the strong relationship between firm performance and CEO compensation. Equity-related pay and accumulated wealth or portfolio holdings offer large incentives.[9]

3.2.3 Select empirical evidence on pay-for-performance

This sub-section is a brief synopsis of empirical literature on pay-for-performance. Section 3.2.3.1 reviews some pioneering studies. Section 3.2.3.2 reviews evidence from the banking sector. Section 3.2.3.3 reviews country-level evidence. Table A3.1 provides a summary review of select empirical papers.

3.2.3.1 Early evidence

The monitoring and review of executives by the board of directors is an internal managerial control mechanism. The board approves the compensation package including the incentive structure to which executives respond. Smith and Watts (1992) claim the executive compensation contracts approved by boards normally link executive pay to performance measures that directly relate to shareholder wealth. Most early studies use readily available data on US firms and investigate the relationship between firm performance and the pay of the CEO. The evidence on pay-for-performance is variable with many caveats. Nevertheless, the importance of incentive structure and driving role of equity-related pay is noted.

Murphy (1985) notes the failure of attempts to document the effect of executive compensation on firm performance other than citing the importance of firm size, and with performance playing a minor role at best. In a critique of the earliest pay-for-

[9] Accumulated wealth is the accumulation of past grants of unexercised options and unsold investments in firm stock. Portfolio holdings create portfolio incentives whereas pay incentives arise from annual remuneration.

performance evidence, Murphy (1985, p. 12) argues that concentrating on the sum of salary and bonus, as “the most visible aspect of remuneration”, fails to account for “potentially performance-sensitive compensation components – such as stock-options, deferred compensation, and stock awards”. A second criticism refers to the use of cross-sectional analysis to derive estimated pay-performance sensitivities, which Murphy suggests is subject to omitted variable problems. This point infers using panel data because compensation depends not only upon contemporaneous performance but also on factors such as an executive’s ability, managerial role and responsibility, firm size and past performance. If the behaviour of the omitted variable is constant across time, panel data estimation (across firms and time) should produce reliable estimates of the pay-for-performance sensitivities.

Taking the above issues into account, Murphy (1985) estimates pay-for-performance elasticities at 73 large Fortune 500 manufacturing firms in the US from 1964 to 1981. The sample covers 461 firm executives, which group into the following professional categories: Chair (non-CEO); CEO; President (non-CEO); and Vice President. Murphy carefully constructs pay variables to include only current awards of stock and options, and deferred compensation. This procedure eliminates the effect of previous awards of such instruments, and breaks the relationship between stock price performance and the realisable value of previously awards. Firm performance is the realised annual rate of return to firm shareholders. The results show a strong and significant pay-for-performance relationship, which suggests the earlier cross-sectional evidence was “biased and misleading” (Murphy, 1985, p. 41). The evidence demonstrates the need to accommodate incentive structures inherent in executive compensation contracts, and the importance of equity-based incentives.

Coughlan and Schmidt (1985) examine pay-for-performance for CEOs at a sample of 129 US firms in 1978, 1979 and 1980. Using the sum of salary and bonus as the dependent variable, Coughlan and Schmidt model the effects upon pay of cumulative daily abnormal returns over a firm’s fiscal year and firm size (annual sales growth). They obtain results after partitioning the sample by the age of a CEO. Their evidence shows boards of directors control the behaviour of firm executives by “making compensation and management termination decisions related to the firm’s stock price performance” (Coughlan and Schmidt, 1985, p. 65). Although firm size affects pay, it does not affect the significance or size of pay-for-performance, and the effect is strongest for CEOs that did not experience turnover. In summary, the evidence supports the notion that executive compensation plans are able to align the interests of top management and firm shareholders.

Murphy (1986) proposes two alternative hypotheses. The incentives hypothesis contends that shareholder wealth depends partly on the efforts of firm executives. The incentives implicit in remuneration contracts influence the level of unobservable effort chosen by an executive. Effort reflects the extent to which current observed productivity affects current and future compensation. The learning hypothesis contends that aspects of productivity are initially unknown and reveal over time. In contrast to Lazear and Rosen (1981) who use a single-period incentive contract, and Lambert (1983) who uses a two-period contract that minimises agency costs by relating executive remuneration to form performance, Murphy (1986) obtains results from more than two-periods. Based on a sample of 1,948 CEOs in 1,191 US firms over 1974 to 1984, Murphy shows compensation strongly and positively depends on firm performance, and that the anticipation of higher future compensation provides incentives only in an executive's early years, that is, earnings growth decreases with experience. Using sub-sampling based on experience, Murphy finds the strength of pay-for-performance elasticities decrease with experience. Barro and Barro (1990) confirm this result for commercial banks in the US. Although the majority of results obtain from using the logged value of salary and bonus as the dependent variable, Murphy considers a sub-sample of CEOs from 73 manufacturing firms for whom stock and options data are available. He finds US firms tended to reward CEOs with stock options in their early years, which is consistent with the general finding more in favour of the learning hypothesis over the incentive hypothesis.

Jensen and Murphy (1990a) make two important contributions. They quantify pay-for-performance sensitivity for a sample of US firms, and following Murphy (1985, 1986) show it matters more how firms pay executives rather than how much they do pay. Their work sets out the econometric framework for pay-performance studies and distinguishes between pay-for-performance sensitivities and elasticities. Jensen and Murphy (1990a) estimate the pay-performance sensitivity of 2,213 CEOs in 1,295 US companies between 1974 and 1986. They report on (median) average CEO wealth (pay and stock-related wealth) changes $3.25 for every $1,000 change in shareholder wealth. A sizeable difference exists between the sensitivities of large and small firms, \$1.85 per \$1,000 for large firms and \$8.05 per \$1,000 for small firms. Other evidence supports the inverse relationship between pay-performance sensitivity and firm size and firm risk (see Schaefer, 1998).

Pay-performance sensitivities vary across different components of pay and the threat of dismissal. For CEOs, pay-related wealth (excluding stock options) increases by 30 cents for every \$1,000 increase in shareholder wealth. The sensitivity on outstanding stock options equals 15 cents per \$1,000 change in shareholder wealth, whilst the average dismissal-performance sensitivity equals 30 cents per \$1,000. They sum the three sensitivities to derive an estimate of pay-performance sensitivity that is under the control of the board, which equals approximately 75 cents per \$1,000. The largest component of the \$3.25 results from sensitivity to stockholdings (CEO stock ownership), which for a CEO with median holdings is \$2.50 per \$1,000 (Jensen and Murphy, 1990a).

Jensen and Murphy (1990b) provide additional support for their previous results using a slightly extended dataset from 1974 to 1988. Hall and Liebman (1998) confirm the importance of incentives associated with equity-related pay and report a strong positive pay-performance association at publicly traded US companies in the US over 1980 to 1994, which they attribute to increases in stock option grants.

3.2.3.2 Evidence from the banking sector

Jensen and Murphy's (1990a) pay-performance sensitivity is \$3.25 for every \$1,000 change in shareholder wealth for US CEOs. Comparable estimates for US banks report a greater pay-performance sensitivity of \$4.27 (Crawford, Ezzell and Miles, 1995).[10] Seventy four percent of the \$4.27 total pay-performance sensitivity at banks is "the direct result of internal (i.e. board of directors) action" (Crawford et al., 1995, p. 244). Internal control refers to aspects of compensation policy under the control of the board of directors. It includes setting of salary and bonus, and award of stock options. (Jensen and Murphy include the threat of dismissal.) Jensen and Murphy find only 23 percent of total pay-performance sensitivity is under board control. A factor external to board control, namely, insider stock holdings, drives sensitivity at US corporates (\$2.50 of \$3.25). The comparative figure for bank CEOs is

[10] Crawford, Ezzell and Miles (1995) examine the relationship between CEO pay and firm performance on a sub-sample of 37 US commercial banks and 75 bank CEOs between 1976 and 1988.

considerably less ($1.10 of $4.27). Hubbard and Palia (1995) quantify the effect of deregulation on total pay-performance sensitivity, which increases from $4.34 before deregulation to $5.72 afterwards.

A body of work considers the effect of deregulation of pay-performance sensitivity. Historically, and until fairly recently, banking has been a heavily regulated industry. Pay-performance sensitivities in regulated (or less competitive) industries tend to be lower (Joskow, Rose and Shepard, 1993). This could be because banks were subject to close scrutiny by regulators and supervisors, and these entities did not view shareholder wealth creation as the leading measure of firm performance. Taking the argument a step further, Jensen and Murphy (1990b, p. 44) explain that “a highly sensitive pay-for-performance system will cause high quality people to self-select into a company”. The prospect of selection effects is consistent with the managerial talent hypothesis. Ambitious and talented CEOs demand greater incentive structures in compensation contracts, that is, a larger proportion of performance-based pay in total compensation (Smith and Watts, 1992). Conversely, a risk averse CEO, say in a regulated industry, may prefer a contract with minimal incentive structure and less sensitivity to performance. This risk differential hypothesis predicts the opposite to the managerial talent hypothesis.

The discussion raises suggestions that executive compensation in regulated industries is not optimal. Similarly, a firm with a diversification strategy and operating in a complex environment requiring managerial discretion should use performance-based compensation plans, weighted heavily in bonus and stock options to minimise monitoring costs for directors. In contrast, firms with low managerial discretion favour behaviour-based compensation plans weighted heavily in salary because executive decision-making and associated outcomes are easily predicted, observed, understood and controlled by directors (Magnan and St-Onge, 1997).

The US banking sector has been subjected to a significant financial deregulation process since the early 1980s, which has moved the industry from heavily to considerably less regulated status. The organisational complexity of banks, especially large institutions, has grown as former lines of demarcation such as the functional separation of commercial and investment banking disappeared following regulatory changes. Bank CEOs are expected to take risks and make decisions that increase shareholder wealth. In turn, executive compensation contracts reflect these developments. The proportion of equity-based compensation at banks in comparison to size-matched non-banking firms was significantly lower in the late 1980s and early 1990s. An equivalence of proportions was reached by the turn of the 2000s (Becher, Campbell and Frye, 2005). Executive compensation at banks accelerated in the run up to the sub-prime crisis. Using data for end 2006, Tung (2011) reports the average total compensation for a CEO at a US bank holding company stood at $7.8 million. CEO pay was heavily weighted in performance-based pay at over 90 percent with equity-based pay accounting for over half of total pay. CEOs held large equity stakes in their banks that is likely to produce a strong incentive effect. On average, the value of a CEO's equity portfolio stood at $87.5 million, which is 10 times larger than total pay and over 20 times the value of annual equity-based compensation.

Crawford, Ezzell and Miles (1995), Hubbard and Palia (1995), Becher, Campbell and Frye (2005), and Cuñat and Guadalupe (2009) examine the deregulation hypothesis, namely that bank CEO compensation became more sensitive to performance as bank management became less regulated. Typically, these authors test for changes in incentive structures and pay-performance sensitivities following deregulatory acts that repeal former barriers to competition in US banking.[11] The empirical evidence from the US banking sector supports the deregulation hypothesis. Studies commonly find increases in pay-performance sensitivities following deregulatory acts and increases in competition. Crawford et al (1995) report sensitivity increases more at thinly capitalised banks than well capitalised banks, which they suggest could create a moral hazard from a regulatory perspective. Hubbard and Palia (1995) test the managerial talent hypothesis and contend that talented CEOs demand appropriate rewards under competitive conditions. They find pay-performance sensitivities

[11] Crawford et al (1995) consider the impact of the Depository Institution Deregulation and Monetary Control Act (DIDMCA) of 1980 - which let non-bank depository institutions offer a wider range of products and phased out interest rate ceilings - and the Garn-St. Germain Depository Institutions Act of 1982 - which let commercial banks issue new asset and deposit products. They also consider some early moves by specific states to deregulate state-level branching restrictions. Hubbard and Palia (1995) examine CEO compensation at 147 US commercial banks between 1980 and 1989, and investigate the impact of greater competition resulting from repeal of state-level branching restrictions on CEO pay-performance sensitivity and turnover. Becher et al (2005) use a natural experiment to determine the impact of deregulation and technological progress on the incentive structure of bank CEOs against a matched sample of non-bank CEOs between 1992 and 1999. Cuñat and Guadalupe (2009) investigate the impact both of the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 – repealing all state-level branching restrictions – and the Gramm-Leach-Bliley Financial Services Modernization Act of 1999 – which repealed the 1933 Banking Act (Glass-Steagall) and ended functional separation between commercial and investment banking – on pay-performance sensitivity.

increase after deregulation makes markets more competitive, which supports their conjecture, and CEO pay increases are significantly larger at banks that change CEO in comparison to banks with incumbent CEOs. Interestingly, incumbent CEOs significantly increase inside equity following deregulation whereas inside equity for new CEOs decreases.

Becher, Campbell and Frye (2005) contend that deregulation should affect the incentive structure of executive compensation because deregulation – as an exogenous shock – improves internal monitoring by aligning the interests of executive directors and shareholders. The monitoring issue is important since regulatory structures in banking such as too-big-to-fail and deposit insurance, and high leverage, could lead to excessive risk-taking and a reduction in monitoring within the bank. Their evidence shows the role of boards did change at banks after deregulation and technological changes. Similar to DeYoung, Peng and Yan (2013), Becher et al suggest bank executives now manage more complex firms under increasingly competitive conditions. As a result, the monitoring role of boards has changed and so too incentive structures in compensation contracts, which are heavily weighted in performance-based pay. Cuñat and Guadalupe (2009) use a natural experiment and difference-in-differences methods to determine the effect of competition resulting from deregulatory acts on pay-performance sensitivity. Whilst their findings confirm earlier evidence, namely deregulation leading to changes in incentive structure with greater pay-performance sensitivity working through variable pay, there is a marginal increase at best in total pay following deregulation.

DeYoung, Peng and Yan (2013) examine CEO incentives at large US commercial banks between 1994 and 2006. They estimate pay-performance sensitivity (delta) or the change in CEO wealth with respect to changes in bank stock price, and pay-risk sensitivity (vega) which is the change in CEO wealth with respect to changes in stock return volatility.[12] DeYoung et al find that CEOs take more risk in response to contractual risk-taking incentives, and argue that bank boards changed CEO compensation to encourage executives to exploit new growth opportunities created by deregulation and debt securitization. Hence, they argue CEOs took more risk.

[12] This chapter uses the term “stock return” rather than “share price return”.

Berger, Imbierowicz and Rauch (2016) consider the stockholdings of bank CEOs and higher-level non-CEO executives officers, such as, the chief financial officer, chief lending officer and chief risk officer, and lower-level managers like vice-presidents and department heads. Specifically, Berger et al determine the effect of stock ownership on the probability of bank failure using data on a sample of over 4,000 US commercial banks from the first quarter of 2007 to the third quarter of 2010. They find bank failure is significantly associated with higher stockholdings of both higher-level and lower-level non-CEO bank management. Berger et al contend that stock ownership creates a moral hazard because non-CEO management takes risks to increase the value of their stock. Berger et al do not find evidence of a relationship between CEO stock ownership and bank failure. Although CEOs and non-CEOs face the same incentives, Berger et al argue the prospect of public vilification cautions CEO risk appetites. In a similar vein, Fahlenbrach and Stulz (2011) find cash bonuses are more important for non-CEOs. Bosma and Koetter (2013) find systemic risk increased during the crisis period at banks that had made higher bonus payments to top management teams (non-CEO) pre-crisis.

Barro and Barro (1990) estimate the pay-for-performance elasticity of CEOs at a sample of 83 large US banks between 1982 and 1987. Drawing on Rosen (1982), Barro and Barro expect to find positive associations between CEO skill and compensation and firm size. For newly hired bank CEOs, Barro and Barro estimate the relationship between total pay in the first year of employment and firm size (total assets). As the data are in logarithms, the pay-performance elasticity is around 0.3 in relation to size. The analysis continues for CEOs that remain in post. Barro and Barro find a positive association between pay growth and improvements in performance (using both market-based and accounting-based measures). Pay sensitivity decreases with CEO experience (consistent with Murphy, 1986), and the match between the quality of a CEO and the size of the bank decrease as tenure increases. CEO pay is sensitive to both relative and aggregate bank performance, which implies growth in CEO pay equals growth in expected marginal product.

Demsetz and Saidenberg (1999) question the appropriateness of estimating a single elasticity to quantify pay-for-performance in banking. They suggest pay-performance elasticities vary across banks with different characteristics and across executives with different roles. Among CEOs, pay-performance sensitivities should be stronger at larger firms because CEOs at smaller firms compete in a labour market tournament for promotion to larger firms. If intra-firm promotion motivates executive officers other than the CEO, their pay should be less sensitive to firm performance. Demsetz and Saidenberg estimate pay-performance elasticity based on percentage changes in compensation and firm performance in 1995 and 1996. Their sample of 298 publicly traded US banks contains compensation data for the CEO and at least one other executive plus bank performance data. The SNL Executive Compensation Review reports nine executive titles, which Demsetz and Saidenberg reduce to five (CEO, chief financial officer, chief operating officer, senior lending officer, and senior subsidiary officer, and miscellaneous).

The regression models specify four dependent variables to account for incentive structure: base pay; annual bonus, long-term compensation; and value of options granted, with each component scaled by option-adjusted compensation. The results show considerable cross-bank variation in base pay and annual bonus with less variation in long-term and options pay. The share of long-term pay and options increases with the size of banks. The patterns “translate into significant differences in pay-performance relations across firms, with size being the distinguishing characteristic” (Demsetz and Saidenberg, 1999, p. 2). The structure of compensation and pay-performance sensitivities both vary across executive roles after controlling for cross-firm differences. However, the difference in pay-performance sensitivities across roles is less robust than differences in sensitivities across firms.

3.2.3.3 Cross-country evidence

Pay practices between firms, and across industries and countries differ significantly and exhibit both cyclical and intertemporal variation (Murphy, 1999; Demsetz and Saidenberg, 1999; Conyon, Fernandes, Ferreira, Matos and Murphy, 2011). Due to the differences and data availability problems, the literature is lacking in comparative international evidence on pay-for-performance.

Conyon, Fernandes, Ferreira, Matos and Murphy (2011) provide an excellent review of developments in equity-based incentive structures in European countries and comparison of pay-performance sensitivities with the US. Based on data for 2008, the median total pay of a European CEO was €1,200,000, lower than the US counterpart who receives €2,414,000. Another difference is the incentive structure facing CEOs. The total pay of the median European CEO is heavily weighted in fixed pay or salary (at 50 percent in comparison to 29 percent in the US). The median US CEO has greater incentive to improve firm performance because equity-related pay accounts for 46 percent of total pay, which is considerably higher than the 19 percent in Europe. The share of bonus in total pay is comparable between Europe and the US (around 20 percent).

Conyon, Fernandes, Ferreira, Matos and Murphy (2011) estimate pay-performance elasticities on samples of European and US firms for the period from 2003 to 2008. The findings reveal significant differences in cash-based incentives within Europe. Although the authors find a positive association between CEO pay and firm performance at European firms, the relationship is sensitive to the choice of firm performance metric. CEO cash compensation significantly relates to stock returns, sales growth, and changes in return on assets, only at UK, German and US firms. Conyon et al find that increasing shareholder value by 10 percent corresponds to an increase in cash pay of roughly 4.1 percent in the US but only 1.2 percent in Europe.

Conyon, Fernandes, Ferreira, Matos and Murphy (2011) suggest European CEOs are paid like bureaucrats. Based on data for 1974 to 1986, Jensen and Murphy (1990a) levied the same accusation at US CEOs (see also Hall and Liebman, 1998). The characteristics of "bureaucratic" pay in Europe are the bulk of compensation takes the form of salary; 75 percent of pay is in salary and bonus but bonuses do not vary with firm performance metrics like shareholder returns; less than 12 percent of pay is in the form of stock or options, and CEO stockholdings are low relative to cash compensation and firm value. Conyon et al (2011, p. 52) state "for the rest of Europe, we find little systematic evidence that executives on average have incentives aligned with the interest of company shareholders". This result confirms evidence elsewhere of very low or negative pay-performance relations in European countries (see Table A3.1, which synthesises relevant empirical evidence).

Whereas CEO pay-performance sensitivities are strongest in the UK (within Europe), they lag behind the US. The result supports Ozkan (2011) and Conyon and Murphy (2000). The latter find larger pay-performance sensitivity for US CEOs relative to counterparts in the UK in 1997. CEOs in the US receive 1.48 percent of any increase in shareholder wealth in comparison to 0.25 percent in the UK. Gregg, Jewell and

Tonks (2012) investigate whether pay-performance sensitivities are larger for financial firms than non-financial firms in the UK. In the absence of a significant difference in cash plus bonus pay-performance sensitivity between sectors, Gregg et al suggest that incentive structures are unlikely to have induced bank CEOs to focus on short-term profits before the crisis.

3.3 Hypothesis development

The conjecture of this chapter is the period from 1999 to 2013, which witnessed a continuation of developments in compensation policy following deregulatory acts that changed the incentive structure in bankers' compensation contracts. As banking shifted from a tightly regulated sector to an increasingly complex and diverse sector, the demand for talented CEOs grew and with it an increasing use of incentive pay to reward bankers and align their interests with shareholders. This cycle ended with the global financial crisis in 2007-08. The severity of the crisis breached the outrage constraint and invoked political intervention in the compensation setting process. The post-crisis period from 2010 to 2013 enables an examination of changes made to compensation policy.

The composition of compensation reveals the incentive structure implicit in executive remuneration contracts. Contracts embed the notion of pay-for-performance that infer pay is sensitive to firm performance with superior performance being rewarded by larger pay increases. Compensation takes the form of fixed and variable pay. The fixed component refers to salary, which does not vary with firm performance, whereas variable pay includes performance-related components such as stock and options. The mix of fixed and variable pay explains differences in incentive structure. A compensation contract weighted heavily in performance-related pay is likely to more closely align the interests of CEO and shareholders because shareholder want an increase in wealth, which a CEO can generate through stock price appreciation that also raises the CEO's wealth. The managerial talent hypothesis suggests talented CEOs demand highly sensitive pay-for-performance systems heavily weighted in performance-based or incentive pay (Smith and Watts, 1992). In contrast, the risk differential hypothesis suggests risk averse CEOs demand an incentive structure less sensitive to firm performance and weighted heavily in salary (fixed pay). As performance-sensitive compensation bears risk, CEOs who select riskier contracts demand a premium in the form of higher pay.

Compensation contracts implicitly incorporate the notion of pay-for-performance. Therefore, this study will determine what the pay-performance sensitivity is in the banking sector. The result is important because shareholders and other stakeholders, including bank regulatory authorities, should know the extent to which executive pay growth is indicative of firm performance. The result could help reconcile a conflicting argument in the literature. Optimal contracting theory suggests compensation can reduce agency costs by creating incentives that motivate a CEO to maximise a bank's earning potential or long-term value. Edmans and Gabaix (2009, p. 486) note compensation contracts "should therefore attract talented CEOs and incentivise them to exert effort, exploit growth opportunities, and reject wasteful projects, while minimising the cost of doing so". This view suggests compensation policy can encourage effective leadership and improve firm performance. Contrasting claims suggest executive compensation practices are inefficient and bad for shareholders because pay arrangements are the product of managerial power (Bebchuk, Fried and Walker, 2002; Bebchuk and Fried, 2003, 2004, 2005). This view questions whether CEOs seek to maximise shareholder value and whether boards of directors seek to maximise shareholder value. It suggests agency problems enable powerful CEOs to extract rents because a CEO (and allied executives) can control the board of directors. Consequently, compensation arrangements favour executives and are sub-optimal for shareholders. The two views predict alternative outcomes for pay-performance sensitivities: sensitivities are larger under the optimal contracting approach and weaker under the managerial power approach.

Some suggest CEO compensation is a more important element in firm performance than the compensation of other executives (Murphy, 2003). A premise of this study, however, is that the increasing complexity of banks, particularly large, internationally active and often too-big-to-fail firms, implies responsibility for firm performance that extends beyond the CEO (Bertrand and Schoar, 2003; Macey and O'Hara, 2003; Hau and Thum, 2009; Philippon and Reshef, 2012; Cremers and Grinstein, 2014; Herring and Carmassi, 2015). Firms should employ competent board members because talented individuals are associated with better firm performance outcomes (Rosen, 1981; Gabaix and Landier, 2008; Falato, Li, and Milbourn, 2015).

Commentators claim a causal link between excessive bank risk-taking and the crisis suggesting compensation practices induced excess risk-taking (Brunnermeier, 2009; Reinhart and Rogoff; 2009; DeYoung et al., 2013; Ellul and Yerramilli, 2013; Marques and Oppers, 2014; Bolton et al, 2015; Cheng et al, 2015). Berger et al (2016) find the probability of bank failure increases when non-CEO bank management own more stock and suggest this provides a perverse incentive to take risks to boost the value of stockholdings. Bebchuk, Cohen and Spamann (2010) claim incentives facing the CEO, chief financial officers and other senior executives at Bear Stearns and Lehman Brothers were a contributory factor in excessive risk-taking that led to failure. Aebi et al (2012) highlight the governance role of a chief risk officer (CRO) in realising superior bank performance when the CRO reports directly to the board and not the CEO. Ellul and Yerramilli (2013) confirm the role of a CRO is kerbing risk exposure. Keys, Mukherjee, Seru and Vig (2009) find syndicated loan quality is higher the stronger the risk management function.

This study acknowledges the importance of teamwork and managerial diversity and hypothesises pay-for-performance relationships vary across hierarchical roles or professional status of bank executives. This study acknowledges a lack of studies on non-CEO bank executives and fills the gap by estimating pay-performance sensitivities for both CEOs and non-CEO executives. Furthermore, this study recognises selection effects and incentive pay structures may lead talented and ambitious individuals to self-select into large complex banking firms. This suggests size is an important factor in explaining inter-firm variation in executive compensation (Jensen and Murphy, 1990a), which justifies the use of sub-sampling in this study.

An optimal or efficient contract maximises the net expected economic value to shareholders after transactions costs – including contracting and monitoring costs - and payments to employees (Core, Guay and Larcker, 2003). Transactions costs vary across countries due to differences in the quality of national legal systems, which infers agency costs show inter-country variation. Providing shareholders recognise the greater agency costs, they can design an efficient contract to constrain executive remuneration. In contrast, an inefficient contract will not minimise agency costs and executives may well earn excess pay (Core, Guay and Thomas, 2005a, b).

The variation in optimal contracting, together with differences in disclosure requirements on executive remuneration and empirical evidence, highlight heterogeneity in pay practices across firms, industries and countries (Abowdb and Bognanno, 1995; Murphy, 1999; Focarelli and Pozzolo, 2000; Conyon et al, 2011; Conyon, Core and Guay, 2011; Fernandes, Ferreira, Matos and Murphy, 2013).[13] Heterogeneity together with firm size and efficiency, and home country restrictions influence both the level of executive remuneration and the structure of incentive pay at banks. Firm size and age could affect corporate practices. The financial operations of large financial conglomerates may be more challenging to monitor and potentially incur greater agency costs. A remuneration premium could substitute high monitoring costs at large firms (Winter-Ebmer and Zweimüller, 1999). Developments in the 2000s reveal wider use of incentive pay, for example, in Continental Europe, possibly since multinational US companies export pay practices to executives in foreign subsidiaries that puts pressure on pay policies globally. The evolution of executive compensation presents a considerable challenge for bank regulators and corporate governance systems as well. The discussion leads to the formulation of Hypotheses 1, 2 and 3, stated in their alternative form:

Hypothesis 1: Pay-for-performance varies across executive roles.

Hypothesis 2: Pay-for-performance varies across firms (country environment).

Hypothesis 3: Pay-for-performance varies between fixed and variable pay.

Executive remuneration in the financial sector, like others, is time-variant (Philippon and Reshef, 2012; Kaplan and Rauh, 2010; Frydman and Saks, 2010). Philippon and Reshef (2012) examine historical data from 1909 to 2006 and find a U-shape pattern for earnings (and education) and complexity of tasks. Financial deregulation realises increases in skill intensity, job complexity, and higher wages in finance. Until 1990, wage levels barely differ between finance and other sectors (DeYoung et al., 2013). By 2006, however, a growing disparity meant wages in finance had an average premium of 50 percent over other wages. The premium for top finance executives

[13] Fernandes, Ferreira, Matos and Murphy (2013) examine CEO pay across 14 countries. Conyon, Core and Guay (2011) examine CEO pay in the US and UK. The evidence suggests the premium (higher pay) of US CEOs reflects the greater risks borne by US CEOs through larger equity incentives. After adjusting for the risk premium, and controlling for cross-border differences in the structure of CEO pay and firm ownership and board characteristics, the premium is “economically modest” and becomes statistically insignificant (in 2007) (Fernandes et al, 2013, p. 360).

was 250 percent. Kaplan and Rauh (2010) report the earnings of Wall Street executives (investment bankers; hedge, private equity, and mutual fund managers) grew more than non-financial firm executives between 1994 and 2004. In sum, deregulation changed finance into a high-skill-wage industry.

As already discussed the causal link between excessive risk-taking and the crisis suggest compensation practices may have induced excess risk-taking. The severity of the crisis breached the outrage constraint (Murphy, 1985; Jensen and Murphy, 1990a) and invoked political intervention in the pay setting process. This suggests the externalities (outrage and public anger) and financial regulation of executive remuneration could affect pay-performance sensitivity inferring pay-for-performance relations are time sensitive. Correa and Lel (2016) suggest the intended outcome of Say on Pay laws is to curb executive compensation in the US. Hypothesis 4 proposes that pay-for-performance is time varying. Hypothesis 5 proposes the global financial crisis weakened pay-performance sensitivities and unleashed political pressure on executive pay arrangements in banking. Hypothesis 6 proposes sensitivities rebounded following regulatory reforms and pressure.

> Hypothesis 4: Pay-for-performance is time varying.
>
> Hypothesis 5: Pre-crisis pay premiums and faulty incentives precede a weakening of pay-for-performance in-crisis.
>
> Hypothesis 6: Political actions on compensation policy work to strengthen pay-for-performance post-crisis.

3.4 Methodology, Data and Summary Statistics

The second investigative study (Chapter Three) considers the issue of pay-for-performance elasticity in banking. The choice of methodology is based on Murphy (1985) and Jensen and Murphy (1990a), with the construction of the pay change and performance change variables following Ang et al (2002). The pay and performance variables as expressed as logarithmic changes to avoid heteroscedasticity problems (following Baker, Jensen and Murphy, 1988; Jensen and Murphy, 1990a). The models are based on ordinary least squares. In a series of sequential steps, the unconditional base model is augmented by vectors of additional variables to elucidate the effect and strength of the chosen covariates. Robust standard errors are clustered by firm.

3.4.1 Estimation of pay-for-performance relationship

The dataset provides a detailed picture of executive remuneration practices at some of the largest, complex and politically powerful banks in the world. The structure of executive remuneration reveals the incentives inherent in compensation contracts. Recognising that pay-for-performance relations are sensitive to the type of executive remuneration, this study estimates pay-performance elasticities by the components of compensation to identify if pay incentives are homogenous or not. A prior and based on the literature, expectations are pay incentives differ according to the structure of executive remuneration. Therefore, this study uses several dependent pay variables to estimate elasticities between pay incentives and bank performance.

This section presents the econometric approach to examine pay-for-performance. The relationship between executive remuneration and firm performance should be captured by a measure of pay consistent with the agency theory of pay-for-performance. Accounting for the structure of executive compensation means the analysis considers both pay incentives and portfolio incentives. Executives receive variable compensation and incentives through three mechanisms. First, flow compensation, that is, total pay (salary, bonus, equity-linked pay, deferred compensation). Second, changes in the value of portfolio holdings of stock and options (accumulated wealth). Third, the possibility that market assessment of an executive’s human capital will fall following termination because of poor performance (Core, Guay and Larcker, 2003).

Executive wealth is explicitly tied to shareholder objectives (creating shareholder wealth) through the executive’s holdings of stock and options (Murphy, 1999). Stock and options create long-term incentives for executives to increase shareholder wealth because both instruments increase with the stock price. However, executives would appear to understand that executive wealth is positively associated with higher stock return volatility, leading to investment in riskier assets (Guay, 1999; Coles et al, 2006; Rajgopal and Shevlin, 2002). In addition, executive wealth is implicitly tied to stock-price performance through accounting-based bonuses (through the correlation between accounting returns and stock price performance) and through annual adjustments in salary, target bonuses, and option and restricted stock grant sizes. This type of payment normally creates a short-term incentive.

The analysis begins by estimating pay-performance relations based on an executive's total pay. Total pay decomposes into constituents: salary; bonus; and equity-linked pay, that is, the annual award of stock and options. This study considers salary as fixed pay. The sum of salary and bonus is referred to as direct compensation or cash compensation. Variable pay is the product of bonus and equity-linked pay. Wherever possible, total accumulated wealth (portfolio incentives) is specified as a dependent variable. Accumulated wealth is the value of cumulative holdings over time of stock, options and long-term incentive plans. Total accumulated wealth is an executive's portfolio holdings that produce portfolio incentives.

To estimate pay-for-performance sensitivity, it is common to specify a regression model in first differences to estimate the effect of changes in firm performance (measured as the change in shareholder value that is continuously accrued by the rate of return on company stock) on the change in executive compensation (pay) over a period normally of one year. The model, therefore, measures the growth of pay in relation to growth in shareholder value (Murphy, 1985; Coughlan and Schmidt, 1985; Conyon et al., 2011). First differencing eliminates the implicit heterogeneity among firms in panel data (Jensen and Murphy, 1990a). Equation [3.1] shows the base unconditional model used to estimate pay-for-performance sensitivity.

$$\Delta\left(Pay_{ijt}\right) = \beta_0 + \beta_1 \Delta(Performance_{jt}) + \varepsilon_{ijt} \qquad [3.1]$$

Equation [3.1] shows the change (Δ) in total pay for executive *i* at bank *j* at time *t*, which is a function of the change (Δ) in performance (shareholder wealth) at bank *j* at time *t*. The annual change in a bank's market capitalisation measures shareholder wealth. Thus, the unconditional model employs market-based data. The coefficient β_1 measures pay-performance sensitivity.

This study will estimate pay-for-performance elasticities. Some changes in model specification are needed to estimate pay-performance elasticity. Some studies log compensation variables to avoid heteroscedasticity problems (Baker, Jensen and Murphy, 1988). This chapter expresses the pay and performance variables as logarithmic changes (following Ang et al, 2002). The independent variable of interest, namely the firm performance indicator, is the annual log stock return. This is equivalent to the annual change in shareholder wealth, and is a market-based indicator. Equation [3.2] shows the unconditional base model, which is estimated using OLS.

$$ln\left(\Delta Pay_{ijt}\right) = \beta_0 + \beta_1 ln(\Delta Performance_{jt}) + \varepsilon_{ijt} \qquad [3.2]$$

Where ln(ΔPay$_{ijt}$) is the natural logarithm of Pay$_{ijt}$/Pay$_{ijt-1}$.

In a series of sequential steps the unconditional base model is augmented by vectors of additional variables to elucidate the effect and strength of the chosen covariates. Initially, the base model is augmented with a single variable to control for the effect of firm size. Second, the base model is augmented to account for country effects and year effects or a combination effect. The results infer further regression models should specify country-year effects.

To estimate pay-performance elasticities across C-suite executives, the model includes intercept dummy variables for each professional role (bar one, the CEO). Intercept dummies show whether the dependent variable (say, total pay) varies across professional status. To obtain the pay-for-performance elasticity by role, the model is augmented by slope dummy variables, which interact each of the intercept dummies with firm performance.

The final model includes a vector of executive-level biographical characteristics to account for variation induced by director-level heterogeneity across time. Executive-level characteristics signal director experience and cultural profile. They offer insights into how diverse bank boards of directors are with diversity varying across countries and between and within banks. The final model also specifies a vector of bank-level indicators to proxy different features relating to bank business models, performance, and corporate governance. These covariates control for variation induced by bank-level heterogeneity across time. Equation [3.3] shows the full conditional model from which the study obtains pay-for-performance elasticities:

$$\Delta ln(Pay_{ijt}) = \beta_0 + \beta_1 + \Delta ln(Performance_{jt}) + \beta_k \sum_{k=10}^{n} D_k + \beta_k \sum_{k=10}^{n} D_k * \Delta ln(Performance_{jt}) + \beta_m X1_{it} + \beta_n X2_{jt} + \varepsilon_{ijt}$$

[3.3]

Where Pay_{ijt} equals total pay (or components: fixed pay; cash compensation; equity-linked pay; total accumulated wealth) for executive *i* in bank *j* at time *t;*

$Performance_{jt}$ is the stock return that equals the logarithmic value of the stock price at time (t) divided by the price at time t-1; that is, 100 * $\ln(P_t/P_{t-1})$ following Ang et al (2002). Since return is a market-based measure, this study uses an alternative accounting-based performance indicator of bank profitability to check robustness. The indicator is return on equity (profit before tax-to-equity);

Variables in *D* signal *k* executive roles. Initially, we code professional status using categorical variables (1 for Chief Executive Officer (CEO); 2 for Chair; 3 for Chief Operating Officer (COO); 4 for Chief Financial Officer (CFO); 5 for Chief Administrative Officer (CAO); 6 for Chief Risk Officer (CRO); 7 for Chief Legal Officer (CLO); 8-10 for junior, middle and senior executives based on total pay being below or equal to the 25th percentile, above the 25th percentile but below the 75th, and above or equal to the 75th percentile, respectively). The regression models use a vector of *k* binary variables where *k* equals 9 (omitting CEO as base category);

X1 contains executive-level covariates {*Age* in years; *Tenure* is time (years) in role and time in organization; *Education* is the number of academic and professional qualifications; *Gender* equals one if an executive is female, 0 otherwise; *Nationality* is the number of nationalities present at executive level; a dummy equal to 1 identifies a *newly appointed CEO*, 0 otherwise; a dummy equals 1 if the CEO and Chair roles are combined (*duality*), 0 otherwise};

X2 contains bank-level covariates {a dummy equal to 1 identifies if a bank engaged in *M&A* (merger and acquisition) activity during the year, 0 otherwise; *Board Size* equals the number of board members; *SD-to-ED* is the ratio of supervisory directors-to-executive directors and proxy for board independence; *Size* is the log of bank total assets; *Growth* opportunities is the ratio of market-to-book value of equity;

Diversification is the ratio of non-interest income-to-total operating income and proxy for a bank's business model; *Funding* is the ratio of short-term money market funds-to-total assets and a business model indicator on the liabilities side of the balance sheet; *Asset quality* is the ratio of non-performing loans-to-total loans; *Leverage* is the ratio of total assets-to-equity; *Z score* equals return on assets plus equity-to-assets denominated by the standard deviation of return on assets over a three year rolling window. It is proxy for bank stability; *Cost-income* is the ratio of overhead cost-to-gross income and proxy for bank efficiency; *Liquidity* is the ratio of cash and securities-to-total assets and a business model indicator on the assets side of the balance sheet}.

ε_{ijt} is a stochastic error term with zero mean and constant variance. It is independently distributed across individuals, firms and time.

The overall linear assumption is that as firm performance increases so does executive remuneration. To avoid potential problems with outliers, all variables are winsorized at the 1st and 99th percentiles. All regressions are estimated using OLS with the source of variation by country-year. Regressions report robust cluster standard errors by firm.

3.4.2 Exploratory data analysis

This thesis uses the same dataset in each chapter. Section 2.4.1 explains how the sample was constructed. Section 2.4.2 explains the classification of bank executives by professional status. Section 2.4.3 discusses the executive-level and firm-level variables. For brevity, this section will not reproduce the earlier text. To construct the market-based performance measure (stock returns), this chapter sources bank stock prices from Thomson Reuters DataStream.

Figure 3.1 illustrates the structure of CEO pay across each cohort. The most striking difference is between G-SIBs and US banks with EU banks. Incentive pay at the two former cohorts is more heavily weighted in equity-related pay with salary accounting for a low percentage of total pay. EU banks attach a larger weighting to fixed pay (salary) which accounts for over 20 percent of total pay. Bonus payments appear greater at G-SIBs whereas EU banks make greater use of deferred compensation. Tables 3.1-3.3 show descriptive data on CEO pay by cohort for 1999-2013.

Figures 3.2-3.4 and Table 3.4 show median executive pay and the structure of incentives across professional status and cohorts for 1999-2013. The mean total pay for a CEO at a G-SIB is £12 million, which compares favourably with counterparts at US banks (£7.5 million) and EU banks (£1.9 million). The bulk of incentives for CEOs come from equity-linked pay with larger equity incentives at G-SIBs and US banks than EU banks. For the period and the average bank CEO, accumulated wealth or value of portfolio holdings was £84.9 million at G-SIBs, £9.9 million at EU banks, and £63.8 million at US banks. The data indicate a positive relationship between firm size and complexity and the level of executive remuneration. Incentive pay structures appear similar with Europe lagging behind the US.

Table 3.1: Descriptive statistics - CEO remuneration: G-SIBs; 1999-2013

G-SIBs - CEO Remuneration (£)		**Mean**	**S.D.**	**Min.**	**p50**	**Max.**	**CV**	**N**
Total annual compensation	Total compensation = sum of salary, bonus and equity-linked pay	12,100,000	24,300,000	77,261	6,443,000	355,000,000	2.01	297
Salary (fixed pay)	Annual cash value of salary	923,033	573,689	32,859	825,472	3,900,213	0.62	295
Bonus	Annual payment in addition to salary	3,164,303	3,355,941	20,332	1,881,237	16,700,000	1.06	208
Salary and bonus	Sum of salary and bonus less pension	3,154,145	3,169,690	77,261	1,974,995	17,600,000	1.00	295
DC Pension	Defined contribution pension	158,009	260,332	1,193	17,377	1,257,526	1.65	122
Equity-linked pay	Sum of shares awarded + estimated value of options awarded + LTIPs awarded in period	11,400,000	25,400,000	165,365	6,169,984	338,000,000	2.22	232
Variable pay	Total compensation less fixed pay	11,200,000	24,400,000	0	5,295,958	354,000,000	2.18	295
Total accumulated wealth	Value of cumulative holdings over time of stock, options + LTIPs	85,500,000	170,000,000	6,216	19,100,000	1,420,000,000	1.99	289

Note: LTIPs is the sum of all cash, equity, equity matched and option plans awarded or held.

Source: BoardEx; own calculations

Table 3.2: Descriptive statistics - CEO remuneration: EU banks; 1999-2013

CEO Remuneration (£)		Mean	S.D.	Min.	p50	Max.	CV	N
Total annual compensation	Total compensation = sum of salary, bonus and equity-linked pay	1,854,701	1,790,547	19,497	1,379,572	11,000,000	0.97	129
Salary (fixed pay)	Annual cash value of salary	643,976	378,998	19,497	584,560	2,095,147	0.59	127
Bonus	Annual payment in addition to salary	501,405	388,955	6,538	390,858	2,051,985	0.78	92
Salary and bonus	Sum of salary and bonus less pension	1,011,095	674,870	19,497	899,993	3,289,872	0.67	126
DC Pension	Defined contribution pension	140,025	241,098	2,052	62,162	1,400,397	1.72	39
Equity-linked pay	Sum of shares awarded + estimated value of options awarded + LTIPs awarded in period	1,513,902	1,685,632	24,865	994,833	10,400,000	1.11	73
Variable pay	Total compensation less fixed pay	1,240,843	1,644,227	0	795,239	10,600,000	1.33	126
Total accumulated wealth	Value of cumulative holdings over time of stock, options + LTIPs	9,935,882	15,700,000	25,754	4,358,805	117,000,000	1.58	102

Note: LTIPs is the sum of all cash, equity, equity matched and option plans awarded or held.

Source: BoardEx; own calculations

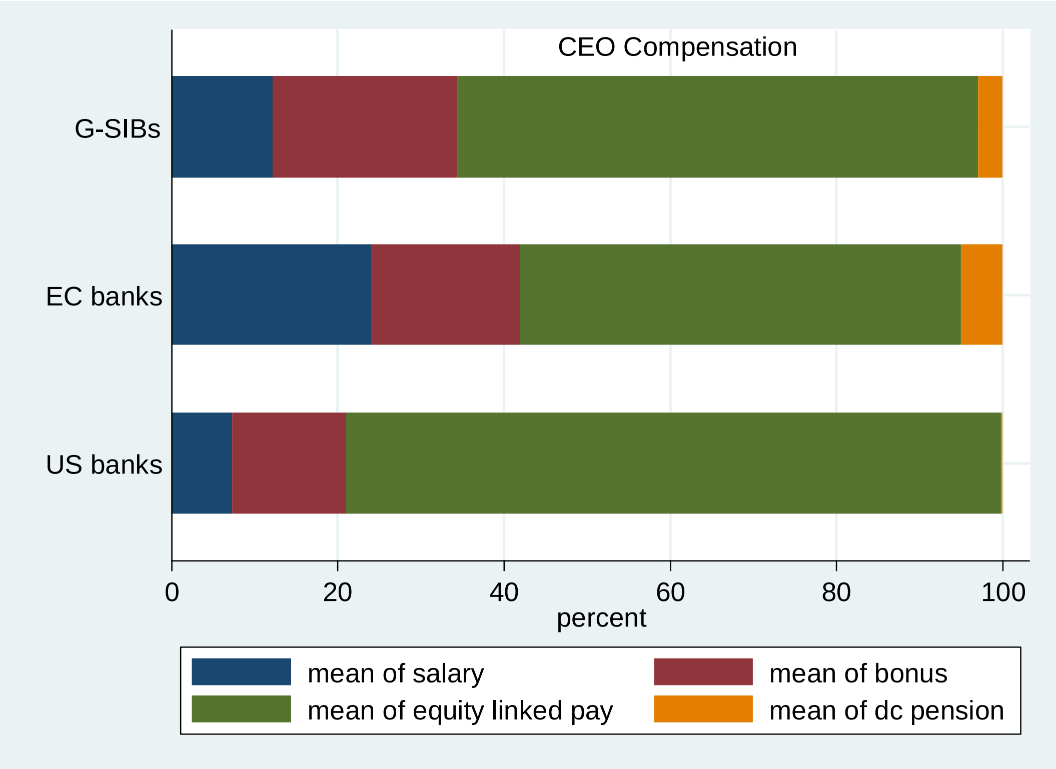
Table 3.3: Descriptive statistics - CEO remuneration: US banks; 1999-2013

CEO Remuneration (£)		Mean	S.D.	Min.	p50	Max.	CV	N
Total annual compensation	Total compensation = sum of salary, bonus and equity-linked pay	7,493,061	8,998,995	98,577	5,115,000	86,300,000	1.20	265
Salary (fixed pay)	Annual cash value of salary	638,603	271,510	98,577	619,788	2,093,120	0.43	264
Bonus	Annual payment in addition to salary	1,354,449	1,952,071	63,109	679,162	11,100,000	1.44	120
Salary and bonus	Sum of salary and bonus less pension	1,254,258	1,443,708	98,577	750,488	11,300,000	1.15	264
DC Pension	Defined contribution pension	18,337	34,111	1,270	7,149	285,067	1.86	184
Equity-linked pay	Sum of shares awarded + estimated value of options awarded + LTIPs awarded in period	7,010,720	8,665,799	3,399	4,724,860	85,400,000	1.24	236
Variable pay	Total compensation less fixed pay	6,881,870	8,997,830	0	4,457,876	85,800,000	1.31	264
Total accumulated wealth	Value of cumulative holdings over time of stock, options + LTIPs	63,800,000	93,300,000	18,307	31,700,000	620,000,000	1.46	261

Note: LTIPs is the sum of all cash, equity, equity matched and option plans awarded or held.

Source: BoardEx; own calculations

Figure 3.1: Structure of CEO pay as % of total compensation: 1999-2013



Source: BoardEx; own calculation.

Figure 3.2: Median executive pay: G-SIBs; 1999-2013

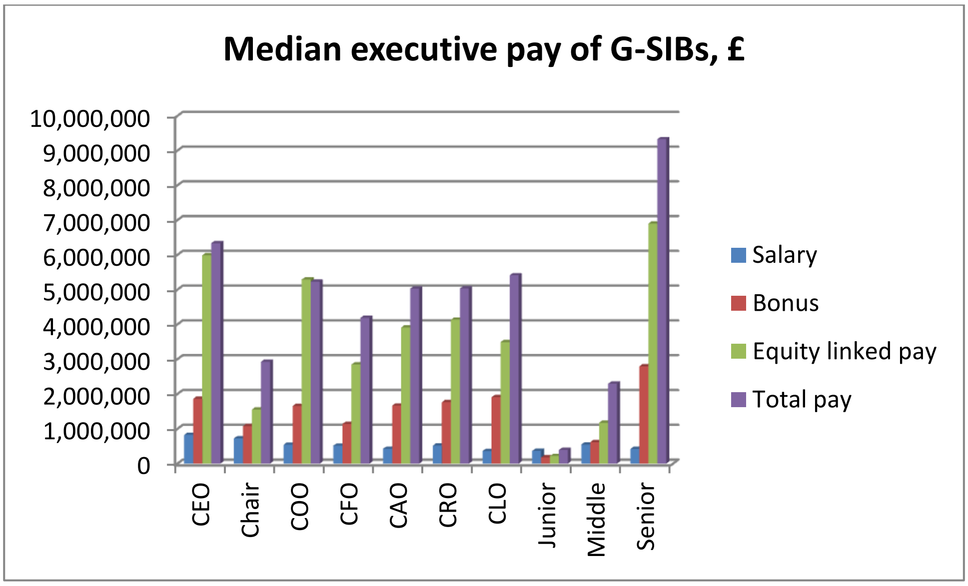


Figure 3.3: Median executive pay: EU banks; 1999-2013

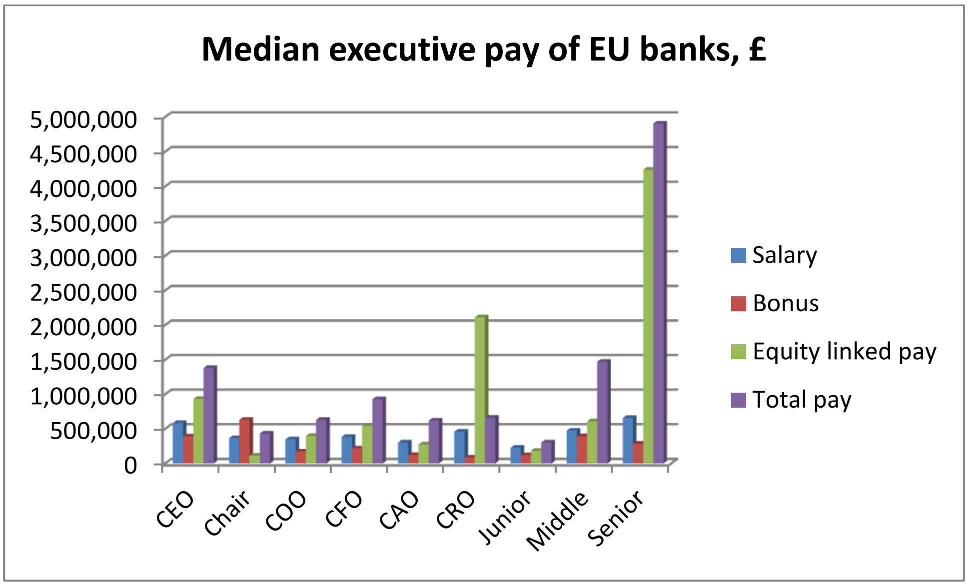
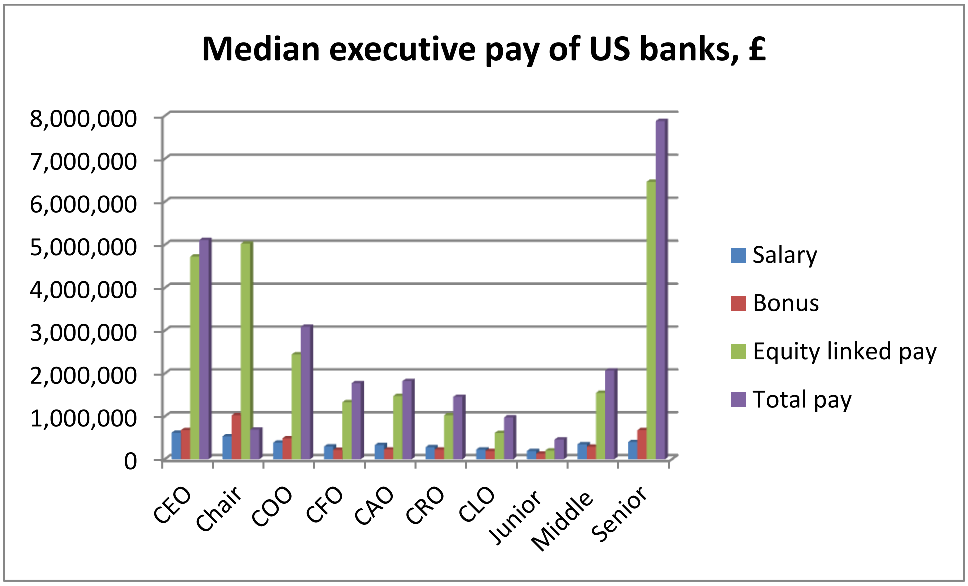


Figure 3.4: Median executive pay: US banks; 1999-2013



Source: BoardEx; own calculation.

