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The Role of the Institutional Environment in Executive Compensation

An Empirical Analysis of European and US Firms

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Summary

Executive compensation is a prominent topic of debate among academics, investors, and policymakers. Moreover, it is one of the most controversial topics in corporate governance literature and is widely viewed as a classic example of the principal-agent problem. The majority of existing research on the role of executive compensation in corporate governance focuses on the relationship between executive compensation and firm-level governance mechanisms, such as ownership or board structure. By contrast, the literature remains quite silent on the role of institutional governance mechanisms in executive compensation. Moreover, due to the lack of data on international compensation practices, the majority of empirical studies rely on single country data - most often on pay practices in the United States.

This dissertation is intended to fill this gap by providing new empirical evidence on a sample of European and US public firms. Therefore, I have created a novel dataset by collecting information from annual reports of almost 15,000 executives in 2,766 firm-years across 17 countries. The empirical analysis follows a two-stage process.

In the first step, I break new ground in compensation literature by studying how the institutional environment influences the design and the effect of executive compensation. The empirical results indicate that institutional governance mechanisms, such as shareholder protection and disclosure rules

have a substantial impact on executive pay policies. In particular, I find that pay-for-performance sensitivity increases in levels of disclosure and decreases in the levels of shareholder protection. Moreover, I show that the institutional setting moderates the impact of firm-level governance mechanisms on executive pay.

In the second step, I examine how executive incentives and bank regulation relate to bank risk taking in the wake of the recent financial crisis of 2007/2008. Because banks are at the center of governmental regulations and lie at the heart of the financial stability of the whole economy, it is tremendously important to understand the drivers of risk taking in banks. My findings suggest that incentives induce managerial risk taking in banks, while tight bank regulation could dampen excessive risks. However, higher regulation has a drawback because the risk-inducing effect of short-term incentives is enhanced by tight regulation, thereby encouraging managers to take even more excessive risks.

Overall, this dissertation postulates that the institutional environment is an important factor in executive compensation and issues surrounding it.

Short table of contents

Contents

List of figures

List of tables

List of abbreviations

2SLS	Two-stage least squares
3SLS	Three-stage least squares
bp	Basis points
CAPM	Capital Asset Pricing Model
CRD	Capital requirements directive
EBIT	Earnings before interest and taxes
EBDITDA	Earnings before interest, taxes, depreciation, and amortization
ECGI	European Corporate Governance Institute
EDF	Expected default frequency
EPS	Earnings per share
e.g.	Exempli gratia
et al.	Et alii
etc.	Et cetera
EU	European Union
EUR	Euro
excl.	Excluding
FAS	Financial Accounting Standards
FTSE 350	United Kingdom stock market index from FTSE Group
GDP	Gross domestic product
GMM	Generalized methods of moments

incl.	Including
i.e.	Id est
ICRG	International Country Risk Guide
IRC	Internal Revenue Code
LN	Natural logarithm
Log	Logarithm
LTIP	Long-term incentive plans
Max	Maximum
Min	Minimum
MSCI Europe	European stock market index from MSCI
N	Number of observations
No.	Number
observ.	Observations
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary least squared
ROA	Return on assets
ROE	Return on equity
R&D	Research and development
SEC	US Securities and Exchange Commission
S&P 500	United States stock market index from Standard & Poor's
S&P 1500	United States stock market index from Standard & Poor's
TARP	Troubled Asset Relief Program
UK	United Kingdom
US	United States
VIF	Variance inflation factor
vs.	Versus
VorstAG	Gesetz zur Angemessenheit der Vorstandsvergütung

1 Introduction

Executive compensation is a controversial topic that attracts much attention from academics, politicians, and the public. While it has sparked a prominent and recurring debate on executive pay in the United States since the Great Depression in the 1920s, media and public interest in Europe was remarkably low until the 1990s. For instance, excessive compensation practices occasionally triggered public outrage in the wake of the privatization of utility companies in the United Kingdom in the 1990s and the Vodafone hostile takeover of Mannesmann in 2000 in Germany.[1] However, two recent landmark events once again sparked a debate on executive pay polices. First, dot-com bubble burst in 2000, followed by the demise of companies such as Enron, WorldCom, and other American and European firms, points to excessive executive pay practices. Second, the recent financial crisis of 2007/2008 still draws worldwide attention to excessive and risk-inducing compensation schemes.

Despite the extensive discussion, existing literature on executive compensation provides little empirical evidence on European compensation practices. Due to the lack of data on international pay arrangements, the majority

[1] *Conyon, Core & Guay (2010)* attribute this to the fact that pay practices in the US simply were more outrageous, and detailed information on executive compensation only recently became widely available in Europe.

of empirical studies rely on single country data - most often on pay practices in the United States. In 2003, following the Sarbanes-Oxley Act in the United States[2], the European Union (EU) Commission advised that listed firms in the EU should disclose individual compensation packages to investors.[3] In practice, many large listed European firms have complied with the recommendations by 2005 or 2006. This improvement in disclosure rules regarding executive compensation allows academics to examine, systematically, executive compensation packages in European firms. However, debates in the media and among politicians in Europe often rely on anecdotal evidence rather than on sound empirical findings. Similarly, academics focus on single country comparisons rather than on the examination of multinational compensation practices.[4] Nevertheless, these preliminary comparisons suggest that there are noticeable differences in pay practices across countries, which brings up the question: What drives differences in executive compensation across countries?

In general, early corporate governance research has focused on firm-level governance mechanisms (e.g., executive compensation, ownership structure), labeled by *Denis & McConnell (2003)* as "first generation" studies. In particular, executive compensation was explained only in terms of firm-specific characteristics, due to the lack of information.[5] By contrast, the "second gen-

[2]In the wake of scandals in the early 2000s, the US Congress passed the Sarbanes-Oxley Act in July 2002. While this Act primarily focuses on improving the accounting standards of publicly traded firms, it also imposes rules on executive compensation.

[3]On May 21, 2003, the EU Commission released the report "Modernizing Company Law and Enhancing Corporate Governance in the European Union - A Plan to Move Forward", COM (2003) 284. It includes, inter alia, a recommendation that details of individual directors' compensation should be disclosed in annual reports, either through legislation or best-practice rules.

[4]For instance, *Conyon & Murphy (2000)* compare UK and German pay practices. *Conyon, Core & Guay (2010)* analyze pay practices of US and UK firms. Multinational studies are limited to *Bryan, Nash & Patel (2010)* and *Muslu (2010)*.

[5]For an overview of firm-level determinants of pay, see *Murphy (1999)*, *Core, Guay*

eration" of corporate governance research was initiated by the seminal work of *La Porta et al. (1997, 1998)* and focuses on the role of country-level mechanisms. This growing stream of research, called "law and finance" literature, connects financial decisions to the institutional setting. Essentially, it is argued that legal differences are fundamental determinants of the evolvement of corporate finance and corporate governance across countries. Although the importance of country characteristics in corporate decision-making is widely discussed, legal and regulatory issues - particularly investor protection rules - play a remarkably small role in international executive compensation research.

Despite the existing research on executive compensation in the US, this dissertation is intended to shed more light on European compensation practices. Furthermore, I break new ground in compensation literature by asking how the institutional environment influences the design and the effect of executive compensation. In particular, I study whether investor protection and disclosure requirements have an impact on pay-for-performance sensitivity. Furthermore, I analyze how the institutional setting moderates the impact of firm-level governance mechanisms on pay policies.

A further aspect that highlights the importance of understanding and exploring international pay practices relates to the role of executive compensation in banks during the financial crisis of 2007/2008. Because the crisis, once more, underlines the systemic importance of banks to the entire economy, it is crucial to understand the risk behavior of banks. It is widely believed that excessive risk taking by banks, due to the systemic risk posed on the whole economy, was the root of the economic crisis. On the basis of

& Verrecchia (2003) and *Fahlenbrach (2009)*.

anecdotal evidence, many critics argue that ill-designed executive compensation contracts were the drivers of excessive risks taken by many banks. The public perception of this issue is reflected by US President Barack Obama:

> "This economic crisis began as a financial crisis, when banks and financial institutions took huge, reckless risks in pursuit of quick profits and massive bonuses."[6]

Until recently, the literature on compensation and risk in the financial industry was remarkably sparse, and emerging empirical evidence on the financial crisis regarding the relationship between risk taking and incentives is mixed. While *Chesney, Stromberg & Wagner (2011)*, *Cheng, Hong & Schenkman (2011)*, and *Suntheim (2011)* find that CEO incentives had an impact on risk taking, *Fahlenbrach & Stulz (2011)* do not find a strong relationship between compensation practices and stock performance during the recent crisis.[7]

Moreover, the financial crisis demonstrated that the failure of an important financial institution poses a major risk to the worldwide economy. Therefore, policymakers and regulators have an incentive to avoid excessive risk taking by banks. Hence, further attention must be paid to the interaction of compensation incentives and bank-specific regulation. In fact, it has been argued that lax regulatory regimes have facilitated managers' wrongdoing and banks' excessive risk taking. Consequently, many governments have enhanced corporate law and compensation guidelines and tried to tie com-

[6] *Obama (2010).*

[7] See *Mehran, Morrison & Shapiro (2011)* for an overview of studies on corporate governance, particularly on executive compensation in banks in the context of the recent credit crisis.

pensation to long-term performance.[8]

The recent financial crisis, as a macroeconomic shock, is well suited for carving out the relationships among bank risk, manager's incentives, and regulatory aspects. In doing so, I am interested in how compensation packages granted prior to the crisis have induced bank executives to take excessive risks. I study the impact of pre-crisis incentives of executives on several ex-ante risk-taking measures, such as the z-score, probability of default, and stock performance during the crisis. I use stock performance as an ex-post proxy for excessive tail risks taken prior to the crisis. Moreover, using cross-country data allows me to analyze whether governmental bank regulation is able to reduce detrimental risk taking, thereby preventing the next financial collapse.

In summary, the main contribution of this dissertation is two-fold. First, it provides novel empirical evidence on the relationship between institutional governance mechanisms and executive compensation. In particular, I present the current compensation practices of 705 firms in 16 European countries and the US for the period 2005-2008. Furthermore, I am the first to analyze intensively the influence of both institutional governance and firm-level governance on executive pay.

Second, using a sample of 352 banks from 14 European countries and the US, I examine the role of executive compensation in bank risk taking in the context of the recent financial crisis. Moreover, I scrutinize whether

[8]For instance, according to the Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 951 n., federal regulators are endowed with the power to prohibit any compensation structure that encourages inappropriate risk taking in covered financial institutions. European countries such as the UK, France, and Germany have adopted overhauled compensation regulations, following recommendations of the Financial Stability Board (FSB).

regulation of the banking sector reduced excessive risk taking in the wake of the financial crisis of 2007/2008.

1.1 Research question

This section outlines the research questions of my dissertation. The first group of questions discusses the determinants of executive pay in Europe and the US. This set of questions is subdivided into two areas. The first area addresses the relevance of institutional governance mechanisms in executive pay. The second area is concerned with the interaction between institutional governance and firm-specific governance with respect to executive pay. In particular, the following research questions are discussed:

Question 1 a: How does the level of shareholder protection influence pay-for-performance sensitivity?

Question 1 b: How does the level of shareholder protection influence the total pay level?

Question 1 c: How does the level of disclosure rules influence pay-for-performance sensitivity?

Question 1 d: How does the level of disclosure rules influence the total pay level?

Question 2 a: Does the institutional environment moderate the impact of firm-level governance mechanisms on pay-for-performance sensitivity?

Question 2 b: Does the institutional environment moderate the impact of firm-level governance mechanisms on the total pay level?

The second collection of questions addresses the role of executive compensation in bank risk taking in the context of the financial crisis of 2007/2008. This collection is further grouped into four areas. The first discusses the effect of bank regulation on executive pay policies. The second set of questions relates to the relationship between incentives and risk taking in banks. The third question deals with the relevance of legal regulations on bank risk taking. The question concentrates on the impact of incentives on risk taking behavior under different quality of bank regulation. In particular, this thesis addresses the additional questions:

Question 3: Do shareholders respond to regulation in the banking sector either by increasing or decreasing managers' incentives?

Question 4 a: Do short-term incentives, such as bonuses, affect bank risk taking?

Question 4 b: Do long-term incentives, such as stock grants, affect bank risk taking?

Question 5: Do strict regulations impose rules and barriers against excessive risk taking by banks?

Question 6: Does the impact of executive compensation on a bank's risk taking vary with different levels of government regulation?

These questions are relevant for both academics and practitioners. Specifically, my empirical findings provide implications for regulators, policymak-

ers, and investors. In a review of existing research on executive compensation, *Devers et al. (2007)* claim that "Examining the effects of regulation on compensation offers important avenues for future research." Following this statement, my empirical analysis provides a deeper insight into how the institutional environment relates to corporate governance mechanisms, such as executive compensation.

1.2 Structure

This section outlines the structure of this dissertation and briefly summarizes important aspects of each chapter. The dissertation consists of eight chapters, including this one.

Chapter 2 describes the theoretical framework of my analysis. I outline existing theories that are closely related to the research topic, and I put my research questions into a theoretical framework of existing theories. After introducing a broad framework of corporate governance that incorporates internal and external mechanisms, I go into the relationship between managers and shareholders, thereby offering a general overview of the agency theory. Subsequently, I discuss two competing theoretical approaches to executive compensation: Optimal contracting vs. managerial power. I describe how both approaches explain the effect and characteristics of executive pay. Lastly, I point to the relevance of the institutional environment as an important external corporate governance mechanism.

Chapter 3 provides a comprehensive overview of existing empirical literature relevant to this dissertation. In the first section, I discuss literature

regarding the role of internal governance mechanisms in executive compensation. In particular, I summarize empirical findings on firm-level determinants of pay-for-performance sensitivity and total pay. Moreover, I differentiate between empirical results, based on two competing hypotheses regarding the relationship between firm-level governance and pay (substitution vs. entrenchment hypothesis). Next, I provide an overview of the limited empirical research on institutional governance influences on executive pay. In the second section of this chapter, I present an overview of corporate risk taking with respect to executive compensation. In addition, I discuss empirical results regarding this relationship in the banking industry. After providing a general review of studies on the impact of the institutional environment on risk taking, I concentrate on bank-specific regulation and risk taking by banks, particularly during the recent financial crisis.

Chapter 4 describes practical aspects of executive compensation and the institutional environment. First, I portray executive compensation, including an overview of components of executive pay arrangements. I continue with an outline of regulatory aspects affecting executive pay, such as accounting rules, taxes, and disclosure rules. In particular, I present a summary of recent reforms and legislative proposals after the crisis of 2007/2008. The second part of this chapter provides a definition of the institutional environment and its dimensions. Furthermore, I explain how the quality of the institutional environment is measured in empirical economic research.

Chapter 5 explains the four stages of the development of the hypotheses, and it outlines my theoretical predictions. The first two sections address the theoretical prediction of the impact of institutional environment on compensation and the interaction between institutional environment and

firm-specific governance mechanisms with respect to pay. The theoretical predictions presented in the third and fourth sections within this chapter deal with the impact of compensation and bank regulation on bank risk.

Chapter 6 presents the first part of the empirical results. In this chapter, I analyze the role of the institutional environment in executive compensation in Europe and the US. First, I provide an overview of the data and methodology used in the empirical analysis. Further, I shed light on contemporaneous pay practices in European firms, by presenting a descriptive summary of executive remuneration practices. Subsequently, I test my hypotheses, outlined in section 5.1 and section 5.2, by estimating various regression models. Finally, I discuss several robustness checks of my empirical results.

Chapter 7 presents the second part of the empirical results. In this chapter, I scrutinize how executive incentives and regulations relate to bank risk taking in the context of the recent financial crisis. I start with an overview of the data and methodology used in the empirical analysis. Subsequently, I provide a descriptive summary of pay practices in European and US banks prior to the crisis. Next, I test my hypotheses, outlined in section 5.3. In particular, I examine how risk taking is affected by both incentives and banking regulation. Moreover, I analyze how the bank regulation setting moderates the impact of incentives on banks' risk taking (section 5.4). Lastly, my empirical results are subject to additional robustness checks.

Finally, **Chapter 8** summarizes the main findings of my dissertation, provides a discussion on its contribution to the literature, and provides an outlook for future research.

2 Theoretical framework

2.1 A broad framework of corporate governance

Corporate governance and the role of agency problems are issues of elementary interest in economics. One of the first thoughts on Corporate governance in history goes back to Adam Smith in 1776 who notes:

> "The directors of such companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartner frequently watch over their own... Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company."[9]

Modern definitions of corporate governance carve out the importance of aligning the interests of corporations with those of other claimholders. One of the most common definitions of corporate governance is from Sir Adrian

[9] *Smith (1776, p. 741).*

Cadbury, head of the Committee on the Financial Aspects of Corporate Governance in the United Kingdom, as part of his work for the London Stock Exchange and OECD:

> "Corporate Governance is concerned with holding the balance between economic and social goals and between individual and communal goals. The corporate governance framework is there to encourage the efficient use of resources and equally to require accountability for the stewardship of those resources. The aim is to align as nearly as possible the interests of individuals, corporations and society."[10]

Basically, Adrian Cadbury defined the purpose of corporate governance as to align interests of individuals, organizations and society.

A broader definition by *Zingales (1998)* is to define a governance system as "the complex set of constraints that shape the ex post bargaining over the quasi rents generated by the firm". Another definition by *Shleifer & Vishny (1997)* describes corporate governance as the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment. This is in line with the statement of Sir Adrian Cadbury that corporate governance "is the system by which companies are directed and controlled" (Cadbury Committee, 1992, introduction). This view shifts attention to the external perspective in which law and regulation play a significant role in corporate governance. Furthermore, a number of suggestions emphasize the role of international financial institutions (IFIs) in encouraging regulations and conventions.[11]

[10] *Cadbury (2000).*

[11] For instance, the Global Development Finance Report 2007 of the World Bank claims that international financial institutions, and standard setters in securities, accounting,

No matter what particular definition is used, corporate governance mechanisms can be divided into the following two categories: Those internal to firms and those external to firms (*Denis & McConnell, 2003*; *Gillan, 2006*). Figure 2.1 illustrates a corporate governance framework including both internal and external elements. Board of directors and management are part of the internal governance. They have implicit or explicit contracts with external parties like shareholders or creditors. The "nexus of contracts" view extends the definition of a corporation and argues that corporations can be seen as a collection of contracts (*Jensen & Meckling, 1976*). Furthermore, external governance as defined above can be extended to parties from the external environment such as the community or the law that do not have an explicit contractual relationship with the corporation. It is widely believed that this enhanced stakeholder view (*Jensen, 2001*) better reflects the realities of the governance environment.

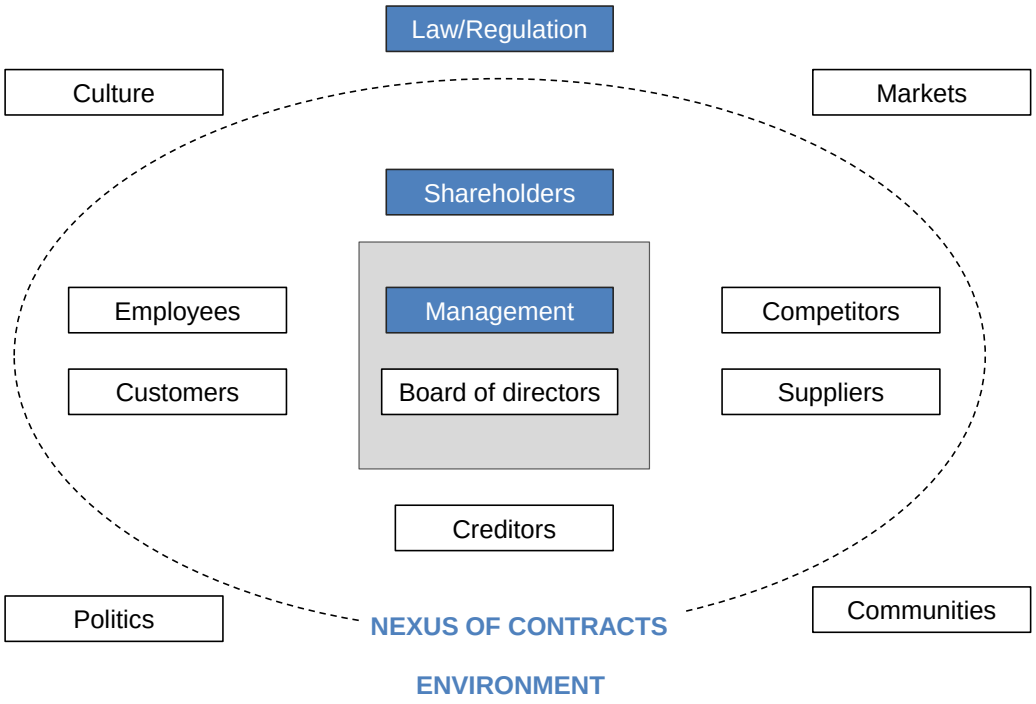
This dissertation focuses on the relationship between the management and the shareholders inside the nexus of contracts, and the legal environment as external governance mechanism, since these aspects are of predominant interest to most academics. Other aspects of the corporate governance literature are beyond the scope of this dissertation.[12]

In this context, involving many different claimholders generates conflicts among them. In general, problems arise because parties have different interests and information is asymmetrically distributed among them. Under both conditions they act in a rational fashion in order to maximize their utility (bounded rationality). Because these problems are fundamental to

and other fields are intended to further better corporate governance.

[12]I bold "Law/Regulation", "Shareholders" and "Management" in figure 2.1 to mark the relevant aspects of this disseration.

Figure 2.1: Corporate governance framework



Source: Own work based on *Gillan (2006)*

understanding the nature of firms, the next chapter discusses potential these conflicts between claimholders in more detail.

2.2 The agency theory perspective

Since this dissertation focuses on the relationship between managers and shareholders, relevant problems in this context mostly arise from the separation of ownership and control. This phenomenon was firstly addressed by *Berle & Means (1932)* who find that the separation of ownership and control

might result in a situation where managers have substantial power. They observed that top executives, "while in office, have almost complete discretion in management". Following the foundation of *Berle & Means (1932)*, *Spence & Zeckhauser (1971)* and *Ross (1973)* offer early formal analyses of the problems associated with the alignment of interests between managers and shareholders. Later, *Jensen & Meckling (1976)* establish the so-called agency theory in modern finance literature by identifying agency problems that occur when cooperating parties have different interests or goals. They explain this relationship by describing a firm as "a nexus of contracting relationships". The agency relationship is usually characterized by a shareholder (the principal) that hires a manager (the agent) to pursue their interests. The agency approach argues that "agency costs" may arise due to this separation of ownership and control (*Fama & Jensen, 1983*). This problem potentially exists when managers do not bear responsibility for the consequences of their decisions. Further, the agency theory contends that most business situations are characterized by information asymmetry and uncertainty. Under this condition, two main problematic conditions are likely to arise: *Moral hazard* and/or *adverse selection*. Generally, the agent has more information about his actions or intentions than the principal does. Thus, moral hazard problems arise when the principal cannot observe if the agent actually acts in his interest. In other words, the agent might not accomplish the work he has been contracted for. The adverse selection problem appears when the agent has more information that is useful to his decision-making while the principal does not possess this information. Therefore, in an adverse selection situation, the principal cannot observe if the agent correctly represents his ability to do the work for which he will be compensated at

the time of contracting (*Eisenhardt, 1989*).[13] Because the shareholders empower managers to manage the firm's assets, the most agency conflicts arise because of a fundamental problem in organizations-self-interested behavior. Typically, the following conflicts might appear in the manager-shareholder relationship:

Choice of effort: Additional effort by the manager generally increases the value of the firm, but additional effort also diminish his utility, i.e. wealth (*Ross, 1973*).

Perquisite Taking: Under the realistic assumption that the manager is not the sole owner of the corporation, the manager is likely to spend firm earnings in his own behalf, since the manager only bears a small part of the cost of perquisites taking. The major part of this costs which come from suboptimal decisions will bear the shareholders. Hence, the manager is supposed to want not only high salaries but also perquisites such as business jets and luxurious cars. Moreover, manager's perquisite taking typically increases with the budget he controls and his power in the firm (*Jensen, 2003*).

Differential horizon of activity: In most situations, manager and shareholders have different interests regarding the horizon of activity. Usually, shareholders are assumed to be interested in long-term performance since the entire future stream of profits determines the value of the firm. By contrast, the manager's claims on the corporation are normally limited to his tenure with the firm. Therefore, the manager focuses on the short-run rather than on long-run. Particularly, the manager does not put too

[13] *Akerlof (1970)* was the first to recognize and analyze the adverse-selection problem in the context of the market for used cars.

much emphasis on profits occurring beyond his horizon which might lead to suboptimal investment decisions that reduce shareholder value (*Jensen, 2003*).

Risk exposure: This problem arises from the fact that shareholders assumed to be better able to diversify their wealth while managers have a substantial amount of human capital and wealth invested in the corporation. Thus, if the manager's wealth is largely in form of non-diversifiable human capital or invested in the firm, he might act in an excessively risk-averse manner to protect his wealth (*Kane, 1985*). In this case the optimal degree of risk taking is less than that desired by the shareholders. Consequently, the manager will pursue own interests even if this means that he does not maximize shareholder value.

Agency theory provides several theoretical solutions to mitigate these agency conflicts, thereby reducing agency costs. In general, a distinction can be drawn between internal and external mechanisms. Internal mechanisms include compensation contracts and monitoring activities within the firm (*Eisenhardt, 1989*). External mechanisms include monitoring activities or interventions by the regulator, capital markets, etc. Regarding internal mechanisms, the agency theory offers two main solutions to mitigate the manager-shareholder conflict, thereby migrating agency costs:

Monitoring: Shareholders can invest in information on manager's behavior. However, monitoring every single managerial action would be extremely costly and inefficient. Another problem is the fact that the shareholder does not have the information held by the manager and even sometimes is unable to observe the manager's behavior. Consequently, shareholders are not able to assess if the manager's actions were in their interest.

Moreover, focusing on the firm's outcome could be misleading because the manager's decisions do not fully determine the outcome. Nevertheless, large external blockholders have more incentives to monitor managers' decisions than do smaller shareholders because monitoring is more cost-efficient for larger blockholders (*Jensen & Meckling, 1976*; *Shleifer & Vishny, 1986*). Moreover, a potential difficulty relates to the problem of who monitors the monitor (*Becht, Bolton & Röell, 2003*).

Alignment of interests: Another way in order to mitigate the manager-shareholder conflict is to align the manager's interests with those of the shareholders. *Jensen & Meckling (1976)* argue that more equity ownership by the manager lead to better alignment of the monetary incentives between the manager and shareholders, because the manager's welfare is more tied to shareholder wealth. Thus, a compensation policy will be designed to give the incentives to the manager to select actions that increase shareholder wealth (*Jensen & Murphy, 1990*). Under this view, a compensation contract can serve as a mechanism for corporate governance and is able to align managerial incentives with those of shareholders.

Beyond monitoring and interest alignment, other mechanisms might incentivize managers to act in the best interests of shareholders. On the one hand, managers face the *threat of being fired*. On the other hand, the *threat of takeovers* might align the manager's interests with those of shareholders. For instance, hostile takeovers are most likely to appear when the firm is undervalued because of poor management. During a hostile takeover, the managers are typically fired or at least lose their sovereignty they had prior to the acquisition. Thus, the threat of a hostile takeover induces managers to maximize shareholder wealth.

Regarding the role of the law/regulation as one effective external governance mechanism, investor protection by law is crucial, since, in many countries, expropriation of minority shareholders by the manager is extensive (*La Porta et al., 2000a*). The legal approach to corporate governance declares that the protection of shareholders through the law is of primary importance. The question of how institutional governance mitigates the agency conflict between manager and shareholder is discussed in section 2.3 in more detail.

As mentioned before, the described principal-agent conflicts, so far, refer to the relationship between managers and shareholders. I denote this area of conflicts by **agency conflict I**. However, this is not the sole area of conflicts within the firm in the view of the "nexus of contracts".

In addition to the agency conflict between managers and shareholders, there is a second class of agency conflicts - those between small and large shareholders.[14] *Shleifer & Vishny (1997)* claim that one central agency problem of large publicly traded firms is not the failure of managers to serve shareholders, but rather the expropriation of minority shareholders by controlling shareholders. Large, controlling shareholders might take advantage of their power to extract rents at the cost of minority shareholders. However, the willingness of the controlling shareholders to extract resources from the firm depend on their level of cash-flow rights, because expropriation leads to a reduction in their own cash flow. Moreover, since expropriation is costly, high cash-flow rights of the controlling shareholders should lead to lower expropriation of resources from the firm, holding other factors constant (*Burkart, Gromb & Panuzi, 1997*). Nonetheless, on theoretical and empirical back-

[14] In fact, there exist other classes of agency conflicts such as the conflict between shareholders and creditors, which shall not be the focus of this dissertation.

grounds it is not clear whether controlling shareholders are rather beneficial or disadvantageous to the interests of minority shareholders. While one strand of the literature argues that monitoring by large shareholders such as institutional blockholders is beneficial (*Shleifer & Vishny, 1986*; *Holderness, 2003*; *Cronqvist & Fahlenbrach, 2009*), other studies note that monitoring is also costly (*Shleifer & Vishny, 1986*; *Johnson et al., 2000*).[15] I denominate this the **agency conflict II**.

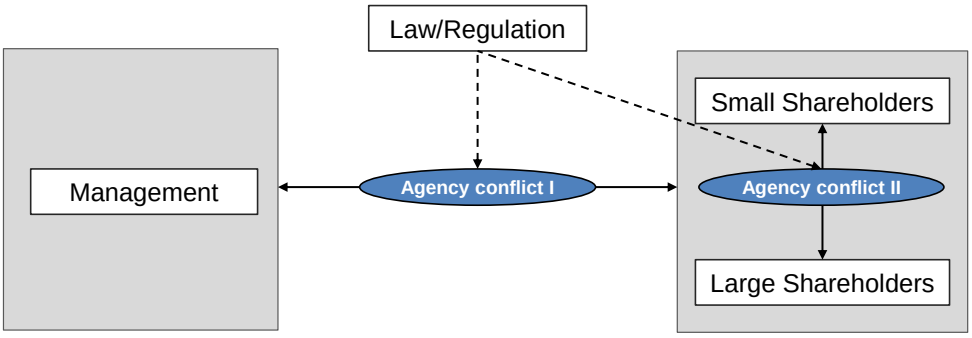
In the last two decades, the importance of the institutional environment has gained momentum as several academics highlight the important role played by the legal system in the alleviation of self-dealing transactions(*Clark, 1986*; *Shleifer & Vishny, 1997*; *La Porta et al., 1997*; *Djankov et al., 2008*). Also *Black (2001)* emphasizes that legal protection for minority shareholders is an important policy issue as it encourages outside investment in firm and the development of stock markets. Section 2.3 provides more details on the role of legal institutions in corporate governance mechanisms.

Figure 2.2 illustrates the areas of interest in this dissertation. I will focus on the conflict between managers and shareholders and to some extent on the conflict between minority and controlling shareholders.

Given the difficulty of directly observing the manager's effort or behavior, much attention is paid to the use of compensation incentives as governance mechanisms that mitigates agency conflicts (*Jensen & Meckling, 1976*). In this dissertation, I focus on the fundamental issue of agency problems - interest alignment through compensation. The extant literature offers a wide

[15]Monitoring requires liquidity costs (*Bhide, 1994*; *Maug, 1998*; *Noe, 2002*) and could lead to the "free-rider problem" with other shareholders (*Grossman & Hart, 1980*).

Figure 2.2: Agency conflicts



Source: Own work.

range of theoretical approaches explaining executive compensation. *Otten (2007)* identifies no less than 16 theories trying to explain pay arrangements (table 2.1).

However, two dominant approaches have been established to explain the nature of executive compensation. On the one hand, the well-established **optimal contracting theory** argues that executive pay arrangements are designed to minimize agency costs arising from the manager-shareholder conflict and maximize shareholder value. By contrast, the **managerial power approach** argues that compensation arrangements are the intended result of executive power, designed by self-interested executives to extract rents from the firm. The following two sections give an overview of the two competing theories explaining the role of compensation incentives in corporate governance.

Table 2.1: Summary of existing theories on excutive pay

Value approach	Agency approach	Symbolic approach
Marginal Productivity Theory	Optimal Contract Theory	Tournament Theory
Efficiency Wage Theory	Prospect Theory	Figurehead Theory
Human Capital Theory	Managerial Power Theory	Stewardship Theory
Opportunity Cost Theory	Class Hegemony Theory	Crowding-out Theory
Superstar Theory		Socially Enacted Proportionality Theory
		Social Comparison Theory
		Implicit/Psychological Contract Theory

Source: Own work based on *Otten (2007)*

2.2.1 Optimal contracting approach on executive compensation

The optimal contracting approach is supposed to be the dominant theory in both theoretical and empirical research on executive compensation. It heavily relies on fundamental aspects of the agency theory. The importance of this theory is is underlined by *Bebchuk & Fried (2004)* who state that the optimal contract view is "the official story" on executive compensation in extant literature. The theory argues that compensation contracts are designed to minimize agency costs as well as to maximize shareholder value (*Core, Guay & Verrecchia, 2003*). In general, agency theory itself relies on the assumption that there is an 'arms-length' contracting between shareholders

and managers, who both pursue their own interests. In terms of executive pay, compensation contracts are designed by boards and negotiated with executives in order to provide incentives for managers to act in the interest of the shareholders by minimizing managerial agency costs and maximizing shareholder wealth. Therefore, contracts should provide incentives for managers to invest in profitable projects while rejecting wasteful investments that are too risky. In particular, in order to reward managers for taking actions that benefit shareholders, optimal contracting theory predicts that boards will design pay arrangements in a way that each manager receives his reservation wage, the lowest wage rate at which the manager would be willing to work or the wage offered by next best opportunity available, plus an additional compensation for bearing risky-pay (performance-based pay). One possibility to induce managers to maximize shareholder wealth is to design performance-contingent pay schemes. As *Eisenhardt (1989)* points out:

> "Such contracts co-align the preferences of agents with those of the principal because the rewards for both depend on the same actions and therefore the conflicts of self-interest between principal and agent are reduced"

A common way to provide executives with incentives intending to maximize shareholder wealth is granting equity incentives to directly relate changes in executive wealth to changes in firm's stock value. Theoretically, The *first-best contract* would be achieved when shareholders (or the board of directors) are able to assess every manager's action that is appropriate for the desired outcome. Since this is not the case, they have to incentivize managers to act in their interest by tying manager's wealth to firm performance,

which is the *second-best contract*.

Difficulties in designing optimal contracts

Transferring more risk to managers could have a drawback, since the optimal contract is a trade off between incentives and risk-sharing (*Fama & Jensen, 1983*). Managers who bear more risk might become risk-averse and will engage in too conservative projects that are not sufficiently risky. In this situation, assuming that risk-neutral shareholders prefer more risk than managers do, risk exposure of the firm will be far away from the optimal level (*Miller, Wiseman & Gomez-Mejia, 2002*). Consequently, rewarding managers for firm's performance involve several problems. Different factors become crucial when deciding on the extent to which incentives are linked to performance goals (*Miller, Wiseman & Gomez-Mejia, 2002*):

(1) The extent to which the performance outcome of the firm can be controlled by the manager or depends on his actions. Pay-for-performance is more effective when the manager's decisions have a substantial impact on firm performance (*Holmstrom, 1979*). When good as well as poor performance slightly depends on manager's actions, the manager is likely to reduce own efforts.

(2) How reliable and observable is the manager's behavior. As mentioned before, obtaining information about the manager's actions is costly and often hard to assess.

(3) Managers will stipulate higher total compensation in exchange for bearing more risk. Consequently, shareholders need to trade off the advantage of interest alignment through pay-for-performance and increased costs stem-

ming from the demand for higher compensation.

Optimal contract theorists commonly put value on the first condition. Therefore, I will review shortly the relation between controllability of the firm's outcome and the degree of performance-contingent pay. The basic premise of optimal contracting is that risky pay in form of performance-based compensation packages should be lower when the firm's outcome is noisy and the manager's control of firm performance is low. Consequently, high pay-for-performance should be implemented in the compensation contract when the manager can exercise over performance. In general, optimal contracting involves that total pay should be an increasing function of firm performance (*Core & Guay, 1999*).[16] While conventional agency theory (e.g., *Holmstrom & Milgrom, 1987*) predicts that optimal incentives should decrease in firm risk (noise or uncertainty of performance), other researchers (e.g., *Demsetz & Lehn, 1985*) expect greater equity incentives for firms with greater uncertainty, because monitoring will be too costly in a less predictable environment. Subsequently, noise in the firm performance is associated with three problems:

(1) The adequacy of performance-based pay becomes weaker, because managers struggle to control and influence firm performance.

(2) The evaluation of the manager's decisions is less reliable and information is more costly to obtain.

(3) Risk-averse managers will ask for higher total pay for bearing higher risk in pay and facing the threat of being fired.

[16]Of course, there are other factors that determine the total pay level. For instance, larger firms generally require more talented managers who therefore receive higher total compensation (*Smith & Watts, 1992*).

Gray & Cannella (1997) emphasize on the latter argument by claiming:

> "If high risk compensation contracts are imposed on executives with no corresponding increase in pay level, higher quality executives may seek opportunities elsewhere."[17]

In general, optimal contract theory argues that performance-based pay arrangements can serve as an effective corporate governance mechanism for mitigating agency problems between managers and shareholders. However, it also becomes apparent that the configuration and implementation of optimal contracts involves many difficulties. Therefore, under most conditions, compensation contracts are supposed to be only efficient but not optimal solutions.

Inefficiencies in optimal contracting

With this in mind, optimal contracting can produce inefficiencies when managers only pursue goals of shareholders (*Jensen & Meckling, 1976*). For instance, an all-equity firm will provide equity incentives to a manager (*Holmstrom & Tirole, 1993*), but this does not directly apply to levered firms. Since shareholders of leveraged firms have an incentive toward risk-shifting, managers who are fully aligned with shareholders will engage in riskier projects (*Jensen & Meckling, 1976*). In other words, risk shifting arises when shareholders prefer riskier projects because of increased debt. Having riskier projects with higher potential outcomes, shareholders can pay off the debt holders at the contracted rate and take the residual gain. Another effect in leveraged firms is that debt overhang could induce underinvestment (*Myers, 1977*). The investment inefficiency or other wrongdoing

[17] *Gray & Cannella (1997, p. 518).*

by the manager can be mitigated if incentives are not exclusively tied to maximization of shareholder wealth. In general, it is widely believed that contracts involving many stakeholders are incomplete. Moreover, it exist no contract which incentivizes managers to fully maximize stakeholder value. Contracts are therefore only efficient governance mechanisms to minimize agency costs. Essentially, an efficient contract maximizes the shareholder wealth after transaction costs.

Nevertheless, contracts could be only efficient at a particular time or in a particular economy. Contracts that were efficient years ago in a specific industry are unlikely to be efficient today because of changing transaction costs (i.e. information costs, monitoring costs). Due to improving contract expertise, optimal contract designs are changing in an evolutionary process (*Core, Guay & Larcker, 2003*). Beside this aspect, *Core, Guay & Verrecchia (2003)* and many others believe that compensation contracts on average are efficient. These agency theorists argue under the assumption of very strong capital market efficiency, that the outcome of optimal contract may have already been factored into the value of the company, making it difficult to observe a direct link between pay arrangements and corporate performance.

As a result of inconsistencies and limitations of optimal contracting an incomplete contracting view on executive pay has been developed (e.g., *Baker, Gibbons & Murphy, 2002*; *Rosen, 1985*) which argues that there are implicit contract between managers and shareholders. Such contracts are made of rules of conduct and unofficial agreements that shape managers behavior.

Lastly, another strand of literature puts emphasis on an extension to the

form of two-layer hierarchies where there is a single principal and a single agent (*Conyon & Freeman, 2004*). This approach extends the optimal contracting paradigm by introducing a third layer into the model - the supervisor (e.g., *Choe, 2003*; *Conyon & Freeman, 2004*; *Döscher & Friedl, 2011*; *Tirole, 1986*). Typically, the shareholders do not negotiate directly with the managers. Instead, the three-tier model conceives that the shareholder (principal) delegates the job of monitoring and controlling the manager (agent) to the board of directors (supervisor), who act as an intermediary (*Tirole, 1986*). If the board of directors does not act perfectly in the interest of the shareholders, then the contracts will be different from those predicted by the optimal contracting approach. Consequently, the shareholders have to incentivize self-interested directors to act in their interests. Furthermore, *Döscher & Friedl (2011)* show theoretically that the pay setting process is affected by stakeholder groups with a potential influence on the board, even if those stakeholder do not have an explicit interest in the level of executive pay. Nonetheless, this third-layer problematic shall not be the focus of this dissertation.

The next section describes the competing managerial power approach in which fundamental assumptions made by the optimal contracting theory are challenged.

2.2.2 Managerial power approach on executive compensation

Many observed characteristics of executive compensation practices seem to be incompatible with the idea of contracts that maximize shareholder

wealth. In fact, the increase in executive pay during the last two decades seems not to be explained by optimal contracting. Observing corporate scandals and the shortcoming of corporate governance systems, some authors identified a phenomenon that they labeled "skimming" which views incentives as an instrument for enriching managers (*Yermack, 1997*; *Bertrand & Mullainathan, 2001*). In fact, presumption of "managerial power" originally starts with the idea of the self-interested manager introduced by *Berle & Means (1932)*. The novel addition to this view is the proposition that powerful executives are able to influence own compensation contracts. This approach argues, as opposed to the optimal contracting theory, that pay arrangements do not stem from bargaining and negotiating between shareholders and managers, but rather that executives might influence the design of compensation contracts to their benefit as it is expected in an "arm's length" bargaining.

Modern critics on the optimal contract theory developed from the sociological perspective which views the contracting approach as being "undersocialized" for three reasons (*Aguilera & Jackson, 2003*). First, the assumption of dispersed ownership ignores that some types of shareholders such as family owners or institutional investors have socially constructed interests. Second, since traditional contract theory relies on bilateral contracts it neglects interrelations between different shareholders. Third, accounting only for shareholder rights is narrowly conceived. Critics claim for a broader understanding of corporate governance in an institutional context.

In the context of executive compensation, the managerial power approach (also known as "rent extraction theory" or "executive power theory") ar-

gues that compensation arrangements are the intended result of executive power, designed by self-interested executives to extract rents from the firm. This rent extraction by managers is mainly constrained only by the need to evade public indignation or shareholder counteraction in case that the extraction of rents from the firm become obvious. As a result, compensation contracts may induce sub-optimal incentives and create incentives that focus on managers' enrichment rather than maximizing shareholder value (*Bebchuk, Fried & Walker, 2002*; *Finkelstein & Boyd, 1998*). The key critics of agency theory, in particular optimal contracting, were developed in *Bebchuk & Fried (2004)*. In their work they refer to phenomena that appear to be incompatible with the perception of optimal contracted compensation plans. In a seminal work, *Bebchuk, Fried & Walker (2002)* point to three limitations of optimal contracting theory: *(1) Limitations of the arm's length model of boards*; *(2) Limitations on the power of market forces*; *(3) Limitations on the power of shareholders*. In the following subsections, I will outline the main arguments of the approach of the managerial power theory pioneered by *Bebchuk, Fried & Walker (2002)* and *Bebchuk & Fried (2004)*.[18]

Limitations of the arm's length model of boards

Management influence over director appointment: Usually, managers are able to influence the director nomination process. In many cases, especially in the US, the CEO formally serves on the committee.[19] Presumably, CEOs

[18]The following part on the limitations of the optimal contract theory draws heavily from *Bebchuk, Fried & Walker (2002)*.

[19]A study of *Shivdasani & Yermack (1999)* reports that in about 266 publicly traded Fortune 500 firms in 1994 in almost 33 % the CEO also serves on the nominating committee.

are able to manipulate directors by influencing the appointment or/and reappointment process of directors that will not decide in their interest.

Board and social dynamics: Directors are supposed to both control and support managers. If they cannot do the latter, then they are expected to resign. Moreover, directors might see their responsibility in policy matters and act with reserve in compensation issues as they might leave this to compensation consultants. In this situation, directors might not completely represent shareholders interests. In general, the relationship between the managers and the board is also likely to involve social dynamics that lead to decisions on compensation issues that might not be in the best interests of the shareholders.

Insufficient incentives: Bebchuk, Fried & Walker (2002) argue that the incentives of directors to challenge powerful CEOs are remarkably low. Essentially, there are fewer economic benefits for the directors to curb excessive compensation packages. Moreover, they argue that director compensation activism will only be costly and not beneficial for directors because of the reappointment issue and reputational costs.

Information disparities: The argument is that even if directors seek to design compensation incentives that induce managers to maximize shareholder wealth, they will generally be short of the information to do so.

Limitations on the power of market forces

Bebchuk, Fried & Walker (2002) argue that it is not clear whether the prediction that market forces push managers to accept and to follow optimal compensation contracts is true. Indeed, one strand of corporate governance

literature holds the opinion that markets for corporate control, capital, products and managerial labor effectively align the interests of managers and shareholders. *Bebchuk, Fried & Walker (2002)* argue with respect to *labor market mechanisms* that the very low pay-for-performance sensitivity in firms[20] involving a small added threat of firing would not discourage executives to extract rents. Moreover, they believe that getting another job will depend rather on overall performance than on the extent to which they extracted rents.

The *market for corporate control*, under the view of optimal contracting, is supposed to be a force that aligns interests of managers and shareholders. As the agency theory argues, the failure of maximizing firm's stock price increases the likelihood of a hostile takeover, which is often associated with the threat of being fired. Thus, the market for control to some extent induces the manager to maximize shareholder value. By contrast, the managerial power approach argues that excessive compensation directly benefits to the executives while the increased risk of takeover resulting from reduction of firm value is comparatively low. In any case, the managers are likely to be able to at least exceed the amount of pay that would be able to extract under optimal contracting.

Under the agency perspective, the *market for capital* will increase the cost of capital for firms with executives that do not focus on shareholder wealth. In other words, future investors will require higher cost of capital in a secondary offering than they would otherwise. Again, *Bebchuk, Fried & Walker (2002)*

[20] *Jensen & Murphy (1990)* have calculated a median CEO wealth-to-shareholder-value sensitivity of \$3.25 per \$1000, for a more recent period *Perry & Zenner (2000)* report a pay-for-performance sensitivity of \$11.50 per \$1000. *Aggarwal & Samwick (2003)* report that incentives for CEOs are \$5.65 higher than for divisional executives. Incentives for the median top management team are \$32.32, while the CEOs account for 42 to 58 % of aggregate team incentives.

expect the executives to put more value on additional compensation than on the reduction in stock price on managerial wealth and on the threat of firing.

Regarding *product markets*, agency theory predicts that the threat of business contraction or failure in a competitive market because of inefficient compensation should constrain managerial rent extraction. Advocates of the managerial power approach counter that this redistribution of wealth from the shareholder to the manager will not have a significant effect on the operational performance of the firm.

Limitations on the power of shareholders

In general, shareholders have two tools at hand for preventing excessive pay packages: Derivative litigation and voting against employee compensation plans (*Bebchuk, Fried & Walker, 2002*; *Bebchuk & Fried, 2004*). Regarding the first, managerial power theorists argue that judicial review in reality do not impose any constraint on executive pay. Moreover, existing procedural hurdles and the difficulty of proving violations would make it almost impossible to tackle excessive pay plans.

The voting against executive stock option plans is an effective mechanisms for allowing shareholders to prevent excessive pay. Again, theorists of managerial power theory are skeptical of the very idea that shareholder are able to challenge compensation plans. Since shareholders could repeatedly put a veto on option plans until they agree with the plan, in the meantime the costs of having no pay-for-performance might be more damaging to the firm value. Until recently, corporate law lacks of shareholder rights regarding the vote on compensation plans. Nowadays, there is an international

trend toward shareholder empowerment. In 2011 the SEC adopted rules regarding shareholder approval of executive compensation (so-called "say-on-pay" votes). While the European Union does not require a shareholder vote on the remuneration policy so far, the Parliament of the United Kingdom implemented a non-binding say on pay provision into the Companies Act 2006.

To sum up, the managerial power approach has been developed in the last years in the consequence of the shortcoming of the optimal contracting theory to explain the excessive increase in executive pay in the last two decades. Advocates of the managerial power approach argue that pay schemes could not be the outcome of arm's-length bargaining between managers and indvestors, but rather are an artifact of the power of self-interested managers. Consequently, compensation contracts will reflect managers' interests rather than the interests of shareholders. Under this view, it is assumed that executives will try to establish pay arrangements with high absolute levels of pay and less variance in total compensation (less performance-contingent pay).

Finally, some agency theorists argue that the managerial power approach is just a special agency case where corporate governance mechanisms are weak. However, the seminal work of *Bebchuk, Fried & Walker (2002)* is contested by many other academics in the field of executive compensation (e.g., *Core, Guay & Thomas, 2005*; *Holmstrom, 2005*; *Murphy, 2002*; *Weisbach, 2006*). It can be stated that the dominant approach in literature is to view executive compensation as a corporate governance mechanism to mitigate agency conflicts. However, in the last decade the managerial power perspective attracts more attention through various theoretical and em-

pirical articles and a book by *Bebchuk & Fried (2004)*. Contemporaneous empirical research finds evidence that is supportive of both theories. The managerial power view and the optimal contracting view possibly will coexist. Hence, this dissertation incorporates both approaches in the empirical analysis.

2.3 The role of the institutional environment

As described earlier in this chapter, firms do not operate in a vacuum, but rather are constrained by many external factors such as culture, communities, markets, law/regulation and politics (*Gillan, 2006*). However, the vast of economic literature is interested in the role of markets (capital, control and labor markets) and institutional environment, whereas this dissertation focuses on the latter.

Institutional environment as external corporate governance mechanism

In a review of international corporate governance studies, *Denis & McConnell (2003)* distinguish extant literature not only between internal and external governance as described before, but also between the "first" and "second" generation of international corporate governance. While the first generation of international corporate governance research focuses on governance mechanisms in individual countries (e.g., board of directors, ownership and control, compensation), the second generation research is based on cross-country studies seeking to examine the mechanisms that explain differences in corporate governance around the world.

In first generation studies, research consists of single-country studies - mostly for the US. Therefore, these studies do not focus on external governance issues and incorporate only very few, if any, regulatory issues of individual states (e.g., state anti-takeover statutes). For instance, some studies analyze how state law changes affect shareholder wealth (*Szewczyk & Tsetsekos, 1992*). In addition, *Comment & Schwert (1995)* examine the probability of takeover after the implementation of anti-takeover strategies. *Bertrand & Mullainathan (1999)* show that the implementation of state-level anti-takeover rules in the 1980s has led to increased average firm wages. Overall, the literature focuses mostly on anti-takeover provisions and pays less attention to other legal and regulatory issues. However, the disregard of legal schemes and regulatory aspects is reasonable, since there is likely to be only very little variation in these factors in a single-country dataset including US firms.

Zingales (1994) among others (e.g., *Levy, 1982*) was first to highlight the importance of country-level differences. He argues that the higher premium on voting shares in Italy compared to other countries is the result of a comparatively low minority shareholder protection by law. Later, the research area that is associated with the systematical examination of country-level characteristics and their impact on corporate finance ("second generation") was initiated by the seminal work of *La Porta et al. (1997)*. La Porta et al. are first to provide systematic knowledge and comparative studies on country-differences in the legal environment. Essentially, they argue that legal differences are fundamental determinants of the evolvement of corporate finance and corporate governance across countries. They suggest that the legal environment - especially investor protection rules - determines differences in the development of capital markets and firm's access to ex-

ternal finance. Their findings indicate that there are significant differences across countries in the degree of outside investor protection (shareholders and creditors). As a result, they find that countries with low investor protection exhibit a high concentration of ownership in firms and less developed stock markets. The rationale for this evidence is that if the law does not protect the shareholder from the controllers, the shareholders will strive to be controllers. This evidence supports the view that institutional environment is a corporate governance mechanism and ownership concentration acts as substitute for legal shareholder protection.

Overall, the basic idea of the "law and finance" literature is that legal rules and institutions play a key role in the conflict between managers and minority shareholders (part of *agency conflict I*) and minority and controlling shareholders (*agency conflict II*). Hence, legal rules that protect minority shareholders have an impact on situations where self-dealing, controlling shareholders extract rents from minority shareholders. For instance, the power of corporate law, bankruptcy law and companies stock act as well as their enforcement by the courts are essential in mitigating the agency conflicts.