Table 3.4: Executive Pay (£ median): Incentive structure by cohort; 1999-2013

Panel A: G-SIBs					
Status	**Salary**	**Bonus**	**Equity-linked pay**	**Total pay**	**Total wealth**
CEO	825,472	1,863,964	5,986,660	6,335,508	19,100,000
Chair	726,212	1,077,804	1,554,732	2,926,941	9,610,245
COO	543,709	1,657,584	5,288,646	5,230,240	12,000,000
CFO	516,522	1,138,391	2,848,641	4,188,319	9,791,688
CAO	427,080	1,667,141	3,911,305	5,027,662	11,700,000
CRO	517,887	1,765,621	4,136,003	5,034,287	11,700,000
CLO	360,708	1,909,862	3,492,031	5,412,000	12,500,000
Junior	366,518	179,185	219,750	393,287	447,932
Middle	549,000	615,458	1,175,632	2,296,573	5,331,293
Senior	422,669	2,796,925	6,899,114	9,326,597	33,000,000
Total	537,445	1,453,053	3,731,932	4,424,873	13,500,000
Panel B: EU banks					
Status	**Salary**	**Bonus**	**Equity-linked pay**	**Total pay**	**Total wealth**
CEO	584,560	390,858	931,077	1,379,572	4,358,805
Chair	367,545	630,294	112,369	432,825	124,637
COO	347,100	170,362	397,837	631,093	1,348,943
CFO	384,442	218,030	544,291	928,259	1,270,228
CAO	303,132	123,948	274,607	620,068	1,184,667
CRO	458,312	85,000	2,111,982	660,703	5,297,523
Junior	226,614	120,319	182,756	301,895	383,259
Middle	473,127	393,399	608,498	1,471,798	2,021,248
Senior	657,348	285,945	4,238,724	4,904,271	6,215,134
Total	394,800	267,297	572,498	771,056	1,691,439
Panel C: US banks					
Status	**Salary**	**Bonus**	**Equity-linked pay**	**Total pay**	**Total wealth**
CEO	619,788	679,162	4,724,860	5,115,000	31,700,000
Chair	534,517	1,025,261	5,027,794	692,323	23,500,000
COO	389,015	490,220	2,444,075	3,092,092	12,000,000
CFO	297,584	221,544	1,332,021	1,774,725	5,335,289
CAO	330,162	227,821	1,474,210	1,823,556	4,854,860
CRO	279,568	226,270	1,026,117	1,456,346	4,235,086
CLO	227,531	193,991	613,946	977,000	1,719,943
Junior	193,807	128,173	205,085	460,458	1,780,320
Middle	350,594	293,799	1,550,320	2,069,216	7,097,017
Senior	401,734	677,516	6,463,720	7,880,866	19,500,000
Total	352,477	304,594	1,921,773	2,186,237	8,418,486

Figures 3.2-3.4 and Table 3.4 Panels A-C illustrate the levels of total pay and incentive structure by professional status at G-SIBs, EU and US banks, respectively. Some common features emerge across cohorts. Non-CEO pay is considerably greater at G-SIBs, which reaffirms the notion of self-selection and size effects. Equity incentives comprise the bulk of incentives for non-CEOs. Total pay levels appear comparable across professional roles within cohorts with the exception of chairman. In the case of US banks, the median pay of the chief operating officer is greater than other C-suite officers, which suggests succession planning. The CEO is not the highest earner. In the absence of an obvious C-suite title, this study sorts hard-to-classify executives into tertiles by total pay (junior, middle and senior). The median pay of senior bank executives is the highest by professional status. Heads of divisions, for instance, investment banking, could benefit more than the CEO from incentive pay – Bob Diamond whilst head of Barclays Capital before he ascended to CEO is one example. Following the crisis and in an atmosphere of public vilification several bank CEOs opted to take pay cuts.

Tables 3.5a-c show the evolution of firm performance measured in annual stock price returns for each cohort and a set of descriptive statistics. Whereas the coefficient of variation suggests returns were more volatile at G-SIBs, the average return (-2.43 percent) is less than EU banks (-6.57 percent) and US banks (-12.19 percent) (see Table 3.5a-c). Table 3.5d-e shows the results of a pairwise comparison. In Table 3.5d, the upper panel reports the average stock price return (percentage) by cohort for 1999-2013 whilst the lower panel compares the means. On average, shareholders at each type of bank suffered from negative returns. Returns for US banks are significantly less than zero at the 1 percent level of significance whilst returns to G-SIBs and EU banks do not differ significantly from zero. The lower panel shows differences in returns between cohorts. Although returns at G-SIBs are less than both EU banks and US banks, and EU banks less than US banks none of the coefficients is statistically significant.

Table 3.5a: Performance indicator: Returns, % - G-SIBs

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	23.20	23.53	-18.07	1.88	24.43	38.67	69.84	1.0141	26
2000	16.98	18.73	-13.09	1.41	13.22	32.19	53.07	1.1033	26
2001	-12.43	16.23	-39.56	-24.77	-15.23	-1.22	31.64	-1.3057	26
2002	-29.17	19.77	-79.55	-39.02	-29.20	-16.05	10.00	-0.6779	26
2003	28.01	9.92	10.09	22.83	27.50	37.11	43.53	0.3541	26
2004	6.50	7.60	-5.85	0.11	5.71	12.48	21.57	1.1696	26
2005	15.73	12.82	-4.81	2.17	16.29	27.16	38.19	0.8150	26
2006	19.40	8.68	-0.21	13.78	19.31	21.99	44.53	0.4472	26
2007	-14.32	23.74	-63.76	-26.23	-16.00	2.35	41.97	-1.6578	26
2008	-115.70	140.88	-768.77	-118.02	-94.01	-66.03	-0.27	-1.2176	26
2009	29.00	37.89	-70.67	6.73	38.11	58.58	98.08	1.3068	26
2010	-7.76	21.04	-48.10	-19.64	-4.90	5.36	35.70	-2.7117	26
2011	-42.62	28.01	-91.63	-62.03	-35.69	-24.36	0.00	-0.6571	26
2012	24.37	18.61	-13.19	11.86	24.15	34.40	73.63	0.7633	26
2013	22.39	16.66	-14.58	4.93	28.25	33.31	49.48	0.7442	26
Total	*-2.429*	*55.003*	*-768.77*	*-16.87*	*5.66*	*24.09*	*98.08*	*-22.6479*	*390*

Notes: Return is the log stock return; S.D. is standard deviation; p25 is 25th percentile; p50 is median; p75 is 75th percentile; CV is coefficient of variation; N is number of firms.

The minimum stock return in 2008 (-768.77%) is for Lehman Brothers, which filed for bankruptcy on Monday 15 September. On that date, the firm's share price was 0.21 cents. The stock return from Friday 12 to Monday 15 September was -285.54%.

Table 3.5b: Performance indicator: Returns, % - EU banks

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	-4.53	26.73	-43.61	-23.17	-4.84	1.59	65.76	-5.8961	18
2000	5.01	17.50	-27.53	-8.98	8.73	22.34	28.93	3.4932	18
2001	-5.79	30.26	-60.00	-21.82	2.62	16.50	37.89	-5.2232	18
2002	-25.35	30.96	-83.62	-51.44	-11.56	-0.62	4.49	-1.2217	18
2003	14.38	20.03	-13.95	2.48	10.03	18.72	72.13	1.3927	18
2004	4.92	15.54	-39.20	-1.56	9.10	15.88	23.66	3.1606	19
2005	24.09	19.58	0.00	8.23	18.79	42.53	68.38	0.8126	19
2006	12.02	33.82	-86.75	9.21	15.77	26.79	71.83	2.8144	19
2007	-23.91	43.92	-136.05	-43.19	-19.13	-7.82	44.02	-1.8369	13
2008	-116.35	90.41	-250.33	-193.38	-132.08	-55.82	1.80	-0.7771	13
2009	10.06	36.54	-36.64	-13.16	0.00	21.62	104.30	3.6318	13
2010	-21.90	45.78	-138.63	-43.94	0.00	0.00	25.94	-2.0905	13
2011	-48.62	59.81	-151.22	-93.09	-20.19	0.00	0.00	-1.2302	13
2012	13.99	30.27	-32.21	0.00	0.00	27.14	82.48	2.1639	13
2013	31.93	34.25	0.00	0.00	20.70	65.95	80.65	1.0728	12
Total	*-6.57*	*49.33*	*-250.33*	*-15.11*	*0.00*	*17.42*	*104.30*	*-7.5043*	*237*

Notes: Return is the log stock return; S.D. is standard deviation; p25 is 25th percentile; p50 is median; p75 is 75th percentile; CV is coefficient of variation; N is number of firms.

Table 3.5c: Performance indicator: Returns, % - US banks

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	-9.21	48.81	-61.31	-37.39	-20.94	1.43	194.05	-5.2978	24
2000	23.80	35.75	-49.42	2.51	20.15	46.34	100.21	1.5021	24
2001	-0.87	19.40	-30.34	-15.60	-1.88	10.60	45.70	-22.4011	24
2002	-2.23	21.72	-54.12	-13.16	0.65	6.96	51.36	-9.7632	24
2003	26.18	15.33	0.93	16.92	25.08	34.54	71.75	0.5856	24
2004	10.34	15.85	-22.27	4.05	8.87	14.51	58.34	1.5331	24
2005	2.85	9.78	-22.63	-3.49	1.98	11.01	18.22	3.4319	24
2006	10.09	11.69	-19.83	5.33	8.89	14.76	36.23	1.1583	24
2007	-54.52	49.80	-202.68	-70.68	-46.70	-26.18	23.26	-0.9135	24
2008	-166.95	220.81	-737.54	-208.67	-76.73	-32.19	40.70	-1.3226	24
2009	-34.04	147.86	-533.27	-41.86	-3.28	15.93	194.59	-4.3436	24
2010	1.95	45.80	-109.86	-3.36	1.78	31.84	63.58	23.4429	24
2011	-15.12	27.61	-71.22	-36.07	-10.89	0.00	69.31	-1.8256	24
2012	8.94	26.19	-91.63	0.00	11.81	22.45	50.57	2.9302	24
2013	17.09	16.14	0.00	0.00	16.75	28.55	46.61	0.9445	23
Total	-12.19	86.12	-737.54	-17.56	0.30	16.75	194.59	-7.0622	359

Notes: Return is the log stock return; S.D. is standard deviation; p25 is 25th percentile; p50 is median; p75 is 75th percentile; CV is coefficient of variation; N is number of firms.

Table 3.5e repeats the pairwise comparison analysis by time interval. The upper panel shows positive returns pre-crisis (6.43 percent) greater than zero at the 1 percent level of significance. Returns turn negative and very significant during the crisis (-50.72 percent). Although returns are negative post-crisis they are not significantly different from zero. Nevertheless, post-crisis returns are significantly greater than in-crisis returns at 1 percent and in-crisis returns are significantly less the pre-crisis again at 1 percent. Whereas this study finds minimal evidence of statistically meaningful performance differentials across cohort, there are significant differences across time. In the Appendix to this chapter, Tables A2a-e repeat the analysis for two accounting-based firm performance indicators, namely, return on equity, and return on assets (Tables not shown). In review, both indicators show significant differences in performance between cohorts and across time intervals.

Table 3.5d: Pairwise Comparison of Means: by Cohort; 1999-2013 – Returns, %

Cohort	**Coefficient**	**Std. Error**	**t**	**P>|t|**	**[95% Confidence interval]**	
(1) G-SIBs	-2.4286	3.3902	-0.72	0.474	-9.0815	4.2242
(2) EU banks	-6.5734	4.3489	-1.51	0.131	-15.1077	1.9608
(3) US banks	-12.1943	3.5335	-3.45	0.001	-19.1284	-5.2602
			Tukey		**Tukey**	
	Contrast	**Std. Error**	**t**	**P>|t|**	**[95% Confidence interval]**	
2 vs 1	-4.1448	5.5142	-0.75	0.733	-17.0881	8.7985
3 vs 1	-9.7657	4.8969	-1.99	0.114	-21.2599	1.7286
3 vs 2	-5.6209	5.6035	-1.00	0.575	-18.7737	7.5320

Table 3.5e: Pairwise Comparison of Means: by Time Interval – Returns, %

Cohort	**Coefficient**	**Std. Error**	**t**	**P>|t|**	**[95% Confidence interval]**	
(1) 1999-2006	6.4322	2.4626	2.61	0.009	1.6003	11.2641
(2) 2007-2009	-50.7239	4.0215	-12.61	0.000	-58.6143	-42.8334
(3) 2010-2013	-0.3348	3.4827	-0.10	0.923	-7.1681	6.4985
			Tukey		**Tukey**	
	Contrast	**Std. Error**	**t**	**P>|t|**	**[95% Confidence interval]**	
2 vs 1	-57.1561	4.7156	-12.12	0.000	-68.2228	-46.0894
3 vs 1	-6.7670	4.2654	-1.59	0.252	-16.7772	3.2432
3 vs 2	50.3891	5.3199	9.47	0.000	37.9042	62.8740

3.5. Estimated pay-for-performance relationships in banking

3.5.1 Total pay-for-performance sensitivity

This study estimates pay-performance sensitivity using Equation [3.1] net of effects for the full sample, G-SIBs, EU banks, and US banks. In common with standard practice, pay-performance sensitivity is the pound increase in total pay for each £1,000 increase in shareholder value. Table 3.6 shows unconditional results of the estimated relationship between changes in banks' market capitalisation (shareholder wealth) and changes in executive total compensation. The initial pay-performance sensitivities vary across banks with sensitivity significant for G-SIBs (at the 1 percent level) and EU banks (10 percent level). Results from the unconditional model suggest size could be an important factor. Therefore, Equation [3.1] is augmented with a size indicator (absolute value of bank total assets) and re-estimated. Table 3.7 shows results that are consistent with Table 3.6.

Table 3.6: Total pay-for-performance sensitivity: by Cohort; 1999-2013

	All banks	G-SIBs	EU	US
Δ Value	0.0000729***	0.0000774***	0.0000404*	0.0000662
	(5.50)	(5.55)	(1.96)	(0.62)
INTERCEPT	-204930.1	-439749.8	144307.2**	-123048.2
	(-1.54)	(-1.49)	(2.83)	(-1.19)
Observations	2582	1085	463	1034
R^2	0.004	0.005	0.059	0.001
Adjusted R^2	0.004	0.004	0.057	-0.000

t statistics in parentheses. Robust standard errors clustered by firm. * p<0.10, ** p<0.05, *** p<0.01

Table 3.7: Total pay-for-performance sensitivity with size: by Cohort; 1999-2013

	All banks	G-SIBs	EU	US
Δ Value	0.0000726***	0.0000782***	0.0000399**	0.0000772
	(5.61)	(5.68)	(2.18)	(0.70)
Size	-0.000000164	0.000000174	0.000000342	-0.00000183
	(-0.65)	(0.35)	(1.27)	(-1.04)
INTERCEPT	-140182.9	-570763.4	49205.1	9319.3
	(-1.03)	(-1.00)	(0.66)	(0.06)
Observations	2582	1085	463	1034
R^2	0.004	0.005	0.068	0.001
Adjusted R^2	0.003	0.003	0.064	-0.001

t statistics in parentheses. Robust standard errors clustered by firm. * p<0.10, ** p<0.05, *** p<0.01

Table 3.8: Total pay-for-performance sensitivity with size: by Cohort; 1999-2006

	All banks	G-SIBs	EU	US
Δ Value	0.000178***	0.000201***	0.00000466	-0.0000946
	(3.54)	(3.71)	(0.22)	(-1.19)
Size	-0.00000192	-0.00000291	0.000000976**	0.00000305
	(-1.44)	(-1.17)	(2.38)	(1.48)
INTERCEPT	294175.6	789485.3	63901.4	-100087.0
	(0.91)	(0.56)	(0.63)	(-0.32)
Observations	1399	588	267	544
R^2	0.011	0.016	0.028	0.001
Adjusted R^2	0.010	0.013	0.021	-0.003

t statistics in parentheses. Robust standard errors clustered by firm. * p<0.10, ** p<0.05, *** p<0.01

Table 3.9: Total pay-for-performance sensitivity with size: by Cohort; 2007-2009

	All banks	G-SIBs	EU	US
Δ Value	0.00000556	-0.00000245	0.0000313	0.000494*
	(0.20)	(-0.09)	(1.12)	(2.02)
Size	0.000000138	0.00000163	0.000000669	-0.00000137
	(0.37)	(1.14)	(1.11)	(-0.17)
INTERCEPT	-1040520.8**	-3372860.2	-371150.7	68994.2
	(-2.11)	(-1.59)	(-1.44)	(0.11)
Observations	568	219	115	234
R^2	0.000	0.011	0.128	0.039
Adjusted R^2	-0.003	0.002	0.112	0.031

t statistics in parentheses. Robust standard errors clustered by firm. * p<0.10, ** p<0.05, *** p<0.01

Table 3.10: Total pay-for-performance sensitivity with size: by Cohort; 2010-2013

	All banks	G-SIBs	EU	US
Δ Value	-0.0000315	-0.0000385*	0.0000732***	-0.0000125
	(-1.61)	(-1.97)	(4.25)	(-0.04)
Size	0.000000179	5.15e-08	0.000000146	-0.00000703
	(0.55)	(0.08)	(0.54)	(-1.60)
INTERCEPT	161460.9	348166.2	24761.2	633766.8
	(0.57)	(0.38)	(0.17)	(1.19)
Observations	615	278	81	256
R^2	0.007	0.013	0.325	0.022
Adjusted R^2	0.004	0.005	0.308	0.015

t statistics in parentheses. Robust standard errors clustered by firm. * p<0.10, ** p<0.05, *** p<0.01

Tables 3.8-3.10 show results when Equation [3.1] augmented with size is re-estimated for the pre-crisis, in-crisis and post-crisis time intervals. Pre-crisis (1999-2006) pay-performance sensitivity is very significant for G-SIBs but insignificant for EU and US banks. The coefficient implies a £1,000 increase in market capitalisation translates into 20.1 pence growth in total pay for G-SIB executives. The intercept term shows the change in total pay if the change in market capitalisation is zero. For

G-SIBs, executive pay increases by £789,485 whereas it would fall by £100,087 at US banks. In the crisis interval (2007-09) pay-performance sensitivities weaken at G-SIBs. Sensitivity is positive and significant at US banks where a £1,000 increase in market capitalisation translates into 49.4 pence growth in total pay for executives. The results alter post-crisis (2010-13). Sensitivity strengthens and turns positive and very significant at EU banks whereas sensitivity weakens further and is negative and significant at G-SIBs. A £1,000 increase in market capitalisation translates into 7.32 pence growth in total pay for EU bank executives but a 3.85 pence drop at G-SIBs. Results from estimations of pay-performance sensitivities shows sensitivities vary both between bank cohorts and across time.

3.5.2 Total pay-for-performance elasticity – baseline estimations

This chapter estimates pay-for-performance elasticity using Equation [3.2] and reports results in a sequential manner. Following Ang et al (2002), the dependent variable and independent variable are denominated in logarithmic changes. The baseline estimation of pay-performance elasticity excludes any effects. Table 3.11 shows positive and significant elasticities for G-SIBs and US banks at the 5 percent level. The next estimation controls for firm size (log of total assets) and year effects.

Table 3.11: Total pay-performance elasticity, 1999-2013

	All banks	**G-SIBs**	**EU**	**US**
Returns	0.277***	0.311**	0.149	0.379**
	(3.56)	(2.64)	(1.12)	(2.59)
INTERCEPT	0.0753***	0.0789**	0.184***	0.0207
	(3.85)	(2.34)	(7.93)	(0.79)
Observations	2582	1085	463	1034
R^2	0.018	0.016	0.016	0.027
Adjusted R^2	0.018	0.015	0.014	0.027

t statistics in parentheses. Robust standard errors clustered by firm. * p<0.10, ** p<0.05, *** p<0.01

Table 3.12 shows pay-performance elasticity strengthens for G-SIBs (and more significant) and US banks. Inclusion of size and year effects raises the R-square goodness of fit even though size is insignificant and some years are significant. A further estimation of Equation [3.2] replaces year effects with country effects (see Table 3.13). Pay-performance elasticities remain significant for G-SIBs and US banks. Size exerts a negative and significant effect on total pay growth at G-SIBs. The dummy variables that account for individual country effects are significant for the majority of countries. The results suggest additional estimations should account for firm size and control for year and country effects as a source of variation.

Table 3.12: Total pay-performance elasticity - Size and Year controls; 1999-2013

	All banks	**G-SIBs**	**EU**	**US**
Returns	0.362***	0.682***	0.0567	0.588**
	(2.75)	(3.05)	(0.48)	(2.33)
Size	0.00804	0.0210	0.00159	-0.00632
	(0.67)	(0.44)	(0.20)	(-0.18)
1999				
2000	0.663**	0.896	0.430	1.476***
	(2.11)	(1.31)	(1.59)	(4.75)
2001	0.273	0.861	0.187	0.602***
	(0.87)	(1.17)	(0.74)	(3.34)
2002	0.230	0.716	0.0740	0.773***
	(0.81)	(1.06)	(0.26)	(4.81)
2003	0.427	0.644	0.432	0.989***
	(1.37)	(0.86)	(1.30)	(4.86)
2004	0.214	0.525	0.199	0.776**
	(0.76)	(0.77)	(0.77)	(2.32)
2005	0.624**	0.813	0.433	1.393***
	(2.16)	(1.19)	(1.29)	(8.32)
2006	0.306	0.627	0.135	0.902***
	(1.12)	(0.92)	(0.53)	(3.44)
2007	0.267	0.630	0.0136	1.042***
	(0.94)	(0.90)	(0.05)	(7.89)
2008	0.585*	1.004	0.0685	1.528***
	(1.74)	(1.39)	(0.17)	(7.46)
2009	-0.0435	-0.0616	-0.0757	0.821***
	(-0.14)	(-0.08)	(-0.22)	(2.82)
2010	0.358	0.734	0.420	0.772***
	(1.22)	(1.04)	(1.44)	(3.55)
2011	0.574*	1.103	0.167	1.204***
	(1.90)	(1.57)	(0.49)	(7.95)
2012	0.305	0.566	0.596**	0.810***
	(1.15)	(0.80)	(2.88)	(4.13)
2013	0.316	0.511	0.184	1.005***
	(1.10)	(0.73)	(0.69)	(4.79)
INTERCEPT	-0.371	-0.876	-0.0499	-0.890*
	(-1.25)	(-1.34)	(-0.20)	(-1.76)
Observations	2582	1085	463	1034
R^2	0.060	0.074	0.093	0.104
Adjusted R^2	0.055	0.060	0.061	0.090

t statistics in parentheses. Robust standard errors clustered by firm. * p<0.10, ** p<0.05, *** p<0.01

Table 3.13: Total pay-performance elasticity - Size and Country controls; 1999-2013

	All banks	**G-SIBs**	**EU**	**US**
Returns	0.289***	0.306**	0.143	0.377**
	(3.68)	(2.57)	(0.96)	(2.53)
Size	-0.0107	-0.0686**	0.00150	0.0124
	(-1.26)	(-2.73)	(0.19)	(0.39)
Switzerland				
Spain	0.347***	0.349***		
	(4.54)	(4.65)		
France	0.642***	0.667***	0.379***	
	(3.69)	(3.20)	(17.39)	
Germany	0.501***	0.515***	0.253***	
	(6.23)	(6.85)	(8.51)	
Ireland	0.423***		0.159***	
	(4.97)		(6.38)	
Italy	0.424***	0.458***	0.171**	
	(4.32)	(5.93)	(2.62)	
Netherlands	0.456***	0.460***		
	(4.54)	(4.95)		
Sweden	-0.00594	-0.0515		
	(-0.08)	(-0.71)		
UK	0.424***	0.390***	0.238***	
	(5.24)	(4.67)	(5.45)	
US	0.255***	0.215**		
	(3.20)	(2.67)		
INTERCEPT	-0.130	0.649*	-0.0563	-0.113
	(-0.97)	(1.84)	(-1.04)	(-0.33)
Observations	2582	1085	463	1034
R^2	0.032	0.038	0.024	0.028
Adjusted R^2	0.028	0.029	0.009	0.026

t statistics in parentheses. Robust standard errors clustered by firm. * p<0.10, ** p<0.05, *** p<0.01

3.5.3 Total pay-for-performance elasticity – Country-Year control and Time

This study re-estimates Equation [3.2]. It controls for country-year variation to obtain precise standard errors clustered by firm. Table 3.14 shows results from estimations of pay-performance elasticity accounting for firm size and with country-year effects. Elasticities are significant for G-SIBs and US banks. The size effect is negative and significant for G-SIBs. The goodness of fit for this set of regressions is noticeably higher than previous.

Tables 3.15-3.17 show results from separate estimations for the three time intervals. Pre-crisis elasticities are economically larger for G-SIBs (1.799) in comparison to earlier estimated coefficients (and significant at 5 percent). Whilst the magnitude of pay-performance elasticity coefficients is larger for EU banks and US banks, neither relationship is significant. There is a positive and significant coefficient on size indicating greater total pay growth at larger EU banks. The inverse significant size-pay growth relation continues at G-SIBs.

Table 3.14: Total pay-performance elasticity; 1999-2013

	All banks	**G-SIBs**	**EU**	**US**
Returns	0.482***	0.607*	-0.139	0.588**
	(2.70)	(1.72)	(-0.38)	(2.33)
Size	-0.0141	-0.0566*	-0.00417	-0.00632
	(-1.60)	(-1.98)	(-0.48)	(-0.18)
INTERCEPT	0.251**	0.832**	0.202**	0.0955
	(2.29)	(2.20)	(2.70)	(0.24)
Observations	2582	1085	463	1034
R^2	0.152	0.249	0.312	0.104
Adjusted R^2	0.110	0.172	0.203	0.090

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table 3.15: Pay-performance elasticity; 1999-2006

	All banks	**G-SIBs**	**EU**	**US**
Returns	0.814**	1.799**	0.0775	0.729
	(2.13)	(2.31)	(0.21)	(1.25)
Size	0.0140	-0.0999**	0.0223*	0.0579
	(0.87)	(-2.60)	(1.89)	(1.32)
INTERCEPT	-0.104	1.333**	-0.0302	-0.641
	(-0.56)	(2.67)	(-0.21)	(-1.41)
Observations	1402	588	270	544
R^2	0.156	0.314	0.269	0.103
Adjusted R^2	0.117	0.250	0.167	0.088

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Consistent with the previous estimation of pay-performance sensitivity in-crisis, the elasticity is positive and very significant (1 percent) for US banks. In contrast, elasticity is significantly negative (at 10 percent) for EU banks. Whereas elasticity is positive and relatively large for G-SIBs, it is insignificant. During the crisis, the coefficient on firm size is significant and inversely related to pay growth at EU banks and US banks (see Table 3.16).

Table 3.17 shows elasticities post-crisis. Strong, positive pay-performance elasticity continues at US banks but pay-performance relations are weak at G-SIBs and EU banks. Inverse size-pay growth relations continue for EU banks and US banks.

Table 3.16: Pay-performance elasticity; 2007-09

	All banks	G-SIBs	EU	US
Returns	0.386**	0.487	-0.694*	0.610***
	(2.27)	(1.14)	(-1.94)	(3.00)
Size	-0.0659**	-0.0972	-0.0382*	-0.141**
	(-2.02)	(-0.60)	(-1.91)	(-2.42)
INTERCEPT	0.808**	1.219	0.0590	1.707**
	(2.07)	(0.58)	(0.82)	(2.57)
Observations	568	219	115	234
R^2	0.125	0.193	0.357	0.144
Adjusted R^2	0.083	0.097	0.236	0.129

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table 3.17: Pay-performance elasticity; 2010-13

	All banks	G-SIBs	EU	US
Returns	0.515*	-0.769	0.162	0.796**
	(1.99)	(-1.06)	(0.15)	(2.41)
Size	-0.00927	0.0625	-0.0468*	-0.127*
	(-0.40)	(1.04)	(-2.06)	(-1.86)
INTERCEPT	0.224	-0.685	0.869***	1.366*
	(0.83)	(-0.85)	(5.63)	(1.78)
Observations	615	278	81	256
R^2	0.139	0.239	0.269	0.090
Adjusted R^2	0.087	0.146	0.100	0.072

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

3.5.4 Total pay-for-performance elasticity – executive and firm-level effects

The next step in the sequential process is to specify intercept dummy variables for the ten executive roles (nine after omitting CEO as the base) and re-estimate pay-performance elasticities. Table 3.18 shows results. The proportion of variance (as measured by the coefficient of determination) in total pay that is predictable from the change in firm performance, firm size, and country-year effects increases when the model specifies dummy variables for executive roles. Elasticity is positive and significant (at 5 percent) for all banks and US banks, and positive yet insignificant for G-SIBs. Inverse size effects remain for all banks, G-SIBs and US banks. The intercept variables show differences in total pay growth between executive roles and

CEO. Faster rates are found for senior executives (G-SIBs and US banks), chief risk officers (EU banks and US banks), and slower growth for chair and junior executives (US banks). For the full sample, the pay of CFOs (10 percent), CROs and senior executives (both 1 percent) grew faster than CEOs, and less for junior executives (5 percent). The rising prominence of CROs is noticeable at EU banks (5 percent) and US banks (10 percent). Senior executives benefit more at G-SIBs (1 percent) and US banks (10 percent) with junior and middle management losing out at US banks (1 percent) and G-SIBs (5 percent), respectively. Pay growth is slower for chairs at US banks (10 percent).

Table 3.18: Total pay-performance elasticity; 1999-2013 – Executive intercept effects

	All banks	**G-SIBs**	**EU**	**US**
Returns	0.442**	0.570	-0.164	0.560**
	(2.65)	(1.68)	(-0.44)	(2.51)
Size	-0.0462***	-0.0647**	-0.00338	-0.0862*
	(-2.85)	(-2.07)	(-0.20)	(-1.78)
Chair	-0.104	-0.0920	-0.00180	-0.365*
	(-1.23)	(-0.70)	(-0.01)	(-1.87)
COO	0.0416	0.0303	0.0609	0.0793
	(1.32)	(0.65)	(0.75)	(1.68)
CFO	0.0508*	0.0761	0.00845	0.0448
	(1.70)	(1.59)	(0.11)	(0.98)
CAO	0.0337	0.0658	-0.0728	0.0427
	(0.61)	(0.76)	(-0.55)	(0.70)
CRO	0.119***	0.0953	0.236**	0.0972*
	(2.90)	(0.93)	(2.60)	(1.97)
CLO	0.0125	-0.0119	0	-0.0658
	(0.23)	(-0.15)	(.)	(-0.78)
Junior	-0.291**	-0.416	0.0219	-0.518***
	(-2.43)	(-0.92)	(0.17)	(-3.26)
Middle	-0.00980	-0.138**	-0.0120	0.0103
	(-0.24)	(-2.35)	(-0.22)	(0.15)
Senior	0.325***	0.221***	0.272	0.616*
	(3.23)	(4.53)	(0.56)	(1.85)
INTERCEPT	0.612***	0.926**	0.180	0.933*
	(2.97)	(2.23)	(0.89)	(1.72)
Observations	2582	1085	463	1034
R^2	0.172	0.266	0.315	0.155
Adjusted R^2	0.128	0.183	0.191	0.134

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table 3.19: Total pay-performance elasticity; 1999-2013 – Executive interactions

	All banks	**G-SIBs**	**EU**	**US**
Returns	0.438**	0.535	-0.174	0.606**
	(2.28)	(1.25)	(-0.48)	(2.35)
Size	-0.0463***	-0.0663**	-0.00432	-0.0863*
	(-2.90)	(-2.10)	(-0.27)	(-1.85)
Chair	-0.102	-0.0932	0.00713	-0.393**
	(-1.15)	(-0.71)	(0.05)	(-2.42)
COO	0.0413	0.0293	0.0559	0.0764
	(1.33)	(0.61)	(0.66)	(1.56)
CFO	0.0527*	0.0769	0.0120	0.0420
	(1.76)	(1.66)	(0.16)	(0.90)
CAO	0.0410	0.0552	-0.0255	0.0357
	(0.71)	(0.57)	(-0.18)	(0.52)
CRO	0.123***	0.0859	0.267**	0.0957*
	(2.90)	(0.81)	(2.47)	(1.83)
CLO	0.0189	-0.0230		-0.0806
	(0.37)	(-0.30)		(-0.82)
Junior	-0.317**	-0.424	-0.0164	-0.543***
	(-2.57)	(-0.94)	(-0.14)	(-3.61)
Middle	-0.00906	-0.146**	-0.0000354	0.0101
	(-0.21)	(-2.46)	(-0.00)	(0.14)
Senior	0.318***	0.221***	1.757***	0.546*
	(3.36)	(4.48)	(5.45)	(1.96)
Chair # Returns	0.0612	0.480	0.0364	0.651
	(0.31)	(0.93)	(0.34)	(1.54)
COO # Returns	-0.0605	-0.201	0.0880	-0.0496
	(-0.51)	(-0.90)	(0.30)	(-0.35)
CFO # Returns	0.0468	0.120	0.0502	-0.0539
	(0.55)	(0.48)	(0.49)	(-0.59)
CAO # Returns	0.210	0.471	0.302	-0.160
	(1.09)	(1.54)	(1.30)	(-0.64)
CRO # Returns	0.110	-0.385*	0.198	0.298
	(0.59)	(-1.85)	(1.04)	(1.00)
CLO # Returns	0.107	0.428		-0.216
	(0.64)	(1.48)		(-1.68)
Junior # Returns	-0.191	-0.0278	-0.170	-0.222
	(-1.13)	(-0.04)	(-0.91)	(-0.93)
Middle # Returns	0.00876	-0.0924	0.0533	-0.0243
	(0.07)	(-0.34)	(0.25)	(-0.15)
Senior # Returns	0.310	0.171	-7.430***	0.863
	(1.42)	(0.65)	(-6.31)	(1.22)
INTERCEPT	0.612***	0.947**	0.190	0.935*
	(3.01)	(2.26)	(0.96)	(1.78)
Observations	2582	1085	463	1034
R^2	0.174	0.270	0.326	0.162
Adjusted R^2	0.128	0.180	0.187	0.134

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Next, the model specifies interaction terms between the intercept dummies on professional status and firm performance. Table 3.19 shows results. Consistent with previous estimations, pay-performance is stronger at US banks (5 percent). Bigger US banks (1 percent) and larger G-SIBs (5 percent) have slower rates of total pay growth. In models that specify the interaction terms, the intercept dummies show the relationship between pay growth and returns when returns are zero. Therefore, this study will not report on the information content on these coefficients. Instead, section 3.5.5 will present a pairwise comparison of pay-performance elasticities obtained from the interactions terms.

Table 3.20 shows results from estimations of Equation 3.3 for the full sample and bank cohorts over 1999-2013. The model is complete with vectors of executive-level and bank-level variables. The relationship between change in firm performance and change in total pay is positive and significant for the full sample (at 1 percent), G-SIBs (at 10 percent), and US banks (at 5 percent). Whilst the inverse size-pay growth persists at G-SIBs, total pay growth is significantly higher at larger EU banks.

Looking at the effects of the executive-level and firm-level covariates on total pay growth, the longer an executive remains in their role the slower pay growth is (all banks at 1 percent; G-SIBs at 10 percent; US banks at 5 percent). A similar result occurs for time spent in the organisation (all banks at 1 percent, EU banks at 5 percent). Female executives have slower pay growth at US banks (10 percent). Total pay growth is significantly greater when a bank appoints a new CEO (all banks at 5 percent; US banks at 1 percent), and when a bank engages in M&A activity (EU banks at 5 percent). Whereas larger board size is associated with significantly higher total pay growth for all banks (5 percent), it leads to slower pay growth at EU banks (10 percent). Total pay growth at EU banks is significantly slower when growth opportunities are greater (1 percent). Total pay growth is significantly slower at banks with more diversified income streams (all banks, G-SIBs and US banks at 5 percent), and when banks rely more heavily on short-term funding (G-SIBs at 5 percent). Greater leverage leads to larger total pay growth at US banks (10 percent). Weaker bank efficiency (higher cost-income ratio) is associated with bigger pay growth (all banks and EU banks at 10 percent). Lastly, higher levels of liquidity are associated with faster pay growth (G-SIBs at 1 percent).

Table 3.20: Total pay-performance elasticity; 1999-2013 – Full model

	All banks	G-SIBs	EU	US
Returns	0.590***	0.756*	-0.134	0.724**
	(2.96)	(1.88)	(-0.38)	(2.23)
Size	-0.0542***	-0.100**	0.114**	-0.0528
	(-2.73)	(-2.31)	(2.30)	(-0.98)
Chair	-0.0543	-0.0198	0.0709	-0.414**
	(-0.51)	(-0.11)	(0.42)	(-2.19)
COO	0.0747	0.160*	0.0518	0.0839
	(1.49)	(2.00)	(0.52)	(1.01)
CFO	0.0713	0.149	-0.0341	0.0397
	(1.35)	(1.52)	(-0.35)	(0.48)
CAO	0.112	0.286	0.156	0.0382
	(1.38)	(1.44)	(1.22)	(0.30)
CRO	0.157**	0.210*	0.279**	0.113
	(2.12)	(1.79)	(2.32)	(0.93)
CLO	0.0227	0.0889		-0.0703
	(0.27)	(0.31)		(-0.55)
Junior	-0.282**	-0.425	-0.0292	-0.538***
	(-2.22)	(-0.87)	(-0.21)	(-3.23)
Middle	0.0210	-0.0434	0.0272	0.0300
	(0.38)	(-0.44)	(0.32)	(0.33)
Senior	0.375***	0.316***	1.755***	0.593**
	(3.05)	(3.32)	(4.14)	(2.19)
Chair # Returns	0.104	0.631	0.125	0.500
	(0.57)	(1.32)	(1.29)	(0.92)
COO # Returns	0.0156	-0.178	0.350	-0.0147
	(0.13)	(-0.67)	(1.37)	(-0.11)
CFO # Returns	0.117	0.329	0.130	-0.0763
	(1.35)	(1.29)	(1.23)	(-0.62)
CAO # Returns	0.201	0.659*	0.374**	-0.222
	(0.85)	(2.00)	(2.26)	(-0.82)
CRO # Returns	0.209	-0.382*	0.372**	0.244
	(1.05)	(-1.88)	(2.49)	(0.77)
CLO # Returns	0.0110	-0.268		-0.0593
	(0.09)	(-0.61)		(-0.50)
Junior # Returns	-0.136	0.194	-0.0968	-0.231
	(-0.81)	(0.28)	(-0.53)	(-1.03)
Middle # Returns	0.0440	-0.125	0.0424	-0.00573
	(0.41)	(-0.48)	(0.24)	(-0.03)
Senior # Returns	0.483*	0.547**	-7.509***	0.958
	(1.98)	(2.25)	(-4.20)	(1.11)
Age	-0.00223	0.0131	-0.0107	-0.0321
	(-0.10)	(0.21)	(-0.37)	(-0.82)
Age^2	0.0000212	-0.0000442	0.0000929	0.000291
	(0.10)	(-0.08)	(0.36)	(0.79)
Time in role	-0.0160***	-0.0229*	-0.0199	-0.00991**
	(-3.44)	(-2.01)	(-1.71)	(-2.29)
Time in org.	-0.00303*	-0.00548	-0.00929**	-0.000165
	(-1.75)	(-1.41)	(-2.30)	(-0.07)

Education	0.00458	0.00209	0.0423	-0.0228
	(0.39)	(0.12)	(1.43)	(-1.20)
Gender	-0.0375	0.108	-0.0969	-0.138*
	(-0.81)	(1.47)	(-0.86)	(-1.85)
Nationality	0.000307	-0.00309	0.0120	0.00843
	(0.08)	(-0.72)	(1.73)	(0.71)
New CEO	0.291**	0.293	0.192	0.314***
	(2.24)	(0.95)	(1.19)	(2.96)
Duality	0.0337	0.121	0.0171	-0.0370
	(0.62)	(1.23)	(0.08)	(-0.44)
M&A	0.117	-0.356*	0.468**	0.187
	(0.96)	(-1.98)	(2.27)	(0.96)
Board size	0.0574**	-0.0777	-0.106*	0.0710
	(2.09)	(-0.83)	(-1.86)	(1.39)
Board size^2	-0.00119	0.00245	0.00152	-0.00150
	(-1.65)	(1.06)	(1.03)	(-1.29)
SD-to-ED	-0.0187	-0.0282	-0.00186	-0.0422
	(-1.15)	(-0.83)	(-0.05)	(-0.71)
Growth	0.00952	0.00817	-0.118***	0.0456
	(0.21)	(0.11)	(-2.95)	(0.66)
Diversification	-0.391**	-0.741**	0.615	-0.659**
	(-2.08)	(-2.48)	(1.30)	(-2.79)
ST-funding	-0.0350	-1.005**	1.866*	-0.110
	(-0.16)	(-2.48)	(1.84)	(-0.28)
Asset quality	3.641	2.433	1.568	5.426
	(1.02)	(0.23)	(0.20)	(1.25)
Leverage	-0.000353	0.0154	0.0102	0.0605*
	(-0.05)	(0.91)	(0.70)	(1.81)
Z-score	-0.111	1.274	-0.208	0.560
	(-0.52)	(1.34)	(-0.41)	(1.20)
Cost-income	0.327*	0.510	0.825*	0.364
	(1.69)	(0.81)	(1.75)	(1.38)
Liquidity	-0.0146	1.041***	-0.904	-0.535
	(-0.05)	(3.83)	(-1.63)	(-1.25)
INTERCEPT	0.469	-1.515	-1.044	-1.222
	(0.50)	(-0.54)	(-0.51)	(-0.57)
Observations	2385	929	456	1000
R^2	0.202	0.341	0.405	0.194
Adjusted R^2	0.145	0.224	0.242	0.147

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table 3.21: Total pay-performance elasticity; 1999-2006 – Full model

	All banks	G-SIBs	EU	US
Returns	0.604	1.743*	-0.593	0.421
	(1.26)	(1.75)	(-1.10)	(0.61)
Size	-0.0751**	-0.0776	0.158	-0.0105
	(-2.45)	(-0.64)	(1.70)	(-0.10)
Chair	0.0196	0.114	0.0201	-0.300
	(0.16)	(0.51)	(0.11)	(-1.19)
COO	0.0649	-0.0414	0.162	0.110
	(1.01)	(-0.35)	(1.07)	(0.76)
CFO	0.0155	-0.0563	0.0565	0.0338
	(0.24)	(-0.70)	(0.43)	(0.26)
CAO	0.103	0.0886	0.0457	0.0549
	(1.30)	(0.50)	(0.39)	(0.33)
CRO	0.125	-0.0501	0.319**	0.0953
	(1.31)	(-0.19)	(2.21)	(0.57)
CLO	0.198**	-1.050		0.308
	(2.08)	(-1.48)		(1.02)
Junior	-0.375***	-0.132	-0.0956	-0.641***
	(-2.91)	(-0.50)	(-0.54)	(-3.22)
Middle	-0.0371	-0.0880	-0.0174	-0.0434
	(-0.64)	(-1.29)	(-0.22)	(-0.29)
Senior	0.299**	0.0234	0.941**	0.565**
	(2.33)	(0.14)	(2.52)	(2.36)
Chair # Returns	0.218	1.574	0.0260	-0.277
	(0.41)	(1.39)	(0.08)	(-0.29)
COO # Returns	0.0901	0.633	0.589	-0.453
	(0.23)	(1.10)	(0.89)	(-0.70)
CFO # Returns	0.151	-0.0977	-0.138	0.313
	(0.46)	(-0.14)	(-0.18)	(0.79)
CAO # Returns	0.863*	0.215	1.159	1.667*
	(1.87)	(0.37)	(1.51)	(1.79)
CRO # Returns	0.909	1.497		0.783
	(1.51)	(0.57)		(1.08)
CLO # Returns	-0.590	-3.002		-2.120
	(-0.70)	(-1.41)		(-0.97)
Junior # Returns	-0.275	-0.175	0.255	0.487
	(-0.61)	(-0.24)	(0.40)	(0.58)
Middle # Returns	0.322	-0.320	0.753	0.417
	(0.97)	(-0.55)	(0.96)	(0.64)
Senior # Returns	1.405	0.713		1.467
	(1.59)	(0.63)		(1.06)
Age	0.0265	0.189**	-0.0424	-0.0755
	(0.57)	(2.35)	(-0.74)	(-0.77)
Age^2	-0.000281	-0.00172**	0.000437	0.000673
	(-0.62)	(-2.37)	(0.80)	(0.71)
Time in role	-0.0212***	-0.0146	-0.0245	-0.0223***
	(-3.51)	(-1.36)	(-1.61)	(-2.88)
Time in org.	-0.00283	-0.00582	-0.00557	0.00113
	(-1.13)	(-1.27)	(-1.13)	(0.25)

Education	0.00787	0.0150	0.0534*	-0.0363
	(0.57)	(0.71)	(1.83)	(-1.28)
Gender	-0.129	0.192	-0.0547	-0.380**
	(-1.35)	(1.36)	(-0.41)	(-2.77)
Nationality	-0.000562	-0.00412	0.00354	0.00302
	(-0.16)	(-1.51)	(0.34)	(0.27)
New CEO	0.182	0.00969	0.299	0.280**
	(1.50)	(0.04)	(1.30)	(2.78)
Duality	-0.0333	-0.0402	-0.112	-0.112
	(-0.51)	(-0.29)	(-0.29)	(-0.94)
M&A	0.137	-0.486***	0.660*	0.307
	(0.71)	(-3.82)	(1.94)	(1.11)
Board size	0.117***	-0.0869	-0.215	0.187*
	(2.93)	(-0.72)	(-1.42)	(1.88)
Board size^2	-0.00242**	0.00343	0.00584	-0.00422*
	(-2.26)	(1.28)	(1.13)	(-1.99)
SD-to-ED	-0.0206	-0.0446	-0.00188	-0.152*
	(-0.64)	(-1.03)	(-0.04)	(-1.99)
Growth	0.0443	0.237	-0.242**	0.130
	(0.66)	(1.37)	(-2.61)	(1.26)
Diversification	-0.396	-0.781	1.232	-0.505
	(-1.34)	(-1.06)	(1.33)	(-0.98)
ST-funding	-0.254	-1.696**	1.634	-0.709
	(-0.84)	(-2.45)	(1.68)	(-1.62)
Asset quality	-1.714	13.57	10.43	6.590
	(-0.20)	(0.53)	(0.62)	(0.33)
Leverage	-0.00923	0.00480	0.0404**	-0.0615
	(-0.82)	(0.17)	(2.64)	(-0.65)
Z-score	-0.390	0.352	0.533	-1.002
	(-0.89)	(0.29)	(1.06)	(-0.58)
Cost-income	0.397	2.000	1.085	-0.356
	(0.80)	(1.34)	(1.28)	(-0.47)
Liquidity	-0.0827	1.193*	-1.129	-1.490**
	(-0.22)	(1.95)	(-1.44)	(-2.26)
INTERCEPT	0.399	-5.034	-2.572	5.115
	(0.24)	(-1.59)	(-1.04)	(0.81)
Observations	1260	481	265	514
R^2	0.215	0.447	0.418	0.227
Adjusted R^2	0.147	0.321	0.221	0.147

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Tables 3.21 to 3.23 show results of re-estimations of the conditional model in Equation [3.3] by time interval. Table 3.21 reports estimated coefficients for the pre-crisis interval 1999-2006. The coefficient on returns is economically meaningful and significant (10 percent) for G-SIBs. A significant quadratic relationship exists between executive age and total pay growth at G-SIBs (5 percent). Total pay growth rises until an executive turns 54.9 years of age before falling. M&A activity (1 percent) and greater reliance on short-term funding (5 percent) slows total pay growth at G-SIBs whereas higher levels of liquidity (10 percent) produce faster total pay growth. Executives with better educational credentials enjoy stronger pay growth at EU banks (10 percent). M&A activity and greater leverage drive stronger total pay growth (10 and 5 percent) whilst greater growth opportunities slows pay growth (5 percent) at EU banks. At US banks, total pay growth is higher if the bank appoints a new CEO (5 percent). Governance variables appear to influence total pay growth at US banks. A significant quadratic relationship exists between board size and total pay growth. Pay growth is quicker until board size totals 22 members before falling. A larger proportion of supervisory directors-to-executive directors works to constrain pay growth (10 percent). Total pay growth is weaker for female executives (5 percent) and for relatively liquid US banks are (5 percent).

Table 3.22 reports estimated coefficients for the crisis interval 2007-09. Whilst the coefficients on the change in firm performance (returns) are positive, it is significant for EU banks only (1 percent). At EU banks, total pay growth slows until board size exceeds 25 members before quickening. Education (10 percent), greater board independence, growth opportunities, diversification, leverage, and bank stability (Z score) significantly constrain total pay growth (at 1 percent) at EU banks in-crisis. For G-SIBs, the significant quadratic relationship between total pay growth and age holds but the signs reverse. In-crisis, pay growth slows with age until an executive reaches 52.4 years. Time spent in one role constrains pay growth (5 percent) but pay growth is higher at more stable G-SIBs (10 percent). Total pay growth is significantly slower at US banks (5 percent) but is faster when boards are more independent (10 percent), at more levered firms (1 percent), more stable (5 percent), efficient and liquid (both at 10 percent) banks.