One of the first, simple approaches to control for institutional environment across countries is to draw on the legal origin of the country. A classification of the legal origin of the company law or commercial code that is widely used in empirical research has been developed by *Reynolds & Flores (1989)* and *La Porta et al. (1998)*. The legal tradition is divided into two classes: English common law and civil law. The latter class is subclassified into French, German and Scandinavian law yielding, finally, four classes of legal origin. A common incident is that common-law countries de-

veloped stronger investor protection than civil law countries - particularly French-civil-law countries (*La Porta et al., 1998*). Additionally, *La Porta et al. (1998)* have developed a country-specific indicator for 49 countries ("Anti-Director Rights Index") that assesses the extent to which investors are protected by law. Overall scores for each country are calculated with various measures of ad hoc shareholder and creditor rights and measurements quantifying the extent to which the legal rules are enforced. This provides researchers with an objective measure of investor protection and led to a growing strand of literature which is called the "law and finance" literature. However, several authors criticized the shareholder protection index for its ad hoc nature as well as for conceptual and coding mistakes (*Pagano & Volpin, 2005*; *Spamann, 2010*). As a result, the index have been revised in 2008 by *Djankov et al. (2008)* who also introduced a new investor protection index (Anti-self-dealing Index) related to self-dealing transactions of the insiders (managers and controlling shareholders) in expense of outsiders (minority shareholders).[21]

In extant literature, it has been established that institutional governance - particularly investor protection - plays an important role in various aspects of corporate finance and corporate decision making: Cost of capital (e.g., *Castro, Clementi & MacDonald, 2004*), capital structure (e.g., *Rajan & Zingales, 1995*; *Booth et al., 2001*; *Giannetti, 2003*; *Bancel & Mittoo, 2004*), financing (e.g., *Demirguc-Kunt & Maksimovic, 1998*; *Rajan & Zingales, 1998*; *Licht, 2003*), investment (e.g., *Dittmar, Mahrt-Smith & Servaes, 2003*; *Pinkowitz, Stulz & Williamson, 2006*; *Hillier et al., 2011*), ownership

[21]This is often referred to "the private benefits of control" which describes the ability of insiders (manager and controlling shareholder) to divert firm wealth to themselves. See *Denis & McConnell (2003)* for an overview of literature. *Johnson et al. (2000)* have established the term "tunneling" describing the transfers of wealth out of firms for benefit of the controlling insider (manager or controlling shareholder).

structure (e.g., *La Porta et al., 1997*; *La Porta et al., 1998*; *La Porta et al., 2002*), payout policies (e.g., *La Porta et al., 2000b*; *Brockman & Unlu, 2009*; *Rapp & Trinchera, 2012*), restructuring (e.g., *Claessens & Klapper, 2005*).

Although the importance of country characteristics in corporate decision-making is widely discussed, legal and regulatory issues - particularly investor protection - play a remarkably small role in executive compensation research. Hence, this dissertation is intended to fill these gaps by exploring the role of institutional environment on executive compensation in Europe and the US.

3 Literature review

3.1 Corporate governance and compensation

Agency theory provides several theoretical solutions to mitigate agency conflicts within the firm. Usually, it can be differentiated between internal and external mechanisms.[22] Internal mechanisms include compensation contracts and monitoring activities within the firm (*Eisenhardt, 1989*). External mechanisms contain monitoring activities or interventions by outside parties (e.g., regulator, capital markets). Following the standard agency theory, executive remuneration policies are a powerful mechanism to reduce agency costs within a firm, whereas monitoring is both costly and often inefficient. Executive contracts are intended to give explicit and implicit incentives to serve the purpose of aligning the interests of managers with those of shareholders. As discussed before, typically, contracts will link manager's wealth to shareholder wealth in order to align managers' interests with those of the shareholders. Essentially, executives receive equity incentives to directly relate changes in executive wealth to changes in firm's stock value.[23] Consequently, the majority of the theoretical and empirical

[22] See section 2.1 for a discussion on a broad framework of corporate governance.

[23] In practice, executive pay levels are tied to stock prices as well as accounting performance, because stock prices might not be solely determined by managers' actions. In

literature is concentrated on the performance sensitivity of pay and the dismissal of executives to firm performance (*Becht, Bolton & Röell, 2003*). Shareholders are assumed to consider three dimensions when they have to decide on pay arrangements for their managers:

(1) Firm size and complexity: Information asymmetries are supposed to be higher in larger firms and firms that, for instance, operate in R&D-intensive industries.

(2) Internal governance mechanisms: There are many internal governance mechanisms within the firm that might influence executive pay practices. For instance, asymmetries are supposed to be higher in firms with high free float, a large number of dependent directors and where the CEO also holds the chairman position.

(3) Institutional governance mechanisms: Some remuneration policies are more subtle and deserve a greater level of transparency than others. However, the regulatory setting varies significantly across countries with respect to levels of transparency on the one hand and protection of shareholders against selfish managers and self-dealing blockholders on the other hand.

The first two dimensions have been widely examined in empirical research on executive compensation, while the institutional environment received remarkable less attention.[24] Although the interaction between internal governance mechanisms and pay should not be the primary interest of this

most cases, it is more effective to relate compensation contracts to different performance indicators (*Holmstrom, 1979*; *Lambert & Larcker, 1987*).

[24]For a review of existing literature on the interaction between internal governance mechanism and executive compensation see *Devers et al. (2007)* and *Florin, Hallock & Webber (2010)*.

dissertation, it is important to understand how firm-specific characteristics determine executive pay. Thus, the next section gives an overview of research on the firm-level determinants of executive compensation, followed by the next section which presents existing literature on institutional environment influences.

3.1.1 The role of internal governance mechanisms in executive compensation

One important aspect in corporate decision-making is that of designing the level and structure executives of the firm.[25] Traditionally, there are two competing hypotheses about the relationship of internal governance mechanisms and executive compensation contracts in existing compensation literature (*Fahlenbrach, 2009*). The first concept predicts that shareholders treat internal governance mechanisms and pay-for-performance sensitivity as substitutes in order to align manager's incentives. This approach is called the **substitution hypothesis**. In contrast, the managerial power view argues that managers will use their power within the firm to establish self-serving contracts, mostly at the expense of shareholders. Especially, if firm-specific governance mechanisms are weak and the regulatory setting sets low standards of transparency this may result in exceptionally high executive compensation. Specifically, risk-averse executives will try to reduce their pay-for-performance sensitivity and simultaneously increase their level of total pay. Thus, this approach is called the **entrenchment hypothe-**

[25]Reviews on existing evidence concerning executive pay in US firms include *Murphy (1999)*, *Core, Guay & Verrecchia (2003)*, *Core, Guay & Thomas (2005)*. More recently, *Devers et al. (2007)* and *Florin, Hallock & Webber (2010)* survey the existing literature on executive compensation including emerging evidence on international pay practices.

sis.[26]

Table 3.1 summarizes the two competing hypotheses on the relationship between pay-for-performance and the quality of internal governance mechanisms.

Table 3.1: Summary of the two key hypotheses on pay-for-performance and internal governance mechanisms

Hypothesis	**Relationship between pay-for-performance and internal governance**
Substitution hypothesis	Strong internal governance substitutes high pay-for-performance sensitivity in order to align incentives. Weak internal governance will increase the need for higher pay-for-performance sensitivity.
Entrenchment hypothesis	Strong internal governance will increase pay-for-performance sensitivity and decrease total pay. Weak internal governance will allow powerful executives to increase total pay and decrease pay-for-performance sensitivity.

Source: Own work partly based on *Fahlenbrach (2009)*

The research on internal corporate governance and executive pay can be divided into two main categories: (1) *Relationships between performance and pay*; (2) *Relationships among pay and behaviors* (*Devers et al., 2007*). As *Finkelstein & Hambrick (1996)* demonstrate, researchers have focused mostly on the relationships between pay and performance. More recently, over the past decade, interest on the interaction between pay and executive

[26]In fact, *Fahlenbrach (2009)* mentions another hypothesis called **complementary hypothesis** that predicts similar to the entrenchment hypothesis that strong governance mechanisms involve high pay-for-performance. In contrast to the entrenchment hypothesis, the rationale behind this is that contracts with pay-for-performance provisions could require an active part of supervision (e.g., board of directors, blockholders) while risk-averse managers would ask for a higher level of overall compensation since they have more risky pay (higher pay-for-performance sensitivity).

actions gained momentum. In particular, regarding this category, I provide only a literature review on the relationship between pay and risk taking in section 3.2.1 as this is essential to understand my research proposition on risk taking in the banking sector.

Relationships between pay and performance

Most important in the context of pay and performance is the quantification of incentives. Premature studies try to discover a reasonable link between differences in firm-specific pay and proxies of firm performance (e.g., profits, sales growth, market capitalization) (e.g., *Lewellen & Huntsman, 1970*; *Masson, 1971*). Later, studies aimed to determine managerial incentives by connecting changes in executive pay to stock price performance (*Murphy, 1985*). The shortfall of these early studies was that they focused only on current compensation. By contrast, a complete measure of incentives is supposed to incorporate every possible link between managers' wealth and firm performance. Essentially, it links performance to: (1) Current pay and (2) future pay; Hence, incentives should account for changes in the value of stock and option holdings, and on the probability of dismissal (*Frydman & Jenter, 2010*). In an empirical study of publicly-traded US firms for the period 1974-86, *Jensen & Murphy (1990)* were the first to incorporate a comprehensive pay-for-performance sensitivity. They find a relatively small sensitivity of CEO wealth on performance ($3.25 increase in CEO wealth for every $1,000 increase in firm value), concluding that pay-for-performance seems to be ineffective in US firms. Other studies reproduced the methodology of Jensen and Murphy yielding somewhat similar results. For instance, *Perry & Zenner (2000)* report a pay-for-performance sensitivity of $11.50 per $1000. *Frydman & Jenter (2010)* report that in 1992, an average CEO in

the US receives about $3.70 for a $1,000 increase in firm value. By contrast, *Hall & Liebman (1998)* challenge the conclusion of Jensen and Murphy that CEO incentives are generally inefficient by arguing that CEO pay-for-performance sensitivity is about four times higher than it is reported in Jensen and Murphy's study, because Jensen and Murphy had insufficient information on stock-based pay and therefore underestimate the value of stock and stock option holdings. Hall and Liebman identified two reasons for this underestimation of pay-for-performance sensitivity. First, stock-based pay has dramatically increased in the last three decades and thus has significantly enhanced pay-for-performance sensitivity. Second, absolute changes in CEO caused by changes in firm value are actually large. They argue that while executives hold only small fractional stock holdings, the absolute dollar values of their stockholdings are high. As a result, the executives are highly incentivized to increase firm performance as supposed by agency theory. Consequently, Hall and Liebman recommend as incentive measure the "dollar change in wealth for a percentage change in firm value", i.e., the value of *equity-at-stake* (*Frydman & Jenter, 2010*). Recently, *Leone, Wu & Zimmerman (2006)* studied the impact of stock returns on CEOs' stock-based compensation. Their results suggest that bonuses tend to be more sensitive to underperformance than to strong performance. They conclude that their results are in line with the view that bonuses produce asymmetric payoffs, thereby reducing settling-up costs.

The review of empirical evidence shows that alternative measures of pay-for-performance sensitivities might yield different views on the effectiveness of incentives. Overall, the majority of studies on of pay-performance sensitivity observe that pay is related to performance.

Corporate governance influences on pay-for-performance

As discussed earlier, there are two main hypotheses on how internal governance mechanisms relate to pay-for-performance: *substitution hypothesis* and *entrenchment hypothesis*. While the first hypothesis is more in the spirit of the agency approach of optimal contracting, the second hypothesis refers to the managerial power approach. The substitution approach predicts that strong internal governance reduces agency costs, allowing firms to reduce incentive pay. The entrenchment approach assumes that powerful executives influence their pay to their benefit, i.e., higher total pay and less pay-for-performance sensitivity. Since the two competing hypotheses predict contrary effects of internal governance mechanisms, researchers examine how different governance mechanisms relate to pay-for-performance sensitivity in order to decide which hypothesis explains executive compensation practices best. The following passage outlines existing evidence on the impact of corporate governance mechanisms on executive pay-for-performance.

Firm size: It is commonly assumed that larger firms acquire more talented managers, who are paid more and paid higher stock-based incentives (*Baker & Hall, 2004*; *Core & Guay, 1999*; *Himmelberg, Hubbard & Palia, 1999*). Moreover, *Bizjak, Lemmon & Naveen (2008)* find that benchmarking in terms of industry and size of compensation remarkably determines the level of executive compensation. Recently, *Fahlenbrach (2009)* confirms the positive relation between firm size (sales) and pay-for-performance sensitivity.

Growth opportunities: Authors such as *Kole (1997)*, *Bizjak, Brickley & Coles (1993)*,*Gaver & Gaver (1993)*, and *Mehran (1995)* suggest that firms with better growth options might exhibit higher informational asymmetries leading to a greater potential for expropriation by managers. Consequently, these firms are supposed to increase pay-for-performance sensitivity in compensation contracts. For instance, analyzing a sample of 94 US firms for the period 1965-1985, *Smith & Watts (1992)* find that firms with higher market-to-book ratios (high growth opportunities) tend to create higher stock-based incentives. In line with this view, *Fahlenbrach (2009)* analyzes 11,029 US CEO-years from 1993 to 2004 and finds that firms with high market-to-book ratios also seem to grant more stock-based incentives for their CEOs.

Risk: Conventional agency theory (e.g., *Holmstrom & Milgrom, 1987*; *Aggarwal & Samwick, 1999*) predicts that optimal incentives should decrease in firm risk (noise or uncertainty of performance), because if performance is noisy or hard to control by the managers' actions, pay-for-performance is not the proper way to align interests. Moreover, executives with higher fractions of performance-contingent pay will demand higher total pay levels for bearing more risk. In general, empirical evidence is inconclusive regarding the role of firm risk on pay-for-performance sensitivity. On the one hand, several authors (e.g., *Lambert & Larcker, 1987*; *Aggarwal & Samwick, 1999*; *Fahlenbrach, 2009*) find evidence that pay-for-performance sensitivity decreases in firm risk. Conversely, evidence is presented suggesting that pay-for-performance increases in risk. However, recently some authors point toward the endogenous nature of firm risk and compensation. For instance, *Chen, Steiner & Whyte (2006)* simultaneously estimate the relation between total risk and option-based compensation for 68 US banks

over the time period from 1992 to 2000. They find that stock option-based compensation increases risk taking, and firm risk has a positive impact on stock option-based pay. In section 3.2.1, I provide more evidence on the relationship between risk and compensation arrangements.

Leverage: One prominent agency problem is that debt overhang could induce underinvestment and asset substitution. For instance, *Bizjak, Brickley & Coles (1993)* and *Yermack (1995)* assert that high pay-for-performance sensitivity through stock-based compensation will intensify these problems in leveraged firms. Additionally, both agency problems become more severe as the leverage of the firm increases. Interestingly, there is no sufficient evidence on the relationship between pay-for-performance sensitivity and leverage. For instance, *Yermack (1995)* finds no empirical relationship between the grant of stock option and firm's leverage.

Ownership: Usually there are two classes to examine the effect of ownership on pay-for-performance: (1) *Managerial ownership* and (2) *Outside ownership*.

Managerial ownership: One argument of the agency theory is that equity ownership by the manager lead to better alignment of the monetary incentives between the manager and shareholder, because the manager's wealth is linked to shareholder wealth (*Jensen & Meckling, 1976*). Conversely, managers with small levels of ownership have more incentives to consume perquisites rather than to maximize shareholder wealth, since the manager only bears a small part of the cost of perquisites taking. However, when managerial ownership is high, firms may not use stock-based incentives to align executives' interests with their interests as executive's wealth is already linked to the shareholders wealth. This view, which is in line with

the substitution hypothesis, is supported by empirical evidence (*Mehran, 1995*; *Core & Guay, 1999*; *Khan, Dharwadkar & Brandes, 2005*). For instance, *Khan, Dharwadkar & Brandes (2005)* analyze 224 US firms and find that higher levels of CEO ownership lead to a significant reduction in the level of options compensation and lower ratios of options to total compensation.

Outside ownership: In their seminal paper *Shleifer & Vishny (1986)* highlight the monitoring role of blockholders as a possible solution to problems arising from the separation of ownership and control. Blockholders are powerful owners of a large amount of a firm's shares and/or bonds who are often able to influence the firm with the voting rights awarded with their stock holdings. Subsequent articles emphasize the important role of blockholders in corporate decision-making and executive compensation (e.g., *Cronqvist & Fahlenbrach, 2009*, *Del Guercio & Hawkins, 1999*; *Hartzell & Starks, 2003*; *Mehran, 1995*). Institutional investors could have a moderating impact on CEO compensation packages. In particular, institutional investors are supposed to have a central position in monitoring activities among other types of shareholder. Institutional investors (e.g., bank trusts, mutual funds, pension funds, insurance companies) typically have block stockholdings and mitigate the so-called "free-rider problem" that could arise in the case of dispersed ownership. Institutional investors could enforce performance-contingent pay, thereby establishing a positive relation between managerial pay and firm performance, as evidenced by *Hartzell & Starks (2003)*. Conversely, if institutional ownership increases monitoring of managers, it could be associated with lower pay-for-performance as monitoring and incentives might act as substitutes. In line with this view, *Fahlenbrach (2009)* finds that the monitoring effect of institutional owner-

ship and pension fund ownership reduces pay-for-performance sensitivity. Until recently, large blockholders were more pronounced in US firms. Despite the growing occurrence of institutional investors in European firms (*Ferreira & Matos, 2008*), there is only little evidence on the role of institutional investors in compensation of European CEOs (*Croci, Gonenc & Ozkan, 2011*). *Elston & Goldberg (2003)* find that executive pay in German firms is negatively related to ownership of banks. Analyzing a large sample of European firms, *Croci, Gonenc & Ozkan (2011)* find that family ownership curbs total pay as well as cash and stock-based incentives. They also find that institutional blockholders partially counterbalance this effect by increasing pay-for-performance sensitivity. To sum up, evidence on the influence of institutional investors on pay-for-performance is mixed. Under this view, it can be assumed that both theories - substitution and entrenchment hypothesis - might coexist and provide more or less explanatory power at a particular firm.

Board of directors: The board of directors is assumed to play an important role in monitoring corporate decisions and furthering the interests of shareholders (*John & Senbet, 1998*). Hereby, one important task of the board of directors is to design efficient contracts that are in the best interest of shareholders (*Monks, 2008*). In literature, much attention is paid to the effectiveness and independence of board members as these are crucial factors regarding the ability to monitor and control compensation contracts. *Jensen (1993)* hypothesizes that large boards are less effective in monitoring managerial behavior. *Yermack (1996)* and *Core & Guay (1999)* also argue that monitoring by small boards is more effective, because it is difficult for a CEO to capture a smaller board of directors. Many authors find evidence that less independent boards tend to design compensation con-

tracts granting higher levels of total pay (*Core & Guay, 1999*; *Cyert, Kang & Kumar, 2002*; *Hallock, 1997*). For instance, *Core & Guay (1999)* find that CEOs tend to have higher compensation packages when the board of directors is less independent and board size is larger. *Cyert, Kang & Kumar (2002)* analyze a large sample of US listed firms in the early 1990s and find that CEO/chair duality is associated with higher levels of total pay. *Mehran (1995)* finds that the fraction of stock-based incentives to total pay increases in the independence of the board (fraction of outside directors). *Grinstein & Hribar (2004)* find that the bonus received for acquiring another firm is higher when the CEO is involved in nominating directors. These empirical findings are supportive of the entrenchment hypothesis. However, there is also empirical evidence that supports the substitution hypothesis. For instance, *Fahlenbrach (2009)* finds that board independence measured as the percentage of non-employee directors on the board is associated with less pay-for-performance sensitivity. Again, there is empirical evidence that is consistent with both the substitution and entrenchment hypothesis of the relationship between pay-for-performance and internal governance mechanisms.

Managerial Characteristics: It is widely believed that CEO tenure is one determinant of both pay-for-performance sensitivity and total pay level. One argument is that executives with a long tenure have more managerial power within the firm. For instance, since CEOs are often involved in the nomination process for directors, they have the ability to gather directors around them, who are then loyal to them (*Baker & Gompers, 2003*; *Lorsch & Maciver, 1989*). Furthermore, *Gibbons & Murphy (1992)* suggest that pay-for-performance sensitivity increases as executive tenure increases because more risk can be imposed on the executive as there re-

mains less uncertainty of his capabilities (*Gibbons & Murphy, 1992*). In line with this view, *Core & Guay (1999)* find a positive relationship between pay-for-performance and CEO tenure on a sample of US CEOs from 1992 to 1996. Other managerial characteristics are gender, race and work experience (e.g., *Brick, Palmon & Wald, 2006*; *Fernandes et al., 2010*).

Answering the pay-for-performance discussion in executive compensation is clearly a complex question. Comparing different studies on pay-for-performance involves several pitfalls. For instance, although most evidence relies on US data, researchers often use different information and calculations on pay-for-performance sensitivity. Moreover, firms sometimes have incomparable business models and most studies do not use the same set of control variables. Finally, there are many unobservable factors that might determine executive pay, but difficult to measure by academics. For instance, since most empirical compensation studies use single-country datasets - mostly on US firms - they are not able to integrate country-specific factors. Studies from other research areas have revealed that country characteristics such as the institutional environment or cultural aspects are important determinants of corporate behavior. Thus, neglecting these potential factors could result in misleading and ambiguous conclusions.

This literature review suggests that both substitution and entrenchment hypothesis can explain empirical evidence on the relationship between internal corporate governance mechanisms and pay-for-performance, but that no theory itself is completely consistent with the evidence. However, the majority of studies based on sound empirical evidence presents findings that are more consistent with the substitution hypothesis (e.g., *Core & Guay, 1999*; *Dittmann & Maug, 2007*, *Fahlenbrach, 2009*). Nevertheless, after a

series of corporate scandals in the past two decades, some authors predict a "skimming" principle (entrenchment hypothesis) that seems to at least partly explain managerial compensation - in particular the recent rise in executive pay (e.g., *Yermack, 1997*; *Bertrand & Mullainathan, 2001*; *Bebchuk & Fried, 2004*, *Kuhnen & Zwiebel, 2010*).

3.1.2 The role of institutional governance mechanisms in executive compensation

There is only very little evidence on the role of institutional governance mechanisms on pay in extant compensation literature. In a recent review of existing compensation literature, *Devers et al. (2007)* states that

> "Regulation, specifically tax and accounting treatments of pay, is another factor that likely influences executive compensation. For example, we expect that such regulations influence the mix of compensation provided to executives through providing favorable or unfavorable treatment of various pay package components (e.g., salary, performance-contingent compensation, etc.). Because different elements of pay have different effects on executive behaviors and, presumably, on firm performance, we speculate that examining the effects of regulation on compensation offers important avenues for future research."[27]

More recently, *Florin, Hallock & Webber (2010)* underline this lack of research by calling for research on institutional environment influences. They

[27] *Devers et al. (2007, p. 1021).*

point out that part of the problem is the availability of data across countries. Recently, *Aggarwal et al. (2011)* relate to the relationship between internal and external governance when examining the role of the institutional environment on governance practices. They suggest that firms trade off investments in firm-specific governance with country-level investor protection. Essentially, firm-level governance and country-level investor protection are either substitutes or complements. Their results suggest that lower legal investor protection makes it suboptimal for non-US firms to invest as much in firm-level governance as high-protected US firms do. Thus, these findings support the view that firm-level governance and country-level investor protection are complements. Regarding executive compensation, little empirical evidence is based only on European versus US variations in executive pay and suffers from a lack of detailed compensation data because of poor disclosure rules in European countries prior to 2005. For instance, *Conyon & Murphy (2000)* compare UK and German compensation from 1968-1994.[28]

Muslu (2010) goes beyond two-country comparisons by analyzing the incentive compensation of the largest 158 European companies from 1999-2004. Moreover, he examines the impact of few country-level characteristics on firm-specific pay disclosure. Although this study does not analyzes the institutional environment influences on compensation policies, it is the first empirical work that reports some evidence on the relevance of the institutional setting in the context of executive compensation.

[28]Because of disclosure issues they only compare average cash compensation for Germany (German rules required only providing aggregated values for the executive group in annual reports) with cash compensation for the UK.

Recently, *Bryan, Nash & Patel (2010)* examine the proportion of stock-based compensation across firms from different legal environments by studying 381 non-US firms issuing American Depository Receipts (ADRs) from 43 countries during the 1996-2000 period. This is the sole study to date that analyzes the direct impact of institutional environment on compensation structure. They use the legal origin (*La Porta et al., 1997*), original Anti-Director Rights Index (*La Porta et al., 1997*), revised Anti-Director Rights Index (*Djankov et al., 2008*) and Anti-self-dealing Index (*Djankov et al., 2008*) as proxies for legal environment. In addition, in their robustness tests they control for political environment (index of democracy) and labor market (number of publicly traded firms and proportion of family-owned firms). However, this study has some shortcomings. For instance, it only selects firms issuing ADRs which could lead to a sample selection bias as commentators often argue that firms acquire US firms or opt for US listing in order to increase their compensation. Supporting this view, *Rapp & Wolff (2010)* find that total pay levels of executives in German public companies increase by 25% when their firm is listed in the US.[29] Furthermore, Bryan, Nash and Patel do not control for commonly used internal governance mechanisms such as board and ownership structure which might cause an omitted variable bias of their findings.

Overall, even sketchy comparisons of executive pay practices in the US and European countries advice against an assumption of homogeneity in pay. These studies reveal remarkable dissimilarities in pay practices that are rarely recognized in academic research, pointing toward the importance of country differences in executive compensation policies.

[29]In addition, *Rapp & Wolff (2010)* show that an US listing of German public firms increases the probability of granting stock-based incentives from 34% to 85% and the fraction of total pay that is in form of stock-based incentives increased from 8% to 21%.

Given this research gap, this dissertation is intented to thicken debate on institutional influences in executive compensation and to shed more light on the impact of legal institutions as an external governance mechanism on compensation policies in Europe and the US.

3.2 Corporate risk taking

In traditional decision and strategic management theory, risk or risk taking reflects three aspects: Variation in the distribution of outcomes, uncertainty about outcomes and impact on subjective utility. Risk is calculated either by nonlinearities in the monetary utility or by the variance of the probability distribution of gains and losses related with alternative scenarios (e.g., *Arrow, 1965*). *Damodaran (2007)* defines risk in finance as "the variability of actual returns on investment around an expected return". In general, a risky choice is one for which the variance is high. Moreover, risk is a characteristic of a choice that can be used to assess different alternatives. Most theories of choice presume decision makers to give preference to larger expected returns than to lower returns, under the condition that the risk is the same. To put it the other way around, decision makers favor lower risks to higher ones, under the condition of same outcome levels (*Arrow, 1965*). *Markowitz (1952)* challenges the variance definitions of risk by connecting the risk of a portfolio to the correlation between individual assets in that portfolio. One major way in corporate risk taking is to estimate risk and risk preference from stock prices. One prominent example is the Capital Asset Pricing Model (CAPM) that has become one standard approach to asset pricing analysis (*Lintner, 1965*; *Sharpe, 1964*). It offers a theoretical construction for the pricing of assets with uncertain returns. The premium to

induce investors to take risk is related to the non-diversifiable (systematic) risk, which is the covariance of the returns on the asset and the aggregate market returns. It is widely believed that managerial risk taking has a significant impact on the overall riskiness of strategic choices in the firm. Interestingly, it is assumed that decision makers such as managers are more concerned with the "down-side" than with variations in performance as a whole (*March & Shapira, 1987*).