Table 3.22: Total pay-performance elasticity; 2007-09 – Full model

	All banks	G-SIBs	EU	US
Returns	0.439	0.463	0.744***	0.812
	(1.63)	(0.70)	(3.40)	(1.67)
Size	-0.0508	0.530	0.0596	-0.220**
	(-0.89)	(0.94)	(0.94)	(-2.38)
Chair	0.0303	-0.202	-0.329	-1.167
	(0.12)	(-0.53)	(-0.51)	(-1.71)
COO	0.0256	0.287	-0.690	-0.405
	(0.14)	(0.81)	(-0.89)	(-1.41)
CFO	0.229	0.895**	-0.279	-0.609*
	(1.08)	(2.44)	(-0.53)	(-1.92)
CAO	0.351	1.603*		-0.897**
	(1.28)	(1.98)		(-2.23)
CRO	0.239	0.274	1.203**	0.0101
	(1.04)	(0.63)	(2.37)	(0.02)
CLO	0.162			-0.402
	(0.54)			(-1.15)
Junior	-0.386	-0.296	-0.500	-1.018*
	(-0.98)	(-0.25)	(-1.06)	(-1.88)
Middle	0.308	0.314	-0.184	-0.338
	(1.54)	(1.27)	(-0.56)	(-1.01)
Senior	0.537*	1.175***		-0.618*
	(2.00)	(3.04)		(-1.74)
Chair # Returns	0.108	0.267	-0.125	0.652
	(0.43)	(0.42)	(-0.36)	(0.64)
COO # Returns	0.0189	0.0142	0.392*	0.0225
	(0.12)	(0.05)	(1.85)	(0.13)
CFO # Returns	0.233	1.488**	-0.160	-0.320
	(1.17)	(2.28)	(-0.88)	(-1.51)
CAO # Returns	0.215	2.674		-1.151***
	(0.50)	(1.69)		(-2.91)
CRO # Returns	0.112	0.187		1.007
	(0.28)	(0.41)		(0.84)
CLO # Returns	0.195	0		0.163
	(0.72)	(.)		(0.49)
Junior # Returns	-0.175	0.692	-0.392	-0.353*
	(-0.55)	(0.63)	(-1.51)	(-1.80)
Middle # Returns	0.189	0.646	-0.182	0.0700
	(1.13)	(1.46)	(-1.28)	(0.30)
Senior # Returns	0.481	1.568**		-1.847***
	(1.58)	(2.16)		(-2.91)
Age	-0.0940	-0.552***	0.0178	-0.0332
	(-1.28)	(-3.83)	(0.50)	(-0.37)
Age^2	0.000841	0.00527***	-0.000257	0.000290
	(1.23)	(3.82)	(-0.94)	(0.37)
Time in role	-0.0282**	-0.0832**	-0.00259	-0.0325
	(-2.20)	(-2.61)	(-0.11)	(-1.34)
Time in org.	-0.00326	-0.000905	-0.00965	-0.00695
	(-0.78)	(-0.10)	(-1.33)	(-0.75)

Education	-0.0684*	-0.107	-0.111*	-0.0731
	(-1.94)	(-1.64)	(-1.92)	(-1.48)
Gender	-0.0301	0.500	-0.0106	-0.122
	(-0.33)	(1.49)	(-0.04)	(-0.78)
Nationality	-0.00370	-0.00300	0.0522	0.0416
	(-0.23)	(-0.21)	(1.73)	(1.03)
New CEO	0.457	2.323	-0.727	-0.245
	(1.15)	(1.40)	(-1.50)	(-0.79)
Duality	0.116	0.0861	-0.331	-0.291
	(0.51)	(0.23)	(-0.53)	(-1.01)
M&A	0.0490	0.135		-0.198
	(0.24)	(0.42)		(-0.55)
Board size	-0.0638	-0.00689	-1.347***	-0.0778
	(-0.83)	(-0.03)	(-6.72)	(-0.20)
Board size^2	0.00177	0.000164	0.0266***	0.00179
	(0.92)	(0.03)	(6.48)	(0.17)
SD-to-ED	-0.0192	0.253	-0.359***	0.434*
	(-0.66)	(1.29)	(-6.82)	(1.99)
Growth	-0.152	-0.161	-2.566***	-0.256
	(-0.96)	(-0.25)	(-6.13)	(-0.71)
Diversification	-0.405	-2.406	-7.567***	0.0477
	(-1.24)	(-1.54)	(-4.14)	(0.06)
ST-funding	0.766	2.946		0.581
	(0.75)	(1.28)		(0.42)
Asset quality	0.779	-102.7		9.715
	(0.06)	(-1.31)		(0.47)
Leverage	0.0258*	0.0536	-0.0521***	0.163***
	(1.81)	(1.34)	(-8.46)	(2.94)
Z-score	0.527	4.912**	-1.386***	2.035**
	(1.14)	(2.83)	(-5.20)	(2.36)
Cost-income	0.316	1.423		0.971*
	(1.12)	(1.04)		(2.06)
Liquidity	0.436	0.810		2.509*
	(1.11)	(0.57)		(2.07)
INTERCEPT	1.881	-6.299	24.54***	-4.126
	(0.61)	(-0.52)	(7.84)	(-0.79)
Observations	533	190	113	230
R^2	0.215	0.517	0.676	0.321
Adjusted R^2	0.106	0.293	0.467	0.164

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table 3.23: Total pay-performance elasticity; 2010-13 – Full model

	All banks	G-SIBs	EU	US
Returns	0.604**	0.0792	0.699	0.635
	(2.30)	(0.15)	(0.46)	(1.30)
Size	-0.0570	-0.380	-0.488*	-0.0957
	(-1.62)	(-1.36)	(-2.14)	(-0.88)
Chair	-0.231	-0.359	-0.373	-0.519
	(-1.31)	(-0.99)	(-0.84)	(-1.71)
COO	0.140	0.356*	-0.0714	0.115
	(1.15)	(2.09)	(-0.15)	(0.75)
CFO	0.0809	0.124	-0.179	0.117
	(0.91)	(0.53)	(-0.43)	(0.66)
CAO	-0.0716		0.350	-0.0469
	(-0.51)		(0.87)	(-0.28)
CRO	0.0516	0.321	-0.158	0.142
	(0.34)	(1.15)	(-0.35)	(0.58)
CLO	-0.176	-0.182		-0.0923
	(-1.47)	(-0.47)		(-0.73)
Junior	0.0165	-0.320	0.0736	-0.558
	(0.07)	(-0.54)	(0.22)	(-1.56)
Middle	-0.151	-0.574*	-0.753	0.0161
	(-1.58)	(-1.91)	(-1.36)	(0.16)
Senior	0.310**	0.272*	-0.226	0.487
	(2.25)	(1.75)	(-0.43)	(1.09)
Chair # Returns	0.100	-0.438	0.401	
	(0.34)	(-0.55)	(0.64)	
COO # Returns	-0.186	-0.677	0.309	0.134
	(-0.55)	(-1.44)	(0.54)	(0.38)
CFO # Returns	0.164	-0.0460	0.317	-0.164
	(0.97)	(-0.16)	(0.43)	(-0.61)
CAO # Returns	0.0387		0.467	-0.00674
	(0.14)		(0.74)	(-0.02)
CRO # Returns	0.139	-0.224	0.259	0.0169
	(0.49)	(-0.34)	(0.42)	(0.05)
CLO # Returns	0.196	0.380		0.0258
	(0.54)	(0.67)		(0.04)
Junior # Returns	0.181	0.574	-0.0480	0.321
	(0.76)	(1.29)	(-0.07)	(0.77)
Middle # Returns	0.0325	-1.246*	-0.456	-0.248
	(0.11)	(-2.03)	(-0.52)	(-0.73)
Senior # Returns	0.0673	-0.182		1.517
	(0.17)	(-0.40)		(0.96)
Age	0.0646	0.125	-0.195*	0.0563
	(1.31)	(0.87)	(-2.21)	(1.17)
Age^2	-0.000549	-0.00111	0.00193**	-0.000436
	(-1.27)	(-0.91)	(2.77)	(-1.11)
Time in role	0.00633	-0.0169	-0.0965	0.0281*
	(0.50)	(-1.02)	(-1.67)	(1.81)
Time in org.	-0.00388	-0.00586	0.0258	-0.000334
	(-1.32)	(-0.83)	(0.83)	(-0.11)

Education	0.0579*	0.139	0.320*	0.0250
	(1.71)	(1.47)	(2.05)	(0.76)
Gender	0.0130	0.0377	-0.857	-0.00924
	(0.25)	(0.30)	(-1.11)	(-0.12)
Nationality	0.00739	0.000836	0.0187	0.173***
	(1.38)	(0.14)	(0.34)	(10.80)
New CEO	0.373	0.189		0.563***
	(1.17)	(0.34)		(5.51)
Duality	0.0713	0.291	-0.674	0.0264
	(0.80)	(1.32)	(-1.04)	(0.17)
M&A	0.323	0.813		-0.484*
	(1.59)	(1.66)		(-1.81)
Board size	0.0816	0.349		0.200
	(1.43)	(1.72)		(0.42)
Board size^2	-0.00187	-0.00810	0.0781**	-0.00314
	(-1.24)	(-1.63)	(3.40)	(-0.23)
SD-to-ED	-0.00153	-0.0140	1.405	-0.270*
	(-0.05)	(-0.39)	(1.37)	(-1.86)
Growth	0.0378	-0.304	1.479	0.202
	(0.26)	(-0.80)	(1.66)	(0.69)
Diversification	-0.491	-3.676		-2.092**
	(-1.42)	(-1.53)		(-2.15)
ST-funding	-0.293	-2.721		-0.0742
	(-0.54)	(-1.50)		(-0.04)
Asset quality	-2.980	-41.69		24.44*
	(-0.31)	(-0.90)		(2.04)
Leverage	0.00568	0.230*	-1.031**	0.473**
	(0.22)	(2.02)	(-3.61)	(2.45)
Z-score	-0.661	2.316		4.393**
	(-1.20)	(0.84)		(2.47)
Cost-income	0.176	0.414		1.276**
	(0.53)	(0.19)		(2.38)
Liquidity	-0.733	-1.042		-1.139
	(-1.30)	(-0.91)		(-1.29)
INTERCEPT	0.0570	-7.080	-18.11*	-19.78**
	(0.03)	(-0.78)	(-2.06)	(-2.57)
Observations	595	258	81	256
R^2	0.236	0.429	0.649	0.368
Adjusted R^2	0.127	0.227	0.261	0.239

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table 3.23 reports estimated coefficients for post-crisis (2010-13). Again, coefficients on change in firm performance (returns) are positive but only significant (5 percent) for all banks. The coefficient for the G-SIBs is economically less important than in previous intervals. For G-SIBs, total pay growth is significantly related to leverage (10 percent) with growth being faster at more highly levered firms. Pay growth is slower at larger EU banks (10 percent) and more highly levered firms (5 percent). Total pay growth is slower for executives up to the age of 50.5 years of age and then increases. Education offers benefits in terms of faster pay growth (10 percent) whereas higher levels of leverage constrain pay growth (5 percent) at EU banks. In US banks, total pay growth is associated with more time spent in a role (10 percent), a greater number of nationalities on the board and when a bank appoints a new CEO (both 1 percent), and at more levered firms and more stable firms (both 5 percent). On the contrary, pay growth decreases when a US bank engages in M&A and when board independence increases (both 10 percent). Pay growth suffers at more diversified and more inefficient US banks (both 5 percent) and when asset quality deteriorates (10 percent).

3.5.5 Pairwise comparisons: Total pay-performance elasticities – By role

Based on the estimated coefficients from running Equation [3.3] for the full sample and three sub-samples for the whole period and for each time interval (see Tables 3.20 to 3.23), this study calculates pay-performance elasticities across the professional status of bank executives. Elasticity is calculated as the product of the coefficient on *Returns* and the interaction of *Returns* and the intercept dummy for an executive role, for instance, *Returns* plus *CFO # Returns* obtains the elasticity of the Chief Financial Officer. Table 3.24 presents the elasticities and reports results of pairwise comparison of means. Initially, and in unreported results, this study computes pairwise comparisons of marginal linear predications of the contrast between the elasticity of each executive role, for instance, contrast between chair and CEO, between CFO and CLO and so forth. This produces a considerable amount of output. To simplify matters, this study organises results by a group option that uses letters to show if average predicated probabilities are significantly different from one another at the 5 percent level.

In Panel A of Table 3.24 CEO pay-performance elasticity for the full sample of banks across 1999-2013 is 0.590, which is the coefficient on *Returns* in the first column of Table 3.20. The comparative coefficient in Panel B, on G-SIBs, is from the second column of Table 3.20 and so forth for EU banks and US banks. The elasticities for 1999-2006, 2007-09 and 2010-13 come from Tables 3.21-3.23.

The size of the average elasticities for executives carrying out different roles varies for the full sample and time. In descending order, pay-performance elasticity is largest for senior executives (1.073) followed by CRO (0.799), CAO (0.791) and CFO (0.707). However, the letters A and B reveal considerable overlap in the confidence intervals around means at the 5 percent significance level. This implies mean pay-performance elasticity differs in the statistical sense only between junior executives (A) and senior executives (B). In all other instances, the null hypothesis of equal means is accepted. The average pay-performance elasticities for the full sample of banks over 1999-2006 are greater in size across professional status (bar two exceptions). Again, the elasticities for non-CEO roles tend to exceed elasticity for CEOs. Nevertheless, there is overlap in the confidence intervals with only the elasticity of CAO significantly different from junior executives. Elasticities in the crisis interval, 2007-09, are smaller than pre-crisis suggesting a weakening of pay-performance relations. Post-crisis elasticities are larger as pay-performance relations re-strengthen (2010-13) though the size of elasticities is below pre-crisis. There are no significant differences in pay-performance elasticities across professional status at the 5 percent level in 2007-09 and 2010-13.

Panel B shows total pay-performance elasticities for executives at G-SIBs. For the full period, the relationship between executive pay and firm performance appears strongest for this cohort based on size of elasticities especially for Chair (1.387), CFO (1.084), CAO (1.415), junior (0.95) and senior executive roles (1.303). Whereas these elasticities do not differ significantly from each other (D), the elasticity of senior executives is significantly greater than other roles (bar those sharing D). The CRO (A) does not share a letter with the CFO, CAO and senior executives, which implies CRO elasticity is significantly different at the 5 percent level. A significant difference exists in pay-performance relations between COO and CAO. The number of overlapping confidence intervals is higher for G-SIBs in comparison to EU banks and US banks. Elasticities reveal a much stronger pay-for-performance relationship for executives in G-SIBs pre-crisis with overlap stretching across two groups (A and B). Relations weaken in-crisis and there are significant differences in mean elasticity between CEO, COO and CRO (A) versus CFO and senior executive (B) roles. The pay-for-performance relationship continues to decouple post-crisis (2010-13) with elasticities diminishing in size with some turning negative. The sole significant difference in mean elasticity between CLO and junior executives (B) with senior executives (A, and with the largest elasticity).

Table 3.24: Total pay-performance elasticities: by role, cohort and time[1]

Panel A – Full sample								
Periods/groups	**1999-2013**	**Groups**	**1999-2006**	**Groups**	**2007-09**	**Groups**	**2010-13**	**Groups**
CEO	0.590	AB	0.604	AB	0.439	A	0.604	A
Chair	0.695	AB	0.822	AB	0.546	A	0.705	A
COO	0.606	AB	0.694	AB	0.457	A	0.418	A
CFO	0.707	AB	0.755	AB	0.671	A	0.769	A
CAO	0.791	AB	1.466	B	0.654	A	0.643	A
CRO	0.799	AB	1.513	AB	0.551	A	0.744	A
CLO	0.601	AB	0.014	AB	0.634	A	0.8	A
Junior	0.454	A	0.329	A	0.263	A	0.785	A
Middle	0.634	AB	0.926	AB	0.628	A	0.637	A
Senior	1.073	B	2.009	AB	0.919	A	0.672	A
Panel B – G-SIBs								
Periods/groups	**1999-2013**	**Groups**	**1999-2006**	**Groups**	**2007-09**	**Groups**	**2010-13**	**Groups**
CEO	0.756	ABC	1.743	AB	0.463	A	0.079	AB
Chair	1.387	ABCD	3.316	B	0.73	AB	-0.359	AB
COO	0.578	AB	2.376	AB	0.477	A	-0.598	AB
CFO	1.084	BCD	1.645	AB	1.951	B	0.033	AB
CAO	1.415	CD	1.957	AB	3.137	AB		
CRO	0.374	A	3.240	AB	0.649	A	-0.145	AB
CLO	0.488	AB	-1.260	A			0.459	B
Junior	0.95	ABCD	1.568	AB	1.155	AB	0.653	B
Middle	0.631	AB	1.423	AB	1.108	AB	-1.167	A
Senior	1.303	D	2.456	AB	2.031	B	-0.103	AB

Panel C shows elasticities for executives at EU banks. It is noticeable that pay-for-performance relations appear much weaker in comparison to G-SIBs and US banks. Among EU bank executives, there is a significant difference between mean elasticities for CEO and junior executives (A) against CAO and CRO (B). Relationships are particularly weak pre-crisis with no significant differences across means. Though elasticities appear to strengthen across 2007-09 and 2010-13, the sample size decreases in 2010-13 due to disclosure issues following the crisis, which affects the pairwise comparisons. Panel D reports comparable information for US bank executives. For the full period, elasticities are positive though not significant from each other at the 5 percent level. For this cohort, pre-crisis pay-for-performance relations range from CAO (2.088) to COO (-0.032), which is a significant difference.

In crisis (2007-09), mean elasticities form four groups in-crisis (A, B, C and D). Whereas pay-performance relations weaken for roles such as CFO, CAO, junior and senior executives, mean elasticities strengthen for CEO, chair, COO, CRO, CLO and middle executives. In the post-crisis time interval (2010-13) mean elasticities appear similar in size (senior executives is noticeably larger), which explains the absence of significant differences across roles.

Panel C - EU banks

Periods/groups	1999-2013	Groups	1999-2006	Groups	2007-09	Groups	2010-13	Groups
CEO	-0.134	A	-0.593	A	0.744		0.699	
Chair	-0.009	AB	-0.567	A	0.619		1.100	
COO	0.216	AB	-0.004	A	1.136		1.008	
CFO	-0.004	AB	-0.731	A	0.584		1.016	
CAO	0.239	B	0.565	A				
CRO	0.238	B					0.958	
CLO								
Junior	-0.231	A	-0.338	A	0.352			
Middle	-0.092	AB	0.160	A	0.562		0.651	
Senior	-7.644						0.243	

Panel D - US banks

Periods/groups	1999-2013	Groups	1999-2006	Groups	2007-09	Groups	2010-13	Groups
CEO	0.724	A	0.421	AB	0.812	CD	0.635	A
Chair	1.225	A	0.144	AB	1.465	ABCD		
COO	0.710	A	-0.032	A	0.835	D	0.769	A
CFO	0.648	A	0.733	AB	0.492	BCD	0.47	A
CAO	0.503	A	2.088	B	-0.339	AB	0.628	A
CRO	0.969	A	1.204	AB	1.82	BCD	0.651	A
CLO	0.665	A	-1.699	AB	0.976	CD	0.660	A
Junior	0.494	A	0.908	AB	0.46	BC	0.956	A
Middle	0.719	A	0.838	AB	0.882	CD	0.386	A
Senior	1.682	A	1.888	AB	-1.035	A	2.152	A

[1] Pay-performance elasticities are drawn from estimations of the full model and pairwise comparison of marginal linear predictions specifying differences in pay-performance among roles at 5 percent significance level. Pairwise comparisons are grouped by letter (A to D onwards), where letter (A) is the bottom value group. Groups with the same letter are not significant different at 5 percent.

3.5.6 Pay-for-performance elasticity and incentive structure

This section reports results from re-estimations of Equation [3.3] that take into account the incentive structure of executive compensation. The dependent variable changes from change in total pay to (1) change in salary (fixed pay); (2) change in cash compensation (salary plus bonus); (3) change in equity-linked pay (equity incentive); (4) change in accumulated wealth (portfolio incentive). In what follows, the sub-sections present abridged results (excluding intercept dummies and interactions terms) from re-estimations of Equation [3.3]. The following section 3.5.7 presents the elasticities and pairwise comparison of means obtained from the re-estimations.

3.5.6.1 Fixed pay (salary) and firm performance

Salary is typically a small proportion of total executive remuneration in banking. Thus, the incentives associated with fixed pay are few. This section discusses factors that affect rates of growth in salary. Table 3.25 shows results. Neither firm performance nor firm size explains salary growth in the statistical sense. For all banks, the relationship between change in salary and age is non-linear: salary growth is slower until the average executive reaches 56.14 years of age. Both time spent in a role and time spent in the organisation constrain salary growth (both 1 percent), and the same for worsening asset quality (10 percent). In contrast, higher levels of liquidity are associated with salary growth (10 percent). The effects of duration (in role and organisation) occur in each cohort (mostly at 5 percent). At G-SIBs, females enjoy faster salary growth (1 percent) yet an increase in diversity in terms of the number of nationalities on boards restricts growth in salary (5 percent). M&A activity inversely affects salary growth at EU banks (10 percent) whereas an increase in growth opportunities produces positive salary growth (1 percent). Salary growth is negatively affected by falls in bank stability (1 percent) increases in bank liquidity (10 percent). In contrast, salary growth is stronger at relatively inefficient EU banks (5 percent). Salary growth is higher at US banks when there is a new CEO (5 percent) and at relatively inefficient firms (10 percent).

Table 3.25: Pay-for-performance: 1999-2013 – Salary (abridged results)

	All banks	G-SIBs	EU	US
Returns	0.0384	-0.0551	-0.0212	0.0777
	(0.84)	(-0.31)	(-0.19)	(1.41)
Size	-0.0126	-0.0421	-0.0243	0.00292
	(-1.31)	(-1.36)	(-1.09)	(0.17)
Age	-0.0247*	-0.0116	-0.0441	-0.0295
	(-1.81)	(-0.36)	(-1.56)	(-1.06)
Age^2	0.000220*	0.000152	0.000371	0.000272
	(1.75)	(0.53)	(1.49)	(1.01)
Time in role	-0.0127***	-0.0208**	-0.0245**	-0.00527**
	(-3.93)	(-2.43)	(-2.28)	(-2.52)
Time in org.	-0.00332***	-0.00486**	-0.00483**	-0.00210*
	(-3.78)	(-2.29)	(-2.23)	(-1.94)
Education	0.00150	0.00561	0.0219	0.00317
	(0.17)	(0.31)	(0.80)	(0.33)
Gender	-0.00704	0.0822***	-0.102	0.00219
	(-0.28)	(2.91)	(-1.08)	(0.10)
Nationality	-0.00233	-0.00638**	-0.000181	0.00158
	(-1.05)	(-2.17)	(-0.03)	(0.24)
New CEO	0.105*	0.160	0.119	0.0924**
	(1.69)	(1.01)	(1.18)	(2.14)
Duality	-0.0401	-0.0338	-0.0935	-0.0413
	(-1.11)	(-0.45)	(-0.67)	(-1.61)
M&A	-0.0323	-0.0409	-0.200*	-0.0103
	(-1.30)	(-0.84)	(-1.77)	(-0.42)
Board size	-0.0108	0.0196	0.00378	-0.0178
	(-0.89)	(0.46)	(0.13)	(-1.09)
Board size^2	0.000385	-0.0000213	0.000474	0.000475
	(1.23)	(-0.02)	(0.63)	(1.23)
SD-to-ED	0.00694	-0.0144	0.0224	-0.0206
	(0.95)	(-1.18)	(1.74)	(-1.20)
Growth	0.0223	0.0497	0.0802***	-0.0131
	(1.51)	(1.25)	(3.25)	(-0.85)
Diversification	-0.0912	-0.00229	-0.171	0.0203
	(-1.60)	(-0.01)	(-0.70)	(0.31)
ST-funding	-0.0777	-0.127	0.571	-0.0324
	(-0.82)	(-0.88)	(1.21)	(-0.28)
Asset quality	4.618*	14.89	4.435	2.107
	(1.85)	(1.52)	(1.35)	(0.80)
Leverage	0.00335	-0.00152	-0.00654	0.00981
	(1.21)	(-0.19)	(-0.91)	(0.67)
Z-score	-0.00554	-0.635	-0.639***	0.168
	(-0.06)	(-1.25)	(-3.30)	(0.73)
Cost-income	0.142	0.158	0.441**	0.160*
	(1.63)	(0.42)	(2.86)	(1.76)
Liquidity	0.150*	0.0518	-0.855*	0.148
	(1.86)	(0.28)	(-1.80)	(0.97)
INTERCEPT	0.918**	2.017	2.638**	0.392
	(2.02)	(0.87)	(2.43)	(0.39)
Observations	2366	914	453	999
R^2	0.214	0.265	0.327	0.231
Adjusted R^2	0.159	0.135	0.143	0.186

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

3.5.6.2 Cash compensation and firm performance

Table 3.26: Pay-for-Performance: 1999-2013 – Cash compensation (abridged results)

	All banks	G-SIBs	EU	US
Returns	0.208**	0.135	0.0199	0.272***
	(2.56)	(0.64)	(0.14)	(4.47)
Size	-0.0258	-0.00367	0.00722	-0.00494
	(-1.58)	(-0.06)	(0.27)	(-0.18)
Age	-0.0278	-0.0116	-0.0412	-0.0419
	(-1.62)	(-0.39)	(-1.41)	(-1.17)
Age^2	0.000259	0.000175	0.000343	0.000382
	(1.61)	(0.65)	(1.29)	(1.12)
Time in role	-0.0158***	-0.0233**	-0.0310**	-0.00768***
	(-3.83)	(-2.56)	(-2.30)	(-3.05)
Time in org.	-0.00212*	-0.00384	-0.00567*	-0.00101
	(-1.85)	(-1.28)	(-2.00)	(-0.61)
Education	0.00000298	-0.00371	0.0272	0.00981
	(0.00)	(-0.25)	(1.03)	(0.61)
Gender	-0.0360	0.0667	-0.0816	-0.0485
	(-1.14)	(1.17)	(-0.85)	(-1.36)
Nationality	0.000555	-0.000285	0.00348	-0.00215
	(0.20)	(-0.08)	(0.46)	(-0.49)
New CEO	0.140	0.262	0.0613	0.0437
	(1.44)	(1.07)	(0.55)	(0.46)
Duality	-0.0777	-0.128	-0.00609	-0.0801
	(-1.49)	(-1.20)	(-0.04)	(-1.25)
M&A	-0.0932	-0.116	-0.228*	-0.0647
	(-1.36)	(-0.67)	(-2.03)	(-0.98)
Board size	-0.00393	0.0754	-0.0497	-0.000252
	(-0.20)	(1.14)	(-1.46)	(-0.01)
Board $size^2$	0.000311	-0.00133	0.00173*	0.000116
	(0.63)	(-0.93)	(1.94)	(0.11)
SD-to-ED	-0.00419	-0.0158	-0.0112	-0.0170
	(-0.53)	(-0.84)	(-0.91)	(-0.33)
Growth	-0.0156	0.0286	0.0756***	-0.0711**
	(-0.66)	(0.33)	(2.95)	(-2.74)
Diversification	-0.164*	0.107	0.497	-0.162*
	(-1.70)	(0.20)	(1.50)	(-1.94)
ST-funding	-0.130	0.291	0.470	-0.0114
	(-0.78)	(1.07)	(0.81)	(-0.04)
Asset quality	3.628	21.39	2.988	1.167
	(1.39)	(1.62)	(0.53)	(0.40)
Leverage	-0.00379	-0.0167	-0.0172*	0.0132
	(-0.71)	(-1.16)	(-1.80)	(0.65)
Z-score	-0.162	-0.823	-1.367***	0.194
	(-0.99)	(-0.87)	(-3.89)	(0.72)
Cost-income	0.0564	-0.0274	0.588**	0.279**
	(0.55)	(-0.09)	(2.75)	(2.10)
Liquidity	0.214	0.522	-0.903	0.355
	(1.59)	(1.37)	(-1.72)	(1.15)
INTERCEPT	1.693**	1.134	4.357***	0.538
	(2.48)	(0.31)	(2.94)	(0.49)
Observations	2366	914	453	999
R^2	0.263	0.315	0.406	0.322
Adjusted R^2	0.211	0.194	0.244	0.282

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Cash compensation equals salary and bonus. Bonus payments form part of incentive pay for bank executives with compensation contracts specifying terms. Table 3.26 shows results for 1999-2013. In contrast to the previous results on salary, there are positive relations between changes in cash compensation and changes in firm performance for all banks (5 percent) and US banks (1 percent). Time spent in a role limits growth in cash compensation in every case (at 1 or 5 percent). Similarly, time spent in an organisation limits growth in cash compensation for all banks and EU banks (both at 10 percent). Changes in cash compensation are constrained at more diversified G-SIBS and US banks (both 10 percent) yet are higher for relatively inefficient EU banks and US banks (both 5 percent). M&A activity (10 percent), greater leverage (10 percent) and lower stability (1 percent) adversely affect growth in cash compensation at EU banks. In contrast, growth rates increase as growth opportunities grow (1 percent) although the opposite exists at US banks (5 percent).

3.5.6.3 Equity-linked pay and firm performance

Equity-linked pay refers to annual grants of stock and options. This type of incentive pay has grown over time and commands a heavy weighting in total remuneration in banking. This type of pay carries equity incentives. Table 3.27 shows results for 1999-2013. In sharp contrast to estimations using other incentive types, there are economically meaningful and statistically important relationships between changes in firm performance and changes in equity-linked pay for all banks and G-SIBs (1 percent) and US banks (5 percent). This result is consistent with evidence elsewhere (see section 3.3) and highlights the importance of incentives in elucidating effort from firm executives. For all banks, changes in equity-linked pay are smaller at larger banks (1 percent) yet bigger at EU banks. In contrast to previous results, tenure does not exert an influence on change in equity-linked pay.

Some executive-level factors affect the rate of growth in equity-linked pay although the effects do not generalise across cohort. At EU banks, equity-linked pay growth is higher for female executives and in cases of duality that combine the role of CEO and Chair (both at 1 percent). At US banks, equity-linked pay growth is slower until an executive reaches 53.3 years of age before rising (5 percent). Greater board diversity in terms of the number of nationalities (10 percent) and appointment of a new CEO (1 percent) are associated with stronger equity-linked pay growth.

Table 3.27: Pay-for-performance: 1999-2013 – Equity-linked pay (abridged results)

	All banks	G-SIBs	EU	US
Returns	0.994***	1.220***	0.475	1.161**
	(3.46)	(3.29)	(0.61)	(2.37)
Size	-0.0929***	-0.0198	0.589***	-0.0714
	(-2.71)	(-0.26)	(5.11)	(-1.13)
Age	-0.0276	0.0966	0.0982	-0.128**
	(-0.67)	(1.29)	(1.04)	(-2.46)
Age^2	0.000301	-0.000762	-0.00100	0.00120**
	(0.75)	(-1.07)	(-1.04)	(2.49)
Time in role	-0.00507	0.000716	-0.0194	-0.00557
	(-0.98)	(0.06)	(-1.12)	(-0.87)
Time in org.	-0.000207	-0.00322	-0.00151	0.000493
	(-0.11)	(-0.79)	(-0.39)	(0.20)
Education	0.0249	0.0286	-0.0261	-0.0148
	(1.28)	(0.67)	(-0.93)	(-0.46)
Gender	0.0600	0.114	0.426***	-0.0884
	(0.79)	(1.07)	(3.25)	(-0.95)
Nationality	-0.000526	-0.00263	0.00222	0.0692*
	(-0.14)	(-0.50)	(0.21)	(1.93)
New CEO	0.282**	0.0950	-0.0336	0.494***
	(2.59)	(0.55)	(-0.10)	(3.74)
Duality	0.0561	0.173	2.909***	-0.0796
	(0.84)	(1.17)	(18.01)	(-0.80)
M&A	0.181	-0.559***	-0.482	0.349
	(1.21)	(-3.42)	(-1.02)	(1.61)
Board size	0.0534	-0.162*	0.132	0.0434
	(1.19)	(-1.87)	(0.47)	(0.52)
Board $size^2$	-0.00119	0.00365	-0.0128	-0.000667
	(-1.08)	(1.70)	(-1.26)	(-0.35)
SD-to-ED	-0.0196	-0.0426	0.217	-0.0513
	(-0.41)	(-0.56)	(1.36)	(-0.50)
Growth	-0.0472	-0.0302	-0.447	0.0622
	(-0.81)	(-0.20)	(-1.52)	(0.81)
Diversification	-0.316	-0.944*	3.145**	-0.789*
	(-1.31)	(-1.95)	(2.35)	(-1.94)
ST-funding	0.0140	-0.683*	1.620**	0.169
	(0.05)	(-1.73)	(2.84)	(0.33)
Asset quality	1.589	-4.682	60.90*	-3.082
	(0.22)	(-0.26)	(1.91)	(-0.32)
Leverage	0.00635	0.0331**	0.107*	0.0507
	(0.64)	(2.13)	(2.14)	(0.76)
Z-score	0.107	2.342**	2.439	0.0455
	(0.34)	(2.45)	(1.25)	(0.04)
Cost-income	0.426	0.534	2.259	0.231
	(1.20)	(1.18)	(1.73)	(0.44)
Liquidity	-0.126	1.516***	-2.776*	-0.974
	(-0.42)	(5.12)	(-2.17)	(-1.63)
INTERCEPT	0.794	-7.052**	-18.88*	3.264
	(0.50)	(-2.34)	(-2.12)	(0.72)
Observations	1833	718	237	878
R^2	0.264	0.429	0.645	0.237
Adjusted R^2	0.210	0.324	0.501	0.186

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Bank-level variables influence equity-linked pay growth at G-SIBs. M&A activity (1 percent) and bigger board size (10 percent) slow down pay growth. Greater levels of diversification (10 percent) and lower amounts of short-term funding (10 percent) produce the same effect. In contrast, growth in equity-linked pay increases when banks are more highly levered and more stable (at 5 percent), and when firms are liquid (1 percent). Coefficients on stability and liquidity are economically meaningful. Bank-level variables influence pay growth at EU banks and US banks. Diversification produces an opposite effect with diversification associated with economically meaningful pay growth at EU banks (5 percent) yet slower growth at US banks (10 percent). Short-term funding (5 percent) and liquidity (1 percent) realise economically meaningful effects, which are in the opposite direction to the same relationships at G-SIBs; for EU banks, increasing reliance on short-term funding is associated with faster equity-linked pay growth with higher levels of liquidity constraining pay growth. Consistent with results for G-SIBs, pay growth rate increases at more highly levered EU banks (10 percent). Based on the coefficient of determination, the model accounts for around 50 percent of the variability in equity-related pay growth at EU banks, and from around 20 to over 30 percent for other cohorts.

3.5.6.4 Total accumulated wealth and firm performance

Table 3.28 shows abridged results when the dependent variable is change in total accumulated wealth. Accumulated wealth refers to the amount of portfolio holdings obtained over time. Portfolio incentives offer the strongest incentive to executives. The economically meaningful coefficients on change in firm performance show the strength of pay-for-performance relations and power of portfolio incentives for all banks, G-SIBs and US banks (at all 1 percent). Firm size does not affect changes in accumulated wealth. Comparable to previous results, tenure (either time spent in a role or organisation) slows down growth in accumulated wealth: time in role for all banks (1 percent), and US banks (5 percent); time in organisation for all banks (5 percent), EU banks (10 percent) and US banks (1 percent). M&A activity improves pay growth at all banks, EU banks, and US banks (10 percent). Board size has a quadratic relationship with growth in accumulated wealth at EU banks (5 percent) and US banks (1 percent). At EU banks, the growth in wealth increases until board size reaches 13.51 (14) members before slowing whilst the comparative number of board members at US banks is 17.14.

Table 3.28: Pay-for-performance: 1999-2013 – Accumulated wealth (abridged results)

	All banks	G-SIBs	EU	US
Returns	1.041***	1.087***	0.564	1.043***
	(12.51)	(8.62)	(1.17)	(10.65)
Size	-0.0166	-0.0181	0.0319	-0.00916
	(-1.05)	(-0.30)	(0.48)	(-0.52)
Age	-0.0223	-0.0219	-0.00911	-0.0346
	(-0.90)	(-0.48)	(-0.14)	(-1.69)
Age^2	0.000176	0.000189	0.0000463	0.000262
	(0.79)	(0.47)	(0.07)	(1.44)
Time in role	-0.0169***	-0.00708	-0.0155	-0.0106**
	(-3.47)	(-0.78)	(-0.75)	(-2.75)
Time in org.	-0.00310**	-0.000350	-0.00823*	-0.00561***
	(-2.16)	(-0.10)	(-1.78)	(-3.66)
Education	-0.00373	-0.00789	0.0278	0.000379
	(-0.29)	(-0.33)	(0.88)	(0.02)
Gender	0.0536	0.0935	0.201	-0.0413
	(1.37)	(1.70)	(1.16)	(-0.97)
Nationality	-0.000869	-0.00150	-0.0106	0.0200
	(-0.33)	(-0.48)	(-1.33)	(1.14)
New CEO	0.00702	0.0677	0.0963	0.0367
	(0.13)	(0.52)	(0.45)	(0.68)
Duality	-0.00275	-0.0115	0.279	0.0157
	(-0.07)	(-0.13)	(0.87)	(0.25)
M&A	0.103**	-0.0199	0.579**	0.0936*
	(2.53)	(-0.20)	(2.27)	(2.04)
Board size	0.0241	-0.104	0.481**	0.0720***
	(1.12)	(-1.64)	(2.42)	(3.05)
Board size^2	-0.000905*	0.00238	-0.0187**	-0.00210***
	(-1.75)	(1.42)	(-2.76)	(-3.92)
SD-to-ED	-0.00389	0.000553	-0.00497	0.0280
	(-0.33)	(0.02)	(-0.18)	(1.13)
Growth	-0.0171	0.137	-0.0541	-0.0631**
	(-0.67)	(1.40)	(-0.92)	(-2.29)
Diversification	0.0617	0.0169	0.354	0.0273
	(0.71)	(0.04)	(0.76)	(0.32)
ST-funding	-0.0149	-0.366	0.571	0.218
	(-0.10)	(-1.66)	(0.42)	(1.38)
Asset quality	12.15***	17.37	15.19	6.202
	(4.00)	(1.37)	(1.59)	(1.46)
Leverage	0.0116	0.0180**	-0.0243*	0.0259
	(1.60)	(2.74)	(-1.97)	(1.01)
Z-score	0.107	0.825***	-1.573***	0.358
	(0.62)	(2.86)	(-4.42)	(0.98)
Cost-income	0.0825	0.335	0.334	0.131
	(0.66)	(1.49)	(0.91)	(0.72)
Liquidity	0.312*	0.808***	-1.368*	0.196
	(1.95)	(4.01)	(-1.80)	(0.80)
INTERCEPT	0.320	-0.783	1.912	-0.802
	(0.41)	(-0.38)	(1.12)	(-0.53)
Observations	2217	897	336	984
R^2	0.403	0.496	0.565	0.484
Adjusted R^2	0.357	0.404	0.427	0.453

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

The relationships between wealth and bank-level variables varies across cohort. When firms are more liquid wealth growth increases at all banks (10 percent) and G-

SIBs (1 percent), yet growth falls at EU banks (10 percent). Similarly, growth is stronger for more highly levered G-SIBs (5 percent), yet weaker for highly levered EU banks (10 percent). Growth is stronger for more stable G-SIBs, yet weaker for relatively stable EU banks (both at 1 percent). For all banks, weaker asset quality is associated with stronger growth in accumulated wealth (1 percent). The explanatory power of the model is stronger for changes in accumulated wealth in comparison to changes in equity-linked pay. Coefficients of determination show the model accounts from between 35.7 percent to 45.3 percent of variability in total wealth growth.

3.5.7 Pairwise comparison: Elasticities and incentive structures

Table 3.29 reports estimated pay-for-performance elasticities according to the structure of executive compensation and for accumulated wealth by professional status and across the full sample and bank cohorts for 1999-2013. Generally, pay-for-performance elasticities are larger for incentive pay, that is, equity-linked pay in comparison to salary and cash compensation. This result shows the importance of including sufficient equity incentives in executive compensation contracts. Another result shows portfolio incentives (arising from total accumulated wealth) create at least as strong if not stronger relations with firm performance than equity incentives do. This result confirms findings in Hall and Liebman (1988) and Core, Guay and Thomas (2005a) showing the importance of portfolio incentives as a key driver of the relationship between firm performance and (CEO) compensation. Pay-performance elasticity for salary is weak and in-line with expectations. Elasticities are larger (than salary) for cash compensation because of the incentive nature of bonus payments. Notwithstanding, elasticities on cash compensation are considerably smaller than equity-linked pay. This re-affirms the ordering in importance of incentives inherent in compensation contracts for bank executives.

Panel A of Table 3.29 reports elasticities for all banks over 1999-2013. Salary elasticities are weak and highest for Chair (0.257). The letter A indicates there are no significant differences between mean salary elasticities by professional status at the 5 percent level. Salary elasticities for some professional roles are negative at G-SIBs including CEO, COO, CFO and CRO. Elasticity is highest for CLO (0.477) and Chair (0.373). Elasticities fall into two groups (A and B) and there are significant differences between CEO, COO, CFO, CRO and middle management (A) with CLO (see Panel

B). Like the G-SIBs, salary elasticities at US banks fall into two groups. Again, salary elasticity is greater for Chair (0.889). A significant difference in mean salary elasticity occurs between COO (A) and CAO, junior and middle management (B) at the 5 percent level (see Panel D). The variation in salary elasticities is greater at EU banks with three groups (A, B and C). Whilst salary elasticities are small, they are relatively larger for CAO (0.221) and CRO (0.191) (see Panel C).

Cash compensation elasticities are relatively larger than salary and there are more overlapping confidence intervals around mean elasticities by professional status. Panel A shows elasticities differ only for CAO (B) and CLO (A) at all banks. Elasticities are greatest for Chair (0.377) followed by senior management (0.275), CAO (0.242), middle management (0.215) and CEO (0.208). Cash compensation elasticities are much bigger for some executive roles at G-SIBs. For instance, Chair (1.058) and junior management (0.560). Elasticities overlap into three groups (A, B and C). There is a significant difference between Chair (C) and COO (A) at the 5 percent level (see Panel B). At EU banks, a significant difference in elasticity exists between CAO and CRO roles (B) and junior management (A) (see Panel C). Panel D shows relatively larger and positive cash compensation elasticities at US banks. The amount of overlapping is less with six roles in A, three in AB, and one in B. Bonus incentives would appear to yield positive effects on firm performance.

Equity pay-performance elasticities are considerably larger. For all banks, there are no significant differences in elasticities across professional status at the 5 percent level. However, at G-SIBs elasticities fall into three groups (A, B and C). Elasticity exceeds unity for senior executives (1.708), CFO (1.511), junior management (1.357), COO (1.342), CEO (1.22) and middle management (1.185). The mean equity-linked pay elasticity for senior management (C) is significantly greater than CRO (A), CLO (AB) and middle management (B) (see Panel B). Similar strong equity-linked pay elasticities occur at US banks. The majority group into A and B with the only significant difference between COO (B) and CAO (A) (see Panel D). Only two equity pay elasticities exceed unity at EU banks (CAO, 1.502; junior management, 1.295). A significant difference in mean elasticities exists between junior management (B) and Chair and middle management (A) (see Panel C).

Table 3.29: Pay-performance elasticities[1]: by Role and Incentive Structure

Panel A - All banks								
Group	**Salary**		**Cash comp.**		**Equity-linked pay**		**Acc. wealth**	
CEO	0.038	A	0.208	AB	0.994	A	1.041	BC
Chair	0.257	A	0.377	AB	0.290	A	1.097	ABCD
COO	0.101	A	0.081	AB	0.899	A	1.209	CD
CFO	0.044	A	0.175	AB	1.025	A	0.953	AB
CAO	0.064	A	0.242	B	0.632	A	1.088	ABCD
CRO	0.016	A	0.089	AB	1.160	A	1.070	ABCD
CLO	0.184	A	0.018	A	0.974	A	0.977	ABC
Junior	0.016	A	0.053	AB	1.008	A	1.036	ABCD
Middle	0.008	A	0.215	AB	0.846	A	0.849	A
Senior	-0.012	A	0.275	AB	1.290	A	1.366	D
Panel B – G-SIBs								
Group	**Salary**		**Cash comp.**		**Equity-linked pay**		**Acc. wealth**	
CEO	-0.055	A	0.135	ABC	1.220	BC	1.087	ABC
Chair	0.373	AB	1.058	C	0.739	ABC	1.439	ABC
COO	-0.056	A	-0.353	A	1.342	BC	1.179	ABC
CFO	-0.054	A	0.201	ABC	1.511	BC	1.055	AB
CAO	0.271	AB	0.133	BC	1.207	ABC	1.952	ABC
CRO	-0.133	A	-0.037	AB	0.569	A	1.233	BC
CLO	0.477	B	0.053	ABC	0.674	AB	1.390	ABC
Junior	0.328	AB	0.560	ABC	1.357	ABC	1.398	ABC
Middle	-0.015	A	0.106	ABC	1.185	B	1.015	A
Senior	0.041	AB	0.317	BC	1.708	C	1.390	C

[1] Pay-performance elasticities are drawn from estimations of the full model and a pairwise comparison of marginal linear predictions specifying differences in pay-performance among roles at the 5 percent significance level.

Lastly, Table 3.29 shows total accumulated wealth elasticities are larger with more differences that are significant across professional status. For all banks, elasticities belong to four groups (A, B, C and D). There is a significant difference between COO (CD) and CFO (AB); middle management (A) and senior management (D) differ from each other and from CEO (BC) (see Panel A). Wealth elasticities exceed unity for all executive roles at G-SIBs with the sole difference between middle management (A) and senior management (C). The largest elasticities are for CAO (1.952), Chair (1.439), junior management (1.398) and CLO and senior management (both 1.39) (see Panel B). Wealth elasticities tend to be smaller at EU banks and US banks, which probably reflects the relative size in pay awards between G-SIBs and the two cohorts. Elasticities are more disperse at EU banks ranging from a negative value for senior management to 1.142 (CAO) and 1.271 (COO). Elasticities for COO and junior management (both D) differ from CEO (BC, 0.564) and seniors at 5 percent (see

Panel C). Wealth elasticities are more comparable by professional status at US banks (see Panel D). They are largest for senior management (1.445), Chair (1.337), COO (1.186) and CEO (1.043). CEO and COO (B) differ from middle management (A) at the 5 percent level.

Panel C - EU banks								
Group	**Salary**		**Cash comp.**		**Equity-linked pay**		**Acc. wealth**	
CEO	-0.021	AB	0.020	AB	0.475	AB	0.564	BC
Chair	0.149	C	0.090	AB	0.352	A	0.978	CD
COO	0.009	ABC	0.228	AB	0.541	AB	1.271	D
CFO	0.024	ABC	-0.002	AB	0.568	AB	0.599	BCD
CAO	0.221	BC	0.269	B	1.502	AB	1.142	BCD
CRO	0.191	BC	0.213	B				
CLO	-0.141	A	-0.200	A	1.295	B	0.906	D
Junior	-0.108	AB	-0.045	AB	0.029	A	0.390	AB
Middle	-0.546	ABC	-6.507	AB	-13.382		-3.736	A
Panel D - US banks								
Group	**Salary**		**Cash comp.**		**Equity-linked pay**		**Acc. wealth**	
CEO	0.078	AB	0.272	A	1.161	AB	1.043	B
Chair	0.889	AB	0.781	AB	0.219	AB	1.337	AB
COO	0.139	B	0.276	AB	1.034	B	1.186	B
CFO	0.082	AB	0.241	A	0.885	AB	0.954	AB
CAO	-0.054	A	0.277	AB	0.488	A	0.586	AB
CRO	0.042	AB	0.147	A	1.815	AB	0.900	AB
CLO	0.077	AB	0.071	A	1.144	AB	0.970	AB
Junior	0.024	A	0.203	A	1.003	AB	0.888	AB
Middle	-0.002	A	0.403	B	0.853	AB	0.780	A
Senior	-0.071	AB	0.197	A	2.068	AB	1.445	AB

[1] Pay-performance elasticities are drawn from estimations of the full model and a pairwise comparison of marginal linear predictions specifying differences in pay-performance among roles at the 5 percent significance level.

3.5.8 Robustness checks

This section reports results from robustness checks of findings reported above. Thus far, the analysis qualified professional status based on categorical titles reported in BoardEx. This section checks robustness by using executive ranks (by total pay) rather than title (following Ang et al, 2002). It specifies intercept dummy variables for seven groups and interacts the dummies with firm performance. Table 3.30 shows results from estimating the full model (Equation 3.3) for 1999-2013 where the dependent variable is change in total pay.

Table 3.30: Total pay-performance: 1999-2013 – executives ranked by pay

	All banks	G-SIBs	EU	US
Returns	0.681***	0.770**	-0.0467	0.817**
	(3.74)	(2.53)	(-0.12)	(2.66)
Size	-0.0209	-0.105***	0.0648	0.0342
	(-1.17)	(-2.97)	(1.67)	(0.53)
rank_=2	-0.187***	-0.243***	-0.170*	-0.234***
	(-5.03)	(-3.81)	(-2.02)	(-3.61)
rank_=3	-0.258***	-0.331***	-0.166**	-0.320***
	(-5.32)	(-3.59)	(-2.19)	(-3.63)
rank_=4	-0.280***	-0.329**	-0.134	-0.387***
	(-4.52)	(-2.36)	(-0.89)	(-4.46)
rank_=5	-0.256***	-0.294**	-0.119	-0.343***
	(-4.26)	(-2.59)	(-1.15)	(-5.04)
rank_=6	-0.349***	-0.413***	0.0525	-0.504***
	(-4.39)	(-3.50)	(0.24)	(-3.16)
rank_=7	-0.540***	-0.589*	-0.301*	-0.521
	(-2.73)	(-1.74)	(-1.95)	(-1.43)
rank_=2 # returns	-0.0889	-0.0361	-0.106	-0.0869
	(-1.00)	(-0.17)	(-0.68)	(-0.68)
rank_=3 # returns	-0.0296	0.0497	0.0429	-0.0611
	(-0.30)	(0.19)	(0.33)	(-0.38)
rank_=4 # returns	-0.00742	0.0625	0.0440	-0.0138
	(-0.06)	(0.28)	(0.44)	(-0.06)
rank_=5 # returns	0.108	0.153	-0.128	-0.0000333
	(0.75)	(0.35)	(-0.96)	(-0.00)
rank_=6 # returns	0.225	0.589	0.743*	-0.261
	(0.82)	(1.19)	(1.85)	(-1.39)
rank_=7 # returns	0.0829	-0.121	-0.0210	1.120**
	(0.17)	(-0.17)	(-0.12)	(2.79)
Age	-0.0245	0.00628	-0.0709**	-0.0623
	(-1.01)	(0.13)	(-2.36)	(-1.31)
Age^2	0.000212	-0.0000360	0.000690**	0.000527
	(0.92)	(-0.09)	(2.51)	(1.19)
Time in role	-0.0151***	-0.0121	-0.0302**	-0.0132***
	(-3.38)	(-0.99)	(-2.73)	(-2.96)
Time in org.	-0.00310*	-0.00509	-0.00768*	0.00179
	(-1.79)	(-1.41)	(-1.97)	(0.65)
Education	-0.00148	-0.00771	0.0523*	-0.0167
	(-0.11)	(-0.36)	(1.82)	(-0.78)
Gender	0.0112	0.0699	-0.106	-0.0718
	(0.27)	(1.04)	(-0.99)	(-1.15)
Nationality	-0.000203	-0.00247	0.00893	0.00600
	(-0.05)	(-0.52)	(1.38)	(0.53)
New CEO	0.194	0.262	0.0727	0.172
	(1.60)	(0.93)	(0.44)	(1.60)
Duality	-0.219***	-0.248***	-0.248	-0.331***
	(-5.45)	(-3.39)	(-0.91)	(-4.31)
M&A	0.141	-0.331*	0.407***	0.267
	(1.06)	(-1.97)	(2.94)	(1.19)

Board size	0.0744**	-0.0459	-0.0418	0.0914
	(2.34)	(-0.57)	(-1.07)	(1.56)
Board size^2	-0.00165*	0.00150	0.000342	-0.00210
	(-1.91)	(0.75)	(0.31)	(-1.62)
SD-to-ED	-0.0290*	-0.0270		-0.0653
	(-1.71)	(-0.80)		(-0.95)
Growth	0.00236	-0.0435	-0.114**	0.0356
	(0.05)	(-0.65)	(-2.23)	(0.53)
Diversification	-0.287	-0.853***	0.476	-0.706**
	(-1.65)	(-3.37)	(1.14)	(-2.73)
ST-funding	0.0964	-0.820*	1.916*	-0.131
	(0.42)	(-1.93)	(1.80)	(-0.31)
Asset quality	5.663*	0.310	-2.018	9.049*
	(1.71)	(0.03)	(-0.42)	(2.04)
Leverage	0.00769	0.0207	0.00669	0.0833**
	(1.31)	(1.07)	(0.33)	(2.46)
Z-score	0.159	1.483	-0.335	1.011**
	(0.83)	(1.47)	(-0.54)	(2.18)
Cost-income	0.532**	0.331	0.823	0.676
	(2.27)	(0.64)	(1.61)	(1.55)
Liquidity	0.124	1.190***	-1.033*	-0.312
	(0.47)	(4.08)	(-1.99)	(-0.66)
INTERCEPT	-0.233	-1.526	0.985	-2.707
	(-0.25)	(-0.58)	(0.43)	(-1.46)
Observations	2234	893	403	938
R^2	0.200	0.335	0.433	0.154
Adjusted R^2	0.142	0.217	0.262	0.109

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

There is a large, positive significant relationship between change in firm performance and change in total pay for all banks (1 percent), G-SIBs and US banks (both 5 percent). Total pay growth is significantly slower at larger G-SIBs (1 percent). The results are in accordance with previous findings based on professional roles. As noted earlier, the intercept dummy terms show differences in total pay growth when returns are zero. Tenure dampens total pay growth. Duality produces a similar effect for all banks, G-SIBs and US banks (at 1 percent), which earlier results did not show as strongly. For all banks, total pay growth increases until the number of board members reaches 23 (22.5) before slowing. Board independence constrains pay growth (10 percent). Surprisingly, poorer asset quality (10 percent) and relative inefficiency (5 percent) are associated with faster total pay growth for all banks.