The finance literature offers a vast amount of theoretical and empirical explanations and determinants of corporate risk taking which should not be the main focus of this dissertation. Instead, I am interested in corporate risk taking that draws on the agency relationship between managers and shareholders. Agency theorists argue that a firm's risk taking is heavily affected by its corporate governance and ownership structure (*Fama & Jensen, 1983*; *Jensen & Meckling, 1976*). For instance, agency theory argues that equity ownership has an impact on the magnitude of managerial risk taking (e.g., *Eisenhardt, 1989*; *Zajac & Westphal, 1994*). It argues that managers become more risk-averse as their equity holdings increase (*Beatty & Zajac, 1994*). This problem arises from the fact that shareholders assumed to be better able to diversify their wealth while managers have a substantial amount of human capital and wealth invested in the firm. Furthermore, managers avoid taking risks for career concerns, even if these risk would increase shareholder wealth (*Amihud & Lev, 1981*; *Hirshleifer & Thakor, 1992*).

The literature proposes that managerial compensation incentives could be a solution to overcome managerial risk aversion. In particular, stock-based compensation is supposed to align the managerial degree of risk aversion

with those of the shareholders and induces optimal risk-taking behavior (*Smith & Stulz, 1985*; *Guay, 1999*; *Coles, Daniel & Naveen, 2006*; *Low, 2009*).

3.2.1 The relationship between risk taking and compensation

It is commonly argued that executives have the power to influence firm risk exposure. By choosing projects with low volatility of expected future cash flows or diversifying investments, managers are able to reduce overall firm risk. However, firm risk and compensation are assumed to be endogenously determined and thus firm risk also influences executive compensation. In general, agency theory assumes that shareholders are better able to diversify their wealth while managers have a substantial amount of human capital and wealth invested in the firm. Consequently, managers who are exposed to excessive risks might act in a risk-averse manner to protect their firm-specific human capital and invested wealth (e.g., *Amihud & Lev, 1981*; *Kane, 1985*; *Smith & Stulz, 1985*) and to continue to consume perquisites (*Williams, 1987*). Typically, agency theory predicts that firms could grant equity to align the interests of managers with those of shareholders. The drawback of granting stocks is the fact that risk-averse managers are induced to take risk-reducing actions and/or to reject sufficient risky projects that have a positive net present value, because of the linear payoff structure of stocks (*Amihud & Lev, 1981*; *Smith & Stulz, 1985*). In line with this view, *May (1995)* provides empirical evidence that executives who have large stock holdings focus on acquisitions that reduce firm risk. To overcome executive risk-aversion, firms could grant stock option awards to executives, as stock option have a convex

payoff (e.g., *Bryan, Hwang & Lilien, 2000*; *Haugen & Senbet, 1981*; *Gaver & Gaver, 1993*; *Guay, 1999*). Thus, executive stock options should encourage executives to take more risks because the value of stock options increases in stock return volatility (*Smith & Stulz, 1985*).

Nevertheless, on theoretical and empirical background, stock-based compensation is not assumed to necessarily induce managerial risk-taking because managers' wealth is linked to stock prices, making them more risk-averse (*Ross, 2004*; *Carpenter, 2000*). For instance, *Ross (2004)* shows that option's private value to the holder can decline with volatility. Also, *Harjoto & Mullineaux (2003)* find evidence that pay-for-performance sensitivity is negatively related to return volatility and *Hirshleifer & Thakor (1992)* find that stock-based compensation lead to too little risk-taking. *Lewellen (2006)* suggests, based on a theoretical model, that options that are in the money could encourage risk-averse managers to reduce risk taking. Hence, *Guay (1999)* argues that one has to draw a distinction between the sensitivity of the manager's wealth and stock price (delta) and the sensitivity of the manager's wealth to stock return volatility (vega). Essentially, it is argued that higher delta increases managerial risk and higher vega counterbalance the risk-aversion arising from the higher delta. Consistent with the agency approach of optimal contracting *Aggarwal & Samwick (1999)* argue that higher risk is associated with to lower delta. *Low (2009)* finds mixed empirical evidence on the relationship between delta, vega and on risk taking.

Endogenous nature of firm risk and stock-based

compensation

Existing evidence suggests that firm risk and compensation are endogenously determined. For instance, *Demsetz & Lehn (1985)* show that ownership structure is endogenous and is itself determined by firm risk. To take into account the endogenous nature of firm risk and pay, *Coles, Daniel & Naveen (2006)* use a simultaneous equations approach analyzing S&P 1500 firms for the period 1992 to 2002 and find that firm risk increases delta and vega in CEO compensation as well as pay-for-performance sensitivity increases firm risk. They find that pay-for-performance sensitivity induces managers to modify firm risk through capital structure and research and development (R&D) expenditures decisions and vice versa. More recently, *Armstrong & Vashishtha (2011)* distinguish between systematic and idiosyncratic risk when studying the relationship between firm risk and stock-based compensation. They analyze 13,233 firm-year observations in the US from 1992 to 2007 and also use a research design that controls for the endogenous nature of the relationship between stock-based incentives and firm risk. Their findings show that the CEO's wealth is positively correlated to stock return volatility (vega) and the level of both total and systematic risk while vega is not correlated with the level of firm-specific risk. Recent empirical evidence that also accounts for the endogenous nature of the relationship between firm risk and stock-based compensation indicates that firm risk and stock-based incentives tend to act as complements.

Cash compensation and firm risk

While most researchers focus on the influence of stock-based compensation, less attention is paid to the impact of bonus and salary on firm risk. *Guay*

(1999) suggests that high cash compensation makes CEOs better able to diversify their own portfolio and thus make them less risk-averse. Another rationale behind a positive relationship between bonus and firm risk is that shareholders implement bonuses to induce managers to focus on the short-run since annual cash bonuses are usually linked to annual performance goals. Thus, managers with short-term incentives are likely to select high-risk projects to achieve these short-term goals. In line with his view, *Harjoto & Mullineaux (2003)* find that bonuses are positively related to risk (return volatility). Regarding the practical reality of bonus payments, the Financial Stability Board alleges in 2009, after the recent financial crisis, that cash bonuses encourage bank managers to engage in excessive risk taking. By contrast, there is some evidence indicating a risk-reducing effect of cash bonus on firm risk (*Balachandran, Kogut & Harnal, 2010*; *Vallascas & Hagendorff, 2012*).

Compensation and risk taking in the banking industry

In general, prior studies indicate that compensation practices in the banking industry are different to other industries. In particular, pay-for-performance sensitivity is lower in banks than in other industries (*Becher, Campbell & Frye, 2005*; *Crawford, Ezzell & Miles, 1995*; *John & Qian, 2003*). Before the financial crisis of 2007/2008, the literature on compensation and risk paid very little attention to the banking industry. Since the recent crisis has been associated with extremely high bonuses and excessive risk taking, research on the relationship between executive pay and risk taking in banks recently emerge in the aftermath of the this crisis. One exception is *Chen, Steiner & Whyte (2006)* who investigate in a sample of US banks from

1992-2000 the relationship of option-based compensation and risk taking in banks. The authors find evidence that option-based wealth induces risk taking. Furthermore, using a similar dataset, *Mehran & Rosenberg (2007)* argue that stock option grants to executives increase the asset volatility of banks. Conversely, these banks also tend to have less leverage, indicating that relationship between executive options and bank risk taking is ambiguous.

Most evidence on the recent financial crisis relies on ex-post proxies for ex-ante risk taking. Recent work on causes of the financial crisis from *Fahlenbrach & Stulz (2011)* analyze the impact of pay-for-performance on stock returns and return on assets of US banks. While their results provide weak evidence that stronger ownership incentives in 2006 correlated with worse stock performance during the crisis 2007-2008, no evidence is found on the influence of annual compensation practices. By contrast, *Bebchuk & Spamann (2010)* present evidence for the case of Bear Stearns and Lehman Brothers that bank managers were able to extract large bonuses prior to the crisis. *Chesney, Stromberg & Wagner (2011)* use write-downs to measure bank risk taking before the crisis. Their results suggest that ownership incentives were generally negatively associated with write-downs, but banks that granted high bonuses suffered from larger write-downs. *Cheng, Hong & Schenkman (2011)* show that short-term incentives such as bonuses and options are related to higher bank risk taking.

3.2.2 Risk taking and institutional environment

Many studies point to the importance of external governance mechanisms such as the legal environment and institutions in corporate decisions (see

section 2.3). However, there are only few studies arguing that the institutional environment has a direct and indirect impact on corporate risk taking. This narrow strand of literature focuses on the implications of investor protection on risk taking. Most arguments that predict either a negative or a positive relationship between risk taking and institutional environment are related to the moderation of agency conflicts by investor protection (*John, Litov & Yeung, 2008*). In other words, legal protection is supposed to assist and to shape the internal governance mechanisms in firms.

Positive impact of investor protection on risk taking[30]

Because managers' wealth is largely in form of non-diversifiable human capital, they will seek to reduce firm risk in order to protect their wealth. Under this assumption of risk-averse managers and risk-neutral shareholders, the optimal degree of risk taking is less than that desired by shareholders. In addition, private benefits induce insiders (managers or controlling shareholders) to reduce risk taking. With this in mind, there are three main arguments for a positive relation between investor protection and risk taking (*John, Litov & Yeung, 2008*). First, stronger investor protection could reduce the importance of private benefits to the insiders and thus leads to less rejecting profitable projects that are sufficiently risky. Second, firms operating in countries with low investor protection tend to have powerful insiders such as controlling blockholders with large cash flow rights and large private benefits (*Morck, Wolfenzon & Yeung, 2005*; *Stulz, 2005*). To protect their wealth they will pursue less risky strategies. Third, since conservative

[30]This section draws partly on *John, Litov & Yeung (2008)*.

non-equity stakeholders like governments and banks are more pronounced in countries with low-investor protection (*Tirole, 2001*), they possibly try to reduce risk exposure by influencing firm's investment strategy. For instance, *Faleye, Mehrotra & Morck (2006)* find that strong labor representation is associated with a less risky investment policy.

Conversely, the "law and finance" literature also provides theoretical and empirical explanation for a negative relationship between investor protection and risk taking.

Negative impact of investor protection on risk taking[31]

First, since investor protection and ownership concentration are substitutes, higher investor protection reduces the need for active monitoring by controlling blockholders (e.g., *Burkart, Panunzi & Shleifer, 2003*). Typically, it is assumed that blockholders provide effective monitoring of the management, influence strategic policies and have the motivation to diminish managerial rent extraction (e.g., *Shleifer & Vishny, 1986*). Thus, when high investor protection leads to a reduction in ownership concentration (blockholders) managers are more able to engage in risk-reducing investment activities. Hence, investor protection is negatively related to firm risk (*John, Litov & Yeung, 2008*).

In summary, there is little evidence supportive of both positive and negative relationships between investor protection and risk taking. For instance, the chance of regulatory intervention by regulators will diminish the incentives posed by executive compensation contracts to pursue risk-shifting activities

[31] This section draws partly on *John, Litov & Yeung (2008)*.

(*Noe, Rebello & Wall, 1996*). By contrast, *John, Litov & Yeung (2008)* use a multinational sample including a US-only sample for the period 1992-2002 to examine the impact of accounting disclosure rules, the rule of law and the protection of shareholder rights on various measures of corporate risk taking. They find that risk-taking is positively related to investor protection by law.

Of particular interest is how legal protection and governmental intervention works in the banking industry. Traditionally, banks operate within greater constraints enforced by regulatory bodies to prevent negative externalities from systemic risks (*Flannery, 1998*). Hence, in the next section, I discuss theoretical and empirical aspects of governmental regulation and bank risk taking.

3.2.3 Impact of banking regulation on bank risk taking

On theoretical or empirical background it is not clear how bank regulation relates to bank risk taking. Typically, capital regulations are intended to reduce risk taking by enforcing shareholders to increase the fraction of their wealth invested in the bank, thereby putting more wealth at risk (*Koehn & Santomero, 1980*). Consequently, shareholders compensate for bearing such regulatory expenses by choosing a riskier investment portfolio (*Buser, Chen & Kane, 1981*). In particular, *Rochet (1992)* shows that capital requirements imposed by the Basel Capital Accord could induce banks to engage in riskier projects than they otherwise would do. By contrast, *Eisenbeis & Wall (1984)* and *Kwan & Ladermann (1999)* argue that providing banks

with more leeway could reduce bank risk because it allows banks to diversify their investment and service portfolio, thereby reducing overall risk exposure. Theoretical and empirical evidence suggest that deposit insurance could lead to weaker enforcement of the market discipline by depositors and therefore encourages banks to take more risks (*Merton, 1977*). Empirical evidence supports this view. *Demirguc-Kunt & Detragiache (2002)* use data from 61 countries for the period 1980-1997, showing that failures in the design of deposit insurance systems increase the likelihood of a banking crisis. However, *Cull, Senbet & Sorge (2001)* and *Demirguc-Kunt & Kane (2002)* believe that strong a legal systems and a strong legal enforcement are able to reduce the risk-enhancing effect of deposit insurance.

Evidence on financial crisis of 2007/2008

There is little evidence on the relationship between bank regulation and bank risk in the context of the financial crisis 2007-2008. Since most studies use single-country data from US banks, cross-country comparisons of regulation regimes are not practiable. Only a few authors study the effect of regulation and supervision on bank performance during the credit-crises using a cross-country sample. *Beltratti & Stulz (2012)* find some evidence that banks from countries with high restrictions on banks performed better during the crisis, but no evidence is found that high-regulated banks took less ex-ante risk. *Erkens, Hung & Matos (2012)* rather use general country-level governance than bank-specific regulation and do not find a significant impact of these factors on bank performance as ex-post measure of ex-ante risk taking. *Laeven & Levine (2009)* analyze 279 banks across 48 countries in 2001, finding that bank regulations reduce bank insolvency risk (z-score) depending on bank's ownership structure.

Given the incomplete understanding of bank regulation and bank risk - particularly during the recent crisis of 2007/2008 - this dissertation aims to provide further insights on how legal rules and bank authorities influence bank risk taking. Besides discussing a direct impact of regulation, I also study potential interactions between banking regulation and incentives of bank executives.

4 Executive compensation and institutional environment

In this chapter, I present an overview of key aspects of executive compensation and institutional environment. In particular, I start with a brief introduction in executive compensation, then provide an overview of compensation components and regulations related to executive pay. Later, I discuss different dimensions of the institutional environment.

4.1 The nature of executive compensation

Executive compensation practices are an international issue debated in academic and political circles. There is a heated debate and controversy among researchers, policymakers and practitioners on the root of the dramatic rise in pay, since academics as well as the media documented that top executive compensation has increased largely since the 1980s (e.g., *Bebchuk & Fried, 2004*; *Gabaix & Landier, 2008*; *Hall & Liebman, 1998*; *Murphy, 1999*). Still, there is an ongoing trend in both increasing absolute pay levels and increasing ratios of CEO to worker pay. For instance, the average total CEO pay of

S&P 500 firms increased from about $850,000 in 1970 to about $14 million in 2005 (*Faulkender et al., 2010*) while the average firm market value of the largest US 500 firms has increased only by a factor of 6.[32] One popular explanation for the increase in total pay levels is that the level of total pay has been driven mostly by an explosion in stock option grants. One reason for this explosion is the fact that shareholders as well as academics in the early 1990s have promoted stock options as one useful tool to align shareholder's and manager's interests. For instance, it has been *Jensen & Murphy (1990)* who famously argued "it's not how much you pay, but how". Historically, research on corporate decision making has paid little attention on executive pay for a longer time. *Murphy (1999)* notices that "the modern history of executive compensation research began in the early 1980s and paralleled the emergence and general acceptance of agency theory". About that time, the public debate on executive pay achieved attention during the takeover wave in the 1980s. However, there is an heated debate among academics about the accuracy, implications and the role of researchers regarding this issue (*Walsh, 2008*).

In general, executive pay is intended to provide both compensation for managerial effort and incentives. It is widely believed that pay arrangements should be designed in a way that each manager receives his reservation wage which is the lowest wage rate at which the manager would be willing to work or the wage offered by the next best opportunity available. Therefore, firms need to offer attractive compensation contracts to attract and retain talented managers. Since it is often very difficult and even costly

[32] *Bogle (2008)* shows that the ratio of total pay for CEOs to the pay of average employee has risen from 42:1 in 1980 to 280:1 in 2004. Furthermore, *Kaplan (2008)* documents for the US that the average CEO pay in 2000 was about 300 times higher than the median household income.

to monitor executive behavior, executive pay arrangements play the dominant role in implementing incentives in order to mitigate agency conflicts, therefore agency costs.

4.1.1 Overview of executive compensation components

Executive pay plans offer two main groups of compensation regarding executive effort and incentives. On the one hand, executives receive *direct* compensation packages that are the financial rewards related to their work and effort. On the other hand, *indirect* compensation includes benefits that either are offered to all employees (e.g., legally-required such as unemployment compensation) or only to individuals (e.g., severance pay, private jets). In executive compensation research much more attention is paid to direct compensation. *Smith & Watts (1992)* provide a comprehensive overview and detailed descriptions of usual provisions of compensation contracts. Typically, provisions are assumed to be designed under the optimal contracting perspective and thus are intended to diminish costs arising from the manager-shareholder conflict. *Smith & Watts (1992)* divide components of compensation arrangements into three categories:

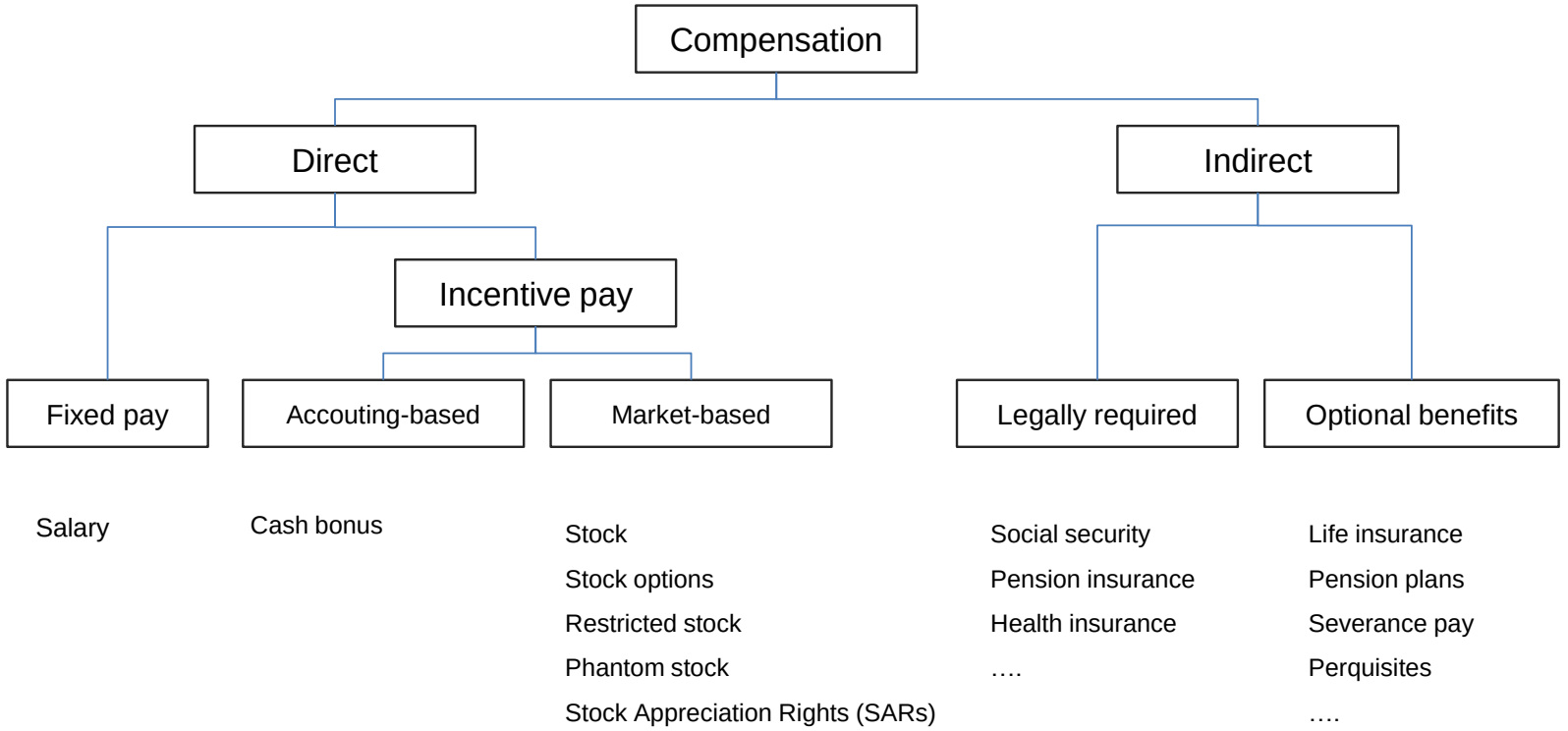
Fixed pay: Compensation that is not linked to firm performance: *Salary, pensions and insurance.*

Accounting-based incentive pay: Compensation that is linked to accounting measures of performance: *Bonus, performance units and performance shares.*

Market-based incentive pay: compensation that is linked to market measures of firm performance: *Stock, stock options, restricted stock, phantom stock, and stock appreciation rights.*

Figure 4.1 gives an overview of common components of executive compensation plans. The vast amount of executive compensation literature discusses the nature of direct compensation packages. Not for that reason alone, it is beyond the scope of this dissertation to describe indirect compensation components such as pension or health plans.

Figure 4.1: Overview of compensation components



Source: Own work.

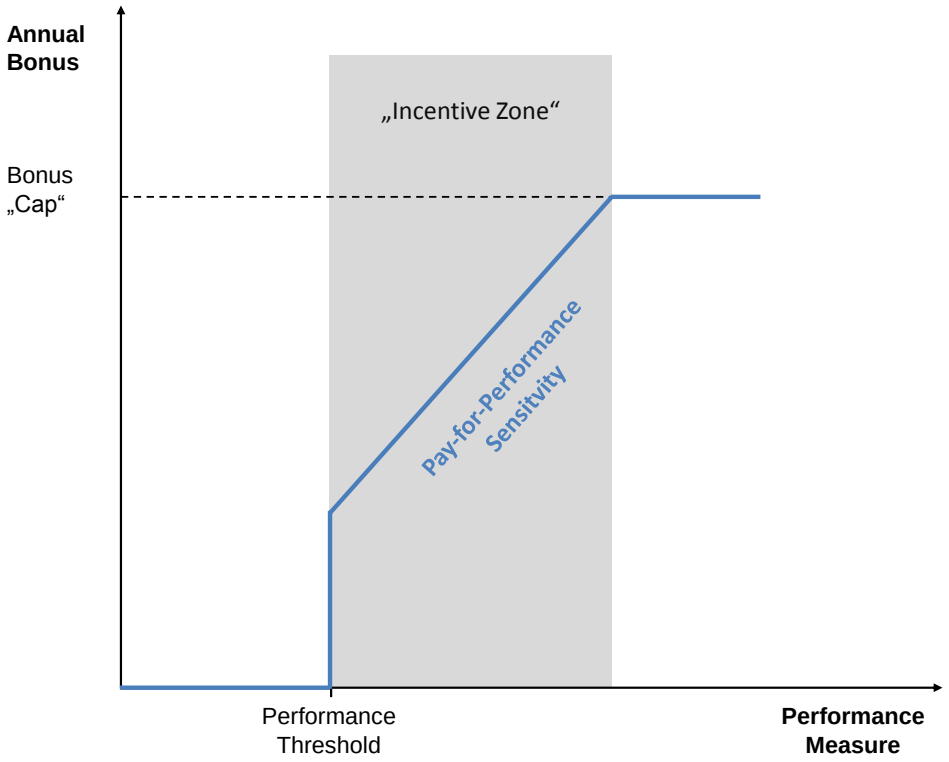
Fixed salary

Fixed salary is the annual fixed financial reward that is unrelated to performance and paid to the manager in return for work performed. Typically, the level of annual salary is determined by market pay rates for managers working in the peer group. *Jensen & Murphy (1990)* and *Hall & Liebman (1998)* demonstrate that differences in the level of salary are remarkably small compared to differences in stock and stock option values. The adjustment of future salary that changes the expected present value serves as an incentive mechanism to mitigate potential agency conflicts. However, bargaining of salary is more effective in incentivizing a younger manager since the present value of future salary is larger (*Jensen & Smith, 2000*). The drawback of granting fixed salary at the beginning of work causes three potential agency problems (*Jensen & Smith, 2000*): (1) Asset substitution: Managers who are compensated with fixed claims will try to reduce firm risk and probability of default as these adversely affect their payoff; (2) Overretention: Managers who are compensated with fixed claims will try to keep funds within their firm in order to increase the coverage on their fixed claims; (3) Underleverage: Managers who are compensated with fixed claims will seek to reduce debt as it is a fixed claim on firm's cash flow. Furthermore, *Murphy (1999)* highlights that risk-averse executives will naturally give more weight to an increase in base salary than to an increase in bonus or variable compensation. Moreover, advocates of the managerial power approach argue that entrenched managers are likely to enforce contracts with a high level of fixed salary and low pay-for-performance sensitivity.

Accounting-based compensation

Typically, accounting-based compensation are short-term incentives based on an annual cash bonus that is directly tied to (one or more) accounting profits, but only implicitly related to stock-price performance. *Perry & Zenner (2001)* present the most frequently used financial measures that determine the annual cash bonus for US firms in 1995. The performance measures, in order, are net income, earnings per share (EPS), sales, return on equity (ROE), shareholder returns, cash flows, return on assets (ROA), profit margin, and dividends. Since in yearly bonus contracts executive's compensation is linked to annual accounting goals, the executive's decision-making is likely to be focused on generating short-run profits. Figure 4.2 illustrates a typical bonus payoff function. A typical bonus plan arranges that no bonus is paid until an ex-ante defined threshold performance is reached and a "minimum bonus" is granted when the threshold performance is achieved. Typically, executives receive a bonus directly proportional to a (linear) combination of performance measures and there is a "cap" on bonuses paid. Therefore, bonus plans do not provide convex payoffs (*Smith & Stulz, 1985*). The pay-for-performance sensitivity of bonuses is characterized by the marginal change in the contract value in response to a marginal change in the performance measure(s). It is commonly argued that annual achievements like accounting profits are backward-looking and short-run target (*Murphy, 1999*). This could be problematic if managers consequently focus only on short-term and ignore projects that reduce actual profitability but increase overall profitability in future, such as neglecting R&D projects (*Dechow & Sloan, 1991*). Additional problems may arise because executives are seeking to achieve performance-targets for reported income. When managers realize that actual performance suggests that an-

Figure 4.2: Typical bonus function and pay-for-performance sensitivity



Source: Own work based on *Murphy (1999)*

nual performance will go above the "bonus cap"-performance-level, they will reduce own effort and try to withhold profits for use in next years (*Healy, 1985*). On the other hand, when managers realize that actual performance is far below the threshold performance and achieving the threshold performance level appears unlikely, they will again reduce effort. Further findings suggest that CEOs with large incentives are more engaged with earnings management (*Bergstresser & Philippon, 2006*) or misreporting (*Burns & Kedia, 2006*). While most bonus plans use annual performance provisions, there exist also long-term bonus plans that have performance periods of 3-6

years. The adoption of performance plans may extend the manager's horizon to at least several years. In addition, executive compensation plans include long-term incentive plans (LTIPs). In the United Kingdom, LTIPs are usually grants of shares of stocks that transferred to the managers ("vested") if the manager achieves ex-ante defined performance objectives. LTIPs in the United States are typically long-term bonus plans or "restricted stock" grants that vest after a certain vesting period, but are not linked to certain performance goals.