Table 3.31: Total pay-performance elasticities[1]: by Executive rank; 1999-2013

Panel A - All banks	PPE	Std. Err.	Groups
Rank_1	0.681	0.182	A
Rank_2	0.592	0.181	A
Rank_3	0.651	0.192	A
Rank_4	0.674	0.254	A
Rank_5	0.789	0.239	A
Rank_6	0.907	0.296	A
Rank_7	0.764	0.509	A
Panel B – G-SIBs			
Rank_1	0.770	0.304	A
Rank_2	0.734	0.241	A
Rank_3	0.820	0.311	A
Rank_4	0.833	0.350	A
Rank_5	0.923	0.462	A
Rank_6	1.359	0.487	A
Rank_7	0.649	0.815	A
Panel C – EU banks			
Rank_1	-0.047	0.382	AB
Rank_2	-0.153	0.394	A
Rank_3	-0.004	0.437	AB
Rank_4	-0.003	0.402	AB
Rank_5	-0.175	0.411	A
Rank_6	0.697	0.492	B
Rank_7	-0.068	0.438	A
Panel D - US banks			
Rank_1	0.817	0.307	A
Rank_2	0.731	0.324	A
Rank_3	0.756	0.336	A
Rank_4	0.804	0.494	A
Rank_5	0.817	0.481	A
Rank_6	0.557	0.306	A
Rank_7 [2]	1.938	0.423	

[1] Pay-performance elasticities are drawn from Table 3.30 and a pairwise comparison of marginal linear predictions specifying differences in pay-performance among roles at the 5 percent significance level.

[2] Significantly different from all roles.

Table 3.31 reports estimated pay-performance elasticities and pairwise comparison of means by executive rank and across cohorts for 1999-2013. Generally, the size of pay-performance elasticities is comparable with previous estimates; elasticities are bigger for G-SIBs and US banks and weaker at EU banks (where at least 50% of ranks show negative elasticities). Whereas there is no significant difference in pay-performance elasticities across ranks and irrespective of cohort, at EU banks pay-performance elasticity of rank 6 significantly differs from ranks 2, 5 and 7. The robustness check shows the use of ranks (by total pay) produces comparable estimates of relations between changes in firm performance and changes in total pay. However, use of professional status reveals differences in pay-for-performance elasticities that are not visible using ranks. Therefore, this study recommends use of professional status.

A second robustness check uses an alternative indicator of firm performance. Since returns is a market-based measure of firm performance, the robustness test employs return on equity (ROE), a bank-level accounting-based measure of firm performance that market analysts evaluate.

Table 3.32 shows results on the relationship between changes in total pay and changes in ROE across 1999-2013. It shows a positive pay-performance relationship for all banks and negative relations for G-SIBs and EU banks. Although none is statistically significant, signs are the same as coefficients in Table 3.20 where returns is the measure of firm performance. A positive, significant relationship exists between changes in total pay and changes in ROE for US banks (1 percent level) consistent with earlier findings. The goodness of fit (R^2) of the models reported in Table 3.32 ranges from around 20 to 40 percent. The effects associated with control variables are comparable. Tenure negatively affects total pay growth whereas the appointment of a new CEO increases pay growth. Quadratic relationships exist on board size with pay growth quickening once the number of members exceeds 19 (18.6) for G-SIBs, and falls once numbers reach 24 (23.8) at US banks. Higher levels of income diversification and liquidity constrain pay growth.

Table 3.33 shows total pay-ROE elasticities by professional status for each cohort. For all banks, pay-performance elasticities fall into two groups (A and B) with elasticities for six roles overlapping. Elasticities range from -0.1644 (CRO) to 1.7097 (junior management), with elasticity exceeding unity in six cases. A significant difference exists between COO, CFO and middle management (B) with CRO (A) at the 5 percent level (see Panel A).

Table 3.32: Total pay-performance (ROE): 1999-2013

	All banks	G-SIBs	EU	US
Δ ROE	0.610	-3.541	-0.894	2.064***
	(0.64)	(-1.42)	(-0.96)	(2.90)
Log assets	-0.0582***	-0.123**	0.104***	-0.0480
	(-2.83)	(-2.67)	(3.13)	(-0.84)
Chair	-0.0546	-0.000327	0.0388	-0.416**
	(-0.53)	(-0.00)	(0.24)	(-2.61)
COO	0.101**	0.125	0.0535	0.0849
	(2.07)	(1.52)	(0.59)	(1.04)
CFO	0.0941*	0.150	-0.0435	0.0652
	(1.83)	(1.56)	(-0.47)	(0.88)
CAO	0.0968	0.158	0.0739	0.0515
	(1.27)	(0.81)	(0.55)	(0.47)
CRO	0.175**	0.173	0.253*	0.142
	(2.52)	(1.32)	(2.07)	(1.37)
CLO	0.0471	0.106		-0.0754
	(0.51)	(0.32)		(-0.58)
Junior	-0.237**	-0.463	-0.0120	-0.455***
	(-2.08)	(-0.95)	(-0.08)	(-3.14)
Middle	0.0363	-0.0383	0.0228	0.0505
	(0.66)	(-0.39)	(0.28)	(0.64)
Senior	0.431***	0.285***	0.253	0.749*
	(3.20)	(3.02)	(1.75)	(2.01)
Chair # ROE	0.653	2.761	-1.057	6.318***
	(0.42)	(0.89)	(-0.61)	(3.11)
COO # ROE	0.584	1.071	-0.0734	0.0951
	(0.78)	(0.53)	(-0.04)	(0.28)
CFO # ROE	0.785	4.388	-0.906	-0.228
	(0.81)	(1.52)	(-0.85)	(-0.44)
CAO # ROE	0.826	10.84***	0.745	-1.539**
	(0.66)	(2.88)	(0.40)	(-2.68)
CRO # ROE	-0.774	1.165	-5.122***	-2.215**
	(-0.94)	(0.51)	(-5.52)	(-2.20)
CLO # ROE	-0.0180	2.983		-0.846
	(-0.02)	(0.72)		(-0.76)
Junior # ROE	1.100	2.288	-0.780	0.614
	(0.95)	(1.40)	(-0.55)	(0.49)
Middle # ROE	0.923	2.666	0.0647	0.405
	(1.05)	(1.21)	(0.04)	(0.54)
Senior # ROE	0.191	2.860	33.72***	1.971*
	(0.22)	(1.31)	(3.90)	(1.81)
Age	-0.00229	0.00183	-0.0110	-0.0245
	(-0.10)	(0.03)	(-0.38)	(-0.70)
Age^2	0.0000268	0.0000462	0.0000912	0.000236
	(0.12)	(0.08)	(0.36)	(0.71)
Time in role	-0.0176***	-0.0233*	-0.0193	-0.0119**
	(-3.80)	(-1.99)	(-1.73)	(-2.49)
Time in org.	-0.00199	-0.00478	-0.00869*	0.000838
	(-1.19)	(-1.27)	(-2.08)	(0.39)

Education	0.00444	0.000969	0.0425	-0.0192
	(0.39)	(0.05)	(1.62)	(-1.15)
Gender	-0.0324	0.0514	-0.119	-0.129
	(-0.74)	(0.74)	(-1.04)	(-1.60)
Nationality	0.00150	-0.00250	0.0106	0.00851
	(0.35)	(-0.62)	(1.46)	(0.71)
New CEO	0.291**	0.309	0.243	0.290***
	(2.24)	(1.02)	(1.39)	(2.88)
Duality	0.0505	0.0453	-0.00328	-0.0230
	(1.00)	(0.43)	(-0.01)	(-0.28)
M&A	0.132	-0.294	0.441**	0.192
	(1.04)	(-1.39)	(2.17)	(1.00)
Board size	0.0416	-0.171*	-0.100*	0.109*
	(1.39)	(-1.87)	(-2.07)	(2.02)
Board size^2	-0.000838	0.00459**	0.00138	-0.00229*
	(-1.07)	(2.13)	(1.02)	(-2.00)
SD-to-ED	-0.0154	-0.0357	-0.00341	-0.0741
	(-0.93)	(-0.89)	(-0.11)	(-1.02)
Growth	-0.000878	-0.00379	-0.137**	0.0490
	(-0.02)	(-0.06)	(-2.84)	(0.66)
Diversification	-0.321*	-0.150	0.621	-0.791***
	(-1.82)	(-0.34)	(1.52)	(-3.22)
ST-funding	-0.0152	-0.856*	1.674*	-0.0260
	(-0.07)	(-1.72)	(1.95)	(-0.07)
Asset quality	2.390	14.24	0.296	1.522
	(0.64)	(1.24)	(0.06)	(0.30)
Leverage	-0.00182	0.0216	0.0138	0.0609**
	(-0.25)	(1.09)	(1.02)	(2.43)
Z-score	-0.0690	1.633	-0.0427	0.515
	(-0.26)	(1.68)	(-0.09)	(1.46)
Cost-income	0.156	-0.268	0.904*	0.377
	(0.86)	(-0.40)	(1.98)	(1.40)
Liquidity	-0.0287	1.087***	-1.066**	-0.640*
	(-0.11)	(2.90)	(-2.24)	(-2.03)
INTERCEPT	0.625	-0.881	-1.236	-1.734
	(0.62)	(-0.34)	(-0.64)	(-1.04)
Observations	2380	929	451	1000
R^2	0.184	0.325	0.415	0.190
Adjusted R^2	0.125	0.205	0.252	0.143

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table 3.33: Total pay-ROE change elasticities: by Executive rank; 1999-2013

Panel A - All banks	PPE	Std. Err.	Groups
CEO	0.6098	0.9541	AB
Chair	1.2625	1.3114	AB
COO	1.1939	0.4951	B
CFO	1.3944	0.5517	B
CAO	1.4354	1.0564	AB
CRO	-0.1644	0.4876	A
CLO	0.5918	1.1473	AB
Junior	1.7097	1.2267	AB
Middle	1.5325	0.6979	B
Senior	0.8011	0.7259	AB
Panel B – G-SIBs			
CEO	-3.5415	2.4962	A
Chair	-0.7809	1.3977	A
COO	-2.4707	1.5633	A
CFO	0.8470	1.2957	AB
CAO	7.3007	2.3764	B
CRO	-2.3765	2.1918	A
CLO	-0.5582	4.1307	A
Junior	-1.2530	2.6128	A
Middle	-0.8755	0.7909	A
Senior	-0.6810	0.8656	A
Panel C – EU banks			
CEO	-0.8939	0.9303	A
Chair	-1.9513	2.0521	A
COO	-0.9673	2.2222	A
CFO	-1.8001	1.4655	A
CAO	-0.1487	1.8692	A
CRO	-6.0159	1.4732	
Junior	-1.6741	1.9349	A
Middle	-0.8293	1.4020	A
Senior	32.8282	8.3987	
Panel D - US banks			
CEO	2.0635	0.7120	BC
Chair	8.3815	2.2308	D
COO	2.1587	0.6982	BC
CFO	1.8351	0.6221	B
CAO	0.5243	0.6662	A
CRO	-0.1511	0.7509	A
CLO	1.2175	1.4089	ABC
Junior	2.6779	1.4250	ABC
Middle	2.4682	0.8054	BC
Senior	4.0348	0.9752	CD

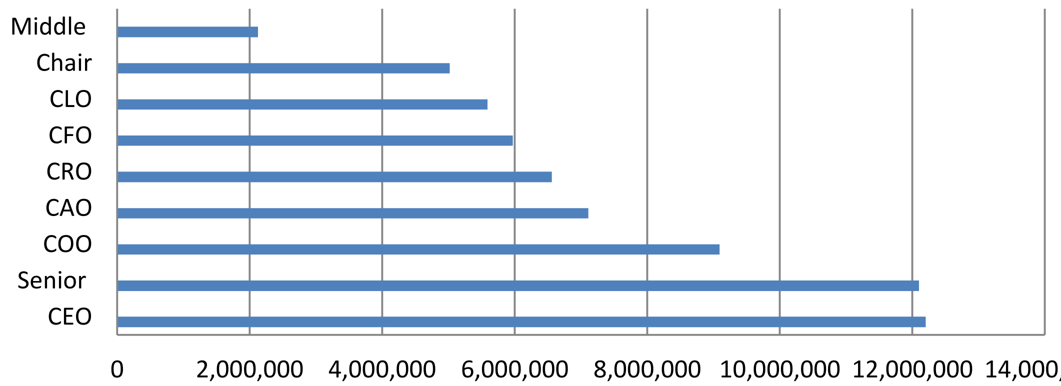
Pay-performance elasticities are drawn from Table 3.30 and a pairwise comparison of marginal linear predictions specifying differences in pay-performance among roles at the 5 percent significance level.

Elasticities range more at G-SIBs from -3.5415 (CEO) to 7.3007 (CAO). Eight elasticities are negative. Only CFO elasticities overlap into two groups (A and B). CAO elasticity differs significantly from all other roles bar CFO. Similar to G-SIBs, eight elasticities are negative at EU banks with no overlap. In contrast, pay-ROE relations are much stronger at US banks with nine positive and relatively larger elasticities, which fall into four groups (A, B, C and D). Consistent with earlier evidence, pay-performance elasticities vary across professional status and cohorts though differences are not always statistically significant.

3.5.9 Results summary and discussion

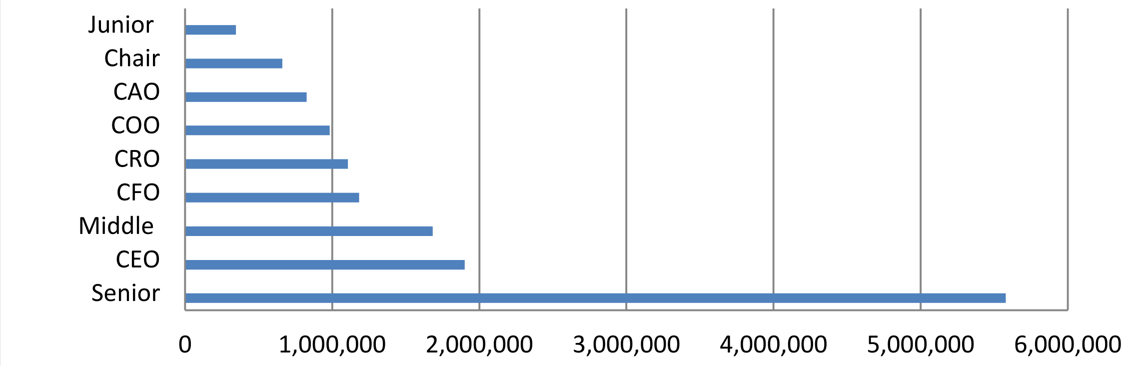
This section reviews main findings on pay-for-performance and discusses results in reference to section 3.2. Hypothesis 1 proposed that pay-for-performance varies by professional status or executive roles. Figure 3.5 shows mean compensation (total pay) and estimated mean pay-performance elasticity by the executive roles this study identified from the BoardEx database. Figure 3.5 shows data by cohort. It evaluates the proposition of Hypothesis 2 that pay-for-performance varies across firms and/or countries.

Figure 3.5: Total pay and pay-performance elasticities: by Role, 1999-2013; G-SIBs



	CEO	Senior	COO	CAO	CRO	CFO	CLO	Chair	Middle
PPE	0.756	1.303	0.578	1.415	0.374	1.084	0.488	1.387	0.631
Total pay £	12,200,00	12,100,00	9,088,399	7,109,123	6,558,103	5,968,856	5,590,189	5,020,503	2,126,849

EU banks



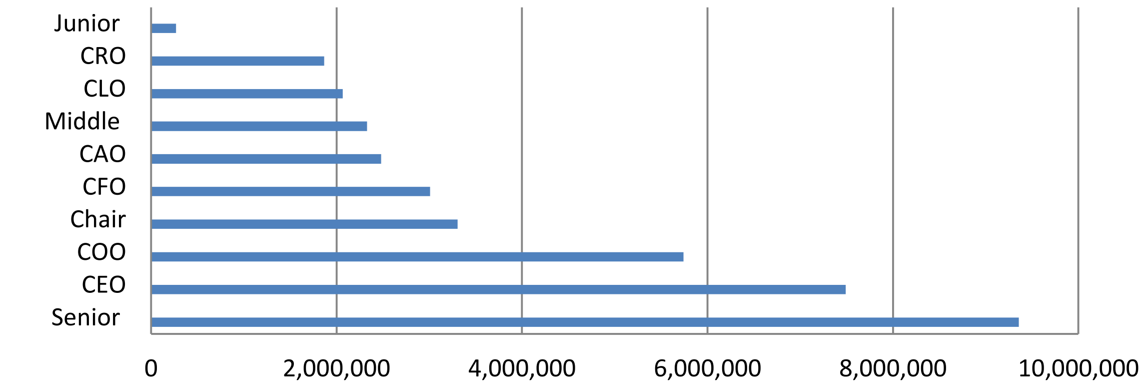
	Senior	CEO	Middle	CFO	CRO	COO	CAO	Chair	Junior
PPE	-7.644	-0.134	-0.092	-0.004	0.238	0.216	0.239	-0.009	-0.231
Total pay £	5,578,60	1,899,88	1,682,45	1,182,37	1,106,72	983,277	827,143	660,713	346,057

Total remuneration of bank executives varies according to professional status. This is unsurprising given hierarchical structures within companies. On average, the CEO is the highest paid executive at G-SIBs, the largest and most complex and diverse group of banks in this study. Total pay for the average G-SIB CEO is £12,200,000. At EU banks and US banks, the senior executive on average has higher total pay than CEOs. Total pay for senior executives is £5,578,607 and £9,357,333 at EU banks and US banks, respectively. (At G-SIBs, pay for the average senior executive is £12,100,000). Taking the average Chief Operating Officer as an example of the possible successor to the CEO, total pay at G-SIBs is £9,088,399; at EU banks, £983,277; at US banks, £5,740,700. Taking the average Chief Risk Officer as an example of a role that become relatively important within the C-suite, total pay at G-SIBs is £6,558,103; at EU banks, £1,106,724; at US banks, £1,865,380.

The data show total pay varies across both professional status and firms, and shows EU banks pay considerably less than G-SIBs and US banks. The mean pay-performance elasticities show similar features. Differences in the size of elasticities between executives within the cohorts, and differences across the same role between cohorts. Within G-SIBs, pay-performance elasticity for CEO is 0.756 and 0.374 for CRO. At EU banks, elasticities are -0.134 and 0.238 for CEO and CRO, respectively. At US banks, the comparative elasticities are 0.724 and 0.969, respectively. Between banks, the mean pay-performance elasticity for Chief Financial Officer is 1.084 at G-SIBs, -0.004 at EU banks, and 0.648 at US banks.

Notwithstanding the more detailed pairwise comparisons that show a large amount of overlapping of elasticities by professional status (at 95 percent confidence interval), the results in this study support the propositions in H1 and H2, namely, pay-for-performance varies across executive roles and between firms.

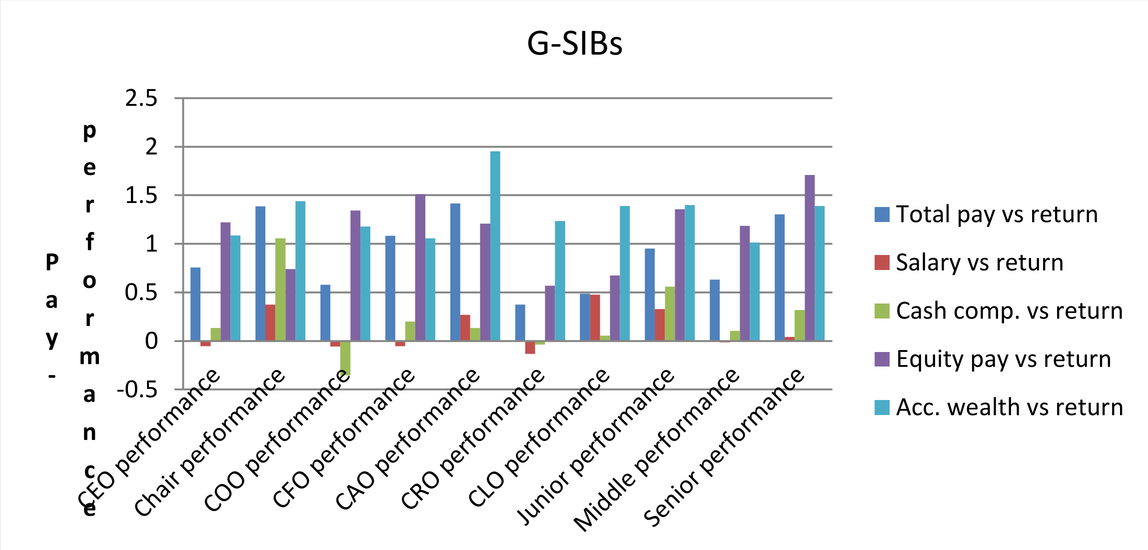
US banks

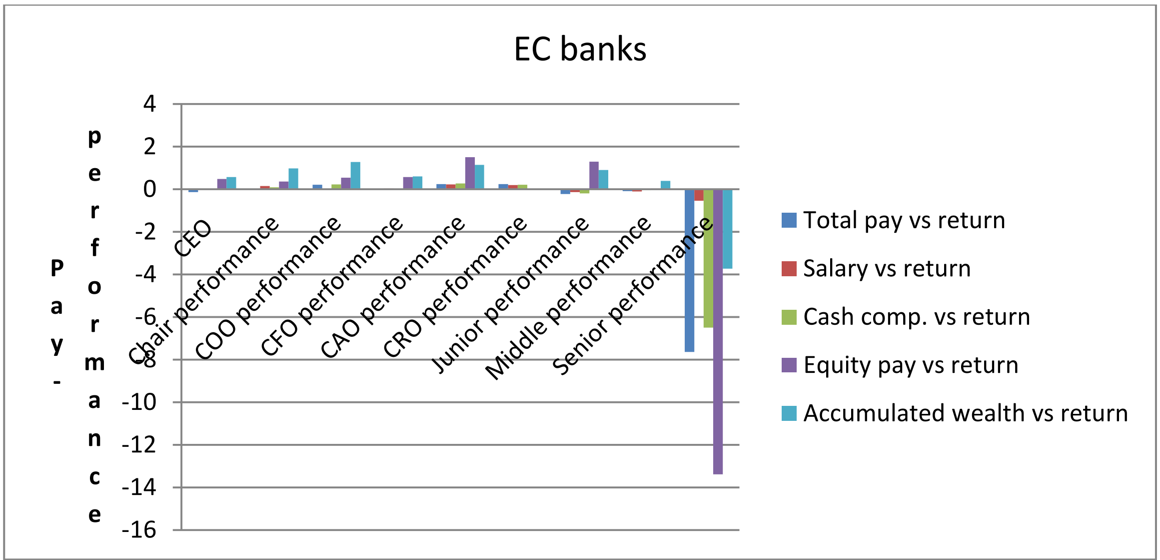


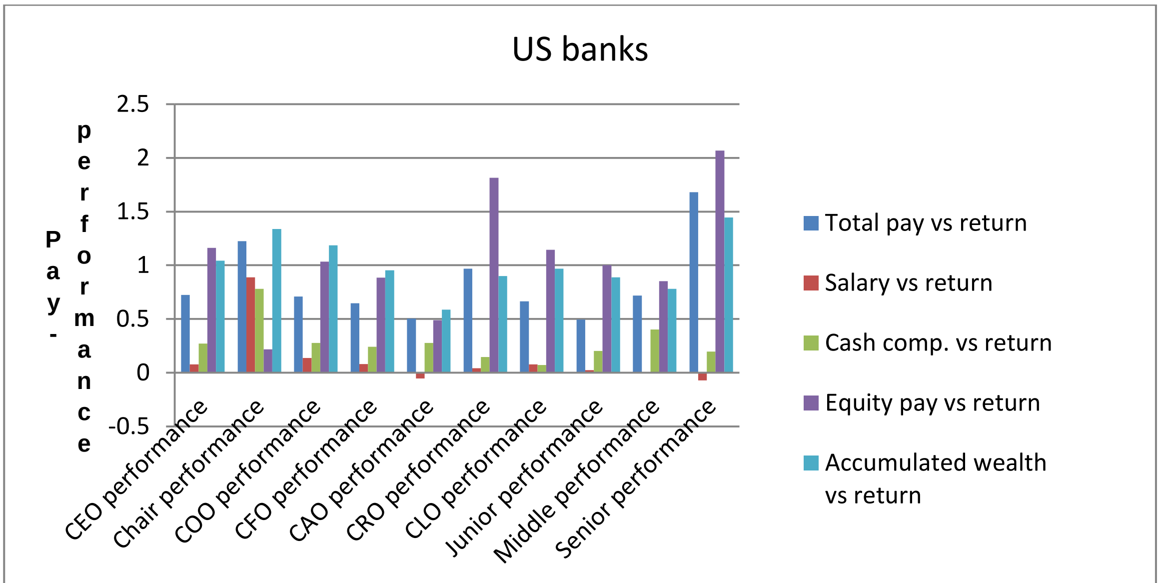
	Senior	CEO	COO	Chair	CFO	CAO	Middle	CLO	CRO	Junior
PPE	1.682	0.724	0.710	1.225	0.648	0.503	0.719	0.665	0.969	0.494
Total pay £	9,357,33	7,491,19	5,740,70	3,306,82	3,007,04	2,480,11	2,328,79	2,066,57	1,865,38	270,056

Hypothesis 3 proposes that pay-for-performance varies between fixed and variable pay. The structure of compensation contracts signifies differences in incentive pay. Earlier this study noted the heavy weighting of variable pay in total pay, which reflects the demand for pay-for-performance systems by bank executives. In other words, executives receive the bulk of remuneration as stock and options (equity-linked pay providing equity incentives). This study also estimated total accumulated wealth-performance elasticities to account for portfolio holdings and associated incentives. Figure 3.6 shows mean elasticities for total pay, salary (fixed pay), cash compensation (salary plus bonus), equity-linked pay (stock and options holdings), and total accumulated wealth (portfolio holdings). It shows elasticities across professional status for each cohort over 1999-2013. Irrespective of cohort, mean elasticities are considerably larger for equity-linked pay and total accumulated wealth. The result demonstrates the importance of equity incentives and portfolio incentives in compensation policy. The findings support H3 that pay-for-performance varies between fixed and variable pay.

Figure 3.6: Pay-performance elasticities: by Incentives and role, 1999-2013



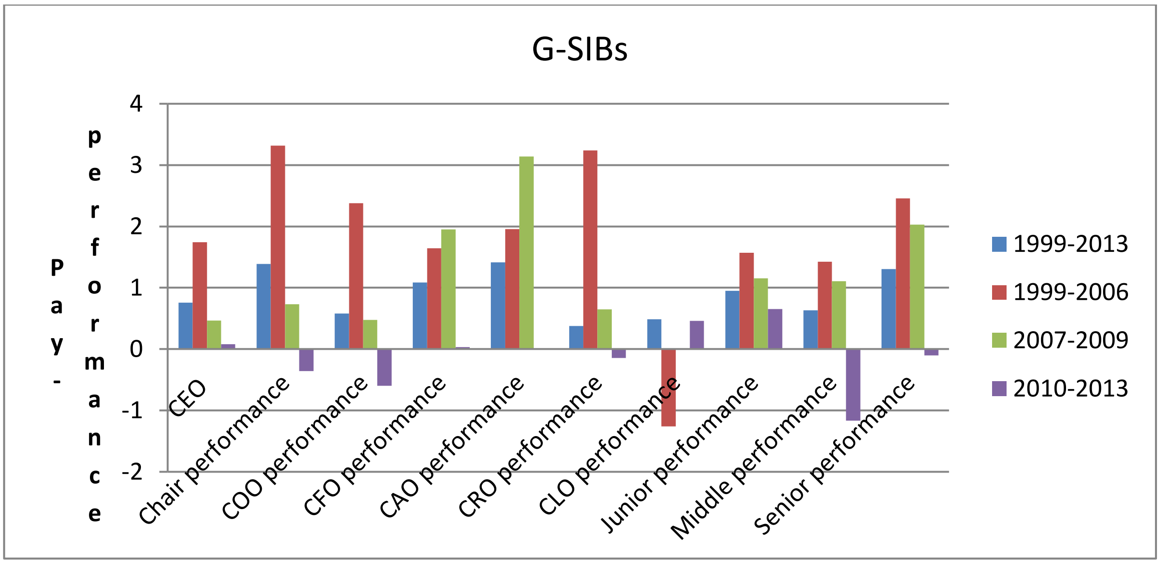


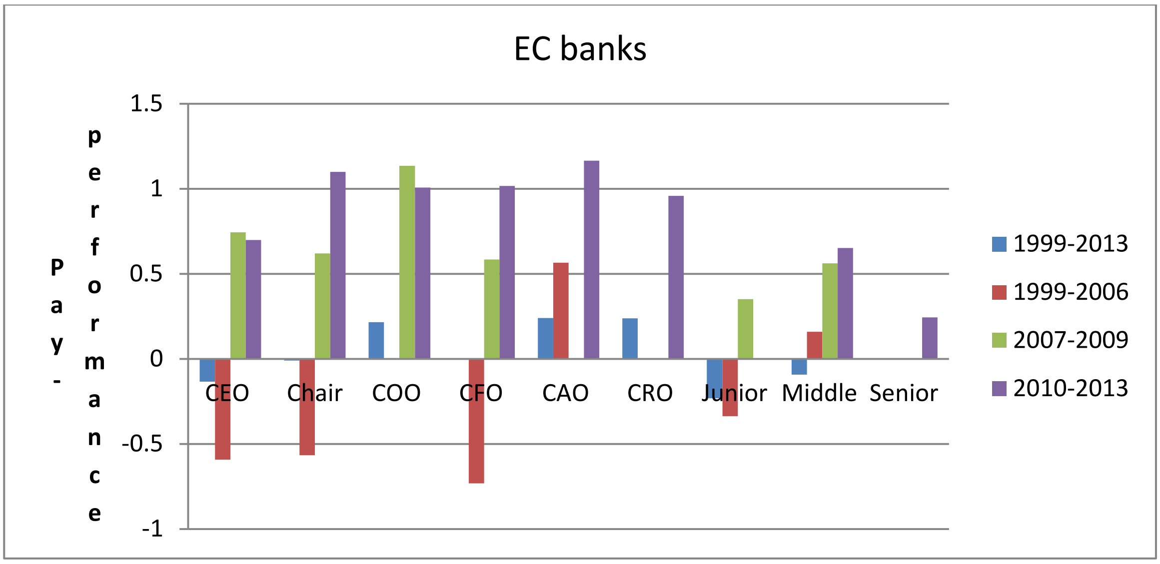


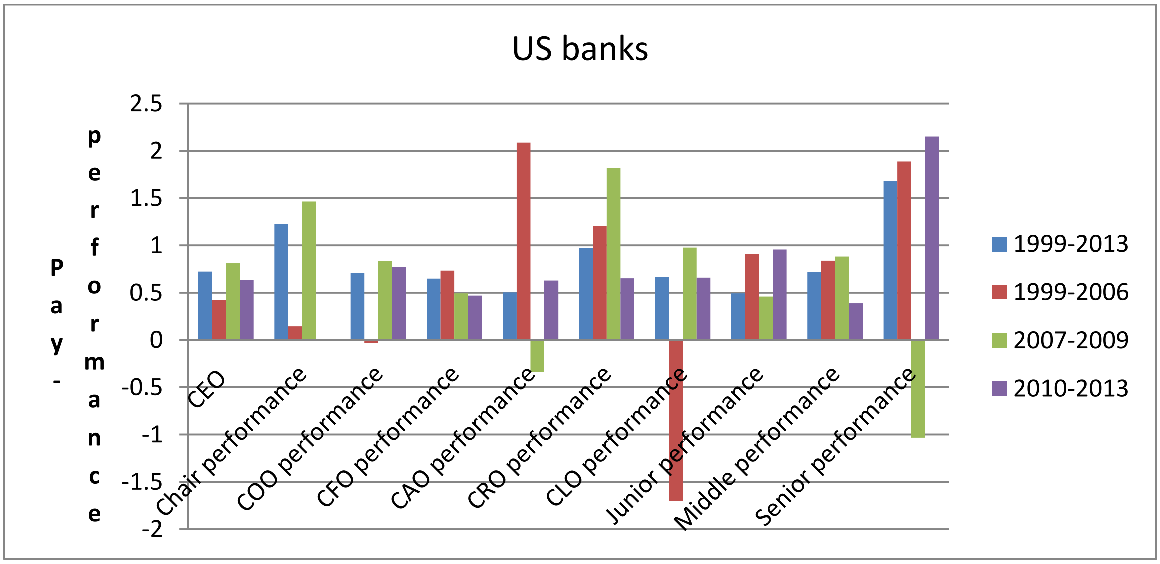
Hypothesis 4 proposes pay-for-performance is time varying. This study has noted developments in executive compensation in the banking industry over time. Until relatively recently, banking was a heavily regulated industry and compensation levels, for bank CEOs for instance, were below CEOs at comparable-sized non-banking firms. A process of financial deregulation not only increased the complexity of increasingly diversified banking firms, it also ushered in changes in executive compensation at banks. Executive compensation increasingly grew heavily weighted in incentive pay as bank executive showed a preference for pay-for-performance remuneration systems. In turn, pay awards in banking caught up with and overtook comparable awards in other industries in the period before the global financial crisis of 2007. A priori changes in compensation arrangements and the demand for pay-for-performance should lead to observed increases in pay-performance relations. Empirical evidence from the US banking industry supports this view.

This study covers the period from 1999 to 2013. Sampling the data by time interval means this chapter can determine whether pay-for-performance shows intertemporal variation. The data are split into pre-crisis (1999-2006), in-crisis (2007-2009), and post-crisis (2010-13) intervals. Hypothesis 5 proposes that pay-performance relations weaken between pre-crisis and in-crisis intervals. Hypothesis 6 proposes that pay-performance relations start to strengthen between in-crisis and post-crisis intervals. Figure 3.7 shows mean total pay-performance elasticities by professional status for each cohort across 1999-2013 and the three time intervals.

Figure 3.7: Total pay-performance elasticities: by Role and time







For G-SIBs, pay-performance elasticity for executive roles is time sensitive and is noticeably higher pre-crisis. Taking the average CEO, pay-performance elasticity is 1.743 pre-crisis and 0.463 in-crisis. Unlike the average CEOs at EU banks and US banks, pay-performance elasticity for the average G-SIB CEO does not rebound post-crisis and actually weakens to 0.079. This pattern is consistent across professional status at G-SIBs. Furthermore, for some executive roles, such as, CFO, CAO, and junior, middle and senior management mean total pay-performance elasticities are relatively large in-crisis before weakening post-crisis.

Whereas mean total pay-performance elasticities at EU banks are time varying, they show a different pattern to G-SIBs. At EU banks, pay-for-performance relations are weak pre-crisis. Pay-performance elasticities are positive across executive roles in-crisis and strengthen post-crisis. For instance, for the average CFO, pay-performance elasticity is -0.731 pre-crisis before rising to 0.584 in-crisis and increasing to 1.016 post-crisis. Consistent with G-SIBs and EU banks, pay-performance elasticities vary across time for executives at US banks. Similar to executives at G-SIBs, at US banks pay-performance elasticity is stronger pre-crisis for some executive roles; namely, CAO, CRO, and junior, middle and senior management. In-crisis, average total pay elasticities strengthen for CEO, Chair, COO, CRO and CLO. In contrast to the other cohorts, total pay elasticities appear to converge across executive roles post-crisis. To illustrate, for the average US bank CRO pay-performance elasticity is 1.204 pre-crisis. It increases to 1.82 (in-crisis) and stands at 0.651 post-crisis, which is comparable to CEO (0.635).

The results of this chapter support H4 that pay-for-performance is time varying. The results are less clear-cut with respect to H5 and H6 and appear sensitive to cohort. For G-SIBs, the results tend to support H5 that pay-for-performance weakens in-crisis but tend not to support H6 that pay-performance strengthens post-crisis. For EU banks, the results offer little support for H4 since pay-performance elasticities are larger in-crisis. Yet, the results are supportive of the strengthening hypothesis in H6. Notwithstanding a greater amount of variation across professional status, developments in the total pay elasticities of executives at US banks tends to support both H5 and H6.

3.6 Conclusion

This chapter examines pay-for-performance associations for the C-suite of bank executives, which it tracks across the international sample of banks and over time. This chapter details compensation arrangements by professional status and uses regression analysis to estimate relationships between firm performance and pay growth. The preferred regression model estimates pay-performance elasticities by professional status. Stock return is the principal measure of changes in firm performance. Accounting-based return on equity is an alternative performance measure to check robustness. The model specifies interaction terms between returns and dummy variables that indicate different professional status, and include vectors of executive-level and bank-level variables.

The chapter estimates total pay-performance elasticities. To account for differences in incentives associated with the structure of executive compensation, the preferred model is re-estimated with different dependent variables (changes in salary, cash compensation, equity-linked pay, and total accumulated wealth) and elasticities calculated by professional status. Pairwise comparisons of marginal linear predictions of mean elasticities and confidence intervals test for differences across professional status at the 5 percent significance level.

Results show pay-performance elasticities vary across professional status. Whereas elasticity varies in size across roles, some differences are significant statistically. Examining estimated elasticities for the three cohorts - G-SIBs, EU banks and US banks – shows elasticity varies between firms and across professional status within firms. It implies pay-for-performance varies across country environments. The re-estimations of the preferred model show the influence of incentive pay and its relation with firm performance. Irrespective of cohort, mean elasticities are considerably larger for equity-linked pay and total accumulated wealth. The result demonstrates the importance of equity incentives and portfolio incentives in compensation policy. In sum, pay-for-performance varies between fixed and variable pay.

This chapter finds pay-for-performance elasticity varies over time. Splitting the sample into time intervals shows if elasticities are consistent across pre-crisis, in-crisis and post-crisis intervals. A priori elasticity should weaken in-crisis from pre-crisis, and strengthen post-crisis. The results are not uniform across bank cohorts. For G-SIBs, total pay-performance elasticities are lower in-crisis though remaining positive, before weakening substantially post-crisis. At EU banks, total pay-performance elasticities are greater in-crisis and strengthen post-crisis. Elasticity is more variable over time at US banks. Results suggest pay-performance elasticity weakens in-crisis in comparison to pre-crisis and strengthens post-crisis. Taken as a whole, differences in time and sample of banks appear to influence pay-for-performance. Whilst incentive effects of equity holdings and portfolio holdings are strong for executives, the results in this chapter suggest it is important to account for heterogeneity in executive compensation arrangements.

Appendix

Table A3.1: Empirical evidence on pay-for-performance: A brief synopsis

Reference / Country/period	**Performance measure and procedure**	**Summary of results**
Jensen and Murphy (1990a) US Corporations 1974-1986	Pay-performance sensitivity Procedure: OLS Performance-based bonus and salary; stock options and performance-based dismissal decisions	On average, CEO wealth changes $3.25 for every $1,000 change in shareholder wealth. Constrains imposed by private and political forces reduce pay-performance relation and level of CEO pay. In larger firms CEOs tend to own less stock and have less compensation-based incentives than CEOs in smaller firms. The total pay-performance sensitivity is about 75 cents per $ 1,000 in shareholder wealth (45 cents and $3.15 per $1,000 for larger and small firms). Sensitivity of cash compensation (salary and bonuses) is 0.002 cents per $1,000 change. Largest CEO performance incentives come from inside stock holdings. .
Barro and Barro (1990) US Large commercial banks 1982-87	Pay-performance elasticity	New CEOs pay-performance elasticity with respect to assets is *ca.* one-third. Other CEOs the change in compensation depends on bank performance. Sensitivity diminishes with experience.
Hall and Liebman (1998) US Public traded cos. 1980-1994	Pay-performance sensitivity	Strong positive relation between CEO compensation and firm performance. The value of stock and stock options account for virtually all the sensitivity. The level of CEO compensation has risen since the 1980 to 1994 on the back of increases in stock option grants.
Demsetz & Saidenberg (1999) US 500 public traded banks 1995	Pay-performance sensitivity	Pay-performance sensitivity is substantially greater for the largest banks. Structure of compensation varies significantly across firms, with firm size being an important explanatory firm characteristic. A one standard deviation increase in stock market return (27.08) leads to a 4.20% point increase in the growth rate of option-adjusted compensation.
Conyon and Murphy (2000) US & UK 1997	Pay-performance sensitivity	Larger sensitivity for US CEOs re UK as US firms use more stock based pay. US CEOs earn 45% higher cash compensation and 190% higher total compensation than UK counterparts do. US CEOs receive 1.48% of increases in shareholder wealth against 0.25% in the UK.

Ang et al. (2002) 166 US banks; 1993-1996	Pay-performance elasticity due to direct compensation	Two tiers of compensation i.e. CEO and rest of the management team. Pay-performance elasticity of CEOs total compensation is highest at 0.65, while ranks 2-4 have pay elasticity of 0.49, 0.37, and 0.40, respectively. The compensation of top executive is dependent on executive rank, bank size and bank performance.
Adams et al. (2005)	CEO power-performance variability	CEO power is positively associated with greater performance variability.
Frydman (2005)		Trends in managerial pay and turnover: 1930s to mid-1970s, pay is stable between and within firms. From the 1980s to 2005, the trend reverses.
Bootsma (2009) Netherlands, 2002-2007	Pay-performance sensitivity and elasticity – Cash compensation and total pay versus ROA, ROE and sales growth.	Small positive relationship between short-term bonus and performance. Pay-performance relationship in the Netherland remains relatively low, but it is driven by the use of equity-based compensation. The relationship has improved after the introduction of the Dutch corporate governance code in 2004.
Duffhues & Kabir (2008) Netherlands; 1998-2001	Aggregate cash compensation of all executive directors- firm performance: ROA, return on sales, stock return and Q.	Inverse relation between compensation and performance (accounting or market-based). All four performance variables show significant negative pay-performance relationships. Firm size and leverage has a significant positive influence on executive pay.
Cheng et al (2015)	Board size-performance variability	Firms with larger boards have lower performance variability.
Marcel (2009) US firms from five industrial sectors 1999-2001	Firm performance: ROA & market-to-book ratio CEO & COO	Strong positive relation for COO and firm performance (ROA; market-to-book ratio). Performance of the CEO/COO duo is contingent on several characteristics of the top management team. Relation contingent on roader characteristics of top management team.
Erkens, Hung and Matos (2012) International 296 financial firms in 30 countries 2007-2008	Corporate governance factors on firm performance: Board independence; institutional ownership and large shareholders.	Firms with more independent boards and higher institutional ownership had worse stock returns during sub-prime crisis period. Large negative average stock returns in both US (-32%) and Europe (-33%). Write downs substantially higher in the US (-1.36% of assets) than in Europe (-0.30%). Substantial within-country variation in firm performance and large cross-country variation in corporate governance characteristics. Financial firms that base CEO compensation mostly on bonuses (non-equity incentives) performed worse in-crisis and took more risk.
Ozkan (2011) UK	Pay-performance sensitivity & elasticity - cash (salary and bonus) - equity(stock options, LTIPs)	Lower pay-performance elasticity of UK CEOs (0.075 total direct compensation) compared to US. Institutional ownership exerts positive and significant impact on CEO

390 non-financial firms 1999-2005	- CEO wealth (shareholdings, stock options, and stock award holdings	pay-performance sensitivity of option grants. Longer CEO tenure associated with lower pay-performance sensitivity i.e. a possible entrenchment effect of CEO tenure
Beltratti and Stulz (2012) International 164 large banks (32 countries) 2006	Stock return performance of large banks (assets in excess of $50 billion) during sub-prime crisis. Uses two proxies of governance: shareholder ownership, and shareholder-friendly board	Bank performance from July 2007 to December 2008 was the worst since the Great Depression. Large banks variation in stock returns and fragility of banks financed with short-term capital market funding. Better performing banks were less levered in 2006 and reported lower returns pre-crisis. Banks with more shareholder friendly boards perform significantly worse in-crisis.
Gregg, Jewell and Tonks (2012) UK financial firms 1994-2006	Pay-performance sensitivity	Financial sector pay is high. Executive cash compensation (incl. bonus) and firm performance not significantly higher than other sectors. Base salary and bonus of UK executives rises substantially over 1994-2006 i.e. sensitivity changes over time. Asymmetric relation between pay and performance i.e. when stock returns are high, pay for performance elasticity is high, and pay is less sensitive to performance when stock returns are low.
Fahlenbrach and Stulz (2012) 95 US Banks (BHCs) 2006-2008	Pay-performance sensitivity Accounting and stock return performance Delta, Vega, ROA, ROE	The performance of banks where the alignment of shareholder and CEO interests was closest was worse during the sub-prime crisis. Poor bank performance in-crisis was the result of unforeseen risk given that CEOs suffered extremely large losses. Average (median) CEO wealth increases by $24 ($10) for every $1,000 in created shareholder wealth. Average (median) dollar gain of $1.1 million ($0.5 million) for a 1% change in firm equity value.
Chen, Jeter and Yang (2013) US firms 1992-2005 (excl. 2001, 2002)	Impact on pay-performance sensitivity following Sarbanes-Oxley Act, 2002 Market- and accounting-based measures	Significant increases in pay-performance sensitivity after SOX. Strengthens link between compensation and shareholder wealth.

Table A2a: Performance Indicator: Return on Equity – G-SIBs

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	0.2537	0.0799	0.1099	0.1964	0.2501	0.3049	0.4294	0.3148	25
2000	0.2597	0.0915	0.1425	0.2013	0.2472	0.2818	0.4820	0.3523	25
2001	0.1891	0.0730	0.0529	0.1513	0.1845	0.2379	0.3330	0.3862	25
2002	0.1815	0.0692	0.0595	0.1168	0.1686	0.2450	0.3248	0.3812	25
2003	0.2037	0.0584	0.0941	0.1701	0.1940	0.2329	0.3347	0.2867	25
2004	0.2069	0.0504	0.0586	0.1910	0.2172	0.2342	0.2844	0.2438	25
2005	0.2199	0.0495	0.1047	0.1990	0.2174	0.2512	0.3246	0.2252	25
2006	0.2421	0.0505	0.1700	0.1928	0.2464	0.2671	0.3591	0.2086	25
2007	0.1431	0.1521	-0.4288	0.1036	0.1819	0.2263	0.3516	1.0630	26
2008	-0.1273	0.4980	-2.0882	-0.1799	0.0354	0.0980	0.2594	-3.9130	25
2009	0.0509	0.1338	-0.4045	-0.0280	0.0627	0.1433	0.2576	2.6311	25
2010	0.1098	0.0491	-0.0058	0.0842	0.1173	0.1486	0.1714	0.4468	25
2011	0.0741	0.0764	-0.1298	0.0652	0.0941	0.1211	0.1670	1.0300	25
2012	0.0321	0.1476	-0.5997	0.0130	0.0410	0.1128	0.1792	4.6024	25
2013	0.0367	0.1661	-0.5997	0.0448	0.0898	0.1185	0.1908	4.5233	25
Total	*0.1384*	*0.1883*	*-2.0882*	*0.0939*	*0.1668*	*0.2315*	*0.4820*	*1.3603*	*376*

Notes: Return on equity is the ratio of profit before tax-to-total equity; S.D. is standard deviation; p25 is 25^{th} percentile; p50 is median; p75 is 75^{th} percentile; CV is coefficient of variation; N is number of banks per year.

Table A2b: Performance Indicator: Return on Equity – EU banks

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	0.1769	0.1544	-0.3206	0.1159	0.1565	0.2830	0.4221	0.8729	19
2000	0.1834	0.1458	-0.2912	0.1333	0.2052	0.2696	0.4113	0.7949	19
2001	0.1463	0.1182	-0.1845	0.0697	0.1834	0.2254	0.3228	0.8083	19
2002	0.1291	0.1384	-0.1357	0.0178	0.1812	0.2697	0.3120	1.0722	19
2003	0.1270	0.1642	-0.1922	0.0533	0.1669	0.2083	0.4201	1.2936	19
2004	0.1705	0.1829	-0.3151	0.0977	0.1675	0.2837	0.4654	1.0729	19
2005	0.1732	0.1298	-0.1576	0.1197	0.1935	0.2567	0.4044	0.7493	20
2006	0.1874	0.1504	-0.2776	0.1135	0.2041	0.2835	0.3755	0.8021	20
2007	0.1497	0.1905	-0.4217	0.0939	0.1770	0.2462	0.3911	1.2727	14
2008	-0.2101	0.6582	-2.2824	-0.2107	-0.0108	0.0832	0.4389	-3.1326	14
2009	-0.0622	0.2092	-0.4732	-0.2218	-0.0570	0.0643	0.2934	-3.3638	14
2010	-0.1801	0.7596	-2.7731	-0.1196	0.0189	0.0795	0.3772	-4.2172	14
2011	-0.0723	0.2971	-0.8986	-0.1611	-0.0267	0.1001	0.4087	-4.1073	14
2012	-0.0105	0.1717	-0.3284	-0.1194	0.0102	0.0607	0.3110	-16.4316	13
2013	0.0054	0.1163	-0.1608	-0.1069	0.0104	0.0884	0.1807	21.5083	10
Total	*0.0794*	*0.3066*	*-2.7731*	*0.0106*	*0.1209*	*0.2256*	*0.4654*	*3.8614*	*247*

Notes: Return on equity is the ratio of profit before tax-to-total equity; S.D. is standard deviation; p25 is 25th percentile; p50 is median; p75 is 75th percentile; CV is coefficient of variation; N is number of banks per year.

Table A2c: Performance Indicator: Return on Equity – US banks

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	0.2486	0.0521	0.1157	0.2077	0.2561	0.2891	0.3186	0.2097	23
2000	0.2202	0.0648	0.0428	0.1898	0.2272	0.2792	0.3024	0.2943	24
2001	0.1996	0.0911	0.0380	0.1526	0.1937	0.2415	0.4549	0.4567	24
2002	0.2063	0.0696	-0.0099	0.1783	0.2080	0.2532	0.3216	0.3374	25
2003	0.2049	0.0717	0.0204	0.1745	0.1962	0.2244	0.3803	0.3501	25
2004	0.2146	0.0541	0.1094	0.1861	0.2175	0.2445	0.3266	0.2523	25
2005	0.2187	0.0627	0.0850	0.1777	0.2108	0.2524	0.3271	0.2869	25
2006	0.2073	0.0714	0.0708	0.1677	0.1961	0.2590	0.3408	0.3444	25
2007	0.0864	0.1679	-0.5421	0.0509	0.1253	0.1901	0.2949	1.9427	23
2008	-0.1470	0.5177	-2.0371	-0.1082	0.0355	0.1090	0.1997	-3.5228	18
2009	-0.0469	0.2155	-0.6893	-0.1181	0.0060	0.0829	0.1988	-4.5923	16
2010	0.0642	0.0668	-0.0606	0.0214	0.0682	0.1272	0.1620	1.0408	16
2011	0.0737	0.1034	-0.2752	0.0562	0.0922	0.1313	0.1896	1.4029	16
2012	0.1079	0.0521	-0.0405	0.0888	0.1067	0.1372	0.1919	0.4832	16
2013	0.1071	0.0502	0.0034	0.0644	0.1106	0.1401	0.1857	0.4690	15
Total	*0.1463*	*0.1824*	*-2.0371*	*0.1005*	*0.1778*	*0.2291*	*0.4549*	*1.2468*	*316*

Notes: Return on equity is the ratio of profit before tax-to-total equity; S.D. is standard deviation; p25 is 25th percentile; p50 is median; p75 is 75th percentile; CV is coefficient of variation; N is number of banks per year.