Market-based compensation

Regarding the optimal contracting theory, stock-based compensation (e.g., stock grants and stock options) has been the main focus of the majority of theoretical and empirical research on executive compensation. Mainly, this is because stock-based compensation accounts for over the half of total pay at large public US firms and compensation research primarily focused on US data. Moreover, most academics view stock-based incentives as the most effective tool to reduce the agency conflicts because managerial equity ownership helps to align the interests of the manager and shareholders (*Walker, 2010*).

Usually, stock as a form of executive compensation is not transferable until certain conditions have been met, therefore it is called restricted stock. Typically, the vesting restriction lapses all at once or gradually if the manager continues to work for the firm for a given number of years. But, those conditions can also be some sort of performance condition. Most commonly, restricted stock is granted to executives without any cost, but the stock cannot be sold or will not be transferred until a certain condition is met.

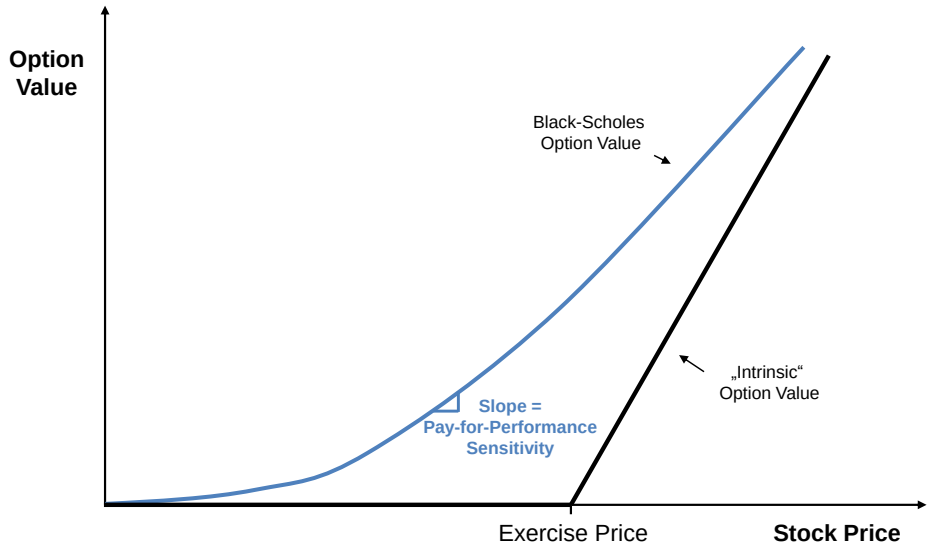
However, the value of restricted stock is linked to stock performance in a linear fashion as the value of restricted stock moves directly with the firm's stock price.

On the other hand, granting stock holdings can be costly. *Smith & Stulz (1985)* and others argue that because of the linear payoff structure a risk-averse manager is induced to select projects that lower corporate risk or refuse sufficiently risky projects that are profitable. It has been showed that managers become more risk-averse as their equity holdings increase (*Beatty & Zajac, 1994*). This problem arises from the fact that shareholders assumed to be better able to diversify their wealth while managers have a substantial amount of human capital and wealth invested in the corporation. Furthermore, managers avoid taking risks for career concerns, even if these risk would increase shareholder wealth (e.g., *Amihud & Lev, 1981*; *Hirshleifer & Thakor, 1992*). Because of the nature of stock options, granting more stock options is a mechanism to overcome managerial risk-aversion. The theory underlying the stock option mechanism relates to the fact that stock options provide a large upside potential with limited downside risks. In particular, under the assumption of a positive relation between risk and return, an increase in volatility of stock prices always increase the value the stock option (*Black & Scholes, 1973*) and thus should lower executive risk aversion. Stock options in executive compensation usually have an exercise price equal to the market price of the underlying stock on the grant date. Moreover, similar to restricted stocks, stock options are granted with a vesting period of several years.[33] Going back to option pricing theory, the value of an option

[33]In the 1990s, vesting periods in the United States were usually 2-5 years. Recently, in the aftermath of the financial crisis of 2007/2008, commentators and policymakers blame stock options for the excessive risks taken by many banks, thereby promoting larger vesting periods for stock-based compensation and substituting stock options with restricted stock plans (*Walker, 2010*).

increases and decreases with the value of the underlying asset (e.g., firms stock). This relation between option price and underlying is not linear, but convex. Figure 4.3 illustrates a typical payoff function of a stock option. For instance, an underwater (or out of the money) stock option has a low price, but its price is fairly sensitive to small changes stock price. Conversely, an option with an exercise price far below the market-price of the underlying stock will begin to act like the stock as it moves dollar for dollar almost with the changes in the stock price.[34] Hence, the pay-for-performance sensitivity of a pay arrangement that only consists of stock options is basically the slope of the function of option price and stock price.

Figure 4.3: Typical option price function and pay-for-performance sensitivity



Source: Own work based on *Murphy (1999)*

[34]The sensitivity of an option's value to a change in the stock price is also known as "delta". Usually, it is represented as a number between minus one and one, and it denotes the change of the option price when the stock price rises by one dollar.

The intrinsic value of an option, which has an important meaning in tax related issues, is the difference between the market value of the underlying stock and the exercise price. In the majority of empirical compensation studies, managerial stock-based incentives, also known as "equity incentives", are calculated as (share price) x (the number of shares held) + (share price) x (option delta) x (the number of options held).[35] Unfortunately, many countries - particularly before year 2006 - had disclosure rules that do not require detailed reporting of stock-based grants and holdings. In those countries only aggregate information on exercisable and non-exercisable stock based grants is accessible. Therefore, researchers often use the "one-year approximation" technique developed by *Core & Guay (2002)* to measure the average characteristics of previously granted non-exercisable and exercisable options (e.g., *Bergstresser & Philippon, 2006*; *Fahlenbrach, 2009*). This methodology treats all previously granted non-exercisable and all previously granted exercisable options as two single grants and derives the exercise price of each aggregated grant from the reported average realizable value of the stock options (*Fahlenbrach, 2009*). Moreover, it is assumed that non-exercisable options have a time-to-maturity that is three years greater than that of the exercisable options.[36]

Pay-for-performance sensitivity

In practice, most researchers use the term pay-for-performance sensitivity to refer to the relationship between changes in managers' wealth and changes in firm performance. *Jensen & Murphy (1990)* define pay-performance sensitivity as the dollar change in manager's wealth associated with a dollar

[35] E.g., *Conyon, Core & Guay (2010)*, *Core & Guay (1999)*, *Fahlenbrach (2009)*.
[36] *Fahlenbrach (2009)*.

change in shareholder wealth and interpret that higher sensitivities indicate a closer interest alignment.[37] *Guay (1999)* distinguishes between *delta* and *vega* in pay-performance relationships. Delta measures the sensitivity of executive's wealth to the firm's stock price and is intended to capture managerial incentives to maximize shareholder wealth, therefore stock price. Vega measures the sensitivity of executive's wealth to the firm's stock price volatility and is intended to capture managerial incentives to take risk. Because of vega, using options in compensation schemes boosts the sensitivity of total pay to the stock price volatility, since the value of stock is not directly determined by stock volatility.[38] Hence, vega is important in estimating and controlling the effect of pay packages on incentives of executives to take risks.

4.1.2 Legal and regulatory aspects of executive compensation

Demands by policymakers, regulators and by the community to impose regulations on top executive pay often come around, particularly subsequent to an economic crisis. In the US, regulatory rules such as mandatory disclosure of executive pay dates back to the Securities Exchange Act of 1934. There are many factors of the institutional environment that come into play when regulating executive compensation. Most important aspects to address

[37] In an empirical study of publicly-traded US firms for the period 1974-1986, *Jensen & Murphy (1990)* were the first to incorporate a comprehensive pay-for-performance sensitivity measure. They find a relatively small sensitivity of CEO wealth on performance ($3.25 increase in CEO wealth for every $1,000 increase in firm value), concluding that pay-for-performance seems to be ineffective in US firms.

[38] In particular, stock grants implicate a zero sensitivity of executive's wealth to the firm's stock price volatility (zero vega). Moreover, restricted stock can be viewed as a zero exercise price option, an option that has zero convexity.

abuses in executive compensation are: (1) Accounting rules; (2) Taxation; (3) Disclosure.

Accounting rules

Before 2005, the US accounting rules had implemented the "intrinsic value accounting" for compensation options under Accounting Principles Board Opinion No. 25. This accounting rule requires firms to recognize the intrinsic value of stock or option at the date of grant as compensation expense (*Walker, 2010*). Consequently, these rules favored options over other forms of equity pay such as restricted stocks (*Walker, 2010*). Until 2005, no expense has been recognized for at the money or out of the money options with a fixed exercise price, since the intrinsic value of these options is zero on the date of grant by definition (see figure 4.3). Discounted or in-the-money options had to be recognized as expense equal to the intrinsic value at the grant date. By contrast, restricted stock grants had to be fully recognized equal to the market-price of stock as expense in the financial statement.

Overall, accounting rules provided large incentives to firms to preference stock options in executive remuneration. In 2004, the new accounting rules set forth under Statement of Financial Accounting Standards No. 123(R), effective from 2006 fiscal year. The new rules require that option grants are recognized by their fair value on the grant date. The fair value has to be calculated using an option pricing model such as the Black-Scholes formula. Since then, companies have to recognize the fair value of the option as a expense over the vesting period. As a result, the new accounting standard removed the advantages for option compensation and disparities

in recognizing expenses between conventional options and stock market index options, and discounted and non-discounted options. After the 1980s boom of stock options, the usage has declined after the new accounting standards of stock-based compensation accounting. For instance, *Walker (2010)* shows that option grants accounted for 60% of the ex ante value of S&P 500 executive compensation in 2000 and declined to about 25% in 2008. In turn, firms expanded the use of restricted stock in executive remuneration.

Taxes

In the past, there were many tax rules that have had a significant impact on managerial pay arrangements. Tax policies are viewed as one driver of the difference in cross-continental pay levels between the US and Europe. In the 1950s, the US rules required that taxes have to be paid when the options are exercised. The US Revenue Act of 1950 introduced "restricted stock options" that become taxable only when the stocks were sold. In 1992, IRC Section 162(m) of the US tax code which applies only to public firms and not to privately held firms, limits the deductibility of non-performance based compensation issued to CEO and top five executives to $1 million per year (*Conyon, Core & Guay, 2010*; *Walker, 2010*). Since stock options were generally considered to be performance-based pay, they are fully deductible as a compensation expense (*Conyon, Core & Guay, 2010*). Not surprisingly, this caused an explosion in stock option grants in the 1990s in the US. Later, IRC Section 409A which has been enacted in 2004 rules that restricted stock and non-discounted option are not taxed until they are exercised. By contrast, discounted options are taxed at vesting with an additional 20% tax penalty (*Walker, 2010*). However, compensating top executives

with stock-based incentives rather than with cash compensation gives firms a small "global" tax advantage (taxes paid by employer and executives) because taxes on stocks and options are deferred until stocks or options are vested/excersiced (*Walker, 2004*).

Although very commonly used in the US, European firms fairly have granted stock-based pay until the mid 1990s with an exception of firms from UK and France. Not surprisingly, there has been no need for complex taxation rules on the various forms of stock-based pay. Even in 2008, on average a CEO in Europe has only about 19% of his annual pay in the form of stock-based pay, compared to 46% for US CEOs (*Conyon, Core & Guay, 2010*). Although not as important as it is in the US, stock-based compensation is a common phenomenon of pay packages in European public companies. Most countries in the European Union are taxing gains from stock options when they are exercised.[39] In the last years, many European countries have introduced tax and legal frameworks to encourage stock-based incentive systems to compensate executives, counteracting the host of regulatory, tax barriers that were slowing down the diffusion of stock options.

Disclosure rules

In general, the main reason for mandatory disclosure in executive compensation is that shareholders are able to monitor and control managerial self-dealing, including rent extraction through executive compensation. The "modern" disclosure regime of the SEC in the US dates from 1992. This regime required a summary compensation table of the dollar value of salary,

[39]DG Enterprise of the European Union study on the effects that the various tax rules in the EU and the USA have for the tax payer. European Union DG Enterprise, "Study on Employee Stock Options in the EU and the USA", 2002.

annual bonuses, restricted stock awards, non-equity performance plans, the number of stocks underlying option grants and perks. However, these disclosure rules were not sufficiently dimensioned. For instance, the value of executive pension plans turned out to account for a large portion of total pay levels (*Bebchuk & Cohen, 2005*). In particular, investors might not adequately assess the effect executive pay, since *Bebchuk & Cohen (2005)* argues that investors might overestimate pay-for-performance sensitivity of executive packages when omitting pension-plan effects. Unfortunately, firms tend to compensate executives with less transparent packages, even if they cannot conceive and control them properly (*Bebchuk, Fried & Walker, 2002*). Executive compensation disclosure was improved significantly in 2006. In 2006, the SEC revised the mandatory summary compensation table, now including the annual change in value of defined-benefit pensions and predetermining the valuation of stock options. Further, a revision in 2009 required firms to report the total ex ante value of annual stock option and stock grants.

Disclosure rules in European countries tended to lag behind the degree of disclosure observed in the US. United Kingdom has been the first to require the disclosure of stock option and equity grants in 1997. Later, Ireland expanded its disclosure rules in 2000. In 2004, the EU Commission declared a voluntary recommendation affecting all listed companies in the EU. The recommendation report is intended to provide details on individual compensation packages to investors. In practice, many large listed European firms have complied with the recommendations by 2005 or 2006. Nonetheless, some academics demand for both a summary and comprehensive disclosure and disclosure rules that are not "asymmetric" across different components of executive compensation (e.g., *Faulkender et al.,*

2010).

4.1.3 Recent reforms and legislative proposals after the crisis of 2007/2008

After the recent financial crisis of 2007/2008, many European countries and the US wanted to reform executive pay polices and introduced legislative proposals. A vast amount of reports of corporate governance codes sprang up. Table 4.1 reports recent changes in European corporate governance codes after or during the financial crisis of 2007/2008.

Important cross-border contributions in the aftermath of the financial crisis are: The Basel Committee report of October 2010[40] and the OCED report of 2009 on "Corporate Governance and the Financial Crisis"[41] with further conclusions[42]; the Walker Review on corporate governance in UK banks of 2009[43]; the European Commission's Green Paper on corporate governance in financial institutions and remuneration policies in June 2010.[44]

Similar to *Dittmann, Maug & Zhang (2011)*, I group proposals to restrict executive compensation into two categories: (1) Restrictions on ex post realized compensation; (2) Restrictions on the ex ante value and structure of compensation.

[40]Basel Committee on Banking Supervision, Principles for enhancing corporate governance, October 2010

[41]OECD, Corporate Governance and the Financial Crisis: Key Findings and Main Messages, Paris, June 2009.

[42]OECD, Corporate Governance and the Financial Crisis, Conclusions and emerging good practices to enhance implementation of the Principles, Paris, 24 February 2010.

[43]Walker Review, A review of corporate governance in UK banks and other financial industry entities, Final recommendations, 26 November 2009.

[44]European Commission, Green Paper on Corporate governance in financial institutions and remuneration policies, 2 June 2010.

Table 4.1: Overview of corporate governance codes during the crisis 2007/2008 in Europe

Country	Year of first code	First revision after the crisis 2007/2008	Last revision
Austria	2000	January 2009	January 2010
Belgium	1995	March 09	March 09
Denmark	2000	December 2008	August 2011
Finland	2003	October 2008	June 2010
France	1995	December 2008	January 2010
Germany	1998	June 08	May 2010
Greece	1999	December 2010	March 2011
Ireland	1991	November 2010	November 2010
Italy	1999	March 2008	December 2011
Netherlands	1996	December 2008	December 2010
Norway	2004	October 2009	October 2010
Portugal	1999	January 2010	January 2010
Spain	1996	-	May 2006
Sweden	1996	May 2008	January 2010
Switzerland	2002	Feb 2008	Feb 2008
United Kingdom	1992	June 2008	November 2010

Notes: The table reports revisions of corporate governance codes during or after the crisis 2007/2008. I only present corporate governance codes of European countries that are included in my empirical analyses.
Source: Own work based on *Aguilera & Cuervo-Cazurra (2009)* and the European Corporate Governance Institute (ECGI), viewed 20 December 2011, available at http://www.ecgi.org.

Restrictions on realized pay[45]

Typically, large realized compensation receives a lot of negative public attention and thus is intended to be curbed by policymakers. For instance, the act on the appropriateness of management board compensation (VorstAG) in Germany came into force on August 2009 and required new rules for

[45]This section draws partly on *Dittmann, Maug & Zhang (2011)*.

setting the structure of executive compensation. Moreover, incentives have to be long-term oriented and the supervisory board should be more responsible for the design of compensation plans. In addition, compensation is required to be more transparent to the shareholders. Similarly, the European Parliament demands stricter rules on bonuses in the banking industry. For instance, financial institutions must defer between 40% to 60% of any "variable remuneration component" for three to five years. Moreover, half of annual granted and received bonuses are required to be in form of performance-based non-cash compensation.

Restrictions on the value and structure of compensation[46]

There are some proposals that address the general "cap" of executive's total compensation. Other proposals deal with the ability of regulators and shareholders to influence executive compensation. For instance, for top-five executives of firms that were recipients of the "Troubled Asset Relief Program" ("TARP"), the cap on deductibility were lowered from $1 million to $500,000. Moreover, the US banned new severance payments for the top executives. Later, the "Dodd-Frank Act" imposes even more restrictions. The Act addresses several issues that are related to excessive executive pay. First, shareholders have a non-binding, advisory vote on whether they agree on the pay packages. This rule in corporate law is also known as **"say-on-pay"** and must take place at least once every three years. Interestingly, *Conyon, Core & Guay (2010)* document that UK firms receive over 90% approval. Second, new rules (**"clawbacks"**) empower firms to reclaim incorrectly compen-

[46]This section draws partly on *Dittmann, Maug & Zhang (2011)* and *Conyon, Core & Guay (2010)*.

sation that has been already awarded. Third, the SEC can force firms to open up the process of proxy access, allowing long-term shareholders to access company sponsored proxies (**"proxy access"**). Under these rules, shareholders will be able to have their nominees included in the proxy materials if they own at least 3% of the total common stock. In Germany, as a result of the new Financial Market Stabilization Act (Finanzmarktstabilisierungsgesetz) of October 2008, total pay in firms which are backed by the stabilization fund has been capped at 500,000 Euro. Similarly, other European countries have introduced new restrictions on executive pay - mostly for the financial industry. For instance, the UK have enacted a new set of laws requiring banks to provide information on how many managers hit the £1 million mark. Moreover, UK financial trading companies had to pay a one-time 50% corporate tax (also known as "supertax") on all bonuses exceeding £25,000. Few days later, France have followed UK by introducing a 50% tax on bonuses for 2009 exceeding 27,500 Euro.

In summary, many European countries have followed the US by either enacting similar rules on executive incentives and total pay levels or at least by improving corporate governance codes with respect to executive remuneration.

4.2 Institutional environment

4.2.1 Definition of the institutional environment

Historical institutionalism as a theoretical view emerged in the early 1980 (*Hall, 1986*) and has its roots in economics sociology. The institutional the-

ory relies on institutions and their influence on organizations surrounding them. *Davis & North (1971)* define the "institutional framework" as "the set of fundamental political, social and legal ground rules that establishes the basis for production, exchange and distribution".[47] In essence, institutions regulate economic behavior by providing the "rules of the game" (*North, 1990*). According to North, the institutional framework consists of formal constraints such as political, legal and economic rules. A central problem in empirical studies dealing with the institutional environment is the difficulty of determining relevant dimensions and measuring its attributes. Typically, the institutional environment includes several aspects, such as the rule of law, transparency, disclosure, etc. Most academics use aggregated indicators that measure particular dimensions of the institutional environment. These indicators are derived from secondary databases such as the economic freedom measures developed by the Heritage Foundation[48], the World Bank's database of political institutions[49], International Country Risk Guide (ICRG)[50] and various indexes of shareholder protection, creditor rights and disclosure rules developed by La Porta and others. Most empirical work relates to country-specific differences in the institutional environment, except for the US in which differences in state laws come into play. Moreover, finance literature focuses on legal rules and their enforcement rather than on social and cultural norms. However, often both aspects are historically closely related. *David & Brierley (1985)* document that most business laws are based on two broad traditions: Common law and civil law. Common law (also known as case law) is developed by judges through decisions of courts. Civil law relies on pre-defined rules and comprehensive

[47] *Davis & North (1971, p. 741).*
[48] Available at http://www.heritage.org.
[49] Available at http://www.worldbank.org.
[50] Available at http://www.prsgroup.com.

codes. Civil legal systems are grouped into three families: 1) French, 2) German, and 3) Scandinavian. Essentially, with respect to corporate decision making, the most dominating area of difference between legal systems is in the protection of investors (*Bryan, Nash & Patel, 2010*; *Djankov et al., 2008*; *La Porta et al., 1997*). Moreover, most studies in this field control for the rule of law as this is a central indicator of the quality of legal systems. Further, *Durnev & Kim (2005)* highlight that disclosure practices of firms are an important determinant of firm valuation. With respect to executive compensation, *Murphy (1999)* argues that "public disclosure of executive pay virtually guarantees that third parties [...] affect the type of contracts written between management and shareholders". Hence, I predict that disclosure of executive pay practices is of significant importance when it comes to analyze the relationship between the institutional environment and executive compensation.

4.2.2 Measuring the institutional environment: Protection of shareholder rights

As discussed before, there are many sources providing various political, economic, and financial ratings for countries. Empirical research generally relies on the initial research of *La Porta et al. (1997)* and *La Porta et al. (1998)* when it comes to assessing the quality of country-specific legal shareholder protection. *La Porta et al. (1998)* (LLSV) introduced in their seminal 'Law and Finance' article a now well-known index of six shareholder protection rules in forty-nine countries, called the **"Anti-Director Rights Index"** (ADRI). They measure shareholder protection by constructing an index based on how the legal rules protect minority shareholders against corpo-

rate insiders (managers or controlling shareholder) in the corporate decision-making process. Essentially, the index is an aggregation of six criteria assessing the voting powers possessed by shareholder at the time about 1993. Higher values indicate a stronger legal protection of minority shareholder rights. Over time, several authors criticized the shareholder protection index for its ad hoc nature as well as for conceptual and coding mistakes (*Pagano & Volpin, 2005*; *Spamann, 2010*). As a result, the Anti-Director Rights Index was revised in 2008 by *Djankov et al. (2008)* (DLLS) who also introduced a new investor protection index (**Anti-self-dealing Index** (ASD)) related to self-dealing transactions of the controlling shareholder in expense of minority shareholders. For the **revised Anti-Director Rights Index** (ADRI_DLLS), DLLS (2008) used the same index components but modified some methods of measurement and the period of time (2003 compared to 1993). For instance, DLLS (2008) count "the law or listing rules" whereas LLSV (1998) "do not use any information from regulations imposed by security exchanges". *Spamann (2010)* claims that DLLS (2008) measurements sometimes are inexplicable, therefore making it impossible to replicate the coding from DLLS (2008). The revised index from DLLS (2008) differs significantly from the original index of LLSV (1998) (correlation r= 0.60).

The newly created Anti-self-dealing Index of DLLS (2008) consists of ten components that measure the degree of ex ante and ex post private control of self-dealing. Essentially, the index addresses the protection of minority shareholders against self-dealing transactions favoring controlling shareholders. DLLS (2008) gathered data from nine Lex Mundi firms describing the minimum legal requirements in force in May 2003 regarding stylized transaction between two companies initiated by a self-dealing investor. The Anti-

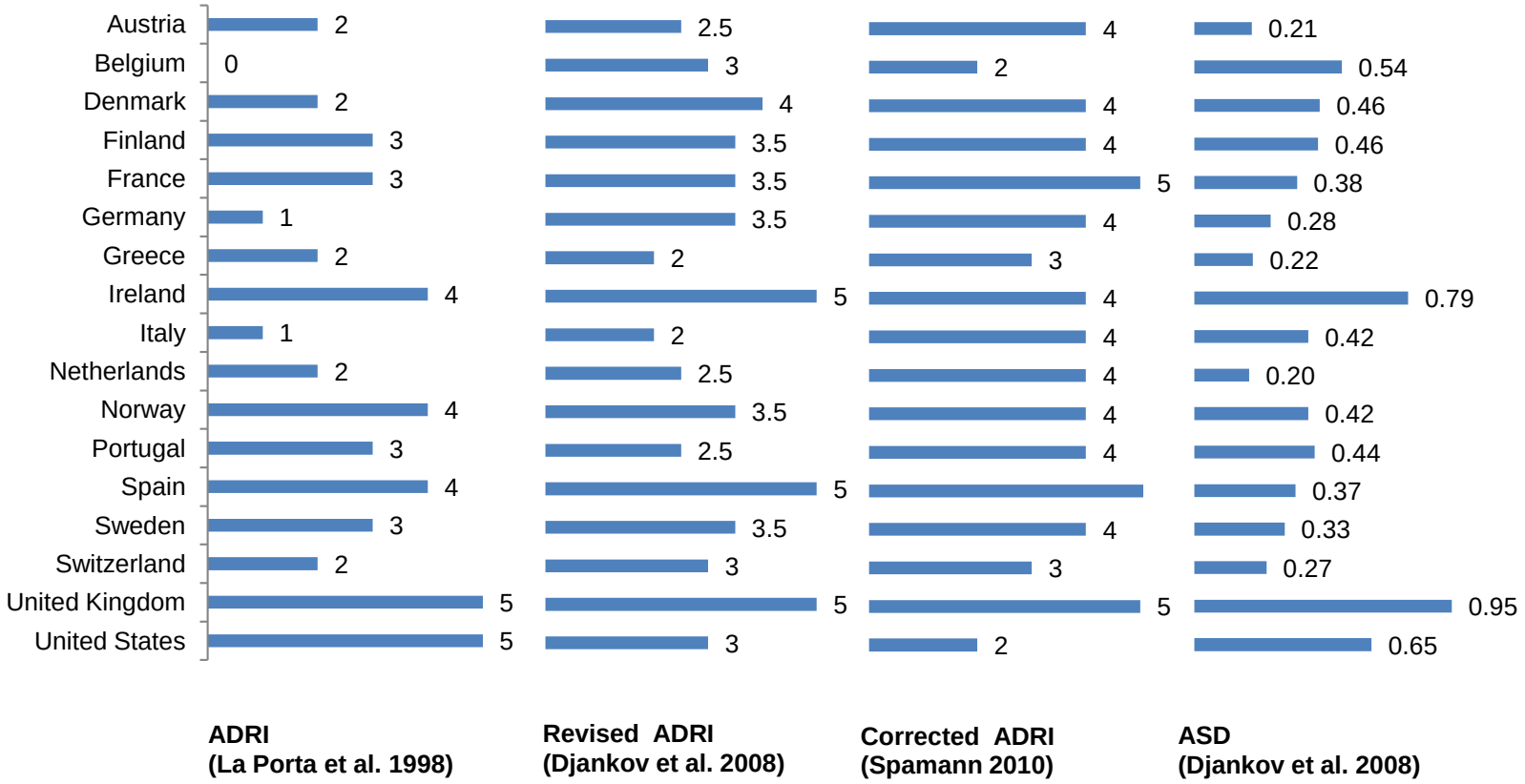
self-dealing Index is noticeably higher in common law countries (0.66) than in civil law countries (0.35). The correlation of Anti-self-dealing Index and revised Anti-Director Rights Index is relatively low (r=0.55).