Table A2d: Pairwise Comparison of Means: by Cohort; 1999-2013 - RoE

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) GSIB	0.1384	0.0115	11.99	0.000	0.1158	0.1611
(2) EU banks	0.0794	0.0142	5.57	0.000	0.0514	0.1073
(3) US banks	0.1463	0.0126	11.62	0.000	0.1215	0.1710
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-0.0590	0.0183	-3.22	0.004	-0.1021	-0.0160
3 vs 1	0.0078	0.0171	0.46	0.890	-0.0323	0.0479
3 vs 2	0.0669	0.0190	3.52	0.001	0.0222	0.1115

Table A2e: Pairwise Comparison of Means: by Time Interval - RoE

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	0.2017	0.0088	22.97	0.000	0.1845	0.2189
(2) 2007-2009	-0.0075	0.0156	-0.48	0.629	-0.0381	0.0230
(3) 2010-2013	0.0385	0.0141	2.74	0.006	0.0109	0.0661
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-0.2092	0.0179	-11.71	0.000	-0.2512	-0.1673
3 vs 1	-0.1632	0.0166	-9.84	0.000	-0.2022	-0.1242
3 vs 2	0.0460	0.0210	2.19	0.073	-0.0032	0.0953

Table A3.1: Pay-for-performance: 1999-2013 – Salary (unabridged)

	All banks	G-SIBs	EU	US
Returns	0.0384	-0.0551	-0.0212	0.0777
	(0.84)	(-0.31)	(-0.19)	(1.41)
Size	-0.0126	-0.0421	-0.0243	0.00292
	(-1.31)	(-1.36)	(-1.09)	(0.17)
Chair	0.00156	-0.00195	0.0695	-0.168
	(0.02)	(-0.02)	(0.48)	(-1.44)
COO	-0.0145	-0.0128	0.0130	0.0184
	(-0.49)	(-0.21)	(0.11)	(0.70)
CFO	-0.0224	-0.0133	-0.0451	0.00260
	(-0.68)	(-0.18)	(-0.48)	(0.10)
CAO	0.0546	0.196	0.136	0.00815
	(0.84)	(1.15)	(1.25)	(0.15)
CRO	0.0392	0.0375	0.237*	0.0168
	(0.90)	(0.37)	(1.90)	(0.43)
CLO	-0.0229	-0.0481	0	-0.0500
	(-0.41)	(-0.35)	(.)	(-1.19)
Junior	0.00567	0.0961	-0.0276	-0.00754
	(0.10)	(0.38)	(-0.28)	(-0.27)
Middle	0.00779	-0.0168	0.0324	0.00319
	(0.28)	(-0.38)	(0.44)	(0.11)
Senior	0.0351	0.0744	0.00919	0.0429
	(0.88)	(1.04)	(0.04)	(0.56)
Chair # Returns	0.219	0.428	0.170***	0.811*
	(1.59)	(1.22)	(2.96)	(1.76)
COO # Returns	0.0630	-0.000375	0.0307	0.0611*
	(1.46)	(-0.00)	(0.19)	(1.76)
CFO # Returns	0.00537	0.000845	0.0451	0.00430
	(0.14)	(0.01)	(0.70)	(0.12)
CAO # Returns	0.0260	0.326	0.243	-0.132
	(0.26)	(1.42)	(1.74)	(-1.34)
CRO # Returns	-0.0225	-0.0780	0.213	-0.0354
	(-0.34)	(-0.83)	(1.53)	(-0.39)
CLO # Returns	0.146	0.533**		-0.000667
	(1.53)	(2.24)		(-0.01)
Junior # Returns	-0.0221	0.383	-0.120	-0.0537
	(-0.25)	(1.07)	(-1.09)	(-1.17)
Middle # Returns	-0.0302	0.0400	-0.0872	-0.0797
	(-0.55)	(0.36)	(-0.77)	(-1.60)
Senior # Returns	-0.0502	0.0964	-0.524	-0.149
	(-0.72)	(0.90)	(-0.50)	(-1.19)
Age	-0.0247*	-0.0116	-0.0441	-0.0295
	(-1.81)	(-0.36)	(-1.56)	(-1.06)
Age^2	0.000220*	0.000152	0.000371	0.000272
	(1.75)	(0.53)	(1.49)	(1.01)
Time in role	-0.0127***	-0.0208**	-0.0245**	-0.00527**
	(-3.93)	(-2.43)	(-2.28)	(-2.52)
Time in org.	-0.00332***	-0.00486**	-0.00483**	-0.00210*
	(-3.78)	(-2.29)	(-2.23)	(-1.94)

Education	0.00150	0.00561	0.0219	0.00317
	(0.17)	(0.31)	(0.80)	(0.33)
Gender	-0.00704	0.0822***	-0.102	0.00219
	(-0.28)	(2.91)	(-1.08)	(0.10)
Nationality	-0.00233	-0.00638**	-0.000181	0.00158
	(-1.05)	(-2.17)	(-0.03)	(0.24)
New CEO	0.105*	0.160	0.119	0.0924**
	(1.69)	(1.01)	(1.18)	(2.14)
Duality	-0.0401	-0.0338	-0.0935	-0.0413
	(-1.11)	(-0.45)	(-0.67)	(-1.61)
M&A	-0.0323	-0.0409	-0.200*	-0.0103
	(-1.30)	(-0.84)	(-1.77)	(-0.42)
Board size	-0.0108	0.0196	0.00378	-0.0178
	(-0.89)	(0.46)	(0.13)	(-1.09)
Board size^2	0.000385	-0.0000213	0.000474	0.000475
	(1.23)	(-0.02)	(0.63)	(1.23)
SD-to-ED	0.00694	-0.0144	0.0224	-0.0206
	(0.95)	(-1.18)	(1.74)	(-1.20)
Growth	0.0223	0.0497	0.0802***	-0.0131
	(1.51)	(1.25)	(3.25)	(-0.85)
Diversification	-0.0912	-0.00229	-0.171	0.0203
	(-1.60)	(-0.01)	(-0.70)	(0.31)
ST-funding	-0.0777	-0.127	0.571	-0.0324
	(-0.82)	(-0.88)	(1.21)	(-0.28)
Asset quality	4.618*	14.89	4.435	2.107
	(1.85)	(1.52)	(1.35)	(0.80)
Leverage	0.00335	-0.00152	-0.00654	0.00981
	(1.21)	(-0.19)	(-0.91)	(0.67)
Z-score	-0.00554	-0.635	-0.639***	0.168
	(-0.06)	(-1.25)	(-3.30)	(0.73)
Cost-income	0.142	0.158	0.441**	0.160*
	(1.63)	(0.42)	(2.86)	(1.76)
Liquidity	0.150*	0.0518	-0.855*	0.148
	(1.86)	(0.28)	(-1.80)	(0.97)
INTERCEPT	0.918**	2.017	2.638**	0.392
	(2.02)	(0.87)	(2.43)	(0.39)
Observations	2366	914	453	999
R^2	0.214	0.265	0.327	0.231
Adjusted R^2	0.159	0.135	0.143	0.186

Notes: *t* statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table A3.2: Pay-for-performance: 1999-2013 – Cash compensation (unabridged)

	All banks	G-SIBs	EU	US
Returns	0.208**	0.135	0.0199	0.272***
	(2.56)	(0.64)	(0.14)	(4.47)
Size	-0.0258	-0.00367	0.00722	-0.00494
	(-1.58)	(-0.06)	(0.27)	(-0.18)
Chair	-0.0119	-0.0376	0.0295	-0.161
	(-0.14)	(-0.26)	(0.17)	(-1.00)
COO	-0.0233	0.00281	0.0320	-0.0372
	(-0.46)	(0.03)	(0.23)	(-0.55)
CFO	-0.0320	-0.0148	-0.0549	-0.0531
	(-0.76)	(-0.17)	(-0.51)	(-1.11)
CAO	0.0276	0.215	0.130	-0.0695
	(0.41)	(1.15)	(1.04)	(-1.19)
CRO	0.00298	0.0493	0.235*	-0.0671
	(0.06)	(0.34)	(1.81)	(-1.23)
CLO	-0.0744	-0.0341		-0.121
	(-0.99)	(-0.18)		(-1.36)
Junior	-0.0575	0.0206	-0.0427	-0.0906
	(-0.77)	(0.06)	(-0.37)	(-1.43)
Middle	0.0172	-0.0342	0.0374	-0.00255
	(0.44)	(-0.47)	(0.42)	(-0.05)
Senior	-0.0480	-0.00894	0.515	-0.0185
	(-0.84)	(-0.08)	(1.30)	(-0.23)
Chair # Returns	0.169	0.923*	0.0706	0.510
	(1.01)	(1.89)	(0.85)	(1.05)
COO # Returns	-0.127	-0.488*	0.208	0.00454
	(-1.14)	(-1.95)	(0.71)	(0.07)
CFO # Returns	-0.0332	0.0662	-0.0222	-0.0308
	(-0.38)	(0.23)	(-0.24)	(-0.50)
CAO # Returns	0.0340	-0.00169	0.249	0.00515
	(0.31)	(-0.01)	(1.63)	(0.06)
CRO # Returns	-0.119	-0.172	0.193	-0.125
	(-1.33)	(-1.29)	(1.24)	(-1.10)
CLO # Returns	-0.190	-0.0816		-0.201
	(-1.62)	(-0.23)		(-1.65)
Junior # Returns	-0.155	0.425	-0.220	-0.0691
	(-1.05)	(0.83)	(-1.24)	(-0.81)
Middle # Returns	0.00734	-0.0294	-0.0644	0.131**
	(0.10)	(-0.22)	(-0.66)	(2.42)
Senior # Returns	0.0670	0.183	-6.526*	-0.0748
	(0.28)	(0.59)	(-2.02)	(-0.82)
Age	-0.0278	-0.0116	-0.0412	-0.0419
	(-1.62)	(-0.39)	(-1.41)	(-1.17)
Age^2	0.000259	0.000175	0.000343	0.000382
	(1.61)	(0.65)	(1.29)	(1.12)
Time in role	-0.0158***	-0.0233**	-0.0310**	-0.00768***
	(-3.83)	(-2.56)	(-2.30)	(-3.05)
Time in org.	-0.00212*	-0.00384	-0.00567*	-0.00101
	(-1.85)	(-1.28)	(-2.00)	(-0.61)

Education	0.00000298	-0.00371	0.0272	0.00981
	(0.00)	(-0.25)	(1.03)	(0.61)
Gender	-0.0360	0.0667	-0.0816	-0.0485
	(-1.14)	(1.17)	(-0.85)	(-1.36)
Nationality	0.000555	-0.000285	0.00348	-0.00215
	(0.20)	(-0.08)	(0.46)	(-0.49)
New CEO	0.140	0.262	0.0613	0.0437
	(1.44)	(1.07)	(0.55)	(0.46)
Duality	-0.0777	-0.128	-0.00609	-0.0801
	(-1.49)	(-1.20)	(-0.04)	(-1.25)
M&A	-0.0932	-0.116	-0.228*	-0.0647
	(-1.36)	(-0.67)	(-2.03)	(-0.98)
Board size	-0.00393	0.0754	-0.0497	-0.000252
	(-0.20)	(1.14)	(-1.46)	(-0.01)
Board size^2	0.000311	-0.00133	0.00173*	0.000116
	(0.63)	(-0.93)	(1.94)	(0.11)
SD-to-ED	-0.00419	-0.0158	-0.0112	-0.0170
	(-0.53)	(-0.84)	(-0.91)	(-0.33)
Growth	-0.0156	0.0286	0.0756***	-0.0711**
	(-0.66)	(0.33)	(2.95)	(-2.74)
Diversification	-0.164*	0.107	0.497	-0.162*
	(-1.70)	(0.20)	(1.50)	(-1.94)
ST-funding	-0.130	0.291	0.470	-0.0114
	(-0.78)	(1.07)	(0.81)	(-0.04)
Asset quality	3.628	21.39	2.988	1.167
	(1.39)	(1.62)	(0.53)	(0.40)
Leverage	-0.00379	-0.0167	-0.0172*	0.0132
	(-0.71)	(-1.16)	(-1.80)	(0.65)
Z-score	-0.162	-0.823	-1.367***	0.194
	(-0.99)	(-0.87)	(-3.89)	(0.72)
Cost-income	0.0564	-0.0274	0.588**	0.279**
	(0.55)	(-0.09)	(2.75)	(2.10)
Liquidity	0.214	0.522	-0.903	0.355
	(1.59)	(1.37)	(-1.72)	(1.15)
INTERCEPT	1.693**	1.134	4.357***	0.538
	(2.48)	(0.31)	(2.94)	(0.49)
Observations	2366	914	453	999
R^2	0.263	0.315	0.406	0.322
Adjusted R^2	0.211	0.194	0.244	0.282

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table A3.3: Pay-for-performance: 1999-2013 - Equity-linked pay (unabridged)

	All banks	G-SIBs	EU	US
Returns	0.994***	1.220***	0.475	1.161**
	(3.46)	(3.29)	(0.61)	(2.37)
Size	-0.0929***	-0.0198	0.589***	-0.0714
	(-2.71)	(-0.26)	(5.11)	(-1.13)
Chair	-0.265*	-0.238	-0.0971	-0.227
	(-1.94)	(-1.07)	(-0.59)	(-0.31)
COO	0.101	0.239	-0.160*	-0.0158
	(1.51)	(1.59)	(-2.11)	(-0.16)
CFO	0.0754	0.104	0.0152	-0.0542
	(1.21)	(0.69)	(0.10)	(-0.53)
CAO	0.00741	0.340*	0.0298	0.0170
	(0.07)	(1.74)	(0.24)	(0.11)
CRO	0.123	0.109	0.453**	0.0601
	(1.52)	(0.67)	(2.30)	(0.41)
CLO	-0.0212	0.380		-0.135
	(-0.18)	(1.12)		(-0.81)
Junior	-0.541*	-0.800	0.434	-0.746*
	(-1.78)	(-0.97)	(1.25)	(-1.88)
Middle	-0.0872	-0.151	-0.124	-0.138
	(-1.34)	(-1.05)	(-1.37)	(-1.10)
Senior	0.495***	0.398**	3.211***	0.666**
	(2.67)	(2.29)	(5.25)	(2.08)
Chair # Returns	-0.704	-0.482	-0.123	-0.942
	(-1.43)	(-0.54)	(-0.54)	(-0.46)
COO # Returns	-0.0945	0.122	0.0663	-0.128
	(-0.55)	(0.48)	(0.11)	(-0.61)
CFO # Returns	0.0314	0.291	0.0933	-0.276
	(0.27)	(0.83)	(0.56)	(-1.62)
CAO # Returns	-0.362	-0.0131	1.028	-0.674*
	(-1.27)	(-0.02)	(0.74)	(-1.99)
CRO # Returns	0.166	-0.651***		0.653
	(0.34)	(-3.45)		(0.86)
CLO # Returns	-0.0194	-0.546		-0.0176
	(-0.12)	(-1.21)		(-0.09)
Junior # Returns	0.0139	0.136	0.820*	-0.159
	(0.06)	(0.22)	(1.90)	(-0.47)
Middle # Returns	-0.148	-0.0352	-0.446	-0.308
	(-0.84)	(-0.16)	(-1.73)	(-0.92)
Senior # Returns	0.296	0.488*	-13.86***	0.906
	(1.13)	(1.88)	(-5.46)	(0.84)
Age	-0.0276	0.0966	0.0982	-0.128**
	(-0.67)	(1.29)	(1.04)	(-2.46)
Age^2	0.000301	-0.000762	-0.00100	0.00120**
	(0.75)	(-1.07)	(-1.04)	(2.49)
Time in role	-0.00507	0.000716	-0.0194	-0.00557
	(-0.98)	(0.06)	(-1.12)	(-0.87)
Time in org.	-0.000207	-0.00322	-0.00151	0.000493
	(-0.11)	(-0.79)	(-0.39)	(0.20)

Education	0.0249	0.0286	-0.0261	-0.0148
	(1.28)	(0.67)	(-0.93)	(-0.46)
Gender	0.0600	0.114	0.426***	-0.0884
	(0.79)	(1.07)	(3.25)	(-0.95)
Nationality	-0.000526	-0.00263	0.00222	0.0692*
	(-0.14)	(-0.50)	(0.21)	(1.93)
New CEO	0.282**	0.0950	-0.0336	0.494***
	(2.59)	(0.55)	(-0.10)	(3.74)
Duality	0.0561	0.173	2.909***	-0.0796
	(0.84)	(1.17)	(18.01)	(-0.80)
M&A	0.181	-0.559***	-0.482	0.349
	(1.21)	(-3.42)	(-1.02)	(1.61)
Board size	0.0534	-0.162*	0.132	0.0434
	(1.19)	(-1.87)	(0.47)	(0.52)
Board size^2	-0.00119	0.00365	-0.0128	-0.000667
	(-1.08)	(1.70)	(-1.26)	(-0.35)
SD-to-ED	-0.0196	-0.0426	0.217	-0.0513
	(-0.41)	(-0.56)	(1.36)	(-0.50)
Growth	-0.0472	-0.0302	-0.447	0.0622
	(-0.81)	(-0.20)	(-1.52)	(0.81)
Diversification	-0.316	-0.944*	3.145**	-0.789*
	(-1.31)	(-1.95)	(2.35)	(-1.94)
ST-funding	0.0140	-0.683*	1.620**	0.169
	(0.05)	(-1.73)	(2.84)	(0.33)
Asset quality	1.589	-4.682	60.90*	-3.082
	(0.22)	(-0.26)	(1.91)	(-0.32)
Leverage	0.00635	0.0331**	0.107*	0.0507
	(0.64)	(2.13)	(2.14)	(0.76)
Z-score	0.107	2.342**	2.439	0.0455
	(0.34)	(2.45)	(1.25)	(0.04)
Cost-income	0.426	0.534	2.259	0.231
	(1.20)	(1.18)	(1.73)	(0.44)
Liquidity	-0.126	1.516***	-2.776*	-0.974
	(-0.42)	(5.12)	(-2.17)	(-1.63)
INTERCEPT	0.794	-7.052**	-18.88*	3.264
	(0.50)	(-2.34)	(-2.12)	(0.72)
Observations	1833	718	237	878
R^2	0.264	0.429	0.645	0.237
Adjusted R^2	0.210	0.324	0.501	0.186

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Table A3.4: Pay-for-Performance: 1999-2013 - Accumulated wealth (unabridged)

	All banks	G-SIBs	EU	US
Returns	1.041***	1.087***	0.564	1.043***
	(12.51)	(8.62)	(1.17)	(10.65)
Size	-0.0166	-0.0181	0.0319	-0.00916
	(-1.05)	(-0.30)	(0.48)	(-0.52)
Chair	-0.110	-0.200**	0.472	-0.0797
	(-1.18)	(-2.08)	(1.15)	(-0.42)
COO	0.0269	0.0346	0.0101	0.0613*
	(0.59)	(0.37)	(0.09)	(1.96)
CFO	0.0305	0.0141	0.0447	0.0195
	(0.88)	(0.26)	(0.28)	(0.32)
CAO	0.0476	0.339	0.0231	-0.0608
	(0.38)	(0.99)	(0.18)	(-0.56)
CRO	0.0927	0.115	0.0744	0.0838
	(1.14)	(0.62)	(0.37)	(0.72)
CLO	0.135*	-0.0739		0.205*
	(1.71)	(-0.30)		(1.90)
Junior	-0.0764	-0.290	0.171	-0.0746
	(-1.10)	(-0.94)	(1.18)	(-1.00)
Middle	0.0000793	-0.122*	-0.0143	0.0518
	(0.00)	(-1.86)	(-0.30)	(0.74)
Senior	0.0261	0.0505	1.142***	-0.00468
	(0.62)	(0.84)	(3.05)	(-0.06)
Chair # Returns	0.0563	0.352	0.414	0.294
	(0.22)	(0.96)	(1.61)	(0.89)
COO # Returns	0.168	0.0916	0.707**	0.143
	(1.47)	(0.54)	(2.61)	(0.99)
CFO # Returns	-0.0881	-0.0318	0.0351	-0.0887
	(-1.15)	(-0.15)	(0.25)	(-1.56)
CAO # Returns	0.0468	0.865	0.578	-0.457*
	(0.15)	(1.71)	(0.95)	(-1.83)
CRO # Returns	0.0292	0.146		-0.143*
	(0.27)	(0.98)		(-1.79)
CLO # Returns	-0.0638	0.303		-0.0732
	(-0.45)	(0.64)		(-0.50)
Junior # Returns	-0.00467	0.311	0.341**	-0.155
	(-0.04)	(0.81)	(2.24)	(-1.44)
Middle # Returns	-0.192***	-0.0723	-0.174	-0.263***
	(-2.88)	(-0.45)	(-1.31)	(-3.72)
Senior # Returns	0.325**	0.303*	-4.300**	0.402
	(2.53)	(1.81)	(-2.16)	(0.85)
Age	-0.0223	-0.0219	-0.00911	-0.0346
	(-0.90)	(-0.48)	(-0.14)	(-1.69)
Age^2	0.000176	0.000189	0.0000463	0.000262
	(0.79)	(0.47)	(0.07)	(1.44)
Time in role	-0.0169***	-0.00708	-0.0155	-0.0106**
	(-3.47)	(-0.78)	(-0.75)	(-2.75)
Time in org.	-0.00310**	-0.000350	-0.00823*	-0.00561***

	(-2.16)	(-0.10)	(-1.78)	(-3.66)
Education	-0.00373	-0.00789	0.0278	0.000379
	(-0.29)	(-0.33)	(0.88)	(0.02)
Gender	0.0536	0.0935	0.201	-0.0413
	(1.37)	(1.70)	(1.16)	(-0.97)
Nationality	-0.000869	-0.00150	-0.0106	0.0200
	(-0.33)	(-0.48)	(-1.33)	(1.14)
New CEO	0.00702	0.0677	0.0963	0.0367
	(0.13)	(0.52)	(0.45)	(0.68)
Duality	-0.00275	-0.0115	0.279	0.0157
	(-0.07)	(-0.13)	(0.87)	(0.25)
M&A	0.103**	-0.0199	0.579**	0.0936*
	(2.53)	(-0.20)	(2.27)	(2.04)
Board size	0.0241	-0.104	0.481**	0.0720***
	(1.12)	(-1.64)	(2.42)	(3.05)
Board size^2	-0.000905*	0.00238	-0.0187**	-0.00210***
	(-1.75)	(1.42)	(-2.76)	(-3.92)
SD-to-ED	-0.00389	0.000553	-0.00497	0.0280
	(-0.33)	(0.02)	(-0.18)	(1.13)
Growth	-0.0171	0.137	-0.0541	-0.0631**
	(-0.67)	(1.40)	(-0.92)	(-2.29)
Diversification	0.0617	0.0169	0.354	0.0273
	(0.71)	(0.04)	(0.76)	(0.32)
ST-funding	-0.0149	-0.366	0.571	0.218
	(-0.10)	(-1.66)	(0.42)	(1.38)
Asset quality	12.15***	17.37	15.19	6.202
	(4.00)	(1.37)	(1.59)	(1.46)
Leverage	0.0116	0.0180**	-0.0243*	0.0259
	(1.60)	(2.74)	(-1.97)	(1.01)
Z-score	0.107	0.825***	-1.573***	0.358
	(0.62)	(2.86)	(-4.42)	(0.98)
Cost-income	0.0825	0.335	0.334	0.131
	(0.66)	(1.49)	(0.91)	(0.72)
Liquidity	0.312*	0.808***	-1.368*	0.196
	(1.95)	(4.01)	(-1.80)	(0.80)
INTERCEPT	0.320	-0.783	1.912	-0.802
	(0.41)	(-0.38)	(1.12)	(-0.53)
Observations	2217	897	336	984
R^2	0.403	0.496	0.565	0.484
Adjusted R^2	0.357	0.404	0.427	0.453

Notes: t statistics in parentheses. Estimations include country-year effects. Standard errors are clustered by firm.
* p<0.10, ** p<0.05, *** p<0.01

Chapter Four

Bank stability and executive pay gaps

4.1 Introduction

The debate on executive compensation in banking continues apace long after the crisis event began in 2007. Substantial evidence affirms the proposition that structuring incentives to maximise shareholder value in levered firms did result in excess risk-taking, which was the source of the volatility that erupted in 2007 (Brunnermeier, 2009; DeYoung, Peng and Yan, 2013; Ellul and Yerramilli, 2013; Bolton, Mehran and Shapiro, 2015). Whereas some contend the problem was the realisation of bad luck – based on the relative underperformance of banks with shareholder-friendly boards (Fahlenbrach and Stulz, 2011; Beltratti and Stulz, 2012), others attribute the combination of managerial power and inappropriate incentives as causal factors for excessive risk-taking and bank distress (Bebchuk, Cohen and Spamann, 2010; Bhagat and Bolton, 2014). An increasing presence of institutional investors as shareholders with short-term preferences and ability to influence firm decision-making exacerbated problems (Cheng, Hong and Scheinkman, 2015). A strand of literature considers the reform of incentive structures and advocates tying pay to realised long-term firm performance (Bebchuk and Spamann, 2009; Bebchuk and Fried, 2010a; Bebchuk, 2010). Others advocate increasing the amount of inside debt (deferred compensation) in total pay (Edmans and Liu, 2011; Srivastav, Armitage and Hagendorff, 2014; Bolton, Mehran and Shapiro, 2015; Bennett, Guntay and Unal, 2015; van Bekkum, 2016). The regulatory response has focused on curbing excesses. Regulators in the US have introduced mandated deferrals of performance-related pay with explicit malus and clawback provisions whereas regulators in the European Community in addition have introduced a bonus cap on the ratio of variable-to-fixed pay (Murphy, 2013; Kleymenova and Tuna, 2015).

I offer another perspective and consider the effect of pay differentials in the executive suite on bank stability. The complexity of banks requires the executives to function as a collective unit. Performance outcomes should improve if executives work as a team and assuming that teamwork correlates with effort. The objective here is to establish whether the dispersion of pay between the CEO and all other bank executive officers works to incentivise executives into expending effort to increase the stability of the bank. I offer a tournament theory perspective and contend that the reward structure is based on a rank-order tournament (Lazear and Rosen, 1981; Rosen, 1986). In the tournament, executives compete for the top prize, which is promotion to a higher level and ultimately ascension to the CEO position. To earn promotion, executives must have an incentive to expend more effort. The incentive is the disproportionately higher pay at more senior levels of the hierarchy. I measure the pay gap as the difference in total pay between the CEO and each executive officer. The pay gap defines the prize, which ultimately only one winner can gain. Thus, the size of pay gaps increases in hierarchical levels, with the prospect of greater pay the motivating factor to expend effort (Rosen, 1982 and 1986; Main, O'Reilly and Wade, 1993; Eriksson, 1999; Conyon and Sadler, 2001; Lin, Yeh and Shih, 2013). A consequence of tournaments is that they require ever-larger prizes to motivate contestants (Rosen, 1986). Top prizes must be elevated to provide performance incentives as the contest proceeds, in expectation that firm performance gains will accrue and correlate with wage dispersion (Eriksson, 1999).

Tournament theory unambiguously predicts a positive relationship between the pay gap and bank performance. The behavioural perspective contends that across-rank pay gaps help to form a bank's social-psychological and socio-political context. Arguments turn on whether pay gaps incentivise executives either to follow self-interest or cooperate towards achieving organisational goals. Large pay gaps could create feelings of deprivation if individuals compare their pay to the pay of higher ranks. The deprived may reduce commitment to organisational goals, or engage in actions like absenteeism, which could adversely affect bank performance. Similarly, rank-order tournaments and the winner takes all outcomes could weaken the cooperative actions of management, and create deadweight costs. Large pay gaps between senior and junior management could adversely impact bank performance if the gaps impair coordination. Behaviourists promote use of smaller pay gaps, because in their view, more equal pay promotes collaboration, which leads to performance gains (Cowherd and Levine, 1992; Henderson and Fredrickson, 2001).

A political economy context reaches similar conclusions. Whilst a large pay gap might motivate effort, it could produce an unintended consequence and split effort between cooperative and self-serving behaviour. This includes politicking to make one look good and peers look bad (Lazear, 1989; Milgrom and Roberts, 1988). Our paper speaks to the evolving literature on sabotage. Arguably, large pay gaps could cause contestants to engage in sabotage to advance their relative position in the tournament rather than increasing their effort (Harbring and Irlenbusch, 2011; Chowdhury and Gürtler, 2015). The prospect of sabotage suggests banks should compress pay and reduce the size of pay gaps across hierarchical levels. The case for small pay gaps rests on arguments that pay compression is sufficient motivation for executives to cooperate and work towards attaining organisational goals. Therefore, the behavioural perspective predicts a negative relationship between the pay gap and bank performance.

This chapter shares similarities with Ang, Lauterbach and Schreiber (2002), Bebchuk, Cremers and Peyer (2011), Bai and Elyasiani (2013), and Burns, Minnick and Starks (2016), and contributes to the scarce literature on the inner workings of top management teams in the banking industry. Ang et al. (2002) find that US banks operated two tiers of compensation, for the CEO and the rest of the team between 1993 and 1996. Bebchuk et al (2011) develop the CEO pay slice measure of the relative importance of the CEO to other executives in terms of power, abilities, or contribution to the firm. They find a negative association between pay slice and value for a large sample of public firms in the US. Bai and Elyasiani (2013) investigate the relationship between bank stability and compensation in the US, using a system model to control for endogeneity between bank risk (measured by the Z-score), risk-taking incentives (vega) and CEO pay-share (proportion of CEO pay-to-total pay of five highest paid executives). Higher sensitivity of CEO wealth to stock return volatility (larger vega) induces CEOs to choose riskier policies that increase stock return volatility and lower bank stability. However, CEOs are more risk averse and choose safer investments when their share of executive compensation is larger. Burns et al (2016) study more than 8,300 firms in 52 countries to test the propositions of tournament theory. Using alternative pay slice and pay gap measures, they offer robust evidence showing tournaments increase firm value.

I contribute to literature in the following ways. First, I test the propositions of tournament theory and behavioural theory for an international sample of firms. Second, the focus is solely on the banking industry. Third, I construct a pay gap indicator for each executive (following Vieito, 2012). The pay slice indicator in the above studies is a ratio of CEO pay to either the five highest paid executives (Bebchuk et al, 2011; Bai and Elyasiani, 2013) or three highest paid (Burns et al, 2016). Fourth, in contrast to the bulk of the compensation literature in banking, I extend analysis beyond the CEO and consider the full C-suite of bank executive officers (Chava and Purnanandam, 2010). Anecdotal evidence recognises the crisis as an example of systemic governance failure, which I believe endorses our study of all senior board executives (Haldane, 2015).

The organisation of the remainder of the chapter is as follows. Section 4.2 reviews literature that outlines the main propositions of tournament theory and the counterpoints of behavioural and sabotage theorists. Section 4.3 formulates hypotheses. Section 4.4 discusses data and variables. Section 4.5 covers econometric design. Section 4.6 provides empirical results. Section 4.7 concludes.

4.2. Literature

4.2.1 Tournament theory – differing perspectives

Agency theory proposes the pay-for-performance system of rewards whereby banks willingly pay more when executives perform better, which results in superior bank performance. In standard contracting models, shareholders cannot observe the actions of an executive on the top management team (TMT). This information asymmetry provides the executive with incentive to engage in opportunistic behaviour and exploit the situation by electing to make the least possible effort, which is the hidden action or moral hazard. Thus, monitoring the executive is unreliable and costly, inferring that the executive could engage in shirking behaviour and free-riding (Jensen and Meckling, 1976; Gibbons and Murphy, 1990). Under such conditions, it is less feasible to base pay on an executive's marginal product, and it becomes more difficult to identify the best candidates for promotion.

Tournament theory contends that shareholders set remuneration policy to reduce the incentives for executives to shirk. In short, a bank would deliberately set a large gap in pay between the CEO and other executives, to increase competitiveness amongst executives vying to secure the CEO position in the future. The result of this action is an increase in bank performance (Lazear and Rosen, 1981; O'Reilly, Main and

Crystal, 1988; Hannan, Krishnan and Newman, 2008). Thus, tournament theory can explain the behaviour of executives and employees from the perspective of a contest. It also explains the very large gaps in pay between the CEO and other executives. Since the CEO is at the top of the hierarchical structure, there are no promotion-based incentives available only performance-based incentives. For other employees, promotion-based incentives are also available. In a tournament, promotion to the next level awaits the best relative performer, which results in higher pay. Higher pay (monetary incentives) is a further incentive for the executive to expend effort, which increases the probability of future elevation and increases bank output (Baker, Jensen and Murphy, 1988). Across the bank, employees compete for promotions and rewards, with expectation that large pay gaps between hierarchical levels will lead to superior bank performance.

As shareholders cannot observe the actions of an executive, it is difficult to base pay on marginal productivity. Tournament theorists contend that a bank could obtain optimal effort by paying its executives based on hierarchical rank, and by increasing the size of the pay gap between ranks with the greatest gap between the CEO and the next executive (Main, O'Reilly and Wade, 1993; Eriksson, 1999; Conyon and Sadler, 2001). Ranking by specific roles means it is simpler for the bank to determine the relative performance of an employee, which results in lower monitoring costs. Pay gaps, therefore, help to align the interests between principal and agents, which reduces supervisory costs. The use of large prizes is the motivating factor for lower-level contestants to obtain promotion. (Disproportionately large) pay gaps create strong incentives for contestants to continue expending efforts to reach ranks where rewards are high. This occurs because the size of pay gaps between ranks increases with hierarchical level (Rosen, 1986). The rank-order tournament results in a winner takes all outcome since it offers high-powered incentives for the winner relative to the next best contestant and then lower incentives for all other contestants (Lazear and Rosen, 1981; Rosen, 1986). Whereas the pay gap increases with the number of contestants, the chances of winning the tournament is decreasing in the number of contestants (O'Reilly, Main and Crystal, 1988; Main, O'Reilly and Wade, 1993).

Several studies use the tournament approach as a basis to assess the relationship between executive pay and firm performance though the results are largely inconclusive as to whether pay gaps exert a positive effect on firm performance

(Main, O'Reilly and Wade, 1993; Eriksson, 1999; Conyon and Sadler, 2001; Vieito, 2012; Lin, Yeh and Shih, 2013). Inter-rank pay gaps are larger at the higher managerial ranks most notably between the CEO and next ranking executive (Lambert, Larcker and Weigelt, 1993), and the CEO pay gap is larger in firms where coordination needs are greater (Henderson and Fredrickson, 2001). Examining tournament incentives, in the form of equity-based incentives, between CEOs and Vice-Presidents (VPs), Kale, Reis and Venkateswaran (2009) find a positive association with firm performance, which increases in intensity when a CEO nears retirement but de-intensifies either when a firm appoints a new CEO or the firm contracts an outside CEO.

In the banking industry, Srivastava and Insch (2007) report results compatible with tournament theory for a sample of 100 US banks. Bai and Elyasiani (2013) investigate pay-inequality among top management teams at a sample of 132 US BHCs between 1992 and 2008. The authors examine the effect of pay-share (CEO pay as a proportion of the total pay of the five highest earning executives) on bank stability. If greater amounts of pay-inequality, a larger pay gap, incentivise executives to take riskier strategies in the hope of winning the tournament (and becoming the next CEO and taking a disproportionately bigger prize relative to other executives), expectations are that bank stability decreases as pay-share increases. Alternatively, non-CEO executives have different risk preferences and may select riskier strategies because they stand to gain more from upside gains and lose less from downside losses in comparison to higher ranked executives. However, higher ranked executives face conflicting incentives. Whereas they could take riskier bets to achieve the larger pay-off, they could turn more risk averse in order to avoid losing their sizeable current pay should the riskier strategy fail. Higher ranked executives like CEOs outrank lower-ranked executives in terms of affecting firm decision-making. Consequently, when CEO pay-share increases the risk aversion stemming from fear of downside risk works to improve bank stability. The results support the latter proposition. Using a system model to account for endogeneity. Bai and Elyasiani (2013, p. 808) find a significant bi-lateral relationship between pay-share and CEO vega that suggests "when bank stability decreases, a compressed compensation scheme may be adopted to promote cooperation among the top executives and to reduce risk-taking. CEOs may even voluntarily support this scheme to demonstrate leadership". Lastly, Gürtler and Gürtler (2015) using a theoretical model show that firms should hire heterogeneous workers because a firm's assessment of an employee's ability is linked to promotion, and assessments are more sensitive to promotion decisions when employees are heterogeneous rather than homogeneous. Thus, in a heterogeneous tournament, workers may exert more effort since they have a greater incentive (to improve their ability assessment) to affect the tournament outcome.

The propositions of tournament theory need not hold. A highly competitive environment where large pay gaps induce extreme competition could potentially endanger firm performance (Henderson and Fredrickson, 2001). Many tasks require collaboration among the executive team, particularly at large complex banks. Rank-order tournaments and the winner takes all outcomes could weaken the cooperative actions of management. Large pay gaps between senior and junior management could adversely impact bank performance if the gaps impair coordination.

A behavioural perspective contends that across-rank pay gaps help to form a bank's social-psychological and socio-political context. The argument turns on whether pay gaps incentivise executives either to follow self-interest, or cooperate towards achieving organisational goals. Large pay gaps could create a feeling of deprivation if individuals compare their pay to that of those in higher ranks. The deprived may lessen their commitment to organisational goals, or engage in actions like absenteeism, which could adversely affect bank performance. Vieito (2012) considers the effect of gender on the pay gap between CEOs and VPs and firm performance. He finds female CEOs perform better than their male counterparts, with smaller pay gaps between CEO and VPs at firms led by a female CEO. The results in Vieito (2012) accord more with behavioural theory than tournament theory. The behavioural approach suggests that smaller pay gaps between upper- and lower level employees, or more equal pay, promotes collaboration, leading to performance gains because lower level managers increase their commitment to top management goals (Cowherd and Levine, 1992; Henderson and Fredrickson, 2001).

A political economy context reaches similar conclusions. Employees face three choices: the level of effort; the split of effort between cooperation and self-serving; politicking in terms of efforts to make oneself look good and peers look bad (Lazear, 1989; Milgrom and Roberts, 1988). The size of pay gaps across hierarchical ranks influences each of the choices. Whilst large pay gaps could incentivise an increase in overall effort, this could lead to an increase in self-serving actions rather than cooperative ones. The latter could create attempts to sabotage peers, for instance, by withholding vital information, efforts to damage the reputation of peers, and covertly trying to curry favour with superiors rather than focusing on organisational goals. The solution to the prospect of sabotage is for banks to engage in pay compression and reduce the size of pay gaps across hierarchical levels. Thus, the argument in support of small pay gaps is based on the need to motivate employees towards cooperation and attainment of organisational goals, which in turn could improve bank performance.

An evolving literature considers the prospect of sabotage (see Chowdhury and Gürtler, 2015). Some authors contend that large pay gaps could cause other contestants or executives to engage in sabotage to advance their relative position in the tournament rather than increasing their effort (Harbring and Irlenbusch, 2011; Lazear, 1989). The rationale behind sabotage is that the allocation of prizes depends on contestants' relative performances and the probability of receiving the winning prize could be increased either by boosting one's own performance or by damaging the performances of other contestants (Chowdhury and Gürtler, 2015). It is extremely difficult to determine if sabotage is taking place, which explains the lack of empirical evidence and reliance on laboratory experiments.

In a controlled laboratory experiment (Harbring and Irlenbusch, 2011), a principal offers a tournament contract to three agents. The contract specifies the total wage sum and the wage spread, which is the difference between the winner prize and the two losing prizes. The agent with the highest output wins the winner prize. The agents view the contract and simultaneously choose effort (productive) and sabotage (destructive). Effort raises an agent's own output whilst sabotage reduces the output of the two other agents. Both effort and sabotage are a cost for the agents. The reward to the principal is proportionate to total output less wage costs. Harbring and Irlenbusch (2011) show that effort and sabotage both increase with the wage spread, which is consistent with Lazear (1989). They also find that the response of the agents to a higher wage sum is to increase effort, but maintain the level of sabotage. The result offers an interesting recommendation; codes of corporate behaviour should unambiguously portray sabotage as a destructive activing and one that the firm does not consider acceptable. Lastly, Harbring and Irlenbusch (2011) introduce communication between the principal and agents. Communication results in agreements on higher fixed wages, or flat prize structures, which induces effort and increases firm output, and reduces sabotage to produce a more efficient outcome.

4.3 Hypothesis development

In what follows, I provide insight into the relationship between executive pay gaps and performance for an international sample of mostly large complex banks between 1999 and 2013. The proxy for bank performance is the Z score, an indicator of bank stability, which is of paramount concern for regulators (Bertay, Demirgüç-Kunt and Huizinga, 2013; Vallascas and Hagendorff, 2013; Anginer, Demirgüç-Kunt, Huizinga and Ma, 2014; Fang, Hasan and Marton, 2014). Put another way, the inverse of the Z-score measures the probability of default, which top management teams strive to avoid. To begin with, I classify bank executives by their professional status to identify the various C-suite actors. These classifications enable to establish the size of pay gaps across executive roles, banks and time. I estimate the relationship between bank stability and the pay gap. A tournament perspective posits that larger pay gaps will motivate executives to realise improvements in bank stability, which gives rise to hypothesis (1):

Hypothesis (1): Bank stability is correlated with larger pay gaps through a motivation effect brought about by pay dispersion across executive roles.

However, there are other possible unintended outcomes associated with tournaments, which could weaken effort. Furthermore, behavioural theory and the sabotage literature emphasise negative socio-emotional feelings associated with perceived injustice over large pay gaps, which lead to a trade-off between cooperation and self-serving, and attempts to make other contestants in the tournament look bad. Bebchuk and Grinstein (2005) find pay increases are positively related with activities that don’t always increase firm value. Based on these points, I formulate hypothesis 2:

Hypothesis (2): Bank stability is correlated with smaller pay gaps, which foster a stronger sense of collaboration towards attaining organisational goals.

Hypothesis 3 proposes the remaining outcome of no relationship between bank stability and the pay gap.

Hypothesis (3): Bank stability is not correlated with pay gaps.

Under certain conditions, incentive pay packages could show intertemporal variation. Evidence is suggestive of poor remuneration practices before and during the crisis especially at banks afflicted by weak financial performance (Bebchuk and Spamann, 2010; Bebchuk, 2010; FSA 2010 p.8; McKee and Monteleone, 2010). As a result, any intertemporal variation in reward structures could impact bank stability, say, if executives engage in aggressive risk-taking in a gamble for resurrection. Hypotheses 4 and 5 test the following propositions.

Hypothesis (4): Tournament incentives and bank stability do not show intertemporal variation.

Hypothesis (5): Tournament incentives and bank stability do not display inter-bank variation.

There are claims that executive directors (internal board members) demonstrate greater loyalty meaning. If so, the CEO might be able to exert more influence over the internal board, for instance, through persuasion, selective use of information, control over the agenda, and other tactics designed to influence deliberations and decisions (Wade, O'Reilly and Chandratat, 1990). Notwithstanding, the empirical relationship between the size of the board, and the proportion of outside directors to insiders, and firm value is ambiguous. Whereas larger boards might be ineffective because of coordination problems (Fama and Jensen, 1983; Yermack, 1996), Coles, Daniel and Naveen (2008) find that more complex firms tend to have larger boards with more outside directors. According to Coles et al, the relationship between board size and firm value is U-shaped meaning that either very small or very large boards are optimal for board effectiveness. Though I do not test the effectiveness of board size, our empirical design evaluates the impact of tournament incentives on bank stability whilst controlling for board size.

Hypothesis (6): Larger boards are more likely to use tournament incentives to improve bank performance.

Hypothesis (7): Smaller boards are more likely to use tournament incentives to improve bank performance.

Hypothesis (8): Board size does not affect the relationship between bank stability and pay gap.

To the best of our knowledge, this is the first study to test for tournament incentive assumptions and quantify pay differentials for C-suite officers in the banking industry. Henderson and Frederickson (2001) offer similar perspectives for non-financial firms (chemical, high-tech, natural resources and conglomerates).

For achieving the objectives, I construct a rich dataset that contains executive compensation data and other biographical information on individual executives across banks and time. Several sources acknowledge the role of director heterogeneity in empirical studies partially as a reflection of the top management team and complexity of the organisation (Hambrick and Mason, 1984; Pitcher and Smith, 2001; Anderson, Reeb, Upadhyay and Zhao, 2011). I use the compensation data to construct the pay gap indicator for each executive director. The dataset also contains bank-level variables, which vary across banks and time. I calculate the Z-score indicator using the bank-level data. Thus, this analysis offers an international and intertemporal comparison of pay gaps in banking, which is a contributing feature of this research. I employ Hierarchical Linear Models (HLM) and control for country-year variation to obtain precise standard errors, which I cluster by bank.

By way of preview, I offer a detailed set of results some of which support the propositions of tournament theory and some that do not. The results, however, offer little support for the behavioural perspective and arguments favouring pay compression. Therefore, I offer tentative support for the use of tournament incentives and pay dispersion as a motivating factor for executive directors, which results in realised improvements in bank stability or reduction of the probability of default. However, I caution that the stability-pay gap relationship exhibits intertemporal and inter-bank variation, and is sensitive to whether board size is above or below the median. Whilst, I show banks use pay dispersion to increase stability by improving profitability, reducing leverage, and constraining volatility, this does not preclude similar effects resulting from pay compression.

Exploiting a director-level dataset, I offer evidence consistent with claims that large pay differentials between the CEO and other directors are a motivating factor, which results in realised improvements in bank stability. Whereas this evidence suggests banks to use tournament incentives in compensation arrangements, the stability-pay gap differential exhibits both intertemporal and inter-bank variation, and is sensitive to whether board size is above or below the median. Whilst, I show banks use pay dispersion (larger pay gaps) to increase stability by improving profitability, reducing leverage, and constraining volatility, this does not preclude similar effects resulting from pay compression (smaller pay gaps).

This chapter offers insights that are relevant to practitioners and policy makers. The complexity of large internationally active banks makes issues of cross-national differences in pay packages, and incentives, salient and important. I contend that pay practices could influence bank soundness because competition for promotion depends on risk sharing between executives. Pay practices for executives could affect bank soundness if competition for promotion reinforces risk taking. Whilst optimal risk levels increase as the number of managers' increases, investors might benefit from the greater risk taken by multiple managers (Barry and Starks, 1984). Different executives may have expertise in different aspects of the business, which could lead to realised performance gains. However, there is scarce information whether the reward structures facing bank executives leads to realised improvements in bank performance or if they exacerbate agency problems. This study will attempt to fill the gap in knowledge.

4.4 Data and variables

The third investigative study (Chapter Four) examines the effect of tournament incentives on bank stability. The principal independent variable is the pay gap. The pay gap for each bank executive is constructed according to Vieito (2012) as the difference between the total pay of the CEO at bank j in time t and the total pay of executive i at bank j in time t. This proxy measure better captures director heterogeneity than pay gap proxies based on aggregated data. The dependent variable is the bank's Z-score. The Z-score is commonly used in banking research as a bank stability indicator (Berger et al, 2009; Laeven and Levine, 2009; Schaeck and Cihák, 2014). I calculate the Z-score over a three year rolling window and it shows the number of standard deviations by which returns would have to fall from the mean to deplete all equity in the bank (Nash and Sinkey, 1997; Fang et al. 2014). The choice of the hierarchical methodology is based on the clustering nature of the data and allows the researcher to assess the proportion of variance or degree of heterogeneity in the population.

This thesis uses the same dataset in each chapter. Section 2.4.1 explains how the sample was constructed. Section 2.4.2 explains the classification of bank executives by professional status. Section 2.4.3 discusses the executive-level and firm-level variables. For brevity, this section will not reproduce the earlier text. In the stability-pay gap analysis to follow, the dependent variable is the Z-score, and the principal explanatory variable of interest is the executive pay gap indicator.

Z-score: The dependent variable is the bank's Z-score on a per annum basis. The Z-score is commonly used in banking research as a bank stability indicator, for instance, to examine the relationship between competition and stability (see, for example, Berger, Klapper and Turk-Ariss, 2009; Laeven and Levine, 2009; Schaeck and Cihák, 2014). The inverse of the Z-score is proxy for bank insolvency risk. Following Nash and Sinkey (1997), I calculate the Z-score over a three year rolling window:

$$Z - score_{jt} = \left\{ \frac{ROA_{jt} + ETA_{jt}}{\sigma ROA_{t,t-3}} \right\}$$

Where ROA is return on assets and a measure of bank profitability; ETA is the ratio of equity-to-total assets and a measure of leverage or capitalisation; and σ_{ROA} is the standard deviation of bank profitability and a measure of volatility. The Z-score is the number of standard deviations by which returns would have to fall from the mean to deplete all equity in the bank (Fang et al. 2014). A higher (lower) Z-score indicates that a bank is more (less) stable and has a lower (higher) probability of distress and/or failure. If the minimum Z-score is a negative value, the natural logarithm of the Z-score is added to the minimum value.

Pay gap: To examine the effect of tournament incentives on bank stability, the principal independent variable is the pay gap indicator. Following Vieito (2012) and to exploit the executive-level properties in the dataset, the pay gap for each bank executive is constructed as the difference between the total pay of the CEO at bank *j* in time *t* and the total pay of executive *i* at bank *j* in time *t*. A visual examination of the pay gap data reveals there are some negative values. This is not surprising. At Barclays, Bob Diamond was paid more as head of the Investment Bank than the CEO at the time. In other cases, especially during the crisis, some CEOs did forgo equity-linked pay, whilst others took reductions because of the sense of outrage. To avoid taking the logarithm of a negative value, I construct the pay gap variable as the natural log of the pay gap plus the minimum value. I construct the pay gap variable across the professional status of bank executives.

4.5 Econometric Design

Since data are at two levels, executive-level and bank-level, with executives nested within banks, I employ a random coefficients model (RCM) or hierarchical linear modelling (HLM) or to estimate the relationship between bank stability and the pay gap. The HLM combines the within- and between- clusters effects into a single effect. One advantage of using the HLM in this study is it accounts for the fact the observations in our data may not be independent from one another (Skrondal and Rabe-Hesketh, 2008; Hillman, Shropshire, Certo, Dalton and Dalton, 2011).

The estimation procedure begins with estimation of the baseline model, Equation [4.1], which includes only the constant term and the pay gap variable as a predictor variable. I estimate the baseline model and examine the estimated coefficients to evaluate hypotheses 1 to 3 concerning the effect of executive pay gaps on bank stability (column 1 in the tables to follow). Next, I augment Equation [4.1] with two dummy variables that control for the crisis interval (2007 to 2009) and post-crisis interval (2010 to 2013) with the pre-crisis interval (1999 to 2006) the omission. Also, I specify interactions of each dummy variable and the pay gap variable. The cross-level intertemporal variation means I can verify the incremental prediction of pay gap as a determinant of inter-bank variation in stability, which provides inference for hypotheses 6 and 7. Column 2 shows the results. Next, I estimate the full model shown in Equation [4.2] that specifies the vectors of executive-level and bank-level covariates (see column 3). In a final step, I consider the impact of board size on the stability-pay gap relation and re-estimate Equation [4.2] for two sub-samples BS1 [board size above median (>20)] and BS2 [board size equal and or below median (=<20)]. Columns 4 and 5 show the results, from which it is possible to evaluate hypotheses 4 and 5.[14]

Equation [4.1] shows the baseline model:

$$ln(Z - score_{jt}) = \beta_0 + \beta_1 ln(Paygap_{ijt}) + u_{0j} + \varepsilon_{ij} \qquad [4.1]$$

Equation [4.2] shows the full model:

$$ln(Z - score_{jt}) = \beta_0 + \beta_1 ln(Paygap_{ijt}) + \beta_k \sum_{k=3}^{n} D_k + \beta_k \sum_{k=3}^{n} D_k * ln(Paygap_{ijt}) + \beta_m X1_{it} + \beta_n X2_{jt} + u_{0j} + \varepsilon_{ij} \qquad [4.2]$$

Where the dependent variable is the bank stability indicator that I measure using the natural logarithm of the Z-score of bank *j* at time *t*;

β_0 is the overall mean across banks;

u_j is the effect of bank j on the Z-score;

e_{ij} is an executive-level residual;

$u_j \sim N(0,\sigma^2)$, $e_{ij} \sim N(0, \sigma^2)$ are the variance components;

β_1 is the coefficient on pay gap, which shows its relation with bank stability;

$\beta_k \sum_{k=3}^{n} D_k$ is the year categorical (pre-, crisis- and post-crisis) dummy variables equal to one and zero otherwise for 1999-2006, 2007-2009 and 2010-2013. The pre-crisis interval is the omitted baseline category;

$\beta_k \sum_{k=3}^{n} D_k * ln(Paygap_{ijt})$ is the interaction of each dummy (D) with pay gap;

$\beta_m X1_{it}$ contains executive-level covariates {*Age* in years; *Tenure* is time (years) in role and time on board; *Education* is the number of academic and professional qualifications; *Gender* equals one if an executive is female, 0 otherwise; *Nationality* is the number of nationalities present at executive level};

$\beta_n X2_{jt}$ contains bank-level covariates {a dummy equal to 1 identifies if a bank engaged in *M&A* (merger and acquisition) activity during the year, 0 otherwise; *Board*

---

[14] For European banks, the median board size is 17 instead of 20 in the case of G-SIBs and US banks.

Size equals the number of board members; *SD-to-ED* is the ratio of supervisory directors-to-executive directors and proxy for board independence; *Size* is the log of bank total assets; *Growth* opportunities is the ratio of market-to-book value of equity; *Diversification* is the ratio of non-interest income-to-total operating income and proxy for a bank's business model; *Leverage* is the ratio of total assets-to-equity; *Liquidity* is the ratio of cash and securities-to-total assets and a business model indicator on the assets side of the balance sheet}.

ε_{ijt} is a stochastic error term with zero mean and constant variance. It is independently distributed across individuals, firms and time.

The assumption is that the residuals at the lowest level e_{ij} have a normal distribution with a mean of zero and a common variance σ^2 in all groups. The second level residuals u_j is assumed to be independent of the lowest level errors e_{ij} and to have a multivariate normal distribution with means of zero. The proportion of variance or degree of heterogeneity in the population is attributed to the differences between banks (σ^2_u) or within banks between directors (σ^2_e) which is explained by clustering structure measured by the variance partitioning coefficients (VPC = σ^2_u / σ^2_u + σ^2_e). Thus, the estimate of the total variance is made up of the partitioning variation across levels i.e. the sum of the variance of the second-level residuals $\sigma^2 u$ (between bank variance) and the variance of the first-level residuals $\sigma^2 e$ (within bank-between executives' variance). I also use the term intra-class correlation interchangeably with VPC to measure the reliability (ρ). I report results for rho as equivalent to the VPC.

I consider relationships between the executive-level and bank-level covariates based on Pearson correlation analysis. Table 4.1 shows the correlation coefficients. None of the coefficients exceeds 0.7. Table 4.2 shows descriptive statistics for the dependent variable and independent variables. In the regression analysis I winsorize bank-level variables at the 1st and 99th percentile points to mitigate the effect of outlying observations.

Table 4.1: Pearson correlation coefficients Executive-level and Bank-level covariates

	Age	*Gender*	*Nation*	*Education*	*T. Role*	*T. Board*	*Board size*	*SD-to-ED*	*Size*	*Growth*	*Divers.*	*Leverage*
Age	1											
Gender	0.1385*	1										
Nationality	0.1018*	0.0601*	1									
Education	-0.0342*	-0.0057	-0.0651*	1								
Time in role	0.2576*	0.0195	0.1196*	-0.0078	1							
Time on board	0.4510*	0.0415*	0.1026*	0.0210	0.6582*	1						
Board size	0.0921*	0.0175	0.1571*	0.0183	-0.0670*	-0.0379	1					
SD-to-ED	0.0473*	0.0447*	0.2728*	-0.0145	0.0002	0.0046	0.1927*	1				
Size	0.0526*	0.0285	0.2461*	0.1051*	-0.0277	-0.0060	0.2463*	0.1813*	1			
Growth	-0.0666*	-0.0054	-0.1181*	0.0091	-0.0130	-0.0404*	-0.1686*	-0.1091*	-0.3125*	1		
Diversification	-0.0697*	0.0145	-0.1035*	0.0413*	-0.1031*	-0.0313	-0.0572*	-0.0278	0.1101*	0.1411*	1	
Leverage	-0.1368*	0.0607*	0.3387*	0.0070	-0.0161	-0.0376	0.1062*	0.0518*	0.4027*	-0.0216	0.1454*	1
Liquidity	-0.0714*	0.0456*	0.0361*	0.0254	-0.0618*	-0.0015	0.0128	-0.0218	0.4021*	-0.0911*	0.5646*	0.4132*

Note: * statistically significant at the 5 percent level.

Table 4.2: Descriptive Statistics: All banks; 1999-2013

Variable	Mean	Std. Dev.	Min.	Max.	Obs.
Z - score	52.48	85.04	-1.15	1205.04	939
Pay gap (£)	4,103,433	5,949,337	-6,413,428	29,700,000	2504
Age (years)	53.12	7.44	33	83	3107
Age^2	2877	822	1089	6889	3107
Female	0	0	0	1	3132
Nationality	8.37	11.13	1	47	3133
Education	1.93	1.04	0	7	3087
Time in role (years)	3.41	3.27	0	25.9	2931
Time on board (years)	4.88	6.05	0	50.4	1654
M&A	0.1161	0.3205	0	1	3134
Board size	20.0	6.05	7	50	3134
Board $size^2$	437.5	287.3	49	2500	3134
SD-to-ED	2.40	1.21	0.57	23	3134
Size (£ m)	360,287	442,268	107	2,627,143	939
Growth	1.8174	2.3740	0.1245	40.4640	903
Diversification	0.5885	4.19	-3.49	128.55	939
Leverage	18.32	10.49	1.01	72.50	939
Liquidity	0.3257	0.1805	0.0000	0.9311	939

Notes: * Monetary values are in pounds sterling at 2013 prices.

4.6 Results

For the purposes of clarity, I discuss results in sub-sections.

4.6.1 Variation in bank stability

I test if there are any significant differences in bank stability across the three cohorts of banks for the whole period. Table 4.3a-b reports results from slope comparison models, which show the differential in the Z-score variable across cohorts and across three time intervals. The Table also shows pairwise comparisons of marginal linear predictions. On average US banks are significantly more stable (69.11) in comparison to G-SIBs (45.68) and European banks (43.15) (at the 1 percent level). Stability at the latter two cohorts is statistically equivalent (see Table 4.3a). Next, I consider intertemporal variation across intervals. Unsurprisingly, the Z-score demonstrates a level of stability in 1999 to 2006 that is significantly larger than in the crisis and post-crisis intervals (at the 1 percent level). Stability bottoms out in 2007-2009 (31.48) before reviving (40.85) although the latter development is statistically insignificant (see Table 4.3b). The appendix contains a set of descriptive statistics for each cohort by year.

Table 4.3a: Slope Comparison Model: Z-score differential across cohort and pairwise comparisons of marginal linear predictions; 1999-2013

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) G-SIBs	45.68	4.29	10.64	0.000	37.26	54.11
(2) EU banks	43.15	4.97	8.68	0.000	33.40	52.90
(3) US banks	69.11	4.51	15.31	0.000	60.25	77.96
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-2.53	6.57	-0.39	0.921	-17.95	12.88
3 vs 1	23.42	6.23	3.76	0.001	8.80	38.05
3 vs 2	25.96	6.71	3.87	0.000	10.20	41.71

Table 4.3b: Slope Comparison Model: Z-score differential across time interval and pairwise comparisons of marginal linear predictions

Cohort	Coefficient	Std. Error	t	P>|t|	[95% Confidence interval]	
(1) 1999-2006	62.46	3.31	18.87	0.000	55.96	68.95
(2) 2007-2009	31.48	6.47	4.86	0.000	18.78	44.18
(3) 2010-2013	40.85	5.85	6.98	0.000	29.36	52.33
			Tukey		Tukey	
	Contrast	Std. Error	t	P>|t|	[95% Confidence interval]	
2 vs 1	-30.98	7.27	-4.26	0.000	-48.04	-13.92
3 vs 1	-21.61	6.72	-3.21	0.004	-37.39	-5.83
3 vs 2	9.37	8.73	1.07	0.530	-11.11	29.85

4.6.2 Quantifying the executive pay gap

One of the objectives is to estimate the size of the pay gap in banking. Using descriptive analysis, I provide a comprehensive assessment of the pay gap across the three bank cohorts, time intervals, and by professional status or executive role.

Table 4.4a: Pay gap: by professional status, G-SIBs (£ 2013 prices)

Status	Mean	p25	p50	p75	SD	CV	N
			1999-2013				
CLO	9,719,028	559,098	11,400,000	14,600,000	9,890,077	1.02	17
CAO	8,501,096	2,597,618	6,311,929	11,600,000	8,648,617	1.02	33
CFO	5,975,901	1,372,623	3,234,341	7,409,352	9,467,344	1.58	169
CRO	5,923,417	2,231,345	5,147,255	8,697,566	6,174,163	1.04	29
COO	4,036,892	533,496	2,200,000	4,528,798	9,771,295	2.42	127
Chair	1,163,857	-252,496	1,216,316	3,687,473	5,812,633	4.99	58
Total	6,420,537	810,124	2,852,138	7,091,889	21,400,000	3.34	1013
			1999-2006				
CLO	16,800,000	13,400,000	14,600,000	18,200,000	7,359,014	0.44	9
CAO	12,000,000	7,766,059	11,800,000	12,400,000	6,555,862	0.54	7
CFO	8,497,133	3,809,363	7,375,787	11,600,000	5,893,145	0.69	25
CRO	7,852,291	1,700,836	3,749,187	11,500,000	10,800,000	1.38	73
COO	4,200,978	706,569	1,457,268	4,241,624	7,412,604	1.76	24
Chair	779,251	-238,560	1,025,074	3,309,663	6,466,267	8.30	37
Total	8,501,255	1,260,424	3,142,669	10,200,000	27,500,000	3.23	572
			2007-2009				
CAO	10,100,000	-1,710,927	6,118,565	15,900,000	15,400,000	1.53	7
COO	5,636,863	314,162	1,610,089	3,266,365	14,200,000	2.52	28
CFO	5,423,048	1,151,564	2,908,584	6,947,970	10,100,000	1.87	55
CRO	3,174,450	1,159,227	2,721,226	6,505,924	5,049,351	1.59	13
CLO	2,849,972	-445,853	559,098	4,747,553	6,008,372	2.11	5
Chair	383,994	-1,278,543	-252,496	6,139,852	5,379,568	14.01	11
Total	4,228,981	161,089	2,412,181	6,160,881	9,920,545	2.35	269
			2010-2013				
CRO	4,528,365.0	987,321	3,955,415	7,084,773	5,332,153	1.18	14
Chair	3,691,670.0	820,000	4,322,000	5,663,417	2,714,949	0.74	11
CFO	3,481,611.0	515,136	2,129,500	5,975,888	3,926,802	1.13	54
COO	1,358,593.0	-527,000	565,371	2,738,000	3,130,953	2.30	23
CLO	-67,266.3	-2,019,106	-1,177,897	1,884,573	2,950,950	-43.87	4
CAO	-2,502,542.0	-2,502,542	-2,502,542	-2,502,542	.	.	1
Total	2,991,720.0	351,000	2,213,074	5,040,000	4,050,308	1.35	230

Notes: S.D. is standard deviation; p25 is 25th percentile; p50 is the median; p75 is 75th percentile; CV is coefficient of variation; N is executive-year observations. CEO = chief executive officer; COO = chief operating officer; CFO = chief financial officer; CRO = chief risk officer; CAO = chief administrative officer; CLO = chief legal officer.

Table 4.4b: Pay gap: by professional status, EU banks (£ 2013 prices)

Status	Mean	p25	p50	p75	SD	CV	N
			1999-2013				
CRO	3,367,714	1,070,427	3,367,714	5,665,000	3,248,854	0.96	2
CAO	1,111,990	589,623	944,124	1,148,286	812,135	0.73	11
CFO	915,004	251,000	631,103	1,301,018	961,330	1.05	86
COO	655,438	0.0	485,227	978,123	1,034,362	1.58	31
Chair	643,228	314,295	425,170	541,849	686,824	1.07	20
Total	998,069	218,232	725,284	1,555,013	1,214,583	1.22	400
			(1999-2006				
CAO	1,111,990	589,623	944,124	1,148,286	812,135	0.73	11
CRO	1,070,427	1,070,427	1,070,427	1,070,427	.	.	1
COO	864,960	305,836	734,755	997,129	954,807	1.10	23
CFO	824,674	390,371	642,485	1,117,605	761,055	0.92	63
Chair	294,844	237,117	384,879	436,456	226,568	0.77	13
Total	811,402	316,452	675,079	1,148,286	1,092,316	1.35	266
			2007-2009				
Chair	1,290,227	457,759	1,465,727	2,021,027	799,869	0.62	7
CFO	1,166,585	124,714	568,120	2,349,982	1,186,413	1.02	15
COO	467,420	-28,327	0.0	98,664	1,127,506	2.41	5
Total	1,520,284	185,975	1,661,121	2,728,368	1,235,639	0.81	112
			2010-2013				
CRO	5,665,000	5,665,000	5,665,000	5,665,000	.	.	1
Chair	2,310,331	2,310,331	2,310,331	2,310,331	.	.	1
CFO	1,158,514	34,890	219,557	3,381,833	1,684,270	1.45	11
COO	-530,117	-825,470	-283,306	-234,765	545,370	-1.03	4
Total	1,145,732	0.0	133,676	2,848,680	1,663,362	1.45	42

Notes: S.D. is standard deviation; p25 is 25th percentile; p50 is the median; p75 is 75th percentile; CV is coefficient of variation; N is executive-year observations. CEO = chief executive officer; COO = chief operating officer; CFO = chief financial officer; CRO = chief risk officer; CAO = chief administrative officer; CLO = chief legal officer.

Table 4.4c: Pay gap: by professional status, US banks (£ 2013 prices)

Status	Mean	p25	p50	p75	SD	CV	N
			1999-2013				
Chair	4,910,816	10,426	505,628	8,402,966	6,994,948	1.42	26
CFO	4,674,132	1,196,646	3,171,883	5,522,953	5,757,493	1.23	235
CAO	4,592,393	2,126,000	3,696,296	5,789,599	3,731,223	0.81	46
CLO	4,562,736	1,139,046	2,847,614	5,801,306	5,292,375	1.16	27
CRO	4,169,312	1,952,796	3,504,294	4,864,033	4,081,918	0.98	75
COO	2,322,166	808,106	2,091,588	3,480,000	2,882,599	1.24	90
Total	4,418,768	939,495	2,926,630	5,520,431	5,913,832	1.34	1091
			1999-2006				
CAO	5,999,174	2,931,687	4,845,922	7,825,620	4,718,171	0.79	21
CFO	5,751,735	830,127	3,082,519	7,424,723	7,251,673	1.26	117
CLO	5,667,396	800,482	5,046,618	7,347,918	6,381,770	1.13	13
Chair	5,347,630	10,426	471,188	12,600,000	7,316,799	1.37	23
CRO	4,393,959	1,227,593	3,020,087	4,592,442	5,270,889	1.20	40
COO	1,862,531	425,940	1,661,431	2,693,767	3,231,919	1.74	56
Total	5,110,233	789,566	2,940,987	6,901,088	7,189,430	1.41	628
			2007-2009				
CLO	4,228,106	1,280,399	2,738,797	5,004,759	4,899,584	1.16	9
CRO	4,148,079	2,490,339	3,943,641	6,181,983	2,442,616	0.59	16
CFO	3,955,692	1,221,622	2,877,780	6,039,742	4,115,313	1.04	71
CAO	3,700,101	1,993,349	2,727,084	5,015,654	2,563,282	0.69	14
COO	2,997,303	1,578,674	2,531,087	4,625,553	2,413,461	0.81	22
Chair	2,672,858	2,599,257	2,672,858	2,746,459	104,088	0.04	2
Total	3,716,799	1,124,561	2,732,229	5,801,306	3,849,420	1.04	283
			2010-2013				
CRO	3,733,527	2,419,191	3,757,878	4,864,033	1,948,705	0.52	23
CFO	3,310,492	1,895,711	3,457,000	4,404,310	2,229,967	0.67	63
COO	3,232,584	2,730,202	3,222,200	4,060,000	1,093,794	0.34	17
CAO	2,819,712	1,986,413	2,508,109	3,738,792	1,250,926	0.44	16
CLO	2,124,197	1,280,399	1,800,150	2,847,614	1,066,980	0.50	6
Chair	-660,000	-660,000	-660,000	-660,000	.	.	1
Total	3,243,747	1,719,862	3,182,380	4,415,922	2,262,428	0.70	238

Notes: S.D. is standard deviation; p25 is 25th percentile; p50 is the median; p75 is 75th percentile; CV is coefficient of variation; N is executive-year observations. CEO = chief executive officer; COO = chief operating officer; CFO = chief financial officer; CRO = chief risk officer; CAO = chief administrative officer; CLO = chief legal officer.

Table 4.4a-c shows descriptive statistics on the pay gap by executive role and for each cohort. Between 1999 and 2013, the median pay gap between the CEO and all executives is largest in the US banks (at £2,926,630) and the G-SIBs (at £2,852,138). The median pay gaps in the US and G-SIBs cohorts are 4.04 and 3.93 times larger than in European banks (£725,284). Pre-crisis (1999 to 2006) the median pay gap is greater in the G-SIBs (£3,142,669), which is equivalent to 4.66 times and 1.07 times the gap at US and European banks. The pay gap in the G-SIBs fell to £2,412,181 in crisis (2007 to 2009) and remains relatively stable at £2,213,074 post-crisis (2010 to 2013). For US banks, the pay gap increases between the crisis and post-crisis from £2,732,229 to £3,182,380. In contrast, the post-crisis median pay gap in European banks collapses to £133,676.

For the G-SIBs and for the whole period, the smallest median pay gap is for the role of chair (£1,216,316) followed by Chief Operating Officer (£2,200,000). In ascending rank order, pay gaps increase for the Chief Financial Officer, Chief Risk Officer, Chief Administrative Officer and Chief Legal Officer. After the crisis, the pay gap reduces for the Chief Legal Officer and Chief Administrative Officer, even turning negative in 2010 to 2013. Whilst the size of pay gaps falls, the rank order is consistent across intervals with the exception of the Chair for which the gap widens.

Across the full period, the median pay gap for a Chief Operating Officer in the European EU banks is £485,227 in comparison to £2,091,588 in US banks. At European banks, the median pay gap for a Chief Operating Officer in 2010 to 2013 was negative, which infers that the pay of the COO exceeded the CEO. I observe a similar situation for the role of Chair in US banks in post-crisis (£-666,000). The size of pay gaps across roles in European banks shrink considerably post-crisis; for instance, the pay gap for the median Chief Financial Officer is £219,557 whereas the pay gap is £3,457,000 for counterparts in US banks. Similar to the G-SIBs, the pay gap for Chief Legal Officer at US banks decreases post-crisis (to £1,800,150 from a pre-crisis £5,046,618). For G-SIBs and US banks, pay gaps diminish over time for the roles of Chief Legal and Chief Administrative Officers.

4.6.3 Estimation of the stability-pay gap relationship

Equation [4.1] is the linear regression of pay gap on bank stability. I augment the baseline model with interval binary indicators and their interactions with pay gap. These results are in columns 1 and 2 in Table 4.5a-d. I estimate equation [4.2] which is the full model before I re-estimate equation [4.2] and partition the samples above and below the median board size. These results are in columns 3 to 5 in Table 4.5a-d. Table 4.5a shows results for the full sample of banks, Table 4.5b for G-SIBs, Table 4.5c for European banks, and Table 4.5d for US banks.

I begin by discussing the baseline relationships from the estimation of Equation [4.1]. For the full sample, the baseline relationship between pay gaps and bank stability is positive and statistically significant at the 1 percent level (Table 4.5a, column 1). The main source of variability in bank stability is e_{ij} or the variation between executives within banks. The intra-class correlation, ρ, shows that 20.6% of the variation in stability is between banks and 79.4% between executives within banks. Although the stability-pay gap relation is positive for the G-SIBs it is statistically insignificant (Table 4.5b, column 1). For the G-SIBs, ρ shows that 15.2% of the variation in stability is between banks and 84.8% between executives within banks. I observe positive and significant relationships between bank stability and pay gap for European banks and US banks (at the 10 and 1 percent levels, respectively) (Table 4.5c-d, column 1). ρ shows that 29.6% (21.4%) of the variation in stability is between banks and 70.4% (88.6%) between executives within banks for European (US) banks.

Whilst the baseline results offer tentative support to the main premise of tournament theory – and acceptance of hypothesis 1 – further confirmation is required. Therefore, I augment Equation [4.1] with interval dummy variables and interactions with the pay gap variable. Column 2 presents the results. Next, I estimate the full model in Equation [3] that includes the vectors of executive-level and bank-level covariates. Column 3 presents the results. The addition of the two levels of covariates changes the source of variation in the dependent variable. For the full sample, ρ increases to 50.6% (Table 4.5a, column 3). For the G-SIBs and European banks, 64.7% and 62.1% of the variance in bank stability is due to between bank characteristics, which infer that 35.3% and 37.9% of the variance is due to executives within banks effects (Table 4.5b-c, column 3). For US banks, the main source of variation in bank stability is executives within bank factors (62%) in comparison to between bank factors (38%; Table 4.5d, column 3). The general high level of between-bank variance justifies the use of HLM for our analysis.

Tables 4.5a: Bank stability and executive pay gap: All banks

Notes: Column (1) shows results from estimation of Equation [4.1]; column (2) shows results from Equation [4.1] augmented with interval dummies and interaction terms; column (3) shows results from estimation of Equation [4.2]; columns (4) and (5) show results from Equation [4.2] when partitioned for above and below median board size, respectively.

COEF.	VARIABLES	(1) Z-score	(2) Z-score	(3) Z-score	(4) Z-score	(5) Z-score
β_1	Pay gap	1.314***	0.892***	0.746*	-1.073*	2.208***
		(5.46)	(3.43)	(1.69)	(-1.89)	(3.59)
β_2	Interval 2 (2007-09)		6.077	-20.527	-72.529***	-17.923
			(0.67)	(-1.08)	(-2.71)	(-0.69)
β_3	Interval 3 (2010-13)		-16.534	-14.936	-90.189**	16.374
			(-1.17)	(-0.71)	(-2.33)	(0.65)
β_4	Interval 2 # Pay gap		-0.388	1.110	3.991***	0.980
			(-0.77)	(1.05)	(2.68)	(0.68)
β_5	Interval 3 # Pay gap		0.903	0.821	5.007**	-0.907
			(1.15)	(0.70)	(2.32)	(-0.64)
β_6	Age			0.022	-0.014	0.039
				(0.73)	(-0.26)	(1.03)
β_7	Age^2			-0.000	0.000	-0.000
				(-0.75)	(0.20)	(-1.17)
β_8	Female			0.026	0.138	0.023
				(0.22)	(0.30)	(0.18)
β_9	Nationality			-0.002	0.003	-0.005
				(-0.64)	(0.37)	(-1.10)
β_{10}	Education			-0.013	-0.054	0.008
				(-0.56)	(-1.47)	(0.30)
β_{11}	Time in role			0.012	-0.005	0.015
				(1.40)	(-0.35)	(1.53)
β_{12}	Time on board			-0.004	0.002	0.002
				(-0.59)	(0.31)	(0.26)
β_{13}	M&A			-0.055	-0.040	-0.050
				(-0.69)	(-0.45)	(-0.38)
β_{14}	Board size			0.018	-0.481***	-0.011
				(0.47)	(-3.21)	(-0.10)
β_{15}	Board size^2			-0.001	0.008***	0.001
				(-0.59)	(3.03)	(0.29)
β_{16}	SD-to-ED			-0.031	-0.030	-0.042
				(-1.10)	(-0.66)	(-1.05)
β_{17}	Size			0.250***	0.127	0.289***
				(3.97)	(1.13)	(3.72)
β_{18}	Growth			0.185***	0.181*	0.240***
				(3.72)	(1.81)	(4.24)
β_{19}	Diversification			1.196***	1.323***	1.531***
				(4.79)	(3.48)	(4.68)

β_{20}	Leverage			-0.044***	-0.038***	-0.036***
				(-7.61)	(-3.66)	(-5.33)
β_{21}	Liquidity			0.621*	0.686	0.187
				(1.82)	(1.17)	(0.44)
β_0	Constant	-20.066***	-12.249***	-16.993**	26.535**	-44.802***
		(-4.64)	(-2.62)	(-2.09)	(2.53)	(-3.96)
	Pay gap # crisis ($\beta1 + \beta4$)			1.856*	2.918**	3.188**
	Pay gap # after ($\beta1 + \beta5$)			1.567	3.934*	1.301
	Observations	2,501	2,501	1,232	391	841
	Number of banks	63	63	58	31	51
	u_j	0.439***	0.461***	0.720***	0.662***	0.852***
	e_{ij}	0.862***	0.793***	0.712***	0.584***	0.708***
	ρ	0.206	0.252	0.506	0.563	0.591

z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4.5b: Bank stability and executive pay gap: G-SIBs

Notes: Column (1) shows results from estimation of Equation [4.1]; column (2) shows results from Equation [4.1] augmented with interval dummies and interaction terms; column (3) shows results from estimation of Equation [4.2]; columns (4) and (5) show results from Equation [4.2] when partitioned for above and below median board size, respectively.

COEF.	VARIABLES	(1) Z-score	(2) Z-score	(3) Z-score	(4) Z-score	(5) Z-score
β_1	Pay gap	0.403	0.481	-0.536	-1.780***	0.583
		(1.40)	(1.46)	(-1.07)	(-2.69)	(0.86)
β_2	Interval 2 (2007-09)		21.877**	-33.084	-109.616***	-49.117*
			(2.04)	(-1.57)	(-3.02)	(-1.87)
β_3	Interval 3 (2010-13)		-3.445	-52.920**	-127.409***	-13.074
			(-0.21)	(-2.37)	(-3.08)	(-0.52)
β_4	Interval 2 # Pay gap		-1.263**	1.814	6.061***	2.717*
			(-2.12)	(1.55)	(3.00)	(1.86)
β_5	Interval 3 # Pay gap		0.191	2.939**	7.086***	0.723
			(0.21)	(2.37)	(3.08)	(0.51)
β_6	Age			-0.028	0.032	0.004
				(-0.50)	(0.30)	(0.06)
β_7	Age^2			0.000	-0.000	-0.000
				(0.33)	(-0.44)	(-0.24)
β_8	Female			-0.062	-0.016	0.093
				(-0.30)	(-0.03)	(0.43)
β_9	Nationality			-0.000	0.010	-0.002
				(-0.04)	(0.90)	(-0.27)
β_{10}	Education			-0.013	-0.038	0.003
				(-0.42)	(-0.88)	(0.09)
β_{11}	Time in role			0.003	-0.002	-0.003
				(0.22)	(-0.10)	(-0.25)
β_{12}	Time on board			-0.006	-0.001	0.008
				(-0.70)	(-0.12)	(0.68)
β_{13}	M&A			0.015	-0.074	0.158
				(0.13)	(-0.52)	(0.96)
β_{14}	Board size			0.153***	-0.682***	0.535***
				(2.63)	(-3.31)	(2.84)
β_{15}	Board $size^2$			-0.004***	0.011***	-0.015**
				(-2.61)	(3.00)	(-2.57)
β_{16}	SD-to-ED			0.021	0.012	0.064
				(0.60)	(0.22)	(1.25)
β_{17}	Size			0.502***	0.603**	0.543***
				(4.49)	(2.53)	(4.09)
β_{18}	Growth			0.420***	0.621***	0.431***
				(4.39)	(4.10)	(3.52)
β_{19}	Diversification			2.064***	1.186**	3.396***
				(5.55)	(2.29)	(6.30)

β_{20}	Leverage			-0.083***	-0.054***	-0.086***
				(-8.78)	(-4.21)	(-6.00)
β_{21}	Liquidity			1.229**	1.074	0.789
				(2.45)	(1.42)	(1.04)
β_{0}	Constant	-3.688	-4.911	-1.525	27.581**	-27.391**
		(-0.71)	(-0.83)	(-0.17)	(2.16)	(-2.21)
	Pay gap # crisis ($\beta 1 + \beta 4$)			1.278	4.281**	3.300**
	Pay gap # after ($\beta 1 + \beta 5$)			2.403**	5.306**	1.306
	Observations	1,013	1,013	584	218	366
	Number of banks	24	24	22	16	18
	u_j	0.358***	0.355***	0.909***	0.793***	1.087***
	e_{ij}	0.846***	0.777***	0.671***	0.584***	0.623***
	ρ	0.152	0.173	0.647	0.648	0.753

z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4.5c: Bank stability and executive pay gap: EU banks

Notes: Column (1) shows results from estimation of Equation [4.1]; column (2) shows results from Equation [4.1] augmented with interval dummies and interaction terms; column (3) shows results from estimation of Equation [4.2]; columns (4) and (5) show results from Equation [4.2] when partitioned for above and below median board size, respectively.

COEF.	VARIABLES	(1) Z-score	(2) Z-score	(3) Z-score	(4) Z-score	(5) Z-score
β_1	Pay gap	4.275*	-0.564	6.891**	12.650**	9.053***
		(1.85)	(-0.22)	(2.45)	(2.25)	(3.03)
β_2	Interval 2 (2007-09)		-487.277***	-394.217***	-445.396***	-478.306***
			(-5.05)	(-4.11)	(-3.11)	(-3.78)
β_3	Interval 3 (2010-13)		-255.493***	36.229	141.793	67.172
			(-2.76)	(0.38)	(0.25)	(0.64)
β_4	Interval 2 # Pay gap		27.142***	21.967***	24.789***	26.645***
			(5.05)	(4.10)	(3.11)	(3.77)
β_5	Interval 3 # Pay gap		14.238***	-2.002	-7.933	-3.747
			(2.76)	(-0.38)	(-0.26)	(-0.64)
β_6	Age			-0.003	-0.005	0.004
				(-0.09)	(-0.17)	(0.06)
β_7	Age^2			0.000	0.000	-0.000
				(0.05)	(0.33)	(-0.18)
β_8	Female			-0.067		-0.077
				(-0.44)		(-0.51)
β_9	Nationality			-0.011	0.097***	-0.012*
				(-1.59)	(3.18)	(-1.65)
β_{10}	Education			0.031	0.009	0.040
				(0.98)	(0.28)	(1.07)
β_{11}	Time in role			0.029	-0.084***	0.030
				(1.59)	(-3.63)	(1.36)
β_{12}	Time on board			-0.003	-0.036**	0.003
				(-0.14)	(-2.19)	(0.12)
β_{13}	M&A			-0.220	0.372***	-1.227***
				(-1.49)	(2.88)	(-4.33)
β_{14}	Board size			0.024	-0.406	-0.798***
				(0.33)	(-1.01)	(-4.78)
β_{15}	Board size^2			-0.000	0.003	0.032***
				(-0.17)	(0.34)	(5.05)
β_{16}	SD-to-ED			-0.106*	-0.270***	-0.084
				(-1.90)	(-3.08)	(-1.34)
β_{17}	Size			0.458***	-0.073	0.377***
				(4.00)	(-0.22)	(3.15)
β_{18}	Growth			0.378***	-0.072	0.180**
				(5.24)	(-0.76)	(2.02)
β_{19}	Diversification			1.923***	2.334***	1.950***
				(5.25)	(6.13)	(4.17)

β_{20}	Leverage			-0.035***	-0.108***	-0.028***
				(-4.20)	(-5.10)	(-3.19)
β_{21}	Liquidity			1.102*	7.129***	2.540***
				(1.72)	(6.26)	(3.36)
β_0	Constant	-73.364*	13.516	-132.524***	-214.746**	-164.421***
		(-1.77)	(0.29)	(-2.63)	(-2.08)	(-3.08)
	Pay gap # crisis ($\beta1 + \beta4$)			28.858	37.439	35.698
	Pay gap # after ($\beta1 + \beta5$)			4.889	4.717	5.306
	Observations	400	400	391	97	294
	Number of banks	15	15	15	7	14
	u_j	0.489***	0.435***	0.776***	0	0.830***
	e_{ij}	0.755***	0.708***	0.606***	0.314***	0.598***
	ρ	0.296	0.274	0.621	0.0	0.658

z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4.5d: Bank stability and executive pay gap: US banks

Notes: Column (1) shows results from estimation of Equation [4.1]; column (2) shows results from Equation [4.1] augmented with interval dummies and interaction terms; column (3) shows results from estimation of Equation [4.2]; columns (4) and (5) show results from Equation [4.2] when partitioned for above and below median board size, respectively.

COEF.	VARIABLES	(1) Z-score	(2) Z-score	(3) Z-score	(4) Z-score	(5) Z-score
β_1	Pay gap	3.059***	1.657***	2.214**	1.026	3.392**
		(6.72)	(3.79)	(2.18)	(0.83)	(2.23)
β_2	Interval 2 (2007-09)		-54.154***	-1.949	8.433	47.068
			(-3.04)	(-0.04)	(0.21)	(0.44)
β_3	Interval 3 (2010-13)		-93.737***	74.600	438.830**	-172.772
			(-3.26)	(0.68)	(2.09)	(-1.07)
β_4	Interval 2 # Pay gap		2.953***	0.040	-0.530	-2.697
			(2.98)	(0.02)	(-0.24)	(-0.46)
β_5	Interval 3 # Pay gap		5.181***	-4.224	-24.536**	9.562
			(3.24)	(-0.69)	(-2.10)	(1.06)
β_6	Age			0.118	0.036	0.268**
				(1.44)	(0.31)	(2.34)
β_7	Age^2			-0.001	-0.000	-0.002**
				(-1.41)	(-0.32)	(-2.32)
β_8	Female			0.077		0.075
				(0.25)		(0.23)
β_9	Nationality			0.006	-0.004	0.012
				(0.63)	(-0.39)	(0.65)
β_{10}	Education			-0.101	-0.084	0.020
				(-1.36)	(-1.08)	(0.18)
β_{11}	Time in role			0.019	-0.006	0.021
				(1.21)	(-0.35)	(0.86)
β_{12}	Time on board			0.006	0.012	-0.014
				(0.43)	(0.84)	(-0.53)
β_{13}	M&A			-0.026	-0.156	0.103
				(-0.17)	(-1.17)	(0.32)
β_{14}	Board size			-0.039	0.008	-0.240
				(-0.36)	(0.03)	(-0.51)
β_{15}	Board size^2			0.000	-0.000	0.009
				(0.05)	(-0.10)	(0.64)
β_{16}	SD-to-ED			-0.208*	-0.187**	-0.702***
				(-1.89)	(-1.97)	(-2.76)
β_{17}	Size			0.123	-0.155	0.252
				(0.77)	(-0.88)	(1.18)
β_{18}	Growth			0.026	-0.117	0.239*
				(0.25)	(-0.89)	(1.71)
β_{19}	Diversification			-0.339	-3.499***	-0.373
				(-0.51)	(-2.79)	(-0.49)

β_{20}	Leverage			-0.080***	-0.273***	-0.083**
				(-2.89)	(-5.07)	(-2.33)
β_{21}	Liquidity			0.747	0.755	1.118
				(0.91)	(0.59)	(1.09)
β_0	Constant	-51.344***	-25.770***	-39.849**	-6.460	-67.165**
		(-6.27)	(-3.27)	(-2.12)	(-0.31)	(-2.28)
	Pay gap # crisis ($\beta1 + \beta4$)			2.254	0.496	0.695
	Pay gap # after ($\beta1 + \beta5$)			-2.01	-23.51**	12.954
	Observations	1,088	1,088	257	126	131
	Number of banks	24	24	21	13	19
	u_j	0.470***	0.526***	0.553***	0.275***	0.572***
	e_{ij}	0.902***	0.790***	0.706***	0.515***	0.709***
	ρ	0.214	0.307	0.380	0.222	0.394

z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

I test for intertemporal variation in the stability-pay gap relation using coefficients from Equation [4.2]. From column 3, the coefficient on pay gap (β_1) relates to the pre-crisis interval (1999 to 2006). I compute the pay gap for the crisis interval and the post-crisis interval by taking the products of β_1 and $\beta_{4,}$ and β_1 and β_5, respectively, and test the combined coefficients for significance. Table 4.6 collates information from Table 4.5a-d and provides additional statistical information for the full sample and each cohort (see Model 3). I uncover evidence in favour of hypothesis 1, which presupposes the use of tournament incentives at banks. Nevertheless, the evidence i demonstrates the presence of intertemporal variation in reward structures.

Table 4.6: Bank stability and executive pay gap: by Interval and Cohort

Test	Coefficient	Std. Err.	z	P>z	[95% Conf. Interval]	
Full sample: summary results of the significance of the interactions from Table 4.5a						
Model (3)						
B1+B4=0	1.857	0.987	1.88	0.06	-0.079	3.792
B1+B5=0	1.568	1.106	1.42	0.156	-0.600	3.736
Model (4)						
B1+B4=0	2.918	1.431	2.04	0.041	0.114	5.722
B1+B5=0	3.934	2.093	1.88	0.06	-0.167	8.036
Model (5)						
B1+B4=0	3.188	1.324	2.41	0.016	0.592	5.784
B1+B5=0	1.300	1.289	1.01	0.313	-1.227	3.828
G-SIBs: summary results of the significance of the interactions from Table 4.5b						
Model (3)						
B1+B4=0	1.278	1.075	1.19	0.234	-0.829	3.386
B1+B5=0	2.403	1.150	2.09	0.037	0.150	4.656
Model (4)						
B1+B4=0	4.280	1.908	2.24	0.025	0.542	8.019
B1+B5=0	5.305	2.212	2.4	0.016	0.970	9.641
Model (5)						
B1+B4=0	3.300	1.310	2.52	0.012	0.732	5.868
B1+B5=0	1.305	1.256	1.04	0.299	-1.156	3.767
EU banks: summary results of the significance of the interactions from Table 4.5c						
Model (3)						
B1+B4=0	28.858	4.773	6.050	0.000	19.503	38.212
B1+B5=0	4.889	4.897	1.000	0.318	-4.710	14.488
Model (4)						
B1+B4=0	37.439	5.290	7.080	0.000	27.071	47.807
B1+B5=0	4.717	30.572	0.150	0.877	-55.203	64.637
Model (5)						
B1+B4=0	35.698	6.808	5.24	0	22.355	49.04
B1+B5=0	5.305	5.463	0.97	0.332	-5.403	16.013
US banks: summary results of the significance of the interactions from Table 4.5d						
Model (3)						
B1+B4=0	2.254	2.386	0.940	0.345	-2.422	6.930
B1+B5=0	-2.011	6.128	-0.330	0.743	-14.021	10.000
Model (4)						
B1+B4=0	0.495	2.144	0.23	0.817	-3.706	4.697
B1+B5=0	-23.511	11.379	-2.07	0.039	-45.814	-1.208
Model (5)						
B1+B4=0	0.695	5.883	0.12	0.906	-10.834	12.225
B1+B5=0	12.955	8.908	1.45	0.146	-4.505	30.414

I accept hypothesis 1 that banks use tournament incentives in the pre-crisis interval in the cases of European banks and US banks. For the European and US cohorts, the stability-pay gap relation is economically meaningful and statistically significant at the 5 percent level. Though the stability-pay gap relation for the full sample is positive and significant (at 10 percent), the magnitude of the coefficient is smaller. This is unsurprising since the coefficient is negative albeit insignificant for the G-SIBs pre-crisis. During the crisis interval, only the European banks seem to use tournament incentives (at the 1 percent level). Although the stability-pay gap relation is positive for G-SIBs and US banks it is not statistically meaningful. For the full sample, the coefficient is positive and significant the 10 percent level. In the post-crisis interval, only the G-SIBs cohort use tournament incentives (at the 5 percent level). This would appear to drive the same result for the full sample. Based on the evidence thus far, I find some support for hypothesis 1 that bank stability is correlated with larger pay gaps possibly working through a motivation effect brought about by pay dispersion across executive roles. I also find support for hypothesis 3 that bank stability is not correlated with pay gaps but we cannot accept hypothesis 2 that stability is correlated with smaller pay gaps, which foster a stronger sense of collaboration towards attaining organisational goals. Furthermore, I am unable to accept hypotheses 4 and 5 and instead suggest that tournament incentives because the results unambiguously show there is both intertemporal and interfirm variation in the use of tournament incentives in banking.

4.6.4 Estimation of the stability-pay gap relationship and board size

Whilst the board of directors sets the tone for a firm's risk-taking culture, it makes sure the firm is stable by monitoring executives, and designing compensation incentives to promote prudent risk-taking. Adams, Hermalin and Weisbach (2010) note the advisory and monitoring roles of the board are not observable, which brings into question how effective the board is. An evaluation of boards should consider other intricacies such as board independence (I use the ratio of supervisory directors-to-executive directors as proxy), the experience of executives (I employ measures of tenure), and the diversity of boards (I use the number of nationalities in the executive team as proxy). The empirical evidence from the banking industry is sparse (see Srivastav and Hagendorff, 2015 for a review on governance and risk-taking in banking). Pathan (2009) classifies a strong board as smaller and more responsive to shareholders rights, and contends that stronger boards are associated with greater bank risk-taking. Beltratti and Stulz (2012) offer a similar view. Whereas, Pathan (2009) finds that greater board independence results in less risk-taking, Erkens, Hung and Matos (2012) report no effect of independence on bank risk-taking during the crisis period. Adams et al (2010) allude to endogeneity issues in the relationship between board size and bank performance.

Columns 4 and 5 in Table 4.5a-d show the results of estimations of Equation [4.2] for above and below median board size. In the case of larger board size, I find support for the behavioural perspective (reject hypothesis 6) at G-SIBs pre-crisis. For US banks, the evidence is inconclusive (hypothesis 8). In contrast, there is significant evidence of tournament incentives in European and US banks with smaller boards (accept hypothesis 7), which drives the result for the full sample. Whereas the stability-pay gap relation is positive in the G-SIBs it is insignificant (accept hypothesis 8). During the crisis interval, our results are indicative of tournaments in each cohort irrespective of board size (accept hypotheses 6 and 7). However, board size confers a different result in post-crisis. In G-SIBs with larger boards, our evidence supports tournament incentives (accept hypothesis 6). Behavioural theory explains the result in US banks with larger boards (reject hypothesis 6) but neither perspective is consistent with the results for G-SIBs, US and European banks with smaller boards (hypothesis 8).

4.6.5 Decomposing the stability-pay gap relationship

Following Laeven and Levine (2009), I decompose the Z-score into its constituents to examine the effect of the pay gap on bank profitability (return on assets), leverage (equity-to-assets), and volatility (standard deviation of bank profitability). The aim here is to identify through which factors do tournament incentives or behavioural incentives affect bank stability. The Introduction cites arguments that compensation incentives were geared to increasing short-term profits via an increase in volatility particularly at heavily levered banks. I attempt to shed some light on this debate and report results from regressions that change the dependent variable from the Z-score to return on assets (Table 4.7a), ratio of equity-to-assets (Table 4.7b), and standard deviation of profitability (Table 4.7c).

Table 4.7a: Constituents of bank stability and executive pay gap: Bank profitability (return on assets)

	Full sample			G-SIBs			EU banks			US banks		
VARIABLES	*All*	*Large*	*Small*	*G-SIBs*	*L*	*S*	*EU*	*L*	*S*	*US*	*L*	*S*
Pay gap	0.003	0.002	0.004	0.003	0.002	0.002	-0.016	0.147***	0.011	0.005	0.015	-0.000
	(0.89)	(0.61)	(0.89)	(1.17)	(0.84)	(0.63)	(-0.67)	(5.14)	(0.43)	(0.64)	(1.30)	(-0.03)
Interval 2 (2007-09)	0.123	0.155	0.177	0.384***	-0.122	0.554***	-3.939***	-0.709	-0.005*	-0.156	0.791**	-1.016
	(0.89)	(0.90)	(0.89)	(3.76)	(-0.92)	(4.18)	(-4.84)	(-0.98)	(-1.70)	(-0.40)	(1.98)	(-1.10)
Interval 3 (2010-13)	-0.246	-0.152	-0.231	-0.202*	-0.130	-0.296**	-0.535	2.230	0.165	0.471	0.102	2.235**
	(-1.61)	(-0.60)	(-1.20)	(-1.86)	(-0.86)	(-2.30)	(-0.66)	(0.79)	(0.17)	(0.49)	(0.05)	(1.99)
Interval 2 # Pay gap	-0.007	-0.009	-0.010	-0.022***	0.007	-0.031***	0.219***	0.040		0.008	-0.045**	0.056
	(-0.93)	(-0.93)	(-0.91)	(-3.77)	(0.89)	(-4.19)	(4.83)	(0.98)		(0.38)	(-2.00)	(1.09)
Interval 3 # Pay gap	0.014	0.008	0.013	0.011*	0.007	0.016**	0.029	-0.125		-0.026	-0.006	-0.125**
	(1.59)	(0.59)	(1.19)	(1.85)	(0.85)	(2.29)	(0.65)	(-0.79)		(-0.49)	(-0.05)	(-1.99)
Age	0.000	-0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	-0.001	0.001
	(0.73)	(-1.38)	(0.87)	(-0.54)	(-1.19)	(-0.56)	(0.28)	(0.03)	(0.15)	(0.44)	(-0.73)	(1.00)
Age^2	-0.000	0.000	-0.000	0.000	0.000	0.000	-0.000	0.000	-0.000	-0.000	0.000	-0.000
	(-0.57)	(1.39)	(-0.72)	(0.39)	(1.14)	(0.37)	(-0.15)	(0.14)	(-0.11)	(-0.44)	(0.63)	(-0.90)
Female	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	0.000		-0.000	-0.003		-0.005*
	(-0.44)	(-0.10)	(-0.32)	(-0.43)	(-0.57)	(-0.88)	(0.04)		(-0.08)	(-1.16)		(-1.66)
Nationality	-0.000	-0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	0.000	0.000
	(-0.86)	(-0.44)	(-0.49)	(0.93)	(-1.58)	(1.25)	(-0.29)	(1.52)	(-0.11)	(0.28)	(0.12)	(1.34)
Education	-0.000	-0.000*	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000	-0.001	-0.001*	0.000
	(-0.57)	(-1.93)	(0.33)	(-1.52)	(-0.48)	(-1.11)	(0.82)	(0.32)	(0.91)	(-1.57)	(-1.78)	(0.04)
Time in role	0.000	0.000	0.000	0.000	-0.000	0.000	0.000	-0.000***	0.000	0.000	0.000	0.000
	(1.34)	(0.70)	(0.98)	(0.95)	(-0.08)	(1.32)	(0.62)	(-3.42)	(0.28)	(0.68)	(0.58)	(0.10)
Time on board	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.000**	0.000	0.000	0.000	-0.000
	(-0.65)	(-0.35)	(-0.42)	(-0.19)	(-0.27)	(-0.43)	(0.31)	(-2.19)	(0.39)	(0.03)	(0.37)	(-0.43)

M&A	0.001	-0.001	0.002**	0.002***	0.002***	0.002***	0.001	-0.001	0.001	-0.001	-0.002	0.002
	(1.31)	(-0.97)	(2.19)	(3.63)	(4.12)	(2.71)	(0.42)	(-1.25)	(0.31)	(-0.95)	(-1.36)	(0.67)
Board size	0.001***	-0.000	0.002***	0.001***	-0.001	0.003***	0.004***	-0.002	-0.002	-0.001	-0.001	-0.011***
	(4.27)	(-0.37)	(2.78)	(2.68)	(-1.05)	(3.01)	(5.54)	(-0.94)	(-1.28)	(-0.82)	(-0.54)	(-2.63)
Board size^2	-0.000***	0.000	-0.000**	-0.000***	0.000	-0.000***	-0.000***	0.000	0.000**	0.000	0.000	0.000**
	(-3.56)	(0.43)	(-2.07)	(-2.59)	(0.60)	(-2.81)	(-4.14)	(0.12)	(2.29)	(0.65)	(0.42)	(2.56)
SD-to-ED	-0.001***	-0.000	-0.001**	-0.000	-0.001***	-0.000	-0.002***	0.000	-0.003***	0.001	0.001	0.000
	(-2.67)	(-1.51)	(-2.06)	(-1.09)	(-4.61)	(-0.05)	(-3.45)	(0.42)	(-4.82)	(0.74)	(0.80)	(0.21)
Size	0.002***	-0.001	0.002***	0.002***	-0.003***	0.003***	0.004***	0.001	0.002	-0.000	-0.001	-0.001
	(3.09)	(-1.40)	(3.14)	(5.02)	(-2.62)	(5.81)	(2.90)	(0.58)	(1.31)	(-0.15)	(-0.51)	(-0.73)
Growth	0.004***	0.003***	0.004***	0.005***	0.002***	0.005***	0.003***	0.004***	0.002**	0.005***	0.005***	0.004***
	(10.94)	(5.25)	(9.03)	(11.49)	(3.30)	(9.20)	(4.39)	(8.78)	(2.22)	(5.87)	(3.98)	(3.87)
Diversification	0.015***	0.003	0.020***	0.012***	0.005***	0.022***	0.012***	0.015***	0.015***	0.014***	-0.002	0.009**
	(8.54)	(1.32)	(8.32)	(6.68)	(2.59)	(8.34)	(3.69)	(7.56)	(3.38)	(2.82)	(-0.12)	(2.06)
Leverage	-0.000***	-0.000**	-0.000***	-0.000***	-0.000	-0.000***	-0.000***	-0.001***	-0.000	-0.001***	-0.003***	-0.000
	(-4.96)	(-2.49)	(-3.69)	(-6.53)	(-0.57)	(-3.50)	(-3.50)	(-10.73)	(-1.59)	(-3.62)	(-5.07)	(-1.22)
Liquidity	-0.003	0.008**	-0.010***	-0.007***	0.005	-0.016***	-0.004	0.033***	0.006	-0.003	0.010	-0.002
	(-1.17)	(2.01)	(-2.97)	(-3.19)	(1.55)	(-5.10)	(-0.76)	(5.69)	(0.80)	(-0.48)	(0.78)	(-0.28)
Constant	-0.107*	0.016	-0.152*	-0.117***	0.080	-0.151**	0.164	-2.614***	-0.241	-0.080	-0.161	0.109
	(-1.81)	(0.22)	(-1.76)	(-2.66)	(1.54)	(-2.41)	(0.39)	(-4.98)	(-0.51)	(-0.52)	(-0.83)	(0.42)
Observations	1,232	391	841	584	218	366	391	97	294	257	126	131
Number of banks	58	31	51	22	16	18	15	7	14	21	13	19
u_j	0.007***	0.005***	0.008***	0.002***	0.006***	0.003***	0.013***	0	0.011***	0.003***	0.003***	0
e_{ij}	0.005***	0.004***	0.005***	0.003***	0.002***	0.003***	0.005***	0.002***	0.005***	0.006***	0.005***	0.007***
ρ	0.641	0.623	0.685	0.367	0.882	0.424	0.868	0	0.792	0.152	0.262	0

z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4.7b: Constituents of bank stability and executive pay gap: Leverage (ratio of equity-to-assets)

	Full sample			G-SIBs			EU banks			US banks		
VARIABLES	***All banks***	***L***	***S***	***GSIBs***	***L***	***S***	***EU***	***L***	***S***	***US***	***L***	***S***
Pay gap	-0.007	-0.013**	-0.001	-0.003	-0.008*	-0.003	-0.034	0.092***	-0.062*	-0.033*	-0.004	-0.102***
	(-1.19)	(-2.40)	(-0.14)	(-0.75)	(-1.81)	(-0.69)	(-1.10)	(4.91)	(-1.73)	(-1.81)	(-1.40)	(-3.08)
Interval 2 (2007-09)	0.230	-0.938***	0.746**	0.335**	-1.082***	0.592***	-1.156	0.744	-1.725	0.755	-0.316***	-0.007
	(0.95)	(-3.86)	(2.04)	(2.19)	(-4.69)	(3.65)	(-1.11)	(1.56)	(-1.13)	(0.98)	(-2.65)	(-0.61)
Interval 3 (2010-13)	-0.431	0.066	-0.672*	-0.194	-0.119	-0.088	-2.816***	1.424	-3.343***	-1.022	3.554***	-8.856***
	(-1.61)	(0.19)	(-1.89)	(-1.20)	(-0.46)	(-0.56)	(-2.72)	(0.77)	(-2.67)	(-0.53)	(5.92)	(-2.68)
Interval 2 # Pay gap	-0.013	0.052***	-0.041**	-0.019**	0.060***	-0.033***	0.064	-0.041	0.096	-0.042	0.018***	
	(-0.94)	(3.86)	(-2.03)	(-2.18)	(4.68)	(-3.64)	(1.11)	(-1.55)	(1.13)	(-0.97)	(2.66)	
Interval 3 # Pay gap	0.024	-0.004	0.038*	0.011	0.007	0.005	0.157***	-0.079	0.186***	0.057	-0.198***	
	(1.62)	(-0.18)	(1.90)	(1.23)	(0.45)	(0.59)	(2.71)	(-0.76)	(2.66)	(0.53)	(-5.92)	
Age	0.000	-0.000	0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.003
	(1.25)	(-0.35)	(0.86)	(0.68)	(-0.13)	(0.51)	(0.01)	(0.46)	(0.15)	(1.13)	(0.78)	(1.12)
Age^2	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-1.09)	(0.25)	(-0.65)	(-0.74)	(-0.15)	(-0.51)	(0.05)	(-0.43)	(-0.11)	(-1.01)	(-0.82)	(-0.98)
Female	0.001	-0.002	0.001	-0.000	-0.004	0.001	0.001		0.001	-0.001		0.001
	(0.62)	(-0.47)	(0.66)	(-0.31)	(-1.28)	(0.98)	(0.79)		(0.79)	(-0.18)		(0.18)
Nationality	0.000	-0.000	-0.000	-0.000	-0.000*	-0.000	0.000	-0.001***	0.000	0.000	-0.000	0.000
	(0.25)	(-0.40)	(-0.23)	(-0.65)	(-1.89)	(-0.23)	(0.38)	(-4.96)	(0.45)	(1.08)	(-0.27)	(1.03)
Education	-0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.001*	0.000	-0.001*	0.002	-0.000	0.005**
	(-0.96)	(-0.68)	(-0.75)	(-0.57)	(-1.44)	(0.56)	(-1.88)	(0.19)	(-1.72)	(1.16)	(-0.03)	(2.00)
Time in role	-0.000	-0.000	-0.000	0.000	-0.000	0.000	-0.000*	-0.000***	-0.001**	0.000	-0.000	0.001
	(-0.45)	(-0.87)	(-0.67)	(0.66)	(-0.36)	(0.06)	(-1.78)	(-3.56)	(-1.98)	(0.61)	(-1.38)	(1.01)
Time on board	0.000	0.000	0.000	-0.000	0.000	0.000	0.001***	-0.000*	0.001***	-0.000	0.000	-0.000
	(0.80)	(1.25)	(0.79)	(-0.02)	(0.40)	(0.60)	(2.66)	(-1.74)	(2.98)	(-0.85)	(0.27)	(-0.48)
M&A	0.001	0.002**	-0.001	0.002***	0.003***	-0.000	0.001	0.001**	0.003	-0.003	-0.000	-0.009