Also *Spamann (2010)* presents a corrected version of the Anti-Director Rights Index (ADRI_S). The correlation between the corrected and the original ADRI of LLSV (1998) is 0.53. Not surprisingly, his corrected index does not support the perception that common law countries developed better investor protection than countries governed by civil law, or that shareholder protection is positively correlated with ownership dispersion or the development of stock markets. Figure 4.4 presents the geographical distribution of the four indices measuring the quality of shareholder protection by law.

This discussion points to the vagueness faced by researchers when using different indicators that try to measure the same dimension of the institutional environment. Although there are some weaknesses of the original Anti-Director Rights Index, it has been used as a measure of shareholder protection in over a hundred articles since it was introduced by LLSV (1998). Now, the authors recommend using the revised Anti-Director Rights Index or the Anti-self-dealing Index from DLLS (2008). Comparing the Anti-Director Rights Index and the Anti-self-dealing Index, *Djankov et al. (2008)* argue that the Anti-self-dealing Index is more theoretically grounded and more suited when it comes to address the problem of self-dealing ("tunneling") by a controlling shareholder. However, there are still many studies using the original Anti-Director Rights Index from LLSV (1998). In my dissertation, I follow *Djankov et al. (2008)* by using the revised Anti-Director Rights Index as well as the Anti-self-dealing Index. In addition, I use the corrected Anti-

Director Rights Index. Table 4.2 provides an overview of the four existing indices measuring the protection of shareholder rights.

Figure 4.4: Indices measuring the quality of a country's shareholder protection



Source: Own work.

Table 4.2: Overview of shareholder protection indices

Index	Authors	Methodology	Countries	Period	Scale
ADRI	La. Porta et al. (1998)	The index is formed by adding one when: (1) the country allows shareholders to mail their proxy vote to the firm; (2) shareholders are not required to deposit their shares prior to the general shareholders' meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) minorities shareholders have legal mechanisms against perceived oppression by directors; (5) the minimum percentage of share capital that entitles a shareholder to call for an extraordinary shareholders' meeting is less than or equal to 10 percent (the sample median); and (6) shareholders have preemptive rights that can be waived only by a shareholders' vote.	49	1993	0-6
Revised ADRI (ADRI_DLLS)	Djankov et al. (2008)	Same as Anti-Director Rights Index from La. Porta et al. (1998)	72	2003	0-6
Corrected ADRI (ADRI_S)	Spamann (2010)	Same as Anti-Director Rights Index La. Porta et al. (1998)	46	2005	0-6
Anti-self-dealing Index (ASD)	Djankov et al. (2008)	Average of ex ante and ex post private control of self-dealing scores: (1) approval by disinterested shareholders; (2) Index of disclosures that Buyer must make before the transaction can be approved; (3) Index of disclosures that the self-dealing investor must make before the transaction can be approved; (4) Requirement of positive independent review (e.g., by a financial expert or independent auditor); (5) Index of disclosures required in periodic disclosures (e.g., annual reports); (6) Equals one if a 10% shareholder can sue derivatively either the self-dealing investor or the approving bodies or both for damages that the firm suffered as a result of the transaction; (7) Index of the ease in rescinding the transaction; (8) Equals one if the interested director is liable if the transaction is unfair, oppressive, or prejudicial; (9) Equals 1 if members of the approving body are liable if the transaction is unfair, oppressive, or prejudicial; and (10) Index of access to evidence.	72	2003	0-1

Notes: This table reports an overview of four different indicators measuring the quality of shareholder protection rights.
Source: Own work.

5 Theoretical predictions and development of hypotheses

In this chapter, I develop the hypotheses deriving from the discussions of the previous chapters. In a first step, I provide theoretical predictions on the impact of the institutional setting on executive compensation. Moreover, I develop a framework that addresses possible interactions between internal and external governance with respect to executive compensation. In a second step, I lay out my hypotheses on how regulation and compensation relates to bank risk taking in the context of the recent financial crisis of 2007/2008. Again, I describe an approach to test potential interactions between bank regulation and pay regarding bank risk taking.

5.1 Impact of the institutional environment on compensation

The relevance of institutional environment in corporate decision making is widely discussed in the governance literature. For instance, *La Porta et al. (2000b)* find evidence that strong minority shareholder rights are asso-

ciated with higher dividend payouts and that investor protection is a robust determinant of ownership concentration (*La Porta et al., 1999*). *Leuz, Nanda & Wysocki (2003)* show that earnings management is expected to decrease in investor protection.[51] Two questions are crucial for the usage and the design of executive compensation schemes: First, how important are compensation incentives as a governance mechanism; and second, the probability of dysfunctional consequences of a poorly designed compensation incentives.

Two prior studies using a cross-country sample examine the influence of country differences on executive pay. *Muslu (2010)* studies the incentive compensation of the largest 158 European companies from 1999-2004 and briefly looks at the impact of few country-level characteristics on firm-specific pay disclosure. *Bryan, Nash & Patel (2010)* examine the proportion of stock-based compensation across firms from different legal environments by studying 381 non-US firms issuing American Depository Receipts (ADRs) from 43 countries during the 1996-2000 period. This is the sole study to date that analyzes the direct impact of institutional environment on compensation structure. However, this study has some shortcomings. For instance, it only selects firms issuing ADRs which could lead to a sample selection bias as commentators often argue that firms acquire US firms or opt for US listing in order to increase their compensation (e.g., *Rapp & Wolff, 2010*). Another important aspect is that Bryan, Nash and Patel do not control for commonly used firm-specific governance mechanisms, such as board and ownership structure. Many studies demonstrate that these firm-specific governance mechanisms have a strong impact on pay-for-performance sensitivity (e.g. *Core & Guay, 1999*; *Fahlenbrach, 2009*; *Hartzell & Starks, 2003*).

[51] Further examples can be found in section 2.3.

Moreover, *Laeven & Levine (2009)* show that regulation has different effects on bank risk taking depending on the bank's internal corporate governance structure (e.g., ownership structure). Thus, I argue that neglecting firm-level governance mechanisms could lead to an omitted variable bias of their findings.

Regarding the impact of legal environment on compensation incentives, I follow *Fahlenbrach (2009)* and others by differentiating between two competing hypotheses: The substitution and the complementary hypothesis. Following the substitution hypothesis, I expect that the stronger governance mechanisms (e.g., existence of a blockholder), the less compensation incentives become relevant for the alignment between manager and shareholder interests (*Finkelstein & D'Aveni, 1994*; *Rediker & Seth, 1995*). Thus, pay-for-performance is important when firms operate in a low-regulated environment. Otherwise, firms operating in a strong regulatory environment do not necessarily need to implement high pay-for-performance. Moreover, strong institutional governance mechanisms (e.g., shareholder protection) make it difficult for managers to influence their level of total pay and thereby extract excess compensation from their firm. Following the complementary hypothesis, I expect that pay-for-performance sensitivity is higher in a environment with strong institutional governance mechanisms. For instance, disclosure and protection of shareholder rights are needed in order to secure the performance-orientated design of a compensation scheme. In my study, I would therefore expect that in low-regulation countries, the pay-for-performance-sensitivity is also low.

Dysfunctional consequences can emerge when compensation incentives are poorly designed. For instance, a high level of cash bonus that is related

to short run performance (e.g., accounting profits) can encourage CEOs to manipulate their benchmarks (e.g., reported earnings). The consequences depend on the extent to which shareholders can monitor compensation contracts and managers' actions. Therefore, transparency is important for detecting wrongdoing. One important aspect of transparency is disclosure requirements defined by corporate law. I expect disclosure requirements to have a complementary effect on pay. Disclosure helps shareholders to assess the incentive effect and to detect dysfunctional consequences faster. Hence, high disclosure makes pay-for-performance more effective and consequently increases pay-for-performance sensitivity in compensation plans. In table 5.1 my hypotheses are summarized.

Table 5.1: Summary of the two key hypotheses on the effect of the institutional environment

	Substitution hypothesis	**Complementary hypothesis**
Predicted sign of correlation between **strong insitutional governance mechanisms** and:		
Pay-for-performance	**-**	+
Total pay level	**0/-**	+

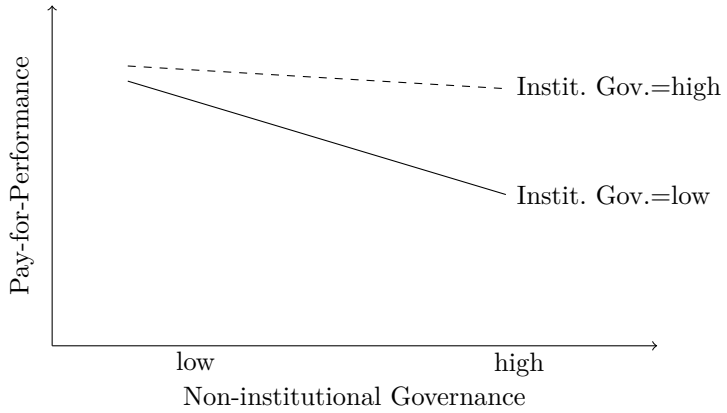
Notes: The table summarizes the empirical predictions of my key hypotheses with respect to institutional governance structures.
Source: Own work.

5.2 Interaction between firm-specific governance and the institutional environment

In addition to the main effects of institutional setting and regulation, I hypothesize that the institutional environment affects the impact of non-institutional governance mechanisms on pay. Essentially, I predict that non-institutional and institutional governance structures exhibit two patterns: Weakening and enhancing interactions, respectively. To illustrate my approach, I take ownership concentration as an example of a non-institutional governance mechanism and shareholder protection as an institutional governance characteristic. For illustration purposes I assume that ownership has a negative impact on pay-for-performance (*Fahlenbrach, 2009*; *Mehran, 1995*). The first pattern that weakens the influence of non-institutional governance is called the *weakening hypothesis*. For instance, an institutional environment with high shareholder protection makes active monitoring by blockholders less important. This effect weakens the negative impact of ownership concentration on pay-for-performance sensitivity.

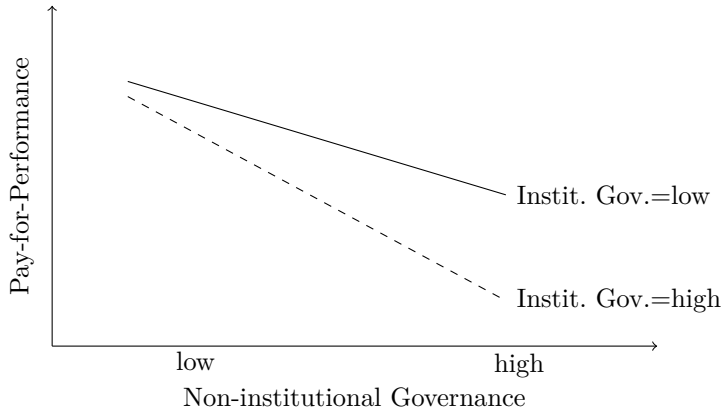
Figure 5.1 illustrates the moderating effect of institutional governance on the negative impact of firm-specific governance on pay-for-performance. On the contrary, the interaction in which the institutional environment strengthens the impact of non-institutional governance mechanisms on compensation is called the *enhancing hypothesis*. Figure 5.2 illustrates the strengthening effect of institutional governance on the negative impact of non-institutional governance on pay-for-performance.

Figure 5.1: Prediction of the weakening effect of institutional governance mechanisms



Source: Own work.

Figure 5.2: Prediction of the enhancing effect of institutional governance mechanisms



Source: Own work.

Hence, from the perspective of the enhancing hypothesis, I would expect that firms in countries with strong shareholder protection and high concentration of ownership do not necessarily need to establish contracts with high

pay-for-performance sensitivity. Thus, the negative, subsitutional effect of monitoring by blockholders on pay-for-performance becomes even stronger in high-regulated countries.

5.3 Regulation, executive compensation and risk taking in banks

Academics, politicians and the media pay much attention to bank's risk behavior. Until recently, the literature on compensation and risk in the banking industry was remarkably sparse. Emerging empirical evidence on the financial crisis regarding the relationship between risk taking and incentives is mixed.[52]

Hence, at first glance, it is not clear how executive compensation and bank risk taking interacted in the recent financial crisis. Under the view of the optimal contract theory I expect that shareholders of banks would design compensation contracts in a way that managers pursue a value maximizing investment strategy. In principle, this would be achieved by including a significant amount of stock based compensation in the overall compensation package. Under the view of the managerial power approach I would expect that self-interested executives try to extract rents from the bank. Hence, if entrenched managers are able to influence decisions of the compensation committee they will try to attain a high level of total compensation with less exposure to bank's stock price. In other words, they will try to establish compensation contracts that have a large amount of fixed pay and low pay-for-performance sensitivity (bonus, stock or stock

[52]See section 3.2.1 for a review of literature about executive pay and risk taking.

options).

However, it is not clear what this implies for an individual bank's risk taking. On the one hand, shareholders may have an incentive to increase risk taking as the equity position can be considered to be an option on the bank's firm value (*Black & Scholes, 1973*; *Merton, 1973*). This incentive is even stronger as debtholders would not always price their credit risk correctly because of government guarantees, which are especially important for large banks. Moreover, governmental deposit insurance and implicit bail-out policies exacerbate shareholders' risk appetite. For instance, it is argued that deposit insurance can be seen as a put option to bank shareholders (*Merton, 1977*; *John, Saunders & Senbet, 2000*).[53] *Mehran, Morrison & Shapiro (2011)* argue that since banks typically are substantially higher leveraged than non-financials, debtholders should be the major claimholder. This fact applies to bank risk taking since debtholders are likely to be in favor of risk-reducing strategies, while shareholders prefer higher levels of risk-seeking behavior. On the other hand, one can also argue that charter values of banks are high because of market entry barriers due to regulation. This would dampen the risk taking incentives of shareholders as the failure of the bank would cause the loss of the charter value (*Keeley, 1990*).

What makes the problem even more intriguing is the fact that even under the optimal contract approach shareholder incentives are only imperfectly transformed into manager incentives. Depending on the specific structure of the compensation package the management's incentives may lead to an increase or decrease of risk taking with respect to what would be optimal

[53] In fact, most European countries do not have a deposit insurance system or their insurances are not as important as in the US. Thus, the put-option effect of deposit insurance should play a minor role in European countries.

from the shareholders' perspective.

Executive compensation and risk taking

In my empirical analysis I want to examine whether compensation packages granted prior to the crisis induced bank executives to take excessive risks. Particularly, I test the prediction that compensation systems that rely heavily on cash bonuses could encourage executives to focus on short-term results since bonuses are typically tied to annual achievements. Usually, annual achievements like accounting profits are backward-looking and short-run target (*Murphy, 1999*). This could be problematic if managers consequently focus only on the short-run and ignore projects that reduce actual profitability but increase overall profitability in future, such as R&D projects (*Dechow & Sloan, 1991*). Several authors show that certain compensation components such as cash bonuses or stock options encourage managers to focus on short-termism. *Healy (1985)* shows that managers manipulate earnings to "game" bonus schemes. Moreover, evidence indicates that some managers are able to manipulate the capital markets (*Collins & Hribar, 2000*; *Sloan, 1996*). Further findings document that CEOs with large incentives are more engaged with earnings management (*Bergstresser & Philippon, 2006*) or misreporting (*Burns & Kedia, 2006*). This may arise from the fact that managers usually understand how to affect accounting profits rather than stock prices. Similarly, *Guidry, Leone & Rock (1999)* show that incentive compensation tend to induce excecutives to maximize their short-term bonus by focusing on short-term performance. Further, *Guay (1999)* suggests that managers receiving more cash compensation are better able to diversify their own portfolio, making them are less risk-averse. Under this view, I predict that investors who incentivize executives to make bets on risky investments by

granting short-term incentives suffered from larger losses during the crisis. Consequently, I predict that these risk-inducing incentives granted prior to the crisis should also affect pre-crisis risk measures of banks. Given the endogenous nature of the relationship between firm risk and incentives I test my hypotheses in my robustness section 7.6.5 using a simultaneous approach that includes both incentives and risk taking.

Bank regulation and risk taking

A common rationale for government intervention through regulation of banks is that shareholders and creditors are not able to implement sufficient governance over complex, opaque banks (*Caprio, Laeven & Levine, 2007*). However, there is no clear theoretical or empirical link between bank regulation and risk taking. Typically, capital regulations are intented to reduce risk taking by enforcing shareholders to increase the fraction of their wealth invested in the bank, thereby putting more wealth at risk (*Koehn & Santomero, 1980*). As a result, shareholders compensate for bearing such regulatory expenses by choosing a riskier investment portfolio (*Buser, Chen & Kane, 1981*). In particular, *Rochet (1992)* shows that capital requirements imposed by the Basel Capital Accord could induce banks to engage in riskier projects than they otherwise would do. Another example is that less activity restrictions might reduce risk taking by increasing opportunities to diversify investments or increase risk taking by allowing for more risky investment opportunities (*Mishkin, 1999*). For instance, many countries try to mitigate excessive bank risk taking by restricting banks from engaging in non-lending activities (*Boyd, Chang & Smith, 1998*). By contrast, *Eisenbeis & Wall (1984)* and *Kwan & Ladermann (1999)* contend that giving banks more leeway could reduce bank risk because it allows banks

to diversify their investment and service portfolio, thereby reducing overall risk exposure. Nevertheless, *Flannery (1998)* and *Mishkin (1999)* notice that activity restrictions are viewed by regulators as well as researchers more as a mechanisms for moderating bank risk. Recently, *Klomp & de Haan (2011)* show that activity restrictions and supervision control reduce bank risk. Furthermore, they find this effect more pronounced for banks with high risk profiles. *Haw et al. (2010)* find that legal institutions moderate the effects of internal governance mechanisms such as concentrated ownership on bank risk taking.

Evidence on the relationship between bank regulation and bank risk in the context of the financial crisis 2007-2008 is relatively sparse.[54] Most studies focus on data from US banks, making cross-country comparisons of regulation policies not possible. So far, only a few authors examine the effect of regulation and supervision on bank performance during the credit-crises using a cross-country sample. Since I am interested in how institutions had an effect on performance and risk taking of banks during the recent crisis I focus on regulations that are related to the banking industry. But one has to be careful since different aspects of regulation interact. For instance, countries with weaker supervisory systems could compensate by imposing more restrictions on bank activities (*Barth, Caprio & Levine, 2004*). Therefore, I test my hypotheses with an aggregated index including several regulation indices that reflect different aspects of regulation.

My hypothesis is that strict regulations impose rules and barriers for banks to take excessive risks. By contrast, banks in countries with low regulation might be tempted to take higher risks (off-balance sheet activities or risky

[54]See section 3.2.3 for a discussion of recent studies on bank risk taking during the financial crisis of 2007/2008.

lending activities) that either were in the interests of shareholders or not. Thus, I would expect that tighter regulation has reduced managers' abilities to engage in high-risk activities and therefore led to better bank performance during the crisis.

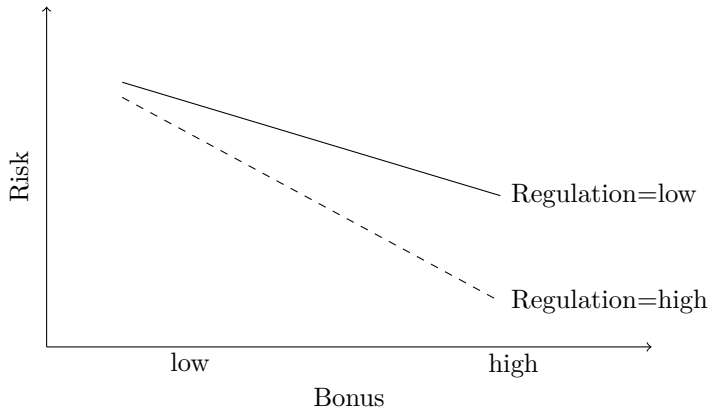
5.4 Interaction between compensation and bank regulation

A recent study from *Laeven & Levine (2009)* argues that the relation between bank risk and bank regulation, such as capital regulations and restrictions on bank activities depends on each bank's ownership structure. I adopt this approach and predict that the impact of executive compensation on bank performance varies with different levels of government regulation. I assume that shareholders use compensation incentives to induce managers to act according to their interests and simultaneously consider regulation rules and restrictions of the banking sector when designing these incentives. Further, I argue that the impact of incentives on bank's risk taking depends on the managers' investment capabilities given by law. There are two possibilities for the managers to behave in this setting. They could either choose projects that are in line with the regulatory rules or take actions that bypass restrictions or manipulate earnings to achieve their incentive goals.

Essentially, I predict that incentives and regulation exhibit two patterns similiar to section 5.2: Weakening and enhancing interactions. For illustration purposes I assume that bonus as a short-term incentive increases risk taking. Figure 5.3 illustrates the moderating effect of bank regulation on

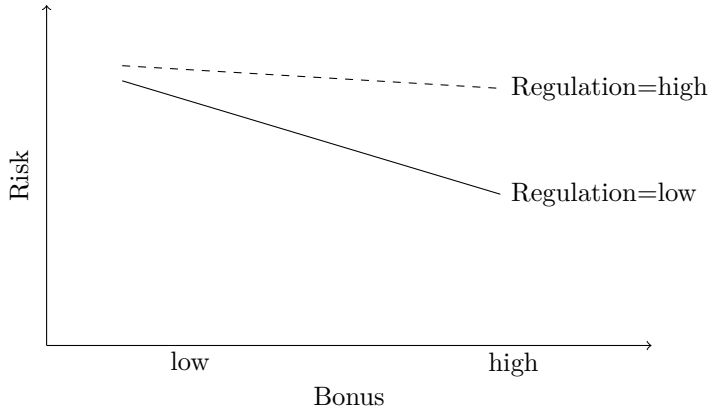
the positive impact of bonus on risk.

Figure 5.3: Prediction of weakening effect of bank regulation



Source: Own work.

Figure 5.4: Prediction of enhancing effect of bank regulation



Source: Own work.

By contrast, the enhancing interaction in which the bank regulation strengthens the impact of incentives on risk is shown in figure 5.4. As argued by

several studies, in a setting where the shareholders tie the manager's potential total compensation more closely to the value of stock, options and cash bonus, the manager could be encouraged to focus on short-termism in order to maximize own wealth. In this situation, it could be even more difficult to achieve high returns in a regulatory environment with tight bank activity restrictions or high capital requirements. Consequently, managers could be encouraged by both high regulation and high incentives to engage in trading complex and risky financial products to meet investor demands or achieve own incentive goals. The downside of investing in high-risk investment was likely to be exposed by the financial crisis and led to worse stock returns.

6 Institutional environment, corporate governance and executive compensation[55]

6.1 Introduction

The influence of institutional, country-specific settings and regulations, such as accounting standards, shareholder protection, and disclosure rules on corporate decision-making is widely discussed in governance literature (e.g., *Bushman & Smith, 2001*; *La Porta et al., 2000a*; *La Porta et al., 2002*). However, as I have demonstrated in the literature review, regarding the design of executive compensation, the extant literature is mostly limited to the impact of non-institutional governance mechanisms such as ownership or board structures on executive pay (*Chhaochharia & Grinstein, 2009*; *Fahlenbrach, 2009*; *Hartzell & Starks, 2003*). Since most empirical studies are single-country analyses, institutional governance influences have not yet

[55] This chapter is partly based on *Hüttenbrink, Rapp & Wolff (2011a)* and *Hüttenbrink, Rapp & Wolff (2011b)*.

been considered.[56] In their reviews of existing compensation literature, both *Devers et al. (2007)* and *Florin, Hallock & Webber (2010)* underline this lack of research by calling for research on institutional environment influences, speculating that analysis of the effects of regulation on compensation offers important avenues for future research.

Given this research gap, I use a novel dataset to build up the link among institutional environment influences and executive pay. I analyze a comprehensive dataset containing detailed information on firm characteristics, compensation, and institutional differences for all firms listed in the S&P 500 and MSCI Europe (590 firms) for the period 2005-2008. A large sample of firms across 17 countries ensures the sufficient heterogeneity of institutional setting and regulation. I test two dimensions regarding non-institutional and institutional governance effects on executive compensation: Direct and indirect effects. Within both dimensions, I analyze the effects on total compensation and pay-for-performance sensitivity. For direct effects, I consider the straight impact of country-level governance mechanisms on pay (section 5.1). As interaction effects, I denote effects that potentially moderate the relation between non-institutional governance mechanism (like ownership structure) and executive compensation (section 5.2).

This part of my dissertation contributes to the compensation literature in three ways. First, it presents the current compensation practices of 17 countries based on a solid sample. Second, to my knowledge, it is the first study to intensively analyze the influence of both the institutional governance and

[56] One exception is *Bryan, Nash & Patel (2010)*. In fact, it is the sole study to date that analyzes the direct impact of institutional environment on compensation structure. However, they do not control for commonly used firm-specific governance mechanisms such as board and ownership structure. As discussed in section 5.1, I suggest that neglecting important internal governance mechanisms could lead to misleading results (e.g., omitted variable bias).

firm-level governance on executive pay. Third, it represents the first consideration of interaction effects between firm-specific governance mechanisms and institutional governance mechanisms with respect to executive compensation. Thus my study extends the ongoing discussion of possible substitutional or complementary interactions between governance mechanisms to the dimension of institutional governance structures.