	(0.72)	(2.30)	(-0.48)	(2.61)	(3.14)	(-0.31)	(0.48)	(2.16)	(0.96)	(-1.27)	(-0.44)	(-1.26)
Board size	0.002***	0.001	0.002	0.003***	0.003**	0.000	0.001	-0.016***	0.005**	-0.000	-0.003***	-0.005
	(3.83)	(0.57)	(1.52)	(7.82)	(2.01)	(0.30)	(0.68)	(-12.05)	(2.23)	(-0.22)	(-3.72)	(-0.54)
Board size^2	-0.000***	-0.000	-0.000	-0.000***	-0.000*	0.000	-0.000	0.000***	-0.000**	0.000	0.000***	0.000
	(-3.01)	(-0.45)	(-0.98)	(-6.23)	(-1.91)	(0.63)	(-0.36)	(13.60)	(-2.02)	(0.39)	(4.35)	(0.66)
SD-to-ED	-0.000	-0.001	0.001	-0.000	-0.001**	-0.001**	0.002***	0.003***	0.003***	-0.001	-0.000	-0.002
	(-0.45)	(-1.48)	(1.00)	(-0.67)	(-2.30)	(-2.32)	(3.64)	(8.70)	(3.58)	(-0.55)	(-1.52)	(-0.36)
Size	-0.006***	-0.004***	-0.006***	-0.004***	-0.005**	-0.002***	-0.000	-0.003***	0.001	-0.012***	-0.002**	-0.022***
	(-6.10)	(-2.72)	(-4.38)	(-5.19)	(-2.39)	(-2.64)	(-0.30)	(-3.08)	(0.51)	(-3.04)	(-2.45)	(-3.42)
Growth	-0.004***	-0.005***	-0.004***	-0.003***	-0.004***	-0.004***	0.001	-0.000	0.002**	-0.004*	0.000	-0.008**
	(-6.46)	(-5.10)	(-4.70)	(-4.85)	(-4.36)	(-4.64)	(1.49)	(-1.39)	(2.23)	(-1.70)	(0.04)	(-2.51)
Diversification	0.007**	0.008**	0.005	0.002	0.006*	0.006*	0.001	-0.001	-0.004	-0.004	0.004	-0.010
	(2.03)	(2.18)	(1.02)	(0.80)	(1.72)	(1.86)	(0.36)	(-1.06)	(-0.61)	(-0.27)	(0.69)	(-0.42)
Leverage	-0.002***	-0.001***	-0.002***	-0.002***	-0.001***	-0.002***	-0.002***	-0.002***	-0.002***	-0.008***	-0.009***	-0.007***
	(-21.59)	(-9.59)	(-18.12)	(-22.43)	(-8.18)	(-22.25)	(-16.45)	(-32.26)	(-13.90)	(-11.01)	(-43.88)	(-6.87)
Liquidity	-0.001	0.007	-0.007	-0.001	-0.001	-0.004	0.017**	0.010***	0.009	-0.035	0.005	-0.076*
	(-0.21)	(1.17)	(-1.02)	(-0.22)	(-0.23)	(-1.00)	(2.29)	(2.68)	(1.01)	(-1.54)	(1.30)	(-1.76)
Constant	0.345***	0.433***	0.235	0.215***	0.324***	0.196**	0.689	-1.286***	1.131*	1.037***	0.337***	2.517***
	(3.30)	(4.24)	(1.46)	(3.24)	(3.71)	(2.56)	(1.26)	(-3.74)	(1.77)	(2.89)	(5.72)	(3.72)
Observations	1,232	391	841	584	218	366	391	97	294	257	126	131
Number of banks	58	31	51	22	16	18	15	7	14	21	13	19
u_j	0.023***	0.018***	0.024***	0.013***	0.017***	0.012***	0.020***	0	0.022***	0.032***	0.003***	0.043***
e_{ij}	0.009***	0.005***	0.010***	0.005***	0.004***	0.004***	0.007***	0.001***	0.007***	0.012***	0.001***	0.014***
ρ	0.865	0.918	0.851	0.881	0.953	0.909	0.904	0	0.906	0.875	0.811	0.901

z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4.7c: Constituents of bank stability and executive pay gap: Volatility of profits (standard deviation of ROA)

	Full sample			G-SIBs			EU banks			US banks		
VARIABLES	***All banks***	***L***	***S***	***G-SIBs***	***L***	***S***	***EU***	***L***	***S***	***US***	***L***	***S***
Pay gap	-0.002	0.000	-0.003	0.000	0.002	-0.003*	-0.010	-0.071***	-0.016	-0.000	-0.001	0.004
	(-1.08)	(0.09)	(-1.15)	(0.07)	(1.44)	(-1.66)	(-0.68)	(-3.95)	(-0.99)	(-0.02)	(-0.22)	(0.49)
Interval 2 (2007-09)	0.009	-0.024	0.056	-0.025	0.202***	-0.046	1.678***	0.545	2.196***	0.032	-0.300	1.097*
	(0.12)	(-0.25)	(0.49)	(-0.52)	(3.02)	(-0.70)	(3.49)	(1.19)	(3.26)	(0.14)	(-1.50)	(1.83)
Interval 3 (2010-13)	-0.023	0.021	-0.029	0.107**	0.226***	0.041	-0.252	-1.004	-0.366	-0.997*	-3.964***	0.716
	(-0.27)	(0.15)	(-0.26)	(2.07)	(3.02)	(0.66)	(-0.53)	(-0.56)	(-0.66)	(-1.71)	(-3.79)	(0.77)
Interval 2 # Pay gap	-0.000	0.001	-0.003	0.001	-0.011***	0.003	-0.093***	-0.030	-0.122***	-0.001	0.017	-0.061*
	(-0.08)	(0.28)	(-0.47)	(0.55)	(-2.99)	(0.72)	(-3.48)	(-1.19)	(-3.25)	(-0.12)	(1.52)	(-1.82)
Interval 3 # Pay gap	0.001	-0.001	0.002	-0.006**	-0.013***	-0.002	0.014	0.056	0.020	0.056*	0.221***	-0.040
	(0.28)	(-0.14)	(0.26)	(-2.07)	(-3.02)	(-0.66)	(0.52)	(0.57)	(0.66)	(1.72)	(3.80)	(-0.77)
Age	-0.000	-0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	-0.001	-0.001	-0.001
	(-0.79)	(-0.45)	(-0.48)	(0.26)	(-0.67)	(0.28)	(-0.17)	(0.29)	(-0.49)	(-1.48)	(-1.31)	(-1.45)
Age^2	0.000	0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	0.000	0.000	0.000
	(0.71)	(0.42)	(0.48)	(-0.08)	(0.84)	(-0.18)	(0.19)	(-0.42)	(0.59)	(1.34)	(1.26)	(1.31)
Female	-0.000	-0.000	0.000	0.000	0.000	-0.000	0.000		0.000	0.001		0.000
	(-0.04)	(-0.23)	(0.19)	(0.02)	(0.45)	(-0.40)	(0.28)		(0.37)	(0.51)		(0.23)
Nationality	0.000	-0.000	0.000	0.000	0.000	0.000	0.000	-0.000**	0.000	-0.000	-0.000	-0.000
	(0.24)	(-0.92)	(0.17)	(0.32)	(0.34)	(0.31)	(0.56)	(-2.15)	(0.30)	(-0.44)	(-0.36)	(-0.08)
Education	0.000	0.000	-0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.001**	0.001*	0.000
	(0.54)	(1.56)	(-0.25)	(0.47)	(0.26)	(0.07)	(-0.88)	(-0.21)	(-0.82)	(2.06)	(1.71)	(0.81)
Time in role	-0.000	0.000	-0.000	0.000	0.000	0.000	-0.000	0.000***	-0.000	-0.000	0.000	-0.000
	(-1.45)	(0.30)	(-1.61)	(0.16)	(0.19)	(0.71)	(-1.53)	(4.11)	(-1.01)	(-0.85)	(0.27)	(-0.69)
Time on board	0.000	-0.000	0.000	0.000	0.000	-0.000	-0.000	0.000*	-0.000	0.000	-0.000	0.000
	(0.65)	(-0.33)	(0.38)	(0.21)	(0.02)	(-0.38)	(-0.08)	(1.88)	(-0.24)	(0.19)	(-0.19)	(0.69)
M&A	-0.000	0.000	-0.000	-0.000*	-0.000*	-0.000	-0.000	-0.001*	0.002	-0.000	0.000	-0.002

	(-0.68)	(0.13)	(-0.44)	(-1.71)	(-1.68)	(-0.27)	(-0.20)	(-1.65)	(1.56)	(-0.54)	(0.17)	(-0.90)
Board size	0.000*	0.001***	0.001	-0.000	0.002***	-0.001***	-0.000	-0.000	0.004***	0.001	0.001	0.003
	(1.73)	(2.60)	(1.57)	(-1.26)	(4.64)	(-2.65)	(-0.26)	(-0.18)	(4.53)	(1.53)	(0.82)	(1.36)
Board size^2	-0.000*	-0.000***	-0.000	0.000	-0.000***	0.000**	-0.000	0.000	-0.000***	-0.000	-0.000	-0.000
	(-1.75)	(-2.64)	(-1.56)	(1.27)	(-4.16)	(2.47)	(-0.20)	(0.77)	(-4.81)	(-1.20)	(-0.64)	(-1.28)
SD-to-ED	0.000	-0.000	0.000**	-0.000	0.000	-0.000*	0.001***	0.001***	0.001***	-0.000	-0.000	0.001
	(1.51)	(-0.35)	(1.98)	(-0.39)	(0.47)	(-1.80)	(4.06)	(3.09)	(4.53)	(-0.20)	(-0.54)	(0.46)
Size	-0.001***	-0.001**	-0.001***	-0.001***	-0.002***	-0.000	-0.002***	-0.000	-0.002***	-0.001	-0.000	-0.001
	(-5.87)	(-2.44)	(-4.70)	(-3.99)	(-3.19)	(-0.99)	(-3.79)	(-0.32)	(-3.29)	(-1.02)	(-0.35)	(-0.90)
Growth	-0.001***	-0.001**	-0.001***	-0.001***	-0.002***	-0.001*	-0.001	-0.000	0.000	-0.001***	-0.001	-0.002***
	(-4.20)	(-2.27)	(-3.47)	(-4.84)	(-5.42)	(-1.79)	(-1.50)	(-0.09)	(0.94)	(-2.72)	(-0.85)	(-2.87)
Diversification	-0.003***	-0.002	-0.005***	-0.007***	-0.002**	-0.014***	-0.006***	-0.007***	-0.009***	-0.003	0.020***	-0.002
	(-3.38)	(-1.23)	(-3.65)	(-7.85)	(-2.03)	(-10.56)	(-3.42)	(-6.07)	(-3.46)	(-1.09)	(3.62)	(-0.62)
Leverage	-0.000	0.000	-0.000*	0.000***	0.000***	0.000	-0.000	0.000***	-0.000*	0.000	0.001***	0.000
	(-0.64)	(0.72)	(-1.79)	(3.60)	(3.50)	(0.10)	(-0.84)	(3.49)	(-1.74)	(0.92)	(3.36)	(0.95)
Liquidity	0.001	-0.001	0.002	-0.001	-0.002	0.002	0.004	-0.019***	-0.004	-0.000	-0.004	-0.003
	(0.56)	(-0.27)	(1.04)	(-0.88)	(-1.46)	(0.88)	(1.20)	(-5.19)	(-1.07)	(-0.12)	(-0.65)	(-0.64)
Constant	0.078**	0.012	0.096**	0.035*	-0.002	0.081***	0.231	1.283***	0.314	0.032	0.024	-0.047
	(2.39)	(0.31)	(1.96)	(1.65)	(-0.08)	(2.63)	(0.92)	(3.89)	(1.10)	(0.33)	(0.24)	(-0.29)
Observations	1,232	391	841	584	218	366	391	97	294	257	126	131
Number of banks	58	31	51	22	16	18	15	7	14	21	13	19
u_j	0.003***	0.002***	0.003***	0.003***	0.003***	0.004***	0.004***	0.000	0.003***	0.002***	0	0.003***
e_{ij}	0.003***	0.002***	0.003***	0.002***	0.001***	0.002***	0.003***	0.001***	0.003***	0.004***	0.003***	0.004***
ρ	0.520	0.554	0.561	0.814	0.912	0.881	0.621	0.0127	0.518	0.166	0	0.322

z-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

I discuss the decomposition of stability-pay gap relation for each cohort with and without controlling for board size. For the G-SIBs with smaller boards, higher pay dispersion is associated with significantly lower levels of bank profitability during the crisis interval, which suggests a behavioural outcome (reject hypothesis 7). However, the post-crisis relationship is consistent with tournament incentives (accept hypothesis 7). Both European and US banks with smaller boards appear to use tournament incentives to improve profitability during the crisis interval (accept hypothesis 7). For banks with large boards, I uncover little evidence to suggest either a tournament or behavioural perspective (hypothesis 8).

Turning attention to the leverage (equity-to-assets) component of bank stability, the results indicate that at banks with large boards (G-SIBs, European and US in the crisis interval; European banks pre-crisis) and with greater pay dispersion achieve significantly higher capitalisation ratios. In other words, larger boards appear to control leverage with tournament incentives (accept hypothesis 6). However, a combination of larger boards and pay compression is associated with greater leverage in G-SIBs (pre-crisis) and US banks (post-crisis), which is consistent with behavioural theory (reject hypothesis 6). The behavioural explanation applies to G-SIBs and US banks with small boards in crisis, and both European and US banks pre-crisis (reject hypothesis 7).

Lastly, our attention turns to volatility. At banks with larger boards, the results show an inverse relationship between pay gap and volatility, that is, a wider pay gap lessens volatility, which is consistent with tournament incentives (accept hypothesis 6) in G-SIBs (crisis and post-crisis intervals), European banks (crisis interval). In contrast, greater pay dispersion is associated with greater volatility in US banks with larger boards (reject hypothesis 6). Similarly, greater pay dispersion reduces volatility when boards are smaller (G-SIBs, pre-crisis; European banks and US crisis) (accept hypothesis 7).

4.6.6 Covariate analysis

I discuss which executive-level and bank-level factors – in addition to executive pay gap - affect bank stability by considering the results from Equation [4.2] for the three bank cohorts (see Table 4.5b-d). Whilst the intra-class correlation shows that between executives within banks differences explain a considerable proportion of the variation in bank stability, the coefficients on individual executive-level covariates tend to lack significance at conventional levels. Nevertheless, I calculate the turning point to find that bank stability increases with age until the average executive at US banks with smaller than average board size is 67 years old. In European banks with smaller than average board size, stability decreases as the number of nationalities on the board increases and if banks engage in M&A activity. For all European banks, greater board independence (higher proportion of supervisory directors-to-executive directors) realises a fall in bank stability.

Bank-level factors exert a larger impact on bank stability. Focusing on board size, I observe a concave relationship for all G-SIBs with stability increasing until the number of board reaches 19.13 directors. The same relationship occurs in G-SIBs with smaller than average board size where the turning point is 17.83 directors. In contrast, in G-SIBs with larger than average board size, the relationship with stability is convex with stability increasing once the number of directors reaches 28.73. I find a convex relationship in European banks with smaller than average board size with stability increasing once the number of directors reaches 12.47. For the G-SIBs and European banks, the factors that increase stability are larger size, growth opportunities, and a higher level of income diversification whereas higher leverage reduces stability. In US banks, I find the same result for leverage, but in contrast find that greater diversification weakens bank stability in banks with larger than average size boards.

4.7 Conclusion

This chapter measures the relationship between pay gaps and bank stability. The findings have implications for compensation policy at banks. The chapter quantifies the size of pay gaps between CEOs and non-CEOs across professional status. The analysis tests the propositions of tournament theory versus behavioural theory, which boils down to a firm believing that either large pay gaps or low pay gaps are sufficient motivation for executives to expend effort to improve firm performance. The relationship between bank stability and executive pay gaps shows intertemporal and inter-bank variation. For all banks, the results suggest that tournament incentives lead to significantly higher bank stability. Whilst this result holds for G-SIBs with above median board size, it is the behavioural perspective that explains the stability-pay gap relation at US banks with larger boards. Nevertheless, collectively the results offer more support for the use of larger pay gaps than smaller gaps or pay compression. Decomposing the Z-score measure of bank stability means the chapter can identify through which channels the pay gap affects stability. Compensation policy appears to affect bank stability by using tournament incentives to improve bank profitability, raise capitalisation, and reduce volatility. However, and consistent with the evidence provided in this thesis, this sub-set of results is characterised by heterogeneity.

Appendix

Table A1: Descriptive Statistics: Z-score measure of bank stability; G-SIBs

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	30.28	18.28	5.84	16.27	24.92	39.26	76.02	0.604	24
2000	37.10	42.93	10.14	16.84	22.35	39.88	213.01	1.157	24
2001	39.49	41.63	6.75	14.26	23.83	54.64	186.17	1.054	24
2002	39.49	39.68	5.24	12.17	27.25	51.77	151.12	1.005	24
2003	77.36	107.86	9.91	28.75	37.51	74.30	534.95	1.394	24
2004	63.49	69.83	11.72	25.38	36.64	67.88	289.86	1.100	24
2005	80.27	111.78	11.45	26.24	49.39	79.45	554.27	1.393	24
2006	69.83	76.41	16.08	28.07	41.16	84.17	371.32	1.094	24
2007	43.60	60.10	1.24	14.46	31.33	43.70	297.25	1.378	24
2008	15.91	21.14	-0.86	2.10	10.31	17.68	79.13	1.329	23
2009	19.13	19.22	1.22	6.11	13.81	25.01	84.03	1.005	23
2010	33.29	36.55	2.08	8.96	19.46	58.19	132.17	1.098	23
2011	48.83	72.74	3.09	10.91	24.36	58.69	355.19	1.490	23
2012	60.17	62.77	1.07	21.00	25.04	68.23	214.32	1.043	23
2013	53.97	45.86	1.24	28.63	33.71	78.83	180.87	0.850	23
Total	*47.63*	*63.79*	*-0.86*	*15.82*	*27.49*	*56.04*	*554.27*	*1.339*	*354*

Notes: S.D. is standard deviation; p25 is 25th percentile; p50 is the median; p75 is 75th percentile; CV is coefficient of variation; N is number of banks per year.

Table A2: Descriptive Statistics: Z-score measure of bank stability; EU banks

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	49.15	37.76	3.55	20.80	40.37	65.81	137.28	0.768	20
2000	42.35	29.02	4.41	22.38	32.21	55.98	107.49	0.685	20
2001	47.71	40.93	10.44	19.28	31.68	61.70	161.70	0.858	20
2002	51.99	77.32	4.09	11.83	24.50	77.61	352.45	1.487	20
2003	60.58	92.12	4.66	12.08	30.71	70.57	412.34	1.520	20
2004	35.43	39.12	4.24	10.77	17.58	47.33	168.58	1.104	20
2005	59.84	69.24	4.68	15.29	40.59	61.15	270.94	1.157	21
2006	58.05	45.88	8.74	26.03	50.99	76.11	203.88	0.790	21
2007	62.57	63.12	1.64	17.65	45.80	78.33	210.24	1.009	15
2008	16.12	29.99	-0.85	3.60	6.90	17.32	121.23	1.860	15
2009	11.20	8.73	1.34	3.51	7.90	20.28	26.40	0.780	15
2010	20.38	21.96	-1.15	7.56	10.69	23.21	75.05	1.077	15
2011	22.14	23.00	0.23	5.14	16.56	25.96	84.86	1.039	15
2012	26.90	28.01	2.18	6.98	19.59	30.16	91.88	1.041	14
2013	30.20	33.34	2.35	6.58	21.90	39.29	104.55	1.104	11
Total	*41.66*	*51.55*	*-1.15*	*10.44*	*25.68*	*53.67*	*412.34*	*1.237*	*262*

Notes: S.D. is standard deviation; p25 is 25th percentile; p50 is the median; p75 is 75th percentile; CV is coefficient of variation; N is number of banks per year.

Table A3: Descriptive Statistics: Z-score measure of bank stability; US banks

Year	Mean	S.D.	Min.	p25	p50	p75	Max.	CV	N
1999	124.21	243.04	9.15	36.08	61.22	91.84	1,192.72	1.9567	23
2000	122.80	240.56	7.06	30.22	59.00	101.63	1,205.04	1.9590	24
2001	54.46	59.21	8.50	20.27	36.02	61.61	275.23	1.0871	24
2002	46.46	47.47	9.33	20.11	36.36	53.55	245.07	1.0219	25
2003	48.87	40.84	10.15	23.30	41.97	54.98	170.85	0.8358	25
2004	65.97	53.53	14.00	36.35	53.84	69.04	248.41	0.8115	25
2005	85.56	95.17	14.99	37.66	61.46	107.08	496.76	1.1123	25
2006	121.12	167.71	15.18	38.15	74.00	110.14	682.60	1.3847	25
2007	47.53	77.33	0.86	11.58	27.44	43.87	381.17	1.6270	24
2008	23.37	32.94	-0.65	5.61	12.40	21.78	128.46	1.4096	19
2009	42.53	104.60	0.81	6.58	12.24	28.25	443.88	2.4595	17
2010	32.00	42.36	2.36	8.47	21.98	32.50	178.84	1.3238	17
2011	25.24	23.48	2.40	8.51	22.02	27.33	81.21	0.9300	17
2012	40.73	29.45	5.42	18.70	32.16	48.50	113.66	0.7230	17
2013	75.98	42.50	6.16	48.39	71.90	105.11	164.36	0.5594	16
Total	*66.56*	*118.88*	*-0.65*	*18.68*	*38.53*	*70.02*	*1,205.04*	*1.7860*	*323*

Notes: S.D. is standard deviation; p25 is 25th percentile; p50 is the median; p75 is 75th percentile; CV is coefficient of variation; N is number of banks per year.

Chapter Five

Thesis Conclusion

This thesis examines executive compensation in banking. The investigative chapters involve empirical analysis of the compensation of bank executives, its structure and implicit incentives in executive remuneration contracts. Throughout the thesis, the analysis uses a carefully constructed dataset, which contains detailed compensation data for executive directors plus information on their biographical characteristics. The dataset includes bank-level financial statements data and stock data. The availability of compensation data for individual executives limits the sample of banks to 71 firms from the US and nine countries in Europe. The analysis utilises 3,889 executive-year observations from 1999 to 2013. The use of subsampling enables the examination of developments in compensation in banking in the boom period before the global financial crisis, during and following the crisis, and for cohorts of global-systemically-important-banks, European banks, and US banks respectively.

Chapter Two investigates developments in executive compensation in banking, and identifies the structure of compensation and incentives provided for the C-suite of bank executives to work towards improving firm performance. It addresses questions regarding the size of compensation awards at banks, and whether such arrangements have changed following the crisis episode and subsequent legislative actions. The chapter provides insights on the factors affecting executive compensation in banking. It demonstrates the contrast in pay between bank CEOs and other executive roles such as chief operating officer and chief risk officer. The analysis identifies which biographical characteristics, features of corporate governance structure, and bank-related factors exert most effect on executive compensation and its constituents.

Chapter Three considers the issue of pay-for-performance in banking. It sheds light on the extent to which executive pay growth reflects changes in bank performance. This is an important question following claims that pay-for-performance systems had become weaker over time, and that powerful firm executives were able to extract rents, which suggests that compensation contracts had become sub-optimal for shareholders. By estimating the strength of pay-for-performance relationships across different pay incentives, the chapter considers the design of compensation contracts.

Chapter Four considers the behaviour of top management teams and investigates whether the size of differences in pay between the CEO and other C-suite executives affects firm performance, for which the Z-score is a measure of bank stability. This question is important to banks in designing the compensation contracts of non-CEO executives. Should banks create a large pay gap (difference in pay relative to the CEO) to motivate executives into expending effort that is expected to improve firm performance (tournament theory) or should pay gaps be minimal to promote co-operative behaviour instead of fostering politicking and possibly sabotage (behavioural theory).

In providing answers to these questions, this thesis makes several important contributions to the compensation literature especially with reference to the banking industry. For instance, Chapter Two reveals what has happened to compensation arrangements in banking over an economic cycle that includes the most severe crisis in a generation. It provides early evidence on how compensation arrangements in banking are changing following new legislation, which governments expects will prevent a reoccurrence of pre-crisis excesses. Similarly, Chapter Three offers up-to-date estimates on pay-for-performance relations in banking, which provides information that is relevant to the on-going debate on how to reform executive compensation. Lastly, the evidence in Chapter Four is informative for regulators and banks alike since it identifies the impact of one feature of compensation policy on bank stability, and identifies the channel(s) through which any effect works. A finding of this thesis is that heterogeneity matters and not one size fits all. Results often show intertemporal variation and variation between the three cohorts of banks.

Chapter Two shows that executives receive larger compensation awards, and hold considerably larger portfolio holdings, at larger, complex firms with wide ranging international operations (G-SIBs). This finding suggests there are selection effects at work as the biggest firms use attractive compensation packages to attract talented and ambitious individuals. Geography matters, in that executive pay is higher at US banks in comparison with EU banks. At all banks, there is a heavier weighting of variable pay in total pay, mostly as equity-linked pay (equity incentives). However, the proportion of performance-related pay is larger at G-SIBs followed by US banks and EU banks. Before the crisis in 2006, the total pay for a CEO at the average G-SIB was £12,900,000 in comparison to £2,578,397 at EU banks and £3,824,010 at US banks. Since the crisis, executive pay in banking has fallen, reflecting the troubles many banks face. The fact that current (2010-13) pay levels remain significantly below pre-crisis levels suggests that compensation is sensitive to boom and bust periods. The source of the variation in total pay differs across cohorts of banks. For G-SIBs, variation is greater within banks and between executives whereas the main source of variation in pay is between banks in the case of US banks. Across banks, significant differences in total pay exist between groups of bank executives based on their professional status. The pay of CEOs, chief operating officers and senior executives commonly form a group that exists across each cohort. Pay for this group tends to be significantly larger than the next group. The chief finance officer, chief administrative officer, chief risk officer and chief legal officer often belong to the same group. The results on the determinants of executive pay have implications for the corporate governance structures in banking. Greater board independence (in terms of a larger number of supervisory directors-to-executive directors) and greater board diversity (in terms of a larger number of nationalities on boards) are associated with lower levels of total (and variable) pay, which suggests that these factors improve the monitoring function. The chapter finds that total (and variable) pay is higher at banks that are larger, more diversified, better capitalised or less levered, and more profitable.

A main result from Chapter Three is that executive pay growth is positively and significantly related to changes in firm performance for all banks over 1999 to 2013. Pay-for-performance relations vary between cohorts of banks, and are stronger at the G-SIBs and US banks and weaker at EU banks. Pay-for-performance elasticities are time varying and the results show that pay-performance relations did decouple during the crisis period. Whilst elasticities show signs of recovery, they remain below pre-crisis levels, which suggest that there is scope for relations to strengthen if executive pay is to adequately reflect firm performance and be closer to the optimum for shareholders. Pay-for-performance relations are larger for portfolio incentives (changes in total accumulated wealth), equity incentives (changes in equity-linked pay) followed by cash compensation (changes in salary plus bonus). The results emphasise the importance of incentives in generating firm performance gains. They question the decision to implement the bonus rule (Capital Requirements Directive IV) in the EU, which stipulates a ratio of variable-to-fixed pay that has resulted in EU banks awarding higher fixed salaries to key staff.

Chapter Four provides results that can inform compensation policy at banks. It quantifies the size of pay gaps between CEOs and non-CEOs according to professional status, and the relationship between the pay gap and bank stability. The analysis tests the propositions of tournament theory versus behavioural theory, which boils down to a firm believing that either large pay gaps or low pay gaps are sufficient motivation for executives to expend effort to improve firm performance. The bank stability-pay gap relationship exhibits intertemporal and inter-bank variation. For all banks, the results suggest that tournament incentives lead to significantly higher bank stability. Whilst this result holds for G-SIBs with above median board size, it is the behavioural perspective that explains the stability-pay gap relation at US banks with larger boards. Nevertheless, collectively the results offer more support for the use of larger pay gaps than smaller gaps or pay compression. By decomposing the Z-score measure of bank stability the chapter identifies through which channels the pay gap affects stability. Compensation policy appears to affect bank stability by using tournament incentives to improve bank profitability, raise capitalisation, and reduce volatility. However, and consistent with the evidence provided in this thesis, this sub-set of results is characterised by heterogeneity.

5.1 Limitations and recommendations

The research in this thesis is timely and offers recommendations for practitioners involved in compensation policy, bank regulators and researchers alike. The results provide an early insight into the effects of the global financial crisis on compensation practices, and in so doing offer a contrast with the pre-crisis period. The evidence is drawn from an international sample of banks including a cohort of some of the largest, most complex and systemically important financial firms in the world. This thesis demonstrates the importance of investigating compensation for the full C-suite of executive directors in comparison to studies that use only the CEO. The econometric techniques and tools used in this thesis can be applied in a variety of applications. The random coefficients model (RCM) or hierarchical linear modelling

(HLM) combine within- and between- clusters and capture variability in data that are not supported by other models.

This thesis has constructed a rich dataset of 3,889 executive-year observations, and employed appropriate econometric methods to derive the estimated results and test robustness. Common to empirical studies, there are limitations in the data. The requirement for detailed data on compensation structure limits the number of sample banks to 71, and the period of analysis to 1999 to 2013. Whilst the sample includes many of the world's largest and most prestigious financial firms, a bigger sample of international firms is statistically appealing although collecting additional data would involve hand collection. Differences in disclosure requirements, especially relating to options, and in the structure of executive compensation across countries mean that it is not possible to construct measures of the sensitivity of executive wealth to equity risk that are commonly used in compensation studies based on US firms. Executive delta and executive vega measure the sensitivity of executive wealth to changes in the firm's stock price and to changes in stock return volatility, respectively (e.g. Guay, 1999; Core and Guay, 2002; Core, Guay and Larcker, 2003; Coles, Daniel and Naveen, 2006; Murphy, 2013a; DeYoung, Peng and Yan, 2013). Amendments to disclosure requirements in Europe (e.g. Conyon, Fernandes, Ferreira, Matos and Murphy, 2011), infer that in future compensation studies could provide estimates of delta and vega for European firms albeit for a relatively recent timeframe.

Agency theory views executive compensation as an important corporate governance mechanism to minimise conflicts of interest between managers and shareholders over the distribution of corporate funds (Jensen and Meckling, 1976). Whilst the board of directors has responsibility for determining corporate governance practices at firms, there is contention over the setting of CEO pay with firms increasingly forming compensation committees and hiring compensation consultants as part of the process (e.g. Murphy, 1999; Bebchuk, Fried and Walker, 2002; Bebchuk and Fried, 2003; Core, Guay and Thomas, 2005a). It is difficult to determine if executive compensation contracts are optimal for shareholders. The fact that contracting theory struggled to explain CEO remuneration gave rise to the alternative perspective of managerial power, which suggests that powerful CEOs are able to control the pay-setting process to extract rents (Bebchuk, Fried and Walker, 2002). Optimal contracting and managerial power are not mutually exclusive (Murphy, 2013a).

Therefore, this thesis must provide estimates of pay-for-performance elasticities and discuss their intertemporal variation without formally supporting either theory. However, this thesis recognises that the majority of proposals on how to reform executive compensation in banking do not deviate far from agency theory and the notion of pay-for-performance, which adds further justification for the current study.

Both theories ignore the importance of the outrage constraint and the effect of political intervention on compensation arrangements (e.g. Murphy, 2013a). This thesis identifies the breaching of the outrage constraint in 2007-08 as a motivating factor, and considers regulatory reforms in executive compensation as influencing post-crisis results. Though this thesis recognises the importance of CEO power (e.g. Adams, Almeida and Ferreira, 2005; Daily and Johnson, 1997; Finkelstein, 1992; Larcker and Tayan, 2012; Pathan, 2009; Pitcher and Smith, 2001; Westphal and Zajac, 1995), it does not construct an indicator of power other than identifying cases of duality. Future research could construct formal indicators of power, and talent (e.g. Cremers and Grinstein, 2014), education (e.g. King, Srivastav and Williams, 2016) and experience (Custódio, Ferreira and Matos, 2013).

This thesis has exploited the executive-level and bank-level heterogeneity in the dataset to control for unobserved firm-specific factors, such as, differences in pay setting arrangements, CEO power and so forth. Future research could consider using techniques, such as, factor analysis and principal components analysis to produce indicators of relevant factors, data permitting. Future research should review an emerging strand of literature on corporate culture and its influence on firm performance (e.g. Acharya, Mehran and Sundaram, 2016; Lo, 2016; Macey and O'Hara, 2016; Mehran and Tracy, 2016; Stulz, 2016; Thakor, 2016). Indeed, the impact of corporate culture on risk-taking is particularly relevant to the banking industry. Future research could devise suitable indicators of culture as a complement to using firm fixed-effects.

The analysis of compensation policy discussed how executive behaviour in response to pay differentials with the CEO could affect firm performance. Whilst the empirical analysis infers that large pay gaps indicate the presence of tournament incentives, it is difficult to confirm if this is an actual feature of a bank's compensation policy. The same point applies to smaller pay gaps, or pay compression. Similarly, it is difficult to establish if an executive attempts to sabotage the contest (tournament) by engaging in destructive behaviour including politicking against colleagues (competitors for the prize of promotion). The limited empirical evidence on sabotage comes from laboratory experiments (Chowdhury and Gürtler, 2015; Harbring and Irlenbusch, 2011). Although challenging data wise, future research is required to test the propositions of sabotage theorists. A case study approach might add value. The response of executives to performance-based incentives is heterogeneous (Gürtler and Gürtler, 2015). Accounting for heterogeneity is a challenge for compensation studies. This thesis illustrates the difficulty for firms to design compensation contracts with sufficient incentives because the results clearly show intertemporal and inter-bank variation, which suggests one size does not fit all and that compensation arrangements should be discretionary.

5.2 Matters arising for public policy

This section reviews the main results of this thesis in relation to developments in public policy pertaining to executive compensation. The breaching of the outrage constraint prompted government intervention into what essentially is a matter for privately-owned firms and their executives. Early actions at the national level included the imposition of taxes on bankers' bonuses above predetermined amounts, and banking levies. At the international level, the response of the G20 to the global financial crisis, and accusations that exorbitant pay awards to bank executives had fuelled excessive risk-taking, came in April 2009 when the Financial Stability Board issued guidelines for banking bonuses. In sum, the guidelines stipulate that bonuses should be: (i) adjusted for the risk an employee takes; (ii) deferred to take account of the duration of risks being taken; and (iii) paid in a mixture of cash and equity.

The US did not adopt the FSB proposals arguing that a single formula approach could exacerbate risk-taking. Instead, the legislative response to matters relating to executive compensation is found in sections 951 to 956 of the Dodd Frank Act of 2010. Essentially, this sets out final rules on say-on-pay, say-on-frequency, and say-on-golden parachutes. The Act targets heightened standards of independence for Compensation Committees, Compensation Consultants and Advisors. Firms must clearly disclose the link between pay and performance in their annual proxy statements, and also disclose the ratio of CEO pay-to-median employer pay. Other initial rules include compensation recovery or clawback; rules preventing directors from hedging against stock price drops with respect to equity compensation contracts; and prohibition of incentive arrangements that could encourage inappropriate risks at covered financial institutions.

The US response of heightened disclosure and adherence to standards suggests that market discipline will play a formal role. In the EU, and in contrast, policymakers have opted to intervene in the pay setting process through the introduction of the bonus cap, which became effective on 1 January 2014 as part of Capital Regulation Directive (CRD) IV. The European Banking Authority (formerly the Committee of European Banking Supervisors) is responsible for implementing the new rules. These include deferring between 40 to 60 percent of variable pay over three to five years and 100 percent of variable pay is subject to forfeiture (malus or clawback) based on future performance. The rules apply to staffs who are deemed to be material risk takers (MRTs), that is, their professional activities have a material impact on risk (firms must disclose MRTs and staff earning in excess of €1 million per annum). CRD IV applies to all financial institutions with headquarters either in the EU or EEA, and to EEA-based subsidiaries of financial institutions headquartered outside the EEA. The most controversial aspect of CRD IV is the bonus cap of 1:1 on the ratio of variable-to-fixed pay; it can rise to 2:1 providing a bank obtains approval from a supermajority of shareholders. In October 2014, the EBA announced that 39 banks (including US banks with subsidiaries in London) in six EU member states were paying role-based allowances (RBAs) alongside salaries and bonuses, and that the banks were paying RBAs in a way that increases the fixed component of remuneration for anyone caught by the bonus cap. In November 2015, the EBA ruled that RBAs should count as bonuses and therefore be subject to the bonus cap.

In October 2014, the Basel Committee on Banking Supervision (a member organisation of the Financial Stability Board) published its *Final Document on Principles for Enhancing Corporate Governance*, and later revised as *Corporate Governance Principles for Banks* in July 2015. Principle 11 deals with compensation and it identifies the link between a bank's remuneration structure that should support sound corporate governance and risk management. Point 143 reaffirms the role of incentives and of ensuring that incentives produce an intended outcome: "Remuneration systems form a key component of the governance and incentive structure through which the board and senior management promote good governance, convey acceptable risk-taking behaviour and reinforce the bank's operating and risk culture".

Evidence from Chapter Two shows the total pay of bank executives fell substantially following the crisis. Whereas pay levels rebounded they remain below pre-crisis levels. Tentatively, this finding suggests that regulatory actions on both sides of the Atlantic might be having an effect, although slow economic growth and continuing financial market difficulties, particularly in continental Europe, may also be a causal factor. Chapter Two provides a recommendation for improving corporate governance via board structure. It identifies greater board independence and greater board diversity as effective mechanisms for monitoring executives and ensuring pay growth is appropriate.

A main result from Chapter Three shows executive pay growth is positively and significantly related to changes in bank performance. This thesis finds some very large estimated pay-for-performance elasticities, which implies that executive pay growth for some executive roles and at some banks might be in excess of what firm performance gains alone can explain. This may be indicative of managerial power or inefficient contracting, which supports the moves to enhance the independence of compensation committees and compensation consultants, for standards to meet those set by regulatory bodies, and for boards of directors to become more involved in designing and assessing appropriate compensation schemes and to tie more closely executive pay and long-term bank performance.

Chapter Four signals that compensation policy does affect bank stability. This result implies that banks could set executive compensation as a tournament with larger pay differentials acting as an incentive for executives to expend effort in expectation of promotion and higher pay. That compensation policy can affect bank stability and through which channels it does so is important for bank regulatory agencies charged with maintaining financial stability. Thus, this thesis recommends for the relevant committees within banks to design a system of compensation, which provides sufficient incentive for executives to behave in a manner that ultimately is beneficial on a personal level and to the bank through enhanced stability.

As a whole, the evidence suggests the incentive structure implicit in executive compensation does realise bank performance gains, and that the most prestigious, largest and complex banking firms heavily weight total pay in performance-related pay to attract and maintain talented and ambitious executives. This thesis offers support for the notion of pay-for-performance and using compensation policy to motivate bank executives into actions that produce positive outcomes for themselves and their firms. Whereas the results show fundamental relationships did decouple following the crisis and have been slow to recover, the evidence is consistent with claims that executive pay in banking pre-crisis was excessive because of faulty incentives. In identifying a key role for incentives, this thesis supports the actions of policymakers to correct those faults through mandated actions on deferred pay and forfeiture, and by linking corporate governance to risk taking. However, the evidence in this thesis shows that fixed pay does not provide an incentive for executives to improve bank performance. Therefore, this thesis recommends that policymakers in the EU continually monitor the effect that the larger weight of salary in total pay has on bank performance.

Heterogeneity is a common feature of the empirical evidence. This can take the form of intertemporal variation, differences across and within cohorts of banks, and variation between professional roles. This general variability implies that one-size-fits-all policies are inappropriate and could produce unintended outcomes. This leads to a final recommendation, namely, that banks disclose full information on their compensation policies and arrangements and how they affect bank performance, and for regulatory agencies to monitor and evaluate this information as greater scrutiny will enhance market discipline.

Bibliography

Abowd, J.M. and Bognanno, M. (1995). International differences in executive and managerial compensation. In Freeman, R.B. and Katz, L.F. (eds) Differences and Changes in Wage Structures (Chicago: University of Chicago Press for the NBER), 67-103.

Acharya, V., Mehran, H. and Sundaram, R.K. (2016). Cash holdings and bank compensation. Federal Reserve Bank of New York Economic Policy Review 22(1): 77-83 (August).

Adams, R.B. (2012). Governance and the financial crisis. International Review of Finance, 12(1): 7–38.

Adams, R.B. and Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. Journal of Financial Economics, 94: 291-309.

Adams, R.B. and Ferreira, D. (2012). Regulatory pressure and bank directors' incentives to attend board meetings. International Review of Finance, 12(1): 227-248.

Adams, R.B. and Funk, P. (2012). Beyond the glass ceiling: Does gender matter? Management Science, 58 (2): 219-235.

Adams, R.B. and Giannetti, M. (2012). Is pay a matter of values? International Review of Finance, 12(1): 133-173.

Adams, R.B. and Ragunathan, V. (2015). Lehman Sisters. Available at SSRN: http://ssrn.com/abstract=2380036.

Adams, R.B., Almeida, H., and Ferreira, D. (2005). Powerful CEOs and their impact on corporate performance. Review of Financial Studies, 18(4): 1403-1432.

Adams, R.B., de Haan, J., Tersesen, S. and Ees, H.V. (2015). Board diversity: Moving the field forward. Corporate Governance: An International Review, 23(2): 77-82.

Adams, R.B., Hermalin, B.E. and Weisbach, M.S. (2010). The role of boards of directors in corporate governance: A conceptual framework and survey. Journal of Economic Literature, 48(1): 58-107.

Adrian, T. and H.S. Shin (2010). The changing nature of financial intermediation and the financial crisis of 2007-2009. Annual Review of Economics, 2: 603-618.

Aebi, V., Sabato, G. and Schmid, M. (2012). Risk management, corporate governance, and bank performance in the financial crisis. Journal of Banking and Finance, 36: 3213-3226.

Anderson, R.C., Mansi, S.A. and Reeb, D.M. (2004). Board characteristics, and the cost of debt. Journal of Accounting and Economics, 37(3): 315-342.

Anderson, R.C., Reeb, D.M., Upadhyay, A. and Zhao, W. (2011). The economics of director heterogeneity. Financial Management, 40(1): 5-38.

Ang, J., Lauterbach, B. and Schreiber, B.Z. (2002). Pay at the executive suite: How do US banks compensate their top management teams? Journal of Banking and Finance, 26: 1143-1163.

Anginer, D., Demirgüç-Kunt, A., Huizinga, H. and Ma, K. (2014). Corporate governance and bank insolvency risk: International evidence. Tilburg University, Discussion Paper; Vol. 2014-053, 52 pp.

Backes-Gellner, U. and Veen, S. (2009). The impact of aging and age diversity on company performance. Institute for Strategy and Business Economics, University of Zurich, Plattenstrasse 14, 8032 Zurich, Switzerland.

Bai, G. and Elyasiani, E. (2013). Bank stability and managerial compensation. Journal of Banking and Finance, 37: 799-813.

Baker, G.P., Jensen, M.C. and Murphy, K.J. (1988). Compensation and incentives: Practice vs. theory. Journal of Finance, 43 (3): 593-616.

Balachandran, S., Harnal, H. and Kogut, B. (2010). The probability of default, excessive risk, and executive compensation: a study of financial services firms from 1995 to 2008. Working paper, Columbia University, New York, 69pp.

Barclay, M.J. and Smith, C.W. (1995). The maturity structure of corporate debt. Journal of Finance, 50: 609–631.

Barro, J.R. and Barro, R.J. (1990). Pay, performance, and turnover of bank CEOs. Journal of Labor Economics, 8(4): 448-481.

Barro, R. (1991). Economic growth in a cross section of countries. Quarterly Journal of Economics, CVI (May 1991), 407-443.

Barry, C. and Starks, L.T. (1984). Investment management and risk sharing with multiple managers. Journal of Finance, 39: 477-491.

Bebchuk, L. and Fried, J.M. (2010a). How to tie equity compensation to long-term results. *Journal of Applied Corporate Finance, 22:* 99-106.

Bebchuk, L. and Fried, J.M. (2010b). Paying for long-term performance. *University of Pennsylvania Law Review, 158:* 1915-1960.

Bebchuk, L. and Grinstein, Y. (2005). The growth of executive pay. Oxford Review of Economic Policy, 21(2): 283-303.

Bebchuk, L., Fried, J.M. and Walker, D.I. (2002). Managerial power and rent extraction in the design of executive compensation. The University of Chicago Law Review, 69: 751-846.

Bebchuk, L.A. (2010). How to fix bankers' pay. *Daedalus,* 139(4): 52-60.

Bebchuk, L.A. and Fried, J.M. (2003). Executive compensation as an agency problem. Journal of Economic Perspectives, 17(3): 71-92.

Bebchuk, L.A. and Fried, J.M. (2004). Pay without Performance: The unfulfilled Promise of Executive Compensation. Cambridge and London: Harvard University Press.

Bebchuk, L.A. and Fried, J.M. (2005). Pay without performance: Overview of the issues. Journal of Corporate Law, 30: 647-672.

Bebchuk, L.A. and Spamann, H. (2009). Regulating bankers' pay. Georgetown Law Journal, 98: 247-287.

Bebchuk, L.A. and Weisbach, M.S. (2010). The state of corporate governance research. Review of Financial Studies, 23(3): 939-961.

Bebchuk, L.A., Cohen, A. and Spamann, H. (2010). The wages of failure: Executive compensation at Bear Stearns and Lehman 2000-2008. Regulating Bankers' Pay. Yale Journal on Regulation, 27: 257-282.

Bebchuk, L.A., Cremers, M.K.J. and Peyer, U.C. (2011). The CEO pay slice. Journal of Financial Economics, 102: 199-221.

Becher, D.A., Campbell II, T.L. and Frye, M.B. (2005). Incentive compensation for bank directors: The impact of deregulation. The Journal of Business, 78(5): 1753-1778.

Becker, B. and Gerhart, B. (1996). The impact of human resource management on organizational performance: Progress and prospects. Academy of Management Journal, 39(4): 779-801.

Becker, G.S. (1975). Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education. NBER (2nd ed.), ISBN: 0-226-04109-3.

Becker, G.S. (1996). Preferences and Values. In Gary S. Becker *Accounting for Tastes*. Cambridge: Harvard University Press.

Belliveau, M. A., O'Reilly, C.A. and Wade, J.B. (1996). Social capital at the top: Effects of social similarity and status on CEO compensation. Academy of Management Journal, 39 (6): 1568-1593.

Beltratti, A. and Stulz, R. (2012). The credit crisis around the globe: Why did some banks perform better? Journal of Financial Economics, 105: 1–17.

Bennett, R.L., Guntay, L. and Unal, H. (2015). Inside debt, bank default risk and performance during the crisis. Journal of Financial Intermediation, 24(4): 487-513.

Benston, G.J. (1985). The self-serving management hypothesis. Journal of Accounting and Economics, 7: 67-84.

Berger, A., Imbierowicz, B., and Rauch, C. (2016). The roles of corporate governance in bank failures during the recent financial crisis. Journal of Money, Credit and Banking 48(4): 729-770.

Berger, A.N., DeYoung, R., Genay, H. and Udell, G.F. (2000). The globalization of financial institutions: Evidence from cross-border banking performance. Brookings-Wharton Papers on Financial Services, 3: 23-158.

Berger, A.N., Kick, T. and Schaeck, K. (2014). Executive board composition and bank risk taking. Journal of Corporate Finance, 28: 48-65.

Berger, A.N., Klapper, L.F. and Turk-Ariss, R. (2009). Bank competition and financial stability. Journal of Financial Services Research, 35: 99-118.

Berle, A. A. and Means, G. C. (1932). The Modern Corporation and Private Property, New York.

Bertay, A., Demirgüç-Kunt, A. and Huizinga, H. (2013). Do we need big banks? Evidence on performance, strategy, and market discipline. Journal of Financial Intermediation 22: 532-558.

Bertrand, M. and Mullainathan, S. (2001). Are CEOs rewarded for luck? The ones without principals are. Quarterly Journal of Economics 116: 901-932.

Bertrand, M. and Schoar, A. (2003). Managing with style: The effect of managers on firm policies. Quarterly Journal of Economics, 118(4): 1169-1208.

Bhagat, S. and Black, B. (2002). The non-correlation between board independence and long-term firm performance. Journal of Corporation Law, 27: 231-273.

Bhagat, S. and Bolton, B. (2014). Financial crisis and bank incentive compensation. Journal of Corporate Finance, 25: 313-341.

Bhagat, S., and Black, B. (1999). The uncertain relationship between board composition and firm performance. Business Lawyer, 54: 921-963.

Bisserbe, N. (2012). Trader in Société Générale Debacle: Bank Shares Blame. www.wsj.com/articles/SB10001424052702304821304577443310855817718.

Bizjack, J.M., Lemmon, M.L. and Naveen, L. (2008). Does the use of peer groups contribute to higher pay and less efficient compensation? Journal of Financial Economics, 90(2): 152-168.

Blundell-Wignall, A. and Roulet, C. (2013). Business models of banks, leverage and the distance-to-default. Financial Market Trends, Vol. 2012/2.

Board of Governors of the Federal Reserve System (2010). Federal Reserve, the Office of the Comptroller of the Currency (OCC), the Office of Thrift Supervision (OTS), and the Federal Deposit Insurance Corporation (FDIC) Issue Final Guidance on Incentive Compensation. 21st June, 2010. www.federalreserve.gov/newevents/press/bcreg/20100621a.htm

Bogle, J.C. (2008). Reflections on CEO compensation. The Academy of Management Perspectives 22: 21-25.

Bolton, P., Mehran, H. and Shapiro, J. (2015). Executive compensation and risk taking. Review of Finance, 19(6): 2139-2181.

Bootsma, A.A. (2009). An Empirical Investigation of the Relationship between Executive Compensation and Firm Performance in the Netherlands. Master Thesis at Eramus School of Economics, Rotterdam, 137p. http://hdl.handle.net/2105/6150.

Bosma, J. and Koetter, M. (2013). Bank executive compensation and systemic risk. Working Paper at Frankfurt School of Finance and Management mimeo.

Boyd, J.H. and de Nicolò, G. (2005). The theory of bank risk taking and competition revisited. Journal of Finance, 60(3): 1329-343.

Brooks, C. (2008). Introductory Econometrics to Finance. Second Edition. Cambridge University Press. ISBN 978-0-521-69468-1.

Brunnermeier, M.K. (2009). Deciphering the liquidity and credit crunch 2007-08. Journal of Economic Perspectives, 23: 77-100.

Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2014-15 Edition, Top Executives. At http://www.bls.gov/ooh/management/top-executives.htm.

Burns, N., Minnick, K. and Starks, L. (2016). CEO tournaments: A cross-country analysis of causes, cultural influences and consequences. Journal of Financial and Quantitative Analysis, forthcoming.

Business, Innovation and Skills (2011). Women on Boards (The Davies Report), 24 February, BIS/11/745: 44p.

Butcher, S. (2014). Bank's weird hierarchies: what analysts, associates, VPs, MDs do really? News e-financial careers. 29th October 2014. http://news.efinancialcareers.com/uk-en/167611/banks-weird-hierarchies-analysts-associates-vps-mds-really/.

Butcher, S. (2014). The current state of salaries, bank by bank. 11th September 2014. http://news.efinancialcareers.com/uk-en/164/the-current-state-of-salaries-bank-by-bank/

Byrd, J., Cooperman, E.S. and Wolfe, G.A. (2010). Director tenure and the compensation of bank CEOs. Managerial Finance, 36(2): 86-102.