6.2 Data and methodology

This section describes my sample selection procedure and the data collection process. It also gives an overview of the measurement of governance and other firm characteristics that I use in my empirical analysis of this chapter.

6.2.1 Sample construction

My sample consists of large, publicly traded European and US firms. The European subsample includes firms listed in the MSCI Europe Index at the end of 2005. The MSCI Europe consists of firms in Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom. The US subsample consists of firms listed in the S&P 500 at the end of 2005. In the first step, I drop all firms with headquarters outside the relevant countries and firms with primary listings outside the country of residence. Furthermore, I exclude all financial, real estate and insurance firms (SIC Code 6000-6999) from my analysis because of their differences in terms of

balance sheets and accounting. This practice is typically applied for empirical studies in finance literature. I obtained firm's primary SIC code from the Thomson Worldscope database. In the next step, I exclude firms without compensation information and firms with negative market-to-book ratio.

For the remaining firms, detailed data were hand-collected from annual reports on executive compensation, board structure, and ownership for the years 2005 to 2008. After further adjustments (e.g., takeover events and additional stock class of shares or firms filing for bankruptcy), I obtained an unbalanced panel of 2,766 firm-year observations covering a total of 705 firms. Table 6.1 describes my sample selection critera.

Table 6.1: Sample selection criteria

Year	**2005**	**2006**	**2007**	**2008**	**All Years**
Firms listed in MSCI Europe and S&P500 in 2005	1,090	1,090	1,090	1,090	4,360
- Different stock class of shares	17	17	17	17	68
- Foreign ISIN	24	24	24	24	96
- Financial firms	197	197	197	197	788
- No compensation	139	145	150	165	599
- Negative market-to-book ratio	8	12	7	16	43
Final sample	**705**	**695**	**695**	**671**	**2,766**

Notes: The table reports the sample selection criteria of firms for which I have collected compensation data.
Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

Table 6.2 describes the geographic distribution of the sample covering 17 countries over the period 2005-2008.

Table 6.2: Sample description of non-financials

Year	**2005**	**2006**	**2007**	**2008**	**All Years**
Austria	8	8	9	9	34
Belgium	15	15	15	15	60
Denmark	16	15	16	16	63
Finland	20	20	20	20	80
France	32	34	39	36	141
Germany	36	36	36	36	144
Greece	14	15	12	12	53
Ireland	13	13	12	10	48
Italy	16	16	15	16	63
Netherlands	19	19	16	14	68
Norway	8	9	10	9	36
Portugal	7	8	7	8	30
Spain	26	26	25	24	101
Sweden	31	28	27	26	112
Switzerland	15	15	25	25	80
Europe(excl. UK)	**276**	**277**	**284**	**276**	**1,113**
United Kingdom	108	100	91	82	381
Europe (incl. UK)	**384**	**377**	**375**	**358**	**1,494**
United States	321	318	320	313	1,272
All firms	**705**	**695**	**695**	**671**	**2,766**

Notes: The table reports the sample of firms for which I have collected compensation data. I collected compensation data for all non-financial firms listed in the MSCI Europe and all non-financial firms listed in the S&P500 in 2005. I exclude firms with headquarters outside the above countries, negative market-to-book ratio, insuffcient compensation information and firms with primary listing outside the country of residence.
Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

6.2.2 Measures of executive compensation

To examine my key hypotheses, I am interested in absolute pay levels as well as pay-for-performance sensitivities. However, while it is easy to obtain compensation data from commercial databases for US firms, there is no such database for European firms. Accordingly, for European firms I had to collect compensation data from individual annual reports. For US firms I used ExecuComp, which is frequently used in most compensation studies.

Measures of total compensation

I measure the level of total pay to executives as salary, bonus, value of stock, stock option grants, and other compensation (e.g. perks). For US firms, I follow the standard approach of *Fahlenbrach (2009)* and others and use the ExecuComp fair value figures for restricted stock and stock options (ExecuComp items OPTION_AWARDS_FV and STOCK_AWARDS_FV). For my measure of total compensation for US firms, I use the item TDC1 in the ExecuComp database, which is frequently used in other studies. For European firms, I use the fair value of stock and option grants as reported in the annual statements if available, and otherwise follow the Black/Scholes option pricing approach as closely as possible. I had to adopt this approach since the stock-based incentive programs of European firms are significantly more complex than programs used by US firms.[57] Stock options that had already been exercised, or which had been awarded previously, were not taken into account. Pensions are not included in this study due to a lack of

[57]See *Rapp, Schaller & Wolff (2009)* and *Sautner & Weber (2008)* for an analysis of incentive programs in European firms.

transparency and comparability. Due to the complex program structure and the limited transparency concerning the option parameters, I could not use simple calculations that value option grants by multiplying the number of options times one fourth of the strike price (*Core & Guay, 1999*; *Finkelstein & Boyd, 1998*).

Moreover, because of different disclosure policies, European firms do not have to provide consistent detailed individual compensation data for all their executives consistently. However, nearly all firms in my sample report the level of executive compensation aggregated over all executives. Hence, I use average values for all executives. Therefore, I collect compensation data for all executives in the firm, as well as the time served on the management boards for each of the executives. This method allows me to calculate executive man years, which I use to normalize the aggregate compensation level.[58] The measure of total compensation is calculated by the following equation:

$$\begin{aligned} TOTAL_{i,t} = \; & Salary_{i,t} + Annual\ Cash\ Bonus_{i,t} \\ & + Value\ of\ Stock\ and\ Option\ Grants_{i,t} \\ & + Other\ Compensation_{i,t} \end{aligned} \tag{6.1}$$

[58]The following (absolute) figures refer to a fictional management board member who has been employed for twelve months at the respective firm. The procedure can be illustrated by the following sample calculation: In a particular company, Executive A earned 900k EUR in 2007 and has been employed the whole year. Executive B at the same company only began working there on October 1st and therefore received a total of 300k EUR. If I now assume that the firm's fiscal year ended on December 31, 2007, then the total performance period of the management board was 15 months (= 12 (Executive A) + 3 (Executive B)). On the basis of the total compensation of 1,200k EUR (= 900 (Executive A) + 300 (Executive B)), there results an average monthly compensation of 80k EUR (= 1,200/15). Extrapolated to a whole year, this is equivalent to an average yearly salary of 960k EUR at the company in question.

In the empirical analysis I follow the standard approach and take the log of the average total compensation (TOTAL_LN).

Measures of pay-for-performance sensitivity

Measuring pay-for-performance sensitivities for European firms is difficult due to the lack of consistent data. Nevertheless, I use three measures. First, I simply define a dummy variable (SBI_DUMMY) that takes the value of one in case a firm grants stock-based incentives (SBI) to their executives. Second, I follow *Bergstresser & Philippon (2006)*, *Cornett, McNutt & Tehranian (2010)*, *Fernandes et al. (2010)*, *Mehran (1995)* and others and normalize the time value of stock and option grants by the level of total compensation. This ratio is called SBI_REL:

$$SBI\_REL_{i,t} = \frac{Value\ of\ Stock\ and\ Option\ Grants_{i,t}}{Total\ Compensation_{i,t}} \tag{6.2}$$

Third, I calculate the ratio of total incentives (stock-based incentives + cash bonus) to total compensation. I call this incentive ratio INC_REL:

$$INC\_REL_{i,t} = \frac{Value\ of\ Stock\ and\ Option\ Grants_{i,t} + Annual\ Cash\ Bonus_{i,t}}{Total\ Compensation_{i,t}} \tag{6.3}$$

6.2.3 Measures of the institutional environment

I focus on two dimensions of institutional mechanisms that might directly affect executive pay: First, the stance of corporate law toward shareholder protection; second, disclosure requirements by law regarding periodic filings and corporate actions. To capture these two dimensions of institutional environments, I use the following indices as proxy from the law and finance literature.

Shareholder Protection

(1) *Shareholder rights index (ADRI_DLLS):* The well-known Anti-Director Rights Index pioneered by *La Porta et al. (1998)* and recently revised by *Djankov et al. (2008)*. I use the revised Anti-Director Rights Index. The index is a direct measure of the extent of shareholder rights. The scale is from 1 to 5 (higher values indicate stronger shareholder protection).

(2) *Alternative shareholder rights index (ADRI_S):* Revised version of the Anti-Director Rights Index by *Spamann (2010)*. The index is conceptually continuous with the original index but differently defined and coded. The scale is from 1 to 6 (higher values indicate stronger shareholder protection).

Disclosure

(1) *Disclosure requirement index (DSRI):* Index of prospectus disclosure requirements from *La Porta, Lopez-de-Silanes & Shleifer (2006)* measuring the level of security-level transparency within the country. Prospectus disclosure requirements comprise disclosure of the equity ownership, inside ownership, irregular contracts, director/manager transactions, and com-

pensation. The metric scale is from 0 to 1 (higher values indicate higher disclosure requirements).

(2) *Ex-ante disclosure in self-dealing transactions (ASD_DISCLOSURE):* Index from *Djankov et al. (2008)* measuring the ex-ante disclosure requirements of a self-dealing transaction by the controlling shareholder. The metric scale is from 0 to 1 (higher values indicate higher disclosure requirements).

(3) *Ex-post disclosure in self-dealing transactions (ASD_POST_DISCLOSURE):* Index from *Djankov et al. (2008)* measuring the ex-post disclosure requirements in periodic filings (e.g., annual reports) of a self-dealing transaction by the controlling shareholder. The metric scale is from 0 to 1 (higher values indicate higher disclosure requirements).

I include additional control variables to capture different dimensions of the institutional environment. However, I have to be careful including other country-level variables as they might be highly correlated. I considered many common country-level measures and end up with two additional country-specific variables that do not cause multicollinearity problems. Hence, following many other studies of the law and finance literature, I include the Rule of Law Index (RULE_OF_LAW) from *Kaufmann, Kraay & Mastruzzi (2009)* as an indicator of law enforcement quality. Moreover, I calculate the ratio of market capitalization of listed firms to GDP (MCAP_GDP) to control for the development of stock markets. In my robustness section I incorporate additional country-level characteristics.

6.2.4 Measures of non-institutional governance

I measure the non-institutional governance of a firm from two perspectives: Firm-specific board structure and ownership structure.

Board structure

I follow the standard approach of the existing literature and use the following variables to measure board effectiveness: Board type (TWO_TIER_SYSTEM), number of executives (BOD_EXEC), number of non-executives on the board (BOD_NEXEC), number of members of the remuneration committee (RC_SIZE), CEO/Chair duality (CEO_DUAL), and CEO tenure (CEO_TENURE) (*Fahlenbrach, 2009*). According to *Jensen (1993)*, *Yermack (1996)*, and *Core & Guay (1999)*, boards with a high number of directors are less effective in monitoring and controlling. This implies that the Executives, especially the CEOs, power increases with the number of directors on the board. Non-Executives (Outsiders) are thought to act as the monitoring and advising role (*Fama & Jensen, 1983*). In the same way, a high number of members of the remuneration committee are less effective and easier to capture by the CEO. *Hermalin & Weisbach (2003)* argue that the board independence and effectiveness in monitoring is a bargaining game between the board and the CEO. For example, *Weisbach (1988)* observes that outsiders-dominated boards are more willing to fire an underperforming CEO. *Core & Guay (1999)* find that CEOs are less paid if more executive than directors serve on the board. *Mehran (1995)* argues that the proportion of equity based compensation of total annual compensation increases with the fraction of outsiders. I define board independence as the fraction of non-executive directors serving on the board. Having the same

person holding the CEO and Chairman positions (CEO_DUAL) reduces the monitoring ability of the board (e.g., *Jensen, 1993*). *Cyert, Kang & Kumar (2002)* find that the CEO Compensation is higher when CEO/chair duality is present. I also include the CEO tenure (CEO_TENURE), as it has also been discussed that CEOs with long tenure are supposed to have more authority and power within the firm. To control for the effectiveness of the remuneration board I use the number of members of the remuneration committee (RC_SIZE).

Ownership structure

Prior research on executive compensation has found evidence that ownership structure is an important determinant of compensation. For instance, *Hartzell & Starks (2003)* find that institutional ownership concentration is related to lower total compensation, but in turn increases pay-for-performance compensation. The results indicate that large institutional investors can monitor and influence managers' behavior and therefore mitigate the agency problem between shareholders and managers. In contrast, *Kraft & Niederprum (1999)* find that ownership concentration reduces the total pay level as well as the pay-performance sensitivity. In addition, *Mehran (1995)* finds that firms with a high percentage of shares held by outside blockholders use less pay-for-performance pay, which is in line with the traditional substitution hypothesis since blockholders have a monitoring role in the firm. Furthermore, *David, Kochhar & Levitas (1998)* show that the impact of institutional investors on CEO compensation depends on the type of relationship they have with the firm. Although these results referred only to institutional shareholders, I want to extend this approach by controlling for more types of blockholders and using a more precise distinction

of blockholder ownership. Therefore, I calculate three measures of ownership concentration that act as a proxy for the monitoring ability of blockholders. Regarding outside shareholders, I distinguish between institutional (OW_INSTITUTIONAL) and non-institutional ownership (OW_NON_-INSTITUTIONAL). Controlling for managerial ownership, I measure the ownership stake of all executives (OW_MANAGEMENT) normalized by total shares outstanding. Managerial ownership is viewed as a direct incentive for executives to encourage in active monitoring (*Bhagat, Carey & Elson, 1999*). I use free float (FREE_FLOAT) as an alternative measure for ownership concentration. Free float is calculated as 100% minus the fraction of voting rights held by the six largest blockholders, the management board, and the supervisory board.

Firm characteristics

Finally, I include standard variables measuring firm characteristics in my empirical analysis that potentially influence executive pay practices (e.g., *Baker & Hall, 2004*; *Cyert, Kang & Kumar, 2002*; *Fahlenbrach, 2009*; *Mehran, 1995*). Measuring the firm size, I use the logarithm of 1 plus sales of the firm (SIZE_SALES). Investment opportunities are measured by the market-to-book ratio (MARKET/BOOK). Current (and past) firm performance is measured by total shareholder return (TSR) (and lagged total shareholder return). Cash flow is measured by EBITDA to total assets (CASH_FLOW), and firm risk is measured by the standard deviation of monthly shareholder returns (RISK) over three years. The intensiveness of R&D is characterized by R&D-expenses to total assets (RND_RATIO). Further, I use firm leverage (LEVERAGE), defined as long-term debt to shareholder equity, and firm diversification (DIVERSIFICATION), defined as the fraction of sales

generated by the largest business segment of the firm. All firm characteristics are obtained from the Thomson Worldscope Database.

A summary of all variables is shown in table 6.3. To reduce the effect of outliers, I winsorize the market-to-book ratio, the performance measures, and the cash flow measure on the 1%- and the 99%-quantile.

Table 6.3: Definition of variables

Variable	Description
	Compensation
TOTAL	Average total compensation per executive (in thousand EUR)
TOTAL_LN	Natural logarithm of 1 plus total average compensation per executive (in thousand EUR)
SBI_DUMMY	Dummy variable taking the value of 1 in case that the firm grants stock-based incentives to executives in the particular year
SBI_REL	Fraction of overall pay that is granted in form of SBI
INC_REL	Fraction of overall pay that is granted in form of SBI and cash bonus
	Firm characteristics
SIZE_SALES	Natural logarithm of of 1 plus sales
MARKET/BOOK	Market-to-book value of equity measured as year end market cap divided by total equity
RISK	Annualized standard deviation of monthly stock returns over the past three years
LEVERAGE	Leverage measured by long-term debt to total equity
DIVERSIFICATION	Diversification measure defined as the fraction of sales generated by the largest business segment
TSR	Total shareholder return (defined as capital gains plus dividends during the calendar year)
TSR_LAG	Lagged total shareholder return in year t-1
CASHFLOW	Ratio of Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) over total assets
	Firm-specific governance
FREE_FLOAT	Proportion of shares that are not held by large owners proxied by [100- percentage of shares owned by the six largest blockholder - percentage of shares held by directors]
OW_MANAGEMENT	Fraction of voting rights held by the management board
OW_NON_INSTITUTIONAL	Fraction of voting rights held by non-institutional shareholders (private, government, firms, others)
OW_INSTITUTIONAL	Fraction of voting rights held by institutional investors
BOD_EXEC	Number of Executive Directors serving on the board
BOD_NON_EXEC	Number of Non-Executive Directors serving on the board
RC_SIZE	Number of members of the remuneration committee
CEO_TENURE	Variable measuring the tenure of the firm's current CEO (defined as natural logarithm of CEO tenure in months)
CEO_DUAL	Dummy variable which takes the value 1 in case that the CEO also chairs the board of directors during the fiscal year
TWO_TIER_SYSTEM	Dummy variable which takes the value 1 in case that the firm has a two-tier system (supervisory and managerial board)

Continued on next page...

Table 3 (continued)

Variable	Description
	Institutional environment
ADRI_DLLS	Anti-director rights index pioneered by *La Porta et al., 1998* and recently revised by *Djankov et al. (2008)*
ADRI_HIGH	Median-split of ADRI_DLLS, taking the value 1 in case that the values are equal to or greater to the median
ADRI_HIGHEST	Median-split of ADRI_DLLS, taking the value 1 in case that the values are greater to the median
ADRI_S	Revised anti-director rights index (ADRI) from *Spamann (2010)*
ASD_DISCLOSURE	Ex-ante disclosure requirements regarding a self-dealing transaction by the controlling shareholder pioneered taken from *Djankov et al. (2008)*
ASD_POST_DISCLOSURE	Ex-post disclosure requirements in periodic filings regarding a self-dealing transaction by the controlling shareholder taken from *Djankov et al. (2008)*
DSRI	Index of disclosure requirements in periodic filings (*La Porta, Lopez-de-Silanes & Shleifer, 2006*)
RULE_OF_LAW	Index of law enforcements. In particular the quality of contract enforcement, property rights, the police and the courts (*Kaufmann, Kraay & Mastruzzi, 2009*)
MCAP_GDP	Index of stock market capitalization. Stock market capitalization to GDP
PURCHASE_POWER	Country- and year-specific purchasing power parity taken from Eurostat website
TAX_DIFFERENTIAL	Measure of the country-specific difference between effective tax rates on capital and labour income taken from *Carey & Tchilinguirian (2000)*
INVESTOR_PR	Index of investor protection from *La Porta, Lopez-de-Silanes & Shleifer (2006)*
LAW_AND_ORDER	Index of strength of the legal system and the popular observance of the law (PRS Group, International Country Risk Guide)
REGULATORY_QUALITY	Index of the perception of government's ability to formulate and implement sound policies and regulations (*Kaufmann, Kraay & Mastruzzi, 2009*)
LEGAL_ENFORCEMENT	Index of legal enforcement of contracts in the country from *Caprio, Laeven & Levine (2007)*
PUBLIC_ENFORCEMENT	Index of public enforcement (*Djankov et al., 2008*)

Notes: The table describes the set of variables that I use in the empirical analysis (section 6.5). I use accounting and capital market data from Thomson Financial Worldscope and Datastream. For US firms I gathered compensation data from the ExecuComp database. All other firm-specific governance variables are hand-collected from annual reports and SEC filings, respectively.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

6.3 Executive compensation practices in Europe

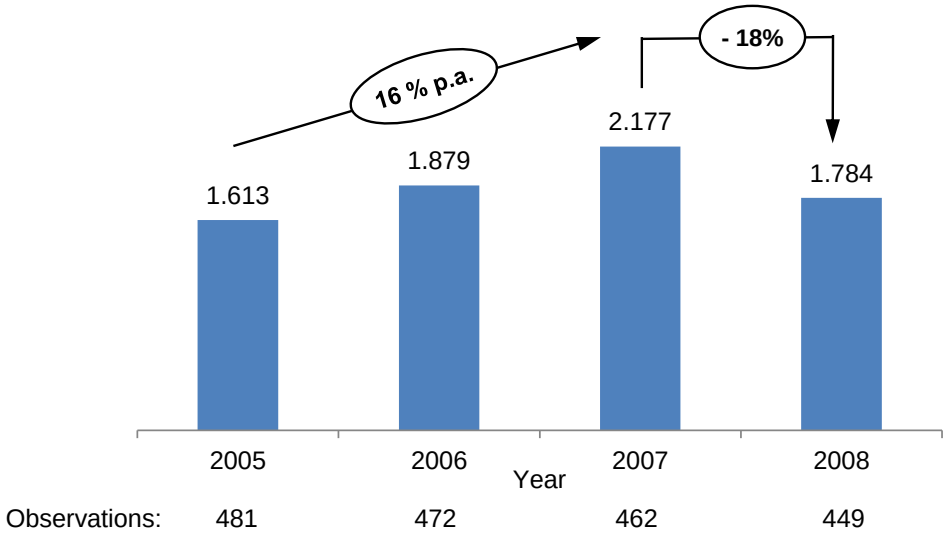
Not only in the aftermath of the financial crisis, executive compensation has been the subject of intense public discussion and heated controversy. However, with few comprehensive empirical studies on European pay practices available, such discussions are usually based on anecdotal evidence alone. This section is set out to fill that gap by presenting executive pay practices of European firms for the period 2005-2008. In particular, I will compare pay practices in Germany with other European countries. In contrast to the empirical analysis following in the next section, I do not exclude financial firms in overview of European compensation practices in this section.[59]

Development of executive compensation in Europe in 2005-2008

The average amount of management board compensation in Europe first rose steadily in the period from 2005 to 2007 (figure 6.1). Total compensation averaged 1,613k EUR and rose by 2007 to 2,177k EUR. Total compensation thus increased steadily between 2005 and 2007 by 16% per annum. This trend came to an end in 2008, however, when the compensation of an average executive decreased by more than 18% compared to the previous year. As a consequence, per-capita total compensation in 2008 has been under the

[59] I use the sample selection outlined in table 6.1, but do include financial firms. When it comes to controlling for various firm characteristics in the following empirical analysis, I follow the literature and exclude financials from my sample as they are very different in terms of the balance sheet and financial accounting.

Figure 6.1: Average total compensation in Europe from 2005-2008 (in thousand EUR)



Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011b)*.

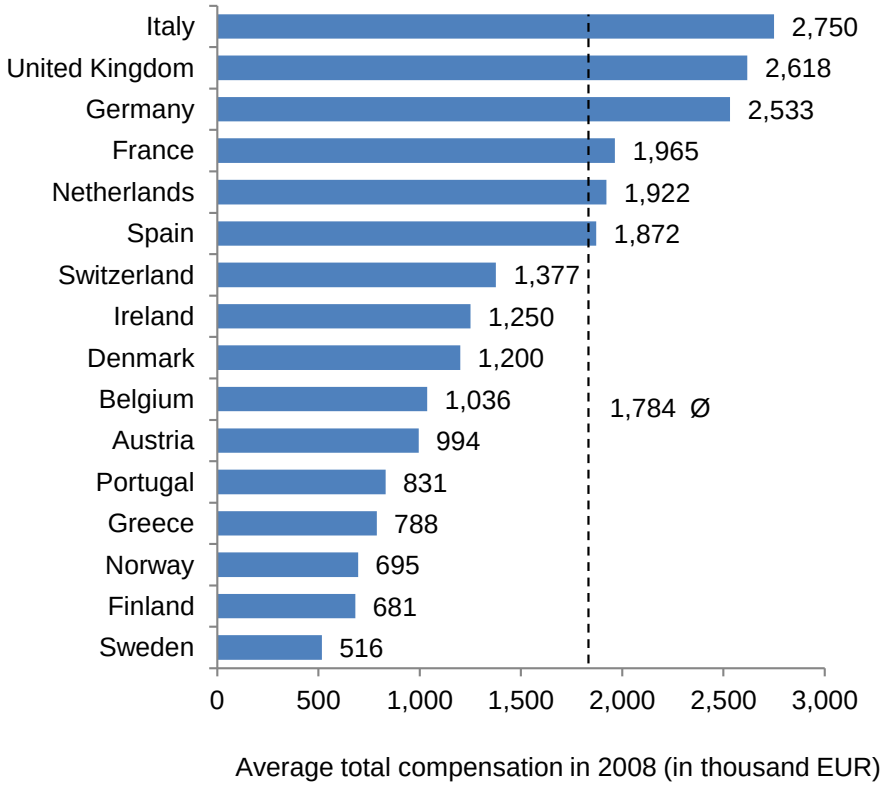
level in 2006. It may be assumed that the strong decline in total compensation is attributable to the influence of the financial and economic crisis, because the strong drop in corporate earnings had a negative effect in particular on variable cash compensation, reducing it from an average of 667k EUR to 486k EUR. This represents a decline of 27%.