Cabo, R.M., Gimeno, R. and Escot, L. (2011). Disentangling discrimination on Spanish boards of directors. Corporate Governance: An International Review, 19(1): 77-95.

Cabo, R.M., Gimeno, R. and Nieto, M.J. (2012). Gender diversity on European banks' boards of directors. Journal of Business Ethics, 109(2): 145-162.

Cai, J., Garner J.L. and Walkling, R.A. (2009). Electing directors. Journal of Finance, 64: 2389- 2421.

Campbell, K. and Mínguez-Vera, A. (2008). Gender diversity in the boardroom and firm financial performance. Journal of Business Ethics, 83(3): 435-451.

Campbell, K. and Mínguez-Vera, A. (2010). Female board appointments and firm valuation: short and long-term effects. Journal of Management and Governance, 14(1): 37-59.

Carpenter, M., Geletkanycz, M. and Sanders, W. (2004). Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. Journal of Management, 30(6): 749-778.

Chava, S. and Purnanandam, A. (2010). CEOs versus CFOs: Incentives and corporate policies. Journal of Financial Economics, 97: 263–278.

Chen, C.R., Steiner, T.L. and Whyte, M. (2006). Does stock option-based executive compensation induce risk-taking? An analysis of the banking industry. Journal of Banking and Finance, 30: 915-945.

Cheng, I.H., Hong, H. and Scheinkman, J.A. (2015). Yesterday's heroes: Compensation and risk at financial firms. Journal of Finance, 70: 839-879.

Chok, I. and Sun, Q. (2007). Determinant of idiosyncratic volatility for biotech IPO firms. Financial Management, 36(4): 107-122.

Chowdhury, S.M. and Gürtler, O. (2015). Sabotage in contests: A survey. Public Choice, 164: 135-155.

Clark, G. (1987). Why isn't the whole world developed? Lessons from the cotton mills. Journal of Economic History XLVII: 141-173.

Cohen, D.A., Dey, A. and Lys, T (2013). Corporate governance reform and executive incentives: Implications for investments and risk taking. Contemporary Accounting Research, 30(4):1296-1332.

Coles, J.D., Daniel, N.D. and Naveen, L. (2006). Managerial incentives and risk-taking. Journal of Financial Economics, 79: 431–468.

Coles, J.L., Daniel, N.D. and Naveen, L.N. (2008). Boards: Does one size fit all? Journal of Financial Economics, 87: 329-356.

Committee of European Banking Supervisors (2010). Guidelines on Remuneration Policies and Practices. December. https://www.eba.europa.eu/-/cebs-guidelines-on-remuneration-policies-and-practices

Conyon, M. and Sadler, G. (2001). Executive pay, tournaments and corporate performance in UK Firms. International Journal of Management Review, 3(2): 141-168.

Conyon, M. and Sadler, G. (2010). Shareholder voting and directors' remuneration report legislation: Say on pay in the UK. Corporate Governance: An International Review, 18(4): 296-312.

Conyon, M.J. (2006). Executive Compensation and Incentives. Academy of Management Perspectives, February 2006, 25-44.

Conyon, M.J. and Murphy, K.J. (2000). The prince and the pauper? CEO pay in the United States and the United Kingdom. Economic Journal, 110: 640–71.

Conyon, M.J., Core, J.E. and Guay, W.R. (2011). Are U.S. CEOs paid more than U.K CEOs? Inferences from risk-adjusted pay. Review of Financial Studies, 24(2): 402-438.

Conyon, M.J., Fernandes, N., Ferreira, M.A., Matos, P. and Murphy, K.J. (2011). The Executive Compensation Controversy: A Transatlantic Analysis. Fondazione Rodolfo de Benedetti.

Cooper, M.J., Gulen, H. and Rau, P.R. (2014). Performance for pay: The relation between CEO incentive compensation and future stock price performance. http://dx.doi.org/10.2139/ssrn.1572085

Cordeiro, J.J. and R. Veliyath (2003). Beyond pay for performance: A panel study of the determinants of CEO compensation. American Business Review, 21(1): 56.

Core, J.E. and Guay, W.R. (2001). Stock Option Plans for Non-executive Employees. Journal of Financial Economics 61: 253-287.

Core, J.E. and Guay, W.R. (2002). Estimating the Value of Employee Stock Option Portfolios and Their Sensitivities to Price and Volatility. Journal of Accounting Research, 40(3): 613-630.

Core, J.E., Guay, W.R. and Larcker, D.F. (2003). Executive equity compensation and incentives: A survey. Federal Reserve Bank of New York Economic Policy Review, April: 27-50.

Core, J.E., Guay, W.R. and Thomas, R.S. (2005a). Is U.S. CEO compensation inefficient pay without performance? Vanderbilt University Law School, Law &

Economics Working Paper Series, Working Paper No. 05-05.

Core, J.E., Guay, W.R. and Thomas, R.S. (2005b). Is U.S. CEO compensation broken? Journal of Applied Corporate Finance, 17(4): 97-104.

Core, J.E., Guay, W.R. and Verrecchia, R.E. (2003). Price versus non-price performance measures in optimal CEO compensation contracts. The Accounting Review, 78(4): 957-981.

Core, J.E., Holthausen, R.W. and Larcker, D.F. (1999). Corporate governance, chief executive officer compensation, and firm performance. Journal of Financial Economics, 51: 371-406.

Correa, R. and Lel, U. (2016). Say on pay laws, executive compensation, pay slice, and firm valuation around the world. Journal of Financial Economics (forthcoming).

Coughlan, A.T. and Schmidt, R.M. (1985). Executive compensation, management turnover, and firm performance: An empirical investigation. Journal of Accounting and Economics, 7: 43-66.

Cowherd, D.M. and Levine, D.I. (1992). Product quality and pay equity between lower-level employees and top management: An investigation of distributive justice theory. Administrative Science Quarterly, 37(2): 302-320.

Crawford, A.J., Ezzell, J.R. and Miles, J.A. (1995). Bank CEO pay-performance relations and the effects of deregulation. The Journal of Business, 68(2): 231-256.

Cremers, M. and Grinstein, Y. (2014). Does the market for CEO talent explain controversial CEO pay practices? Review of Finance, 18(3): 921-960.

Cuñat, V. and Guadalupe, M. (2009). Executive compensation and competition in the banking and financial sectors. Journal of Banking and Finance, 33: 495-504.

Custódio, C. and Metzger, D. (2013). How do CEOs matter? The effect of industry experience on acquisition returns. Review of Financial Studies, 26(8): 2007-2047.

Custódio, C. and Metzger, D. (2014). Financial expert CEOs: CEO's work experience and firm's financial policies. Journal of Financial Economics, 114: 125-154.

Custódio, C., Ferreira, M.F. and Matos, P. (2013). Generalists versus specialists: Lifetime work experience and chief executive officer pay. Journal of Financial Economics, 108: 471-492.

Cyert, R. M., Kang, S.-H. and Kumar, P. (2002). Corporate governance, takeovers, and top-management compensation: Theory and evidence. Management Science, 48: 453-69.

Daily, C.M., and Johnson, J.L. (1997). Sources of CEO power and firm financial performance: A longitudinal assessment. Journal of Management, 23(2): 97-117.

Daily, C.M., Certo, S.T. and Dalton, D.R. (1999). A decade of corporate women: Some progress in the boardroom, none in the executive suite. Strategic Management Journal, 20(1): 93-99.

Daily, C.M., Dalton, D.R. and Cannella, A.A. (2003). Corporate governance: Decades of dialogue and data. Academy of Management Review, 28(3): 371-382.

Dalton, D.R., Daily, C.M., Ellstrand, A.E. and Johnson, J.L. (1998). Meta-analysis reviews of board composition, leadership structure, and financial performance. Strategic Management Journal, 19: 269-290.

Dalton, D.R., Daily, C.M., Johnson, J.L. and Ellstrand, A.E., (1999). Number of directors and financial performance: a meta-analysis. Academy of Management Journal, 42: 674-686.

Dechow, P.M. and Sloan, R.G. (1991). Executive incentives and the horizon problem: An empirical investigation. Journal of Accounting and Economics, 14(1): 51-89.

Deckop, J.R. (1988). Determinants of chief executive officer compensation. Industrial and Labor Relations Review, 41(2): 215-226.

Demsetz, R.S. and Saidenberg, M.R. (1999). Looking beyond the CEO: Executive compensation at banks. Federal Reserve Bank of New York Staff Report, No. 68: March.

DeYoung, R., Peng, E.Y. and Yan, M. (2013). Executive compensation and business policy choices at U.S. commercial banks. Journal of Financial and Quantitative Analysis, 48(1): 165-196.

Dhir, A.A. (2015). *Challenging Boardroom Homogeneity. Corporate Law, Governance, and Diversity*. Cambridge: Cambridge University Press.

Diversity Report (2013). Making Diversity a Core Corporate Strategy. Oxford Economics, 9p. https://www.oxfordeconomics.com/recent-releases/diversity-2013-making-diversity-a-core-corporate-strategy.

Dold, W. and Knopf, J.D. (2012). Bank failures and CEO compensation. In: Research Handbook on International Banking and Governance (Barth, J.R. and Wihlborg, C. eds.), 210-218.

Duffhues, P. and Kabir, R. (2008) Is the pay–performance relationship always positive? Evidence from the Netherlands. Journal of Multinational Financial Management, 18(1): 45-60.

Duru, A., Mansi, S.A. and Reeb, D.M. (2005). Earnings-based bonus plans and the agency costs of debt. Journal of Accounting and Public Policy, 24: 431-447.

Edmans, A. and Gabaix, X. (2009). Is CEO pay really inefficient? A survey of new optimal contracting theories. European Financial Management, 15(3): 486-496.

Edmans, A. and Gabaix, X. (2016). Executive compensation: A modern primer. Journal of Economic Literature (forthcoming).

Edmans, A. and Liu, Q. (2011). Inside debt. Review of Finance, 15 (1): 75-102.

Eisenmann, T.R. (2002). The effects of CEO equity ownership and firm diversification on risk taking. Strategic Management Journal, 23: 513–534.

Ellul, A. and Yerramilli, V. (2013). Stronger risk controls, lower risk: Evidence from US bank holding companies. Journal of Finance, 68: 1757-1803.

Elsas, R., Hackethal, A. and Holzhauser, M. (2010). The anatomy of bank diversification. Journal of Banking and Finance, 34(6): 1274-1287.

Eriksson, T. (1996). Executive compensation and tournament theory: Empirical tests on Danish data. Centre for Labour Market and Social Research, University of Aarhus and the Aarhus School of Business, Denmark, Working Paper 96-13, 23pp.

Erkens, D.H., Hung, M. and Matos P. (2012). Corporate governance in the 2007–2008 financial crisis: Evidence from financial institutions worldwide. Journal of Corporate Finance, 18: 389–411.

Estélyi, K. S. and Nisar, T. M. (2016). Diverse boards: Why do firms get foreign nationals on their boards? Journal of Corporate Finance, http://dx.doi.org/10.1016/j.jcorpfin.2016.02.006.

European Banking Authority (2012). The 2012 EBA Annual Report, https://www.eba.europa.eu/-/the-2012-eba-annual-report

European Banking Authority (2013a). High Earners 2012 data. EBA Report, http://www.eba.europa.eu.

European Banking Authority (2013b). EBA agrees on definition of identified staff for remuneration purposes, 13 December 2013. http://www.eba.europa.eu/-/eba-agrees-on-definition-of-identified-staff-for-remuneration-purposes. EBA Final draft Regulatory Technical Standard issued on 16 Dec 2013, EBA/RTS/2013/11.

European Banking Authority (2014). Opinion of the European Banking Authority on the Application of Directive 2013/36/EU (Capital Requirements Directive) regarding the principles on remuneration policies of credit institutions and investment firms and the use of allowances. EBA/Op/2014/10, 15 October 2014.

European Banking Authority (2015). Benchmarking of Remuneration Practices at Union Level and Data on High Earners. https://www.eba.europa.eu/-/eba-updates-on-remuneration-practices-and-high-earners-data-for-2013-across-the-eu, EBA report, 07 September 2015.

European Central Bank (2010). Beyond RoE – How to measure bank performance; Appendix to the report on EU banking structures, European Central Bank - Eurosystem September 2010, 44p.

European Commission (2012). The 2012 Ageing Report: Economic and Budgetary Projections for the 27 EU Member States (2010-2060). ec.europa.eu/economy_finance/publications/European_economy/2012/2012-ageing-report_en.htm

European Union (2012). Women in Economic Decision-making in the EU: Progress Report. A Europe 2020 initiative. Luxembourg: Publications Office of the European Union. doi: 10.2838/65541 http://ec.europa.eu/justice/gender-equality/files/women-on-boards_en.pdf

Fahlenbrach, R. and Stulz, R. (2011). Bank CEO incentives and the credit crisis. Journal of Financial Economics, 99: 11–26.

Falato, A., Li, D. and Milbourn, T. (2015). Which skills matter in the market for CEOs? Evidence from pay for CEO credentials. Management Science, 61(12): 2845-2869.

Fama, E.F. and Jensen, M.C. (1983). Separation of Ownership and Control. Journal of Law and Economics, 26(2): 301-325.

Fang, Y., Hasan, I. and Marton, K. (2014). Institutional development and bank stability: Evidence from transition countries. Journal of Banking and Finance, 39: 160-176.

Feng, M., Ge, W., Luo, S. and Shevlin, T. (2011). Why do CFOs become involved in material accounting manipulations? Journal of Accounting and Economics, 51(1-2): 21-36.

Fernandes, C., Farinha, J., Martins, F. V. and Mateus, C. (2012). Board's characteristics in the banking sector and the 2007-2008 financial crisis. Versin 1.0, April 2012, PhD at University of Porto, Faculty of Economics.

Fernandes, C., Farinha, J., Martins, F.V. and Mateus, C. (2015). Supervisory boards, financial crisis and bank performance: Does board characteristics matter? http://ssrn.com/abstract=2707713.

Fernandes, N., Ferreira, M.A., Matos, P. and Murphy, K.J. (2009). The pay divide: (Why) are U.S. top executives paid more? ECGI Finance Working Paper No.255.

Fernandes, N., Ferreira, M.A., Matos, P. and Murphy, K.J. (2013). Are U.S. CEOs paid more? New international evidence. Review of Financial Studies, 26, 2, 323-367.

Fich, E. and Slezak, S. (2008). Can corporate governance save distressed firms from bankruptcy? An empirical analysis. Review of Quantitative Financial Accounting, 30(2): 225-251.

Financial Services Authority (2009a). Reforming Remuneration Practices in Financial Services, Consultation Paper 09/10 (March 2009)

Financial Services Authority (2009b). The Turner Review: A Regulatory Response to the Global Banking Crisis (March 2009), 126 pp. (p. 36)

Financial Services Authority (2010). Regulatory Reform – background. FSA website www.fsa.gov.uk/about/what/reg_reform/background. Retrieved 26 November 2013.

Financial Services Authority (2010). Revising the Remuneration Code. Feedback on CP10/19 and final rules. www.fsa.gov.uk/pubs/policy/ps10_20.pdf, p.8. FSA December 2010.

Financial Services Authority (2010). Revising the Remuneration Code. Feedback on CP10/19 and final rules. www.fsa.gov.uk/pubs/policy/ps10_20.pdf, p.8. FSA December 2010.

Financial Stability Board (2015). FSB publishes the 2015 update of the G-SIB list, Press Release Ref: 66/2015 3 November 2015, 2pp.

Financial Stability Forum (2000). Report of the Working Group on Offshore Centres. Financial Stability Forum, 5 April 2000.

Finkelstein, S. (1992). Power in top management teams: Dimensions, measurement, and validation. Academy of Management Journal, 35(3): 505-538.

Finkelstein, S. and Hambrick, D.C. (1989). Chief executive compensation: A study of the intersection of markets and political processes. Strategic Management Journal, 10(2): 121-134.

Focarelli, D. and Pozzolo, A. (2000). The determinants of cross-border shareholding: an analysis with bank level data from OECD countries. Banca d'Italia Servizio di Studi no. 381.

Forbes, (2012). HSBC Helped Terrorists, Iran, Mexican Drug Cartels Launder Money, Senate Reports Says. Markets 7/16/2012. At www.forbes.co/sites/afontevecchia/2012/07/16hsbc-helped-terrorists-iran -mexican-drug-cartels-launder-money-senate-report-says/

Forbes, D.P. and Milliken, F.J. (1999). Cognition and corporate governance: Understanding boards of directors as strategic decision-making groups. The Academy of Management Review 24(3): 489-505.

Frankel, M. (2015). Over the past couple of decades, we've seen many big bank mergers, and we might start seeing more very soon. At www.fool.com/investing/general/2015/04/22/the-biggest-mergers-and-acquisitions-in-banking.aspx

Frydman, C. (2007). Rising through the ranks. The evolution of the market for corporate executives, 1936-2003. Working Paper, Northwestern University, Kellogg School of Management, Evanston, Illinois.

Frydman, C. and Jenter, D. (2010). CEO compensation. Annual Review of Financial Economics, 2(1): 75-102.

Frydman, C. and Saks, R.E. (2010). Executive compensation: A new view from a long-term perspective, 1936-2005. Review of Financial Studies 23: 2099-2138.

Füss, R., Rottke, N. and Zietz, J. (2011). What drives CEOs take on more risk, some evidence from the laboratory of REITs. Journal of Applied Corporate Finance, 23: 92-105.

Gabaix, X. and Landier, A. (2008). Why has CEO pay increased so much? Quarterly Journal of Economics 123: 49-100.

Gao, H. (2010). Optimal compensation contracts when managers can hedge. Journal of Financial Economics, 97: 218–238.

Gayle, G. and Miller, R.A. (2009). Has moral hazard become a more important factor in managerial compensation? American Economic Review, 99(5): 1740-1769.

Gelman, A. and Hill, J. (2007). Data Analysis Using Regression and Multilevel/Hierarchical Models. New York: Cambridge University Press.

Gibbons, R. (2005). Four formal(izable) theories of the firm? Journal of Economic Behavior & Organization, 58: 200-245.

Gibbons, R. and Murphy, K.J. (1990). Relative performance evaluation for chief executive officers. Industrial and Labor Relations Review, 43: 30-51.

Gibbons, R. and Murphy, K.J. (1992). Optimal incentive contracts in the presence of career concerns: Theory and evidence. Journal of Political Economy, 100(3): 468-505.

Gillan, S.L., Hartzell, J.C. and Parrino, R. (2009). Explicit versus implicit contracts: Evidence from CEO employment agreements. Journal of Finance, LXIV(4): 1629-165.

Girma, S., Thompson, S. and Wright, P. (2002). Multinational activity and CEO compensation: Preliminary evidence from large UK firms. Weltwirtschaftliches Archiv, Bd. 138 (4): 680-693.

Gorton, G. and Metrick, A. (2012). Getting up to speed on the financial crisis: A one-weekend-reader's guide. Journal of Economic Literature, 50(1): 128-150.

Gramm Leach Bliley Act (1999/2000). United States S.900 – 106th Congress report filed in House (11/02/1999). https://www.congress.gov/bill/106th-congress/senate-bill/900

Gregg, P., Jewell, S. and Tonks, I. (2012). Executive pay and performance: Did bankers' bonuses cause the crisis? International Review of Finance, 12(1): 89-122.

Gropp, R. and Köhler, M. (2010). Bank owners or bank managers: Who is keen on risk? Evidence from the Financial Crisis. ZEW Discussion paper 100013. University of Mannheim, Mannheim.

Grove, H., Patelli, L., Victoravich, L.M. and Xu, P. (2011). Corporate governance in the wake of the financial crisis: Evidence from US commercial banks. Corporate Governance: An International Review, 19(5): 418:436.

Guay, W.R. (1999). The sensitivity of CEO wealth to equity risk: An analysis of the magnitude and determinants. Journal of Financial Economics, 53: 43-71.

Guiso, L., Sapienza, P. and Zingales, L. (2006). Does culture affect economic outcomes? Journal of Economic Perspectives, 20(2): 23-48.

Gürtler, M. and Gürtler, O. (2015). The optimality of heterogeneous tournaments. Journal of Labor Economics, 33(41): 1007-1042.

Haan, J. and Vlabu, R. (2013). Corporate governance of banks: A survey. De Netherlandsche Bank, Eurosysteem, DNB Working Paper No. 386 / July 2013, 53pp.

Hagendorff, J and Vallascas, F. (2011). CEO pay incentives and risk-taking: Evidence from bank acquisitions. Journal of Corporate Finance, 17(4): 1078-1095.

Hagendorff, J. (2015). Corporate Governance in Banking. In Berger, A.N., Molyneux, P. and Wilson, J., eds. *The Oxford Handbook of Banking*, 2nd Edition, (Oxford University Press) Chapter 6, 139-159.

Haldane, A. (2012). The Doom Loop: equity and the banking system. London Review of Books, 34(4): 21-22.

Haldane, A. (2015). Growing, Fast and Slow. Bank of England. Speech 797, University of East Anglia 17 February 2015, 34p.

Hall, B.J., and Liebman, J.B. (1998). Are CEOs really paid like bureaucrats? The Quarterly Journal of Economics. 113(3): 653-691.

Hallock, K. (1995). Executive pay and reciprocally interlocking boards of directors. Industrial Relations Section, Princeton University. Working paper #340, January 1995, 57p.

Hambrick, D. (2007). Upper echelons theory: an update. Academy of Management Review, 32(2): 334-343.

Hambrick, D.C. and Mason, P. (1984). Upper echelons: The organisation as a reflection of its top managers. Academy of Management Review, 9(2): 193-206.

Hampel, R. (1998). Committee on Corporate Governance. In: www.ecgi.org/codes/documents/hampel.pdf

Hannan, R.L., Krishnan, R. and Newman, A.H. (2008). The effects of disseminating relative performance feedback in tournament and individual performance compensation plans. Accounting Review, 83(4): 893-913.

Harbring, C. and Irlenbusch, B. (2011). Sabotage in tournaments: Evidence from a laboratory experiment. Management Science, 57(4): 611-627.

Harford, T. (2006). Why Your Boss is Overpaid. Forbes, 5/23/2006. http://www.forbes.com/2006/05/20/executive-compensation-tournament_cx_th_06work_0523pay.html

Harford, T. (2014). How inequality tracks nationality. http://www.bdlive.co.za/opinion/2014/11/12/how-inequality-tracks-nationality

Harjoto, M.A. and Mullineaux, D.J. (2003). CEO compensation and the transformation of banking. Journal of Financial Research, 26: 341-354.

Harris, R.S. and Marston, F.C. (1994). Value versus growth stocks: Book to market growth and beta. Financial Analysts Journal, 50(5): 18-24.

Hart, O. and Holmström, B. (1987). The Theory of Contracts. Massachusetts Institute of Technology. Department of Economics, Working paper, Volume 418, Cambridge University Press, 85p.

Hau, H. and Thum, M.P. (2009). Subprime crisis and board (in-)competence: Private vs. public banks in Germany. ECGI – Finance Working Paper No. 247/2009.

Hawkins, J. and Turner, P. (1999). Bank restructuring in practice: An overview. Bank for International Settlements, BIS Policy Papers No. 6: 6-105.

Hayes, R.M., Lemmon, M.L. and Qiu, M. (2012). Stock options and managerial incentives for risk-taking: Evidence from FAS 123R. Journal of Financial Economics, 105: 174-190.

Henderson, A.D. and Fredrickson, J.W. (2001). Top management team coordination needs and the CEO pay gap: A competitive test of economic and behavioural views. Academy of Management 44(1): 96-117.

Hermalin, B.E., and Weisbach, M.S. (1998). Endogenously chosen boards of directors and their monitoring of the CEO. American Economic Review, 88(1): 96-118.

Herring, R. and Carmassi, J. (2010). The corporate structure of international financial conglomerates: Complexity and its implications for safety and soundness. In: Berger, A., Molyneux, P. and Wilson, J. (eds), The Oxford Handbook of Banking (1st edition), Oxford University Press, 195-229.

Herring, R. and Carmassi, J. (2015). Complexity and systemic risk: What's changed since the crisis? In: Berger, A., Molyneux, P. and Wilson, J. (eds), The Oxford Handbook of Banking (2nd edition), Oxford University Press, 77-112.

Higgs, D. (2003). Review of the role and effectiveness of non-executive directors. European Corporate Governance Institute.

www.ecgi.org/codes/documents/higgsreport.pdf, revised in January 2010.

High Pay Center (2015). New High Pay Centre report: Executive pay continues to climb at expense of ordinary workers. http://highpaycentre.org/pubs/new-high-pay-centre-report-executive-pay-continues-to-climb-at-expense-of-o...Posted 16 August 2015.

Hillman, A. (2015). Board diversity: Beginning to unpeel the onion. Corporate Governance: An International Review, 23(2): 104-107.

Hillman, A., Shropshire, C., Certo, S.T., Dalton, D.R. and Dalton, C.M. (2011). What I like about you: A multilevel study of shareholder discontent with director monitoring. Organization Science, 22(3): 675-687.

Hoelscher, D.S. and Quintyn, M. (2003). Managing systemic banking crises. International Monetary Fund, August 28, 2003. Occasional Paper 224.

Hogan, T.D. and McPheters, L.R. (1980). Executive compensation: Performance versus personal characteristics. Southern Economics Journal, 46: 1060-1068.

Holmstrom, B. (1979). Moral Hazard and Observability. Bell Journal of Economics, 10, 74-91.

Holmstrom, B. and Milgrom, P. (1991). Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design. Journal of Law, Economics, and Organization, (7): 24-52.

Houston, J.F. and James, C. (1995). CEO compensation and bank risk: Is compensation in banking structured to promote risk taking? Journal of Monetary Economics, 36, 405-431.

Hubbard, R.G. and Palia, D. (1995). Executive pay and performance: Evidence from the U.S. banking industry. Journal of Financial Economics, 39: 105-130.

Hunt, V., Layton, D. and Prince, S. (2015). Why diversity matters. McKinsey & Company. http://www.mckinsey.com/business-functions/organization/our-insights/why-diversity-matters.

Independent Commission on Banking (2011). Final Report Recommendations. ISBN 978-1-845-32-829-0

Jensen, M.C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. Journal of Finance, 48(3): 831-880.

Jensen, M.C. and Meckling, W.H. (1976). Theory of the firm: Managerial behaviour, agency costs, and ownership structure. Journal of Financial Economics, 3: 305-60.

Jensen, M.C. and Murphy. K.J. (1990a). Performance pay and top-management incentives. Journal of Political Economy 98: 225-264.

Jensen, M.C. and Murphy. K.J. (1990b). CEO incentives – It's not how much you pay, but how. Harvard Business Review, 3: 138-153.

John, K. and Senbet, L.W. (1998). Corporate governance and board effectiveness. Journal of Banking and Finance, 22: 371-403.

John, K., de Masi, S. and Paci, A. (2016). Corporate governance in banks. Corporate Governance: An International Review, 24(3): 303-321.

John, T.A. and John, K. (1993). Top-Management Compensation and Capital Structure. The Journal of Finance, 48(3): 949-974.

Jordan, D.J., Rice, D., Sanchez, J. and Wort, D.H. (2011). Explaining bank market-to-book ratios: Evidence from 2006 to 2009. Journal of Banking and Finance, 35(8): 2047-2055.

Joskow, P.L., Rose, N.L. and Shepard, A. (1993). Regulatory constraints on CEO compensation. Brookings Papers on Economic Activity (Microeconomics): 1-72.

Kale, J., Reis, E. and Venkateswaran, A. (2009). Rank-order tournaments and incentive alignment: The effect on firm performance. Journal of Finance, 64: 1479-1512.

Kaplan, S.N. (2013). CEO pay and corporate governance in the U.S.: Perceptions, facts, and challenges. Journal of Applied Corporate Finance, 25(2): 8-25.

Kaplan, S.N. and Minton, B.A. (2012). How has CEO turnover changed? International Review of Finance, 12(1): 57–87.

Kaplan, S.N. and Rauh, J. (2010). Wall Street and Main Street: What contributes to the rise in the highest incomes? Review of Financial Studies, 23(3): 1004-1050.

Katz, L.F. (1986). Efficiency wage theories: A partial evaluation. NBER Macroeconomics Annual 1986, Volume 1: 235-290.

Keeley, M.C. (1990). Deposit insurance, risk, and market power in banking. American Economic Review, 80(5): 1183-1200.

Keys, B., Mukherjee, T., Seru, A., and Vig, V. (2009). Financial regulation and securitization: evidence from subprime loans. Journal of Monetary Economics 56(5): 700–720.

King, T., Srivastav, A. and Williams, J. (2016). What's in an education? Implications of CEO education for bank performance. Journal of Corporate Finance, 37: 287-308.

Kirkpatrick, G. (2009).The corporate governance lessons from the financial crisis. Financial Market Trends (OECD: Paris). ISSN 1995-2864.

Klaus, B. and Schäfer, D. (2013). Implicit state guarantees exacerbate problem: Separated banking system alone not a solution. DIW Berlin-Deutsches Institut, DIW Economic Bulletin 3(6): 1-15.

Kleymenova, A. and Tuna, I. (2015). Regulation of compensation. Working Paper, Booth Business School.

Kogut, B., Colomer, J. and Belinky, M. (2014). Structural equality at the top of the corporation: Mandated quotas for women directors. Strategic Management Journal, 35(6): 891-902.

Kollewe, J. and Davies, R. (2016). Goldman Sachs and Deutsche Bank Shareholders Revolt against Pay Deals. ExecReview, May 20, 2016. http://www.execreview.com/2016/05/deutsche-bank-shareholders-vote-against-pay-plan-for-bosses/

Kremer, M. (1993). The O-ring theory of economic development. Quarterly Journal of Economics, 108(3): 551-575.

Kroszner, R.S. and Strahan. P.E. (2011). Financial regulatory reform: Challenges ahead. American Economic Review, 101(3): 242-46.

Krugman, P. (2002). The Outrage Constraint. The New York Times, Opinion, August 23, 2002. http://www.nytimes.com/2002/08/23/opinion/the-outrage-constraint.html

Laeven, L. and Levine, R. (2009). Bank governance, regulation and risk taking. Journal of Financial Economics, 93(2): 259-275.

Lambert, R.A., Larcker, D.F. and Weigelt, K. (1993). The structure of organizational incentives. Administrative Science Quarterly, 38: 438-461.

Larcker, D.F. and Tayan, B. (2010). CEO succession planning: Who's behind door number one? CGRP-05, 06/24/10. Board of Trustees of the Leland Stanford Junior University. Stanford Closer Look Series 7p.

Larcker, D.F. and Tayan, B. (2012). Is a powerful CEO good or bad for shareholders? Stanford Closer Look Series. www.thecasecentre.org/stanfordfreecases

Larcker, D.F., Miles, S.A. and Tayan, B. (2014). The handpicked CEO successor. Stanford Closer Look Series. www.thecasecentre.org/stanfordfreecases

Lasfer, M.A. (2006). The inter-association between managerial ownership and board structure. Journal of Business Finance and Accounting, 33(7-8): 1006-1033.

Lazear, E. (1999). Globalisation and the market for team mates. The Economic Journal, 109(454): 15-40.

Lazear, E.P. (1979). Why is there mandatory retirement? Journal of Political Economy, LXXXVII: Dec. 1261-1284.

Lazear, E.P. (1989). Pay equality and industrial politics. Journal of Political Economy, 97: 561-580.

Lazear, E.P. and Rosen, S. (1981). Rank-order tournaments as optimum labor contracts. Journal of Political Economy, 89(5): 841-864.

LePetit, L., Nys, E., Rous, P. and Tarazi, A. (2008). Bank income structure and risk: An empirical analysis of European banks. Journal of Banking and Finance, 32(8): 1452-1467.

Lewellen, W., Loderer, C. and Martin, K. (1987). Executive compensation contracts and executive incentive problems: An empirical analysis. Journal of Accounting and Economics, 9(3): 287-310.

Lin, Y-F., Yeh, Y.M.C. and Shih, Y-T. (2013). Tournament theory's perspective of executive pay gaps. Journal of Business Research, 66(5): 585-592.

Lo, A.W. (2016). The Gordon Gekko effect: The role of culture in the financial industry. Federal Reserve Bank of New York Economic Policy Review 22(1): 17-42 (August).

Lubinski, D., Humphreys, L. (1997). Incorporating general intelligence into epidemiology and the social sciences. Intelligence, 24(1): 159-201.

Lucas, R.E. Jr. (1978). On the size distribution of business firms. Bell Journal of Economics, 9(2): 508:523.

MacCrimmon, K.R. and Wehrung, D.R. (1990). Characteristics of risk taking executives. Management Science, 36(4): 422-435.

Macey, J. and O'Hara, M. (2016). Bank corporate governance: A proposal for the post-crisis world. Federal Reserve Bank of New York Economic Policy Review 22(1): 85-105 (August).

Macey, J.R. and O'Hara, M. (2003). The corporate governance of banks. Federal Reserve Bank of New York Economic Policy Review, 9(1): 91-107 (April).

Magnan, M.L. and St-Onge, S. (1997). Bank performance and executive compensation: A managerial discretion perspective. Strategic Management Journal, 18(7): 573-581.

Main, B.G.M., O'Reilly, C.A. and Wade, J. (1993). Top executive pay: Tournament or teamwork? Journal of Labor Economics, 11(4): 606-628.

Malmendier, U., and Tate, G.A. (2009). Superstar CEOs. The Quarterly Journal of Economics, 124(4): 1592-1638.

Mankiw, N.G., Romer, D. and Weil, D.N. (1992). A contribution to the empirics of economic growth. The Quarterly Journal of Economics, 107(2): 407-438.

Marcel, J.J. (2009). Why top management team characteristics matter when employing a chief operating officer: a strategic contingency perspective. Strategic Management Journal, 30(6): 647-658.

Marques, L.B. and Oppers, S.E. (2014). Risk taking by banks: The role of governance and executive pay. International Monetary Fund - IMF, Chapter 3, pp. 105-147, October 2014.

Marshall, J. (2009). Executive in UK Banking. Business and transport section. Standard note: SN/BT/04970. House of Commons, UK.

McKee, M. and Monteleone, M. (2010). Reward structures under fire in the UK financial services sector. International Corporate Rescue, Chase Cambria Publishing, 15-24.

McKnight, P.J., Tomkins, C., Weir, C. and Hobson, D. (2000). CEO age and top executive pay: A UK empirical study: Journal of Management *and Governance,* 4: 173-187.

McNulty, T., Florackis, C. and Ormrod, P. (2012). Corporate Governance and Risk: A Study of Board Structure and Process. University of Liverpool Management School. The Association of Chartered Certified Accountants (ACCA) Educational Trust (London), Research report 129/001, 33p. ISBN: 978-1-85908-9.

Mehran, H. and Rosenberg, J. (2008). The effect of employee stock options on bank investment choice, borrowing, and capital. Federal Reserve Bank of New York Staff Reports, no. 305, October 2007: revised June 2008.

Mehran, H. and Tracy, J. (2016). Deferred cash compensation: Enhancing stability in the financial services industry. Federal Reserve Bank of New York Economic Policy Review 22(1): 61-75 (August).

Milgrom. P. and Roberts, J. (1988). An economic approach to influence activities in organizations. American Journal of Sociology, 94: 154-179.

Miller, D., Xu, X. and Mehrotra, V. (2015). When is human capital a valuable resource? The performance effects of Ivy league selection among celebrated CEOs. Strategic Management Journal, 36(6): 930-944.

Mirrlees, J. (1976). The Optimal Structure of Incentives and Authority within an Organozation. Bell Journal of Economics, 7: 105-131.

Mishel, L. and Davis, A. (2015). Top CEOs Make 300 Times More than Typical Workers. Economic Policy Institute-EPI, Issue Brief #399, 14pp. June 21, 2015. http://www.epi.org/publication/top-ceos-make-300-times-more-than-workers-pay-growth-surpasses-market-gains-and-the-rest-of-the-0-1-percent/

Mishel, L. and Sabadish, N. (2013). CEO Pay in 2012 was Extraordinary High Relative to Typical Workers and Other High Earners. Report http://epi.org/publication/Ceo-pay-2012- extraordinary-high/

Morrison, A.D. (2010). Universal banking. In: Berger, A., Molyneux, P. and Wilson, J. (eds), The Oxford Handbook of Banking (1st edition), Oxford University Press, 171-194.

Murphy, K.J. (1985). Corporate performance and managerial remuneration. Journal of Accounting and Economics, 7: 11-42.

Murphy, K.J. (1986). Incentives, learning, and compensation: A theoretical and empirical investigation of managerial labor contracts. The RAND Journal of Economics, 17(1): 59-76.

Murphy, K.J. (1999). Executive compensation. In Ashenfelter, O. and Card, D. (eds) *Handbook of Labor Economics*, Vol. 3, Part B, Chapter 38, 2485-2563.

Murphy, K.J. (2000). Performance standards in incentive contracts. Journal of Accounting and Economics, 30(3): 245-78.

Murphy, K.J. (2012). Pay, politics and the financial crisis. In Blinder, A.S., Lo, A.W. and Solow, R.M. (eds) *Rethinking the Financial Crisis*, 303-344.

Murphy, K.J. (2013a). Executive compensation: Where we are, and how we got there. In Constantinides, G., Harris, M. and Stulz, R. (eds) *Handbook of the Economics of Finance*, Vol. 2, Part A, 211-356.

Murphy, K.J. (2013b). Regulating banking bonuses in the European Union: A case study in unintended consequences. European Financial Management, 19(4): 631-657.

Murphy, K.J. and Jensen, M.C. (2011). CEO bonus plans: And how to fix them. Harvard Business School NOM Unit Working Paper No. 12-022.

Murphy, K.J. and Zabojnik, J. (2007). Managerial capital and the market for CEOs. Available at SSRN 984376.

Nash, R.C. and Sinkey Jr, J.F. (1997). On competition, risk and hidden assets in the market for bank credit cards. Journal of Banking and Finance, 21(1): 89-112.

National Audit Office, (2009). Maintaining the Financial Stability Across the United Kingdom's Banking System. Central Finance and Treasury, 4 December 2009. https://www.nao.org.uk/report/maintaining-financial-stability-across-the-united-kingdoms-banking-system/

National Audit Office, (2015). Taxpayer Support for UK Banks: FAQs. How much support did the Government provide to UK banks? https://www.nao.org.uk/highlights/taxpayer-support-for-uk-banks-faqs/

National Audit Office-NAO, (2010). Maintaining the Financial Stability of UK Banks: Update on the Support Schemes. National Audit Office, Central Finance and Treasury. https://www.nao.org.uk/report/maintaining-the-financial-stability-of-uk-banks-update-on-the-support-schemes/

Nguyen, D.D., Hagendorff, J. and Eshraghi, A. (2015). Which executive characteristics create value in banking? Evidence from appointment announcements. Corporate Governance: An International Review, 23: 112-128.

Nourayi, M.M (2006). CEO compensation and firm performance: non-linearity and asymmetry. Advance in Management Accounting, (15):103-126.

O'Reilly III, C.A., Main, B.G. and Crystal, G.S. (1988). CEO compensation as tournament and social comparison: A tale of two theories. Administrative Science Quarterly, 33(2): 257-274.

Office for National Statistics (2003). Ethnic Group Statistics. A Guide for the Collection and Classification of Ethnicity Data. Controller of Her Majesty's Stationary Office (HMSO) ISBN 1 857745612.

Office for National Statistics (2012). Annual Survey of Hours and Earnings, 2012 Provisional Results. Statistical Bulletin. www.ons.gov.uk/ons/dcp171778_286243.pdf

Oi, W.Y. and Idson, T.L. (1999). Firm size and wages. In: Handbook of Labor Economics. Ashenfelter, O. and Card, D. (eds.), Vol. 3, Amsterdam: North Holland, 2166-2214.

Olson, P. (2012). Regulation's role in bank changes. Federal Reserve Bank of New York, FRBNY Economic Policy Review, July 2012, 13-20.

Organization for Economic Cooperation and Development (2013). OECD Economic Surveys: Switzerland 2013, November, 2013 overview. http://www.oecd.org/eco/surveys/Overview%202013%20SWI.pdf

Oyer, P. and Schaefer, S. (2001). Litigation costs and return to experience. Stanford Law and Economics Olin Working Paper No. 215.

Oyer, P. and Schaefer, S. (2005). Why do some firms give stock options to all employees? An empirical examination of alternative theories. Journal of Financial Economics, 76: 99-133.

Ozkan, N. (2007). Do corporate governance mechanisms influence CEO compensation? An empirical investigation of UK companies. Journal of Multinational Financial Management, 17(5): 349-364.

Ozkan, N. (2011). CEO Compensation and Firm Performance: An Empirical Investigation of UK Panel Data. European Financial Management, 17(2): 260-285.

Page, S. (2007). The difference: How the power of diversity creates better groups, firms, schools, and societies. Princeton University Press, Princeton.

Palvia, A., Våhåmaa, E. and Våhåmaa, S. (2015). Are female CEOs and chairwomen more conservative and risk averse? Evidence from the banking industry during the financial crisis. Journal of Business Ethics, 131(3): 577-594.

Pan, Y., Siegel, S. and Wang, T.Y. (2016). Corporate Risk Culture. Available at SSRN: http://ssrn.com/abstract=2675594.

Pathan, S. (2009). Strong boards, CEO power and bank risk-taking. Journal of Banking and Finance, 33: 1340-1350.

Pathan, S. and Faff, R. (2013). Does board structure in banks really affect their performance? Journal of Banking and Finance, 37: 1573-1589.

Pathan, S. and Skully, M. (2010). Endogenously structured boards of directors in banks. Journal of Banking and Finance, 34: 1590-1606.

Pew Research Center (2015). Women and leadership: Public says women are equally qualified, but barriers persist. Pew Research Center, Washington, D.C.: 14 January.

Philippon, T. and Reshef, A. (2012). Wages and human capital in the U.S. finance industry: 1909-2006. The Quarterly Journal of Economics 127(4): 1551-1609.

Pi, L. and Timme, S.G. (1993). Corporate control and bank efficiency. Journal of Banking and Finance, 17: 515-530.

Pitcher, P. and Smith, A.D. (2001). Top management team heterogeneity: Personality, power, and proxies. Organization Science, 12(1): 1-18.

Pozzebon, S. (2015). HSBC whistle-blower: You Have to Know How Banks Work to understand the size of this Scandal. UK Business Insider Feb. 20, 2015. www.uk.businessinsider.com/interview-with-herv-falciani-hsbc-2015-2.

Queiro, F. (2016). The effect of manager education on firm growth. Harvard University. http://scholar.harvard.edu/franciscoqueiro/publications/effect-manager-education-firm-growth

Quigley, T.J. and Hambrick, D.C. (2015). Has the "CEO effect" increased in recent decades? A new explanation for the great rise in America's attention to corporate leaders. Strategic Management Journal, 36: 821-830.

Rabe-Hesketh, S., and Skrondal, A. (2008). Multilevel and Longitudinal Modeling Using Stata. College Station, TX: Stata Press (2nd ed.).

Rajgopal, S. and Shevlin, T. (2002). Empirical evidence on the relation between stock option compensation and risk taking. Journal of Accounting and Economics, 33: 145-171.

Raudenbush, S.W., and Bryk, A.S. (2002). Hierarchical Linear Models. Thousand Oaks: Sage.

Reavis, C. (2009). The global financial crisis of 2008-2009: The role of greed, fear and oligarchs. Massachusetts Institute of Technology, 09-093, July 22, 2009, 22p.

Reinhart, C.M. and Rogoff, K.S. (2009). This Time is Different. Eight Centuries of Financial Folly. Princeton University Press.

Reinhart, C.M. and Rogoff, K.S. (2011). From financial crash to debt crisis. American Economic Review 101(5): 1676-1706.

Rhodes, S.R. (1983). Age-related differences in work attitudes and behavior: A review and conceptual analysis. Psychological Bulletin, 93: 328–367.

Rijsenbilt, A. (2011). CEO Narcissism, Measurement and Impact. Ph.D. Erasmus University Rotterdam, 23rd June 2011, 227p.

Rosen, S. (1981). The economics of superstars. American Economic Review, 71(5): 845-858.

Rosen, S. (1982). Authority, control and distribution of earnings. Bell Journal of Economics, 13: 311-323.

Rosen, S. (1986). Prizes and incentives in elimination tournaments. American Economic Review, 76: 701-715.

Ross, S.A. (1973). The economic theory of agency: The principal's problem. American Economic Review, 63(2): 134-139.

Rugman, A.M., Collinson, S. and Hodgetts, R.M. (2006). International Business (4th ed.). Harlow, UK; 341p.

Saltmarsh, M. (2011). UBS Blames $2 Billion Loss on Rogue Trader. Dealbook.nytimes.com/2011/09/15/ubs-reports-2-billion-loss-to-rogue-trader/?_r=0 retrieved 18/02/2015.

Saunders, A. and Wilson, B. (2001). An analysis of bank charter value and its risk – Constraining incentives. Journal of Financial Services Research, 19(2/3): 185-195.

Schaeck, K. and Cihák, M. (2014). Competition, efficiency, and stability in banking. Financial Management, 43(1): 215-241.

Schaefer, S. (1998). The Dependence of pay-Performance Sensitivity on the Size of Firm. Review of Economics and Statistics 80(3): 436-443.

Schultz, T.W. (1961). Investment in human capital. American Economic Review, 51(1): 1-17.

Securities and Exchange Commission (2008). Chairman Cox Announces End of Consolidated Supervised Entities Program, September 26, 2008-230.

Securities and Exchange Commission (2010). SEC Proposes Rules on "Say on Pay" and Proxy Vote Reporting. SEC 2010-198. https://www.sec.gov/news/press/2010/2010-198.htm

Securities and Exchange Commission (2015). SEC Proposes Rules Requiring Companies to Adopt Clawback Policies on Executive Compensation. SEC 2015-136, https://www.sec.gov/news/pressrelease/2015-136.html.

Security Exchange Commission-SEC proxy rules (2009). Security Exchange Commission-SEC proxy Disclosure enhancements, 17 CFR Parts 229,239,240,249 and 274 [Release Nos. 33-9089; 34-61175; IC-29092; File No. S7-13-09] RIN, Final rule.

Shakir, R. (2009). Examining the effect of leadership structure and CEO tenure on Malaysian property firm performance. Journal of Real Estate Literature, 17(1): 45-62.

Sheehan, K. (2007). Is the outrage constraint an effective constraint on executive remuneration? Evidence from the UK and preliminary results from Australia. Available at SSRN: http://ssrn.com/abstract=974965

Shleifer, A., and Vishny, W. (1997). A survey of corporate governance. Journal of Finance, 52(2): 737-783.

Sila, V., Gonzalez, A. and Hagendorff, J. (2016). Women on board: Does boardroom gender diversity affect firm risk? Journal of Corporate Finance, 36: 26-53.

Singh, V., Vinnicombe, S. and Johnson, P. (2001). Women directors on top UK boards. Corporate Governance: An International Review, 9(3): 206-219.

Skrondal, A. and Rabe-Hesketh, S. (2008). Multilevel and Longitudinal Modelling using Stata. StataCorp LP (2nd edition), ISBN-10: 1-59718-040-8.

Smith, A. (1776). An Inquiry into the Nature and Causes of the Wealth of Nations. London: Meuthuen and Co. Ltd.

Smith, C.W. and Stulz, M. (1985). The determinants of firms' hedging policies. Journal of Financial and Quantitative Analysis, 20: 391-405.

Smith, C.W. and Watts, R.L. (1992). The investment opportunity set and corporate financing, dividend and compensation policies. Journal of Financial Economics, 32: 263-292.

Srivastav, A. and Hagendorff, J. (2016). Corporate governance and bank risk-taking. Corporate Governance: An International Review, 24(3): 334-345.

Srivastav, A., Armitage, S. and Hagendorff, J. (2014). CEO inside debt holdings and risk-shifting: Evidence from bank payout policies. Journal of Banking and Finance, 47: 41-53.

Stewart, H. (2009). IMF: Fifth of Britain's GDP Spent so far on Bailouts. Financial crisis. https://www.theguardian.com/business/2009/mar/06/imf-uk-bailout-gdp

Stiroh, K.J. (2006). A portfolio view of banking with interest and non-interest activities. Journal of Money, Credit and Banking, 38(5): 1351-1361.

Stiroh, K.J. and Rumble, A. (2006). The dark side of diversification: The case of US financial holding companies. Journal of Banking and Finance, 30: 2131-2161.

Stiroh, K.J. and Strahan, P.E. (2003). Competitive dynamics of deregulation: Evidence from U.S. banking. Journal of Money, Credit and Banking, 35(5): 801-828.

Stulz, R.M. (2016). Risk management, governance, culture, and risk taking in banks. Federal Reserve Bank of New York Economic Policy Review 22(1): 43-59 (August).

Terviö, M. (2008). The difference that CEOs make: An assignment model approach. American Economic Review 98: 642-668.

Thakor, A. (2016). Corporate culture in banking. Federal Reserve Bank of New York Economic Policy Review 22(1): 5-16 (August).

Treanor, J. (2014). Senior City Bankers Paid an Average £1.3m, data shows. http://www.theguardian.com/business/2014/dec/31/city-of-london-bankers-paid-1300000-average, 31 Dec 2014.

Treanor, J. (2016). Boardroom pay system is not fit for purpose, says top investor group. http://www.theguardian.com/business/2016/apr/21/boardoom-pay-system-is-not-fit-for-purpose-says-top-investor-group

Tung, F. (2011). Pay for banker performance: Structuring executive compensation for risk regulation. Northwestern University Law Review, 105(3): 1205-1252.

Tung, F. and Xue, W. (2012). Bank CEOs, inside debt compensation, and the global financial crisis. Social Science Research Network. Boston Univ. School of Law Working Paper No. 11-49.

Vallascas, F. and Hagendorff, J. (2013). CEO bonus remuneration and bank default risk: Evidence from the U.S. and Europe. Financial Markets, Institutions & Instruments, 47-89.

van Bekkum, S. (2016). Inside debt and bank risk. Journal of Financial and Quantitative Analysis, forthcoming

Vemala, P., L. Nguyen, D. Nguyen and Kommasani, A. (2014). CEO compensation: Does financial crisis matter? International Business Research 7(4): 125-131.

Vieito, J.P.T. (2012). Gender, top management compensation gap, and company performance: Tournament versus behavioural theory. Corporate Governance: An International Review, 20(1): 46-63.

Vigeo Rating (2013). Toward a more balanced banking remuneration in EU: Will reputation and regulation do the job? Sustainability Focus, September.

Wade, J., O'Reilly, C. and Chandratat, I. (1990). Golden parachutes: CEO and the exercise of social influence. Administrative Science Quarterly, 35: 587-603.

Wagner, W.G., Pfeffer, J. and O'Reilly III, C.A. (1984). Organizational demography and tumover in top management groups. Administrative Science Quarterly, 29: 74-92.

Walker, S.D. (2009). A Review of Corporate Governance in UK banks and Other Financial Industry Entities. Final Recommendations. http:/www.hm-treasury.gov.uk/d/walker_review_261109.pdf, retrieved 26 November 2009.

Walker-Arnold, E. (2010). Company law, corporate governance and the banking crisis. International Corporate Rescue, Chase Cambria Publishing, pp. 3-11.

Weisbach, M. (1988). Outside directors and CEO turnover. Journal of Financial Economics, 20(1-2): 431-460.

Westphal, J.D. and Zajac, E.J. (1995). Who shall govern? CEO/board power, demographic similarity, and new director selection. Administrative Science Quarterly, 40(1): 60-83.

Williams, R. (2015). Interaction effect and group comparisons. University of Notre Dame, https://www3.nd.edu/~rwilliam/stats2/l51.pdf

Winter-Ebmer, R. and Zweimüller, J. (1999). Firm-size differentials in Switzerland: Evidence from job-changers. American Economic Review, 89(2): 89-93.

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. Journal of Financial Economics, 40: 185-211.

Yitzhaki, S. (1991). Economic distance and overlapping of distributions. Journal of Econometrics, 61:147-159.

Zalewska, A. (2014). Gentlemen do not talk about money: Remuneration dispersion and firm performance relationship on British boards. Journal of Empirical Finance, 27: 40-57.

Zalewska, A. (2016). A new look at regulating bankers' remuneration. Corporate Governance: An International Review, 24(3): 322-333.

Zhou, W., Georgakopoulos,G.; Sotiropoulos, I. and Vasileiou, K.Z. (2011).The impact of executive payment on firm performance of the financial enterprises in China. Canadian Center of Science and Education, 7(8): 65-80.