Country-level comparison of total pay levels

An examination of the average amount of management board compensation in various countries reveals substantial heterogeneity on the country level (figure 6.2). With a European average of 1,784k EUR in 2008, German, British and Italian executives in particular earn an above-average income. The average executive in a German firm for example earns 2,533k EUR and

hence 42% more than his European counterparts. Conspicuous here is the gap between companies in Central Europe and Scandinavia: Executive total compensation in the Scandinavian countries is in general far lower than elsewhere in Europe. The lowest per capita total compensation in Europe can be found in Sweden. Figure 6.3 shows the average total compensation

Figure 6.2: Average total compensation per country in 2008 (in thousand EUR)



Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011b)*.

of executives in Europe grouped by the four legal origins (Common law, German law, French law, Scandinavian law).[60] As shown in the previous

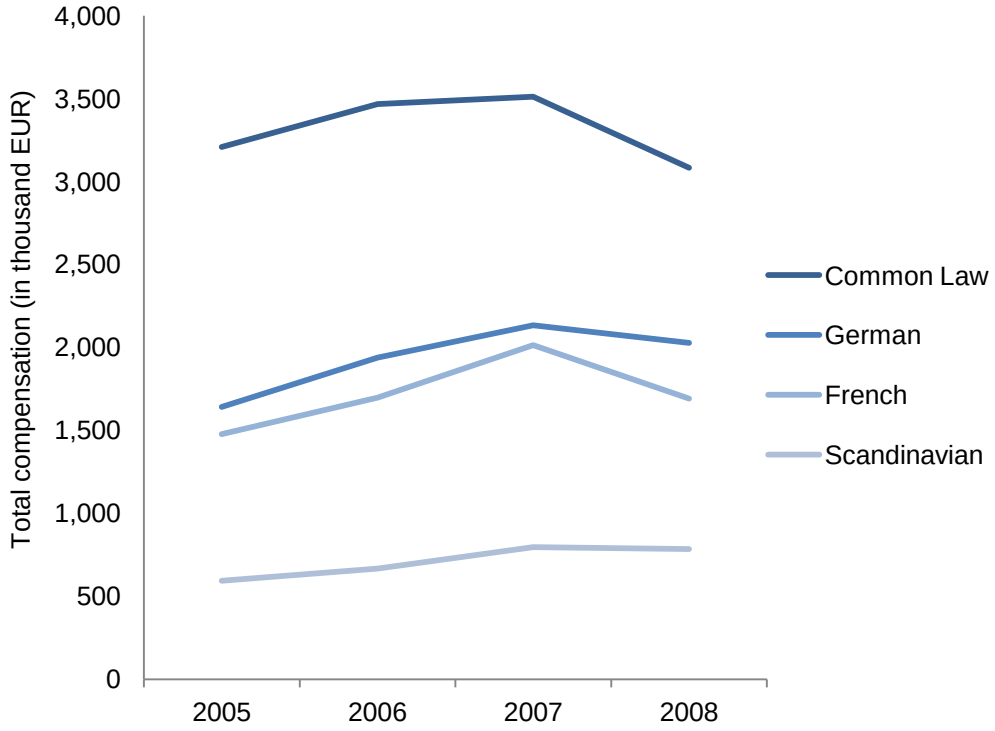
[60] A classification of the legal origin of the Company Law or Commercial Code was developed by *Reynolds & Flores (1989)* and *La Porta et al. (1998)*.

figure, there is a huge gap in total pay levels between common law countries (United Kingdom and Ireland) and countries of other law families. Average total compensation in the Anglo-Saxon area is about six times higher than in the Scandinavian countries. Firms operating in Western and Southern European countries exhibit similar total pay levels. The figure shows that in every European area the average total pay in Europe first rose steadily in the period from 2005 to 2007. This trend came to an end in 2008 and total pay levels particularly in Common and French law countries dropped radically. Since Scandinavian firms fairly grant variable (performance-based) compensation, total pay level did not noticeably reduced because of significant decline in profits and stock price collapses. Total pay in countries from the German law area has only slightly decreased. A number of studies have shown that firm size is a significant determinant for the total pay level.[61] This aspect in turn presents problems for the above analysis because average firm size varies in the countries within the universe studied. Therefore, the question will be pursued in the following of whether the above-described compensation premium for German executives is of a fundamental nature, or whether it is generated only by especially large firms and thus no actual premium can be said to exist. As it turns out, the truth lies in a combination of those two aspects: The total level of pay of executives of German firms reacts much more sensitively to the factor firm size. This is why executives in major German firms have above-average total compensation compared to other European countries. In order to shed some light on this effect, the firms studied will first be divided into four size quartiles - measured according to market capitalization - and the mean compensation amount within each quartile calculated.[62] I distinguish here once again between German

[61] E.g., *Core & Guay (1999)*, *Fahlenbrach (2009)*, *Mehran (1995)*.

[62] The following results do not rely on how company size is measured, i.e. equivalent results are shown regardless of whether total assets or number of employees is used as

Figure 6.3: Average total compensation grouped by legal origin in 2005-2008 (in thousand EUR)

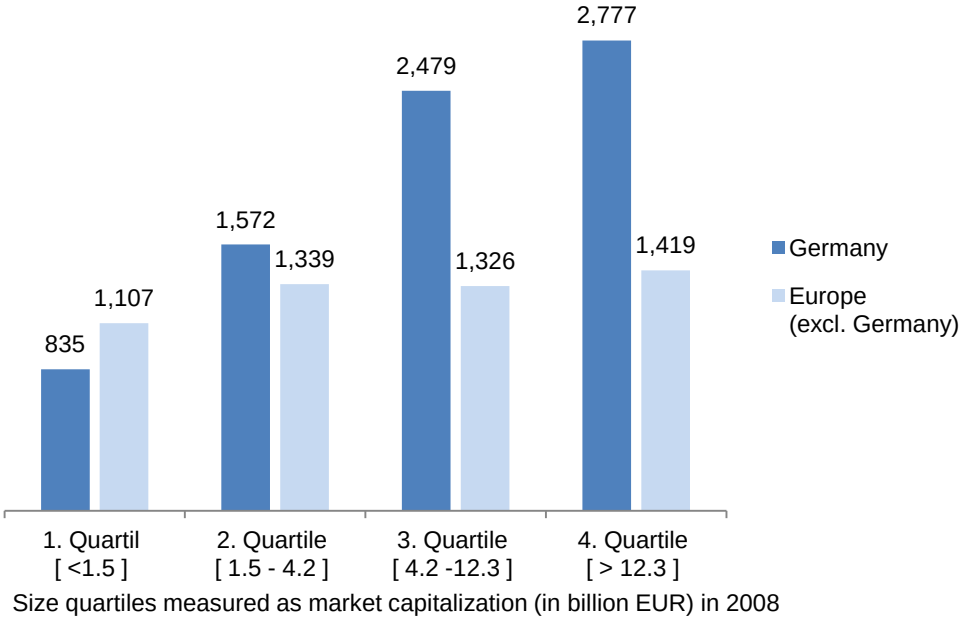


Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011b)*.

and European firms (figure 6.4). As can be seen, the amount of compensation increases both in Germany and in Europe with increasing company size. The difference is that the total pay level in German firms reacts much more sensitively to such size variations. While compensation in German firms in the lowest quartile is lower than the European average (although to a statistically insignificant extent), the opposite situation can be seen in the quartile with the largest businesses: Here the amount of compensation in German firms exceeds that in the European comparison group by nearly 50% (statistically significant). In sum, it is evident from figure 6.4 that in

key indicator.

Figure 6.4: Average total compensation by firm size (in thousand EUR) in Germany vs. Europe (size measured by market capitalization in billion EUR)



Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011b)*.

Germany the size of a firm seems to have a comparatively strong influence on the amount of total compensation for executives. This preliminary finding will be examined in more detail by multivariate regressions in the following section.

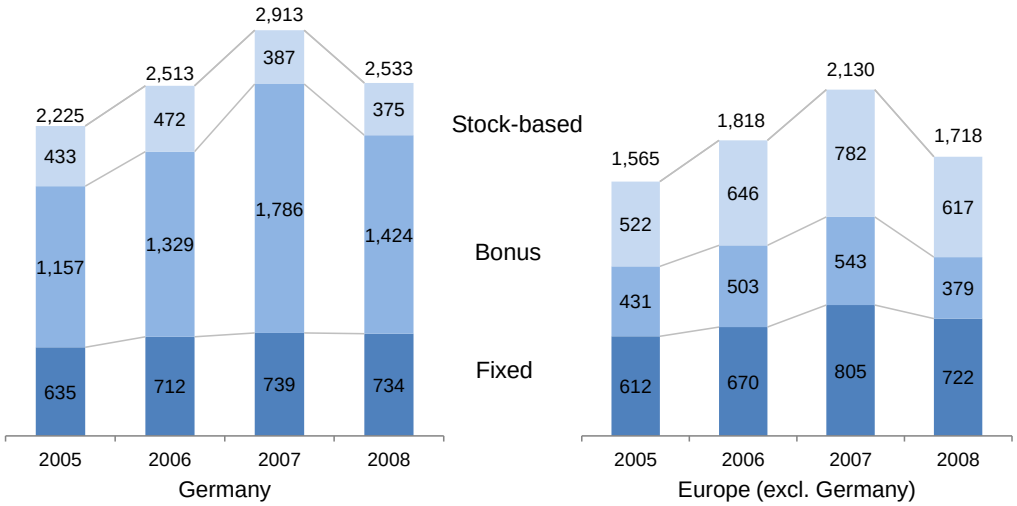
Structure of pay packages in Germany and Europe

In order to analyze the compensation structure, I divide total compensation into fixed and variable components, whereby the latter is made up of variable cash compensation and stock-based long-term incentives. Sub-

sumed under stock-based long-term incentives are in particular compensation components such as stock, stock option and so-called "phantom stock". In Figure 6.5, German firms are compared with those elsewhere in Europe. Marked differences can be discerned: While only around one quarter of total compensation in Germany comes from fixed components and three-quarters from variable elements, in the rest of Europe fixed compensation accounts for an average of 40% of the total. The large variable portion of executive pay in Germany is driven here especially by a relatively high ratio of variable cash bonus. This component made up considerably more than half of total compensation in the years 2005 to 2008. Also notable is the fact that stock-based components are much less firmly established in Germany than in the rest of Europe, where they make up an average of one third of total compensation. Tracking the changes in compensation structure over the period under study, analogous trends can be found in Germany and elsewhere in Europe. During the period before the financial crisis (2005-2007), the structure remained relatively constant. It was only in Germany that cash bonus rose sharply before the crisis in 2007 and the bonus component rose by an additional 9 percentage points (approx. 450k EUR). The following year, total compensation in Germany sank back down to the 2006 level, while in Europe as a whole it even dipped below the value in 2006.

This slump is the result of dwindling firm profits and the accompanying reductions in cash bonus, so that in all countries managers received much less in variable cash compensation in 2008. In that crisis year, bonuses were down 20% in Germany and 30% in the rest of Europe. While in Europe as a whole the value of stock-based compensation dropped significantly in 2008, the stock-based component decreased only slightly in

Figure 6.5: Compensation structure in Germany vs. Europe from 2005-2008 (in thousand EUR)



Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011b)*.

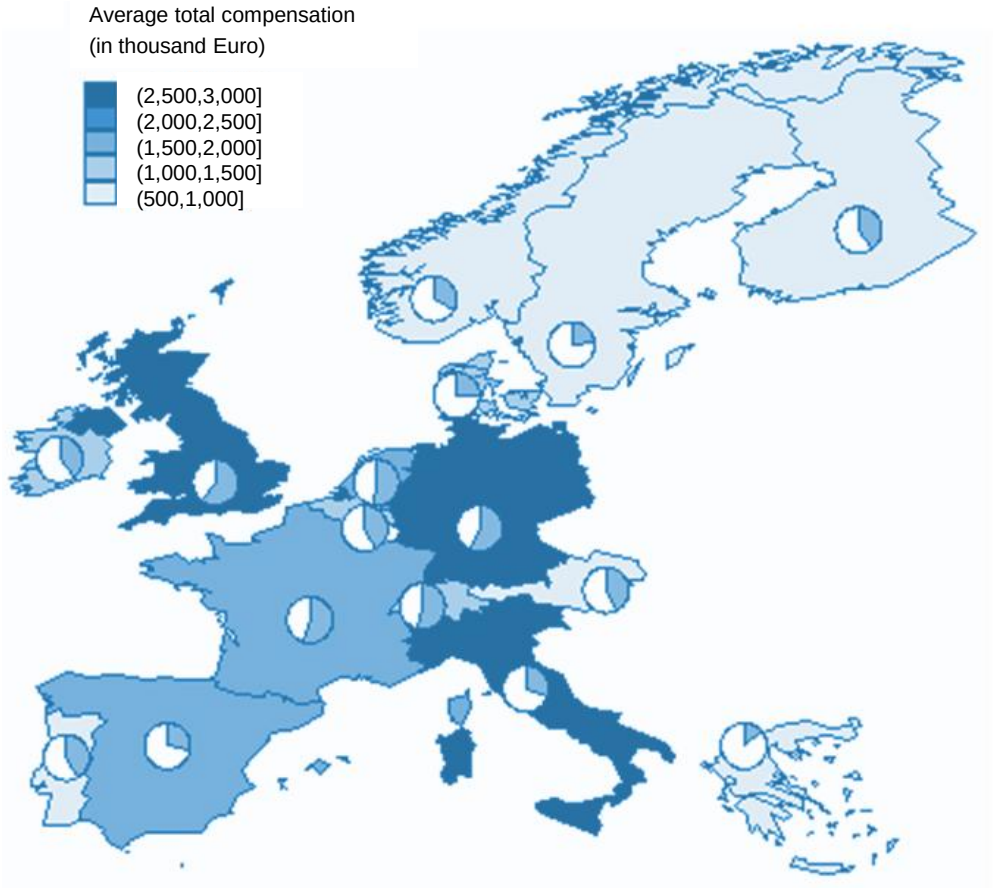
Germany.

Connection between total pay level and structure of pa arrangements

As a final step of this descriptive analysis, I analyze the connection between the structure and amount of executives in European countries. Figure 6.6 illustrates the geographic distribution of the average total compensation (grayscale) and simultaneously shows the proportion made up by variable components in total compensation (pie charts). It can be seen that - with the exception of Italy - variable compensation components play a major role in countries with high per-capita total compensation. By contrast, variable compensation plays only a minor role in countries with a low compensation

level.

Figure 6.6: Geographic distribution of average total compensation and proportion of variable compensation in Europe in 2008 (in thousand EUR)



Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011b)*.

The connection between total pay level and structure in Europe can hence be conjectured as follows: High total compensation is accompanied by a high proportion of variable components. Consequently, the variable components can be identified as the main drivers behind the level of total pay in European firms. The descriptive overview leads to the assumption that a

marked heterogeneity can be discerned among the European countries with respect to the total level of compensation. In addition to the total pay level, the structure of compensation as well exhibits significant differences within Europe. It can be presumed that both firm-level factors and country-level differences seem to determine executive pay. Therefore, I aim to explore differences in relevant country characteristics in more detail in the next section.

6.4 Institutional environment and firm-level governance

This section provides an overview of how the institutional environment is measured. In particular, I present summary statistics and correlation coefficients of the variables measuring different dimensions of the institutional environment.

Institutional environment statistics

Table 6.4 gives an overview of the institutional governance indicators across the countries and underlines the huge heterogeneity within countries. I find the highest shareholder protection (ADRI_DLLS) in this sample in the UK, Spain, and Ireland. Surprisingly, US shareholder protection is below the median, while in all Scandinavian countries high shareholder protection prevails. Figure 6.7 illustrates the extent to which minority shareholders are protected by law in a particular country.

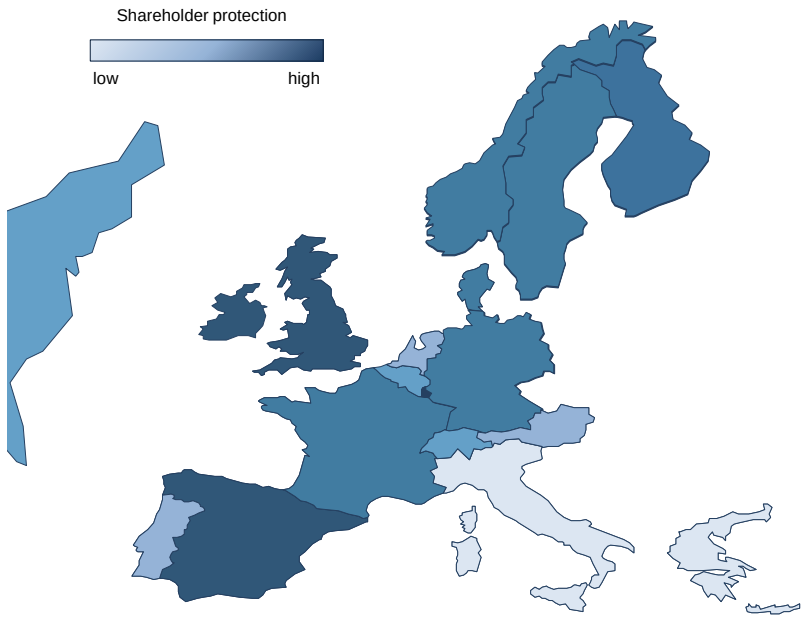
Table 6.4: Institutional governance indices

Country	ADRI_DLLS	ADRI_S	ASD_DISCLOSURE	ASD_POST_DISCLOSURE	DSRI
AUSTRIA	2.5	4	0.00	0.40	0.25
BELGIUM	3	2	0.78	0.80	0.42
DENMARK	3.5	4	0.28	0.40	0.42
FINLAND	4	4	0.50	0.80	0.58
FRANCE	3.5	4	0.28	1.00	0.50
GERMANY	3.5	5	0.17	0.80	0.75
GREECE	2	3	0.17	0.40	0.33
IRELAND	5	4	0.56	0.80	0.67
ITALY	2	4	0.33	1.00	0.67
NETHERLANDS	2.5	4	0.11	0.60	0.50
NORWAY	3.5	4	0.83	0.20	0.58
PORTUGAL	2.5	4	0.28	1.00	0.42
SPAIN	5	6	0.44	0.60	0.50
SWEDEN	3.5	4	0.33	0.40	0.58
SWITZERLAND	3	3	0.17	0.40	0.67
UNITED KINGDOM	5	5	1.00	1.00	0.83
UNITED STATES	3	2	0.67	1.00	1.00
Median	3.5	4	0.33	0.80	0.58

Notes: The table reports descriptive statistics on the institutional governance variables across the countries.
Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

The lowest protection of shareholder rights (ADRI_DLLS) exist in Italy and Greece. Germany, a typical representative of its legal family, ranks in the average among this sample. By contrast, the corrected Anti-Director Rights Index from *Spamann (2010)* (ADRI_S) of Germany is above the average with a score of 5, indicating that shareholder rights in Germany are strongly protected by law. As discussed in section 4.2.2, the original Anti-Director Rights Index developed by *La Porta et al. (1998)* has been updated by *Djankov et al. (2008)*, leading to a shifting in the rankings.[63]

Figure 6.7: Geographic distribution of the revised Anti-Director Rights Index



Source: Own work.

The most prominent change is the downgrade of the US from 5 to 3. It has been common practice to assume that the US is the worldwide leader

[63]Since the revised Anti-Director Rights Index is available, I do not use the original, outdated index from *La Porta et al. (1998)*.

in shareholder protection until the revised index was introduced. However, while the US had the highest score in the original Anti-Director Rights Index, it is now ranked below the median in this sample. By contrast, the levels of disclosure requirements are highest in the US. The lowest levels of disclosure rules exist in Austria and Greece.

Table 6.5 shows correlation coefficients for the non-institutional and institutional governance variables. Not surprisingly, the largest correlations in the sample are within the group of disclosure indices (r = 0.77) and within the group of shareholder rights indices (r = 0.71). More interestingly, countries with high levels of disclosure requirements did not establish high shareholder protection (r= -0.60). Examination of the correlation between institutional and non-institutional governance variables reveals that the highest correlation is between the board type (TWO_TIER_SYSTEM) and all institutional governance variables except for the ADRI_DLLS. This is because attribute levels of the board system variable are country specific. Overall, the highest (lowest) correlations are between the general disclosure index (DSRI) and the non-institutional governance variables. In contrast, both proxies for shareholder protection are less correlated with firm-specific governance variables.

Table 6.5: Correlation table for institutional and non-institutional governance mechanisms

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Institutional governance mechanisms																		
1	ADRI	1																
2	ADRI_S	0.71	1															
3	ASD_DISCLOSURE	0.47	-0.13	1														
4	ASD_POST_DISCLOSURE	0.03	-0.37	0.63	1													
5	DSRI	-0.1	-0.6	0.6	0.77	1												
6	RULE_OF_LAW	0.24	-0.05	0.13	-0.14	0.06	1											
7	MCAP_GDP	0.02	-0.26	0.24	0.21	0.45	0.24	1										
Non-institutional governance mechanisms																		
8	FREE_FLOAT	-0.12	-0.33	0.2	0.33	0.39	0.14	0.21	1									
9	OW_MANAGEMENT	-0.03	0.01	-0.07	-0.04	-0.05	-0.14	0.01	-0.23	1								
10	OW_NON_INSTITUTIONAL	-0.02	0.28	-0.39	-0.42	-0.5	-0.17	-0.26	-0.73	0.1	1							
11	OW_INSTITUTIONAL	0.15	0.01	0.24	0.15	0.18	0.11	0.07	-0.33	-0.05	-0.31	1						
12	BOD_EXEC	-0.23	-0.20	-0.21	-0.14	0.04	0.32	0.19	0.05	0.03	-0.02	-0.02	1					
13	CEO_DUAL	-0.34	-0.63	0.23	0.43	0.61	0.00	0.23	0.30	-0.01	-0.31	0.03	0.09	1				
14	CEO_TENURE	0.00	0.00	-0.02	0.02	0.03	-0.10	-0.04	-0.05	0.21	0.02	-0.01	-0.06	0.15	1			
15	TWO_TIER	-0.06	0.33	-0.64	-0.71	-0.64	0.45	-0.16	-0.21	-0.06	0.33	-0.11	0.33	-0.39	-0.09	1		
16	BOD_NEXEC_IND	-0.04	-0.39	0.44	0.56	0.68	0.21	0.43	0.39	0.01	-0.54	0.19	0.08	0.44	0.03	-0.41	1	
17	RC_IND	0.01	-0.29	0.39	0.43	0.55	0.11	0.26	0.24	-0.06	-0.34	0.15	0.00	0.36	-0.04	-0.37	0.63	1

Notes: The table reports pairwise correlation coefficients.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

Before continuing with the empirical analysis, table 6.6 gives an aggregated overview of my compensation data, the firm characteristics, governance variables, and variables measuring regulatory differences. Please note that from now on I use the sample without financials. Table 6.6 also shows correlation coefficients for the compensation and governance variables. My sample comprises relatively large firms with average sales of 5,4 billion Euros. On average, executives receive a total compensation of approximately 2.6 million Euros, of which 38% of total pay consists of stock-based incentives. Across all years, executive directors hold 0.1% of the firm's equity. The average firm has 5.2 executive directors and the average fraction of independent non-executive directors is 84%. About 30% of all firms have CEO/chair duality. The average CEO tenure is 4.2 years.

Table 6.6: Descriptive statistics

VARIABLE	MEAN	MEDIAN	MIN	MAX	Obs.	Correlation with ... TOTAL_LN		SBI_DUMMY		SBI_REL		INC_REL	
Compensation													
TOTAL_LN	7.51	7.57	4.03	10	2766			0.40	***	0.60	***	0.72	***
TOTAL	2,621	1,943	55	25,957	2,766	0.80	***	0.23	***	0.45	***	0.52	***
SBI_DUMMY	0.84	1.00	0	1.00	2,720	0.40	***			0.65	***	0.55	***
SBI_REL	0.38	0.41	0	0.97	2,720	0.60	***	0.65	***			0.76	***
INC_REL	0.63	0.69	0	1.00	2,681	0.72	***	0.55	***	0.76	***		
Firm characteristics													
SIZE_SALES	8.60	8.59	0	12.65	2,759	0.47	***	0.12	***	0.14	***	0.27	***
MAREKT/BOOK	3.71	2.69	0.07	32.58	2,756	0.03		0.02		0.07	***	0.05	**
TSR	2.77	4.5	-92.23	129.65	2,734	-0.01		-0.01		-0.08	***	0.04	
TSR_LAG	17.49	15.06	-63.6	156.57	2,722	-0.02		-0.04	*	-0.07	***	0.00	
CASH_FLOW	0.21	0.14	-0.54	1.48	2,732	-0.19	***	-0.1	***	-0.11	***	-0.19	***
LEVERAGE	0.2	0.18	0	1.01	2,758	-0.05	**	-0.07	***	-0.09	***	-0.11	***
RND_DUMMY	0.13	0	0	1	2,766	0.18	***	0.15	***	0.17	***	0.19	***
DIVERSIFICATION	0.66	0.64	0.16	1.43	2,709	-0.04	*	0.00		0.07	***	0.02	
Firm-specific governance													
FREE_FLOAT	0.71	0.74	0	1	2,765	0.33	***	0.33	***	0.36	***	0.37	***
OW_MANAGEMENT	0.01	0	0	0.65	2,766	-0.03		-0.04	*	-0.03		-0.02	
OW_NON_INSTITUTIONAL	0.13	0.01	0	1	2,766	-0.30	***	-0.40	***	-0.42	***	-0.39	***
OW_INSTITUTIONAL	0.13	0.10	0	0.99	2,766	-0.02		0.12	***	0.10	***	0.04	
BOD_EXEC	5.16	5	0	28	2,765	-0.15	***	0.05	**	0.01		-0.02	
CEO_DUAL	0.32	0	0	1	2,680	0.38	***	0.27	***	0.42	***	0.42	***
CEO_TENURE	7.33	7.44	0	10	2,689	0.09	***	0.02		0.03		0.09	***
TWO_TIER_SYSTEM	0.25	0	0	1	2,765	-0.38	***	-0.22	***	-0.43	***	-0.37	***
BOD_NON_EXEC_IND	0.84	1	0	1	2,731	0.36	***	0.46	***	0.55	***	0.50	***
RC_IND	0.91	1	0	1	2,586	0.26	***	0.32	***	0.39	***	0.40	***

Continued on next page...

Table 6 (continued)

VARIABLE	MEAN	MEDIAN	MIN	MAX	Obs.	Correlation with ... TOTAL_LN		SBI_DUMMY		SBI_REL		INC_REL	
Institutional environment													
ADRI_DLLS	3.43	3	2	5	2,766	-0.06	***	-0.06	**	-0.14	***	-0.16	***
ADRI_S	3.25	3	2	6	2,766	-0.29	***	-0.32	***	-0.46	***	-0.45	***
ASD_DISCLOSURE	0.58	0.67	0	1	2,766	0.29	***	0.32	***	0.39	***	0.28	***
ASD_POST_DISCLOSURE	0.85	1	0.2	1	2,766	0.43	***	0.36	***	0.51	***	0.42	***
DSRI	0.79	0.83	0.25	1	2,766	0.53	***	0.46	***	0.64	***	0.58	***
RULE_OF_LAW	1.56	1.56	0.34	2.04	2,766	-0.05	*	0.22	***	0.07	***	0.05	**
TAX_DIFFERENTIAL	-1.05	-8.5	-17.4	24.9	2,766	-0.44	***	-0.40	***	-0.53	***	-0.46	***
PURCHASING_POWER	1	0.93	0.82	1.41	2,766	-0.43	***	-0.17	***	-0.41	***	-0.49	***
MCAP_GDP	111.51	134.12	17.44	309.92	2,766	0.16	***	0.28	***	0.29	***	0.25	***
PUBLIC_ENFORCEMENT	0.25	0	0	1	2,766	-0.42	***	-0.47	***	-0.57	***	-0.46	***
LAW_AND_ORDER	8.66	8.33	6.67	10	2,766	-0.32	***	-0.05	**	-0.21	***	-0.30	***
LEGAL_ENFORCEMENT	6.55	7.01	3.18	8.06	2,766	0.36	***	0.34	***	0.47	***	0.51	***
INVESTOR_PR	0.7	0.78	0	1	2,766	0.47	***	0.40	***	0.62	***	0.53	***
REGULATORY_QUALITY	1.51	1.54	0.79	1.93	2,766	0.09	***	0.30	***	0.19	***	0.11	***

Notes: The table reports descriptive statistics on the variables. All compensation level values are in thousand Euros. Compensation granted in currencies other than Euro are transformed to Euro by using the average of monthly exchange rates of the corresponding year. MARKET/BOOK, TSR, TSR_LAG, and CASH_FLOW are winzorized at the 1%-level. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a).*

6.5 Empirical results

This section discusses my empirical strategy and lays out my empirical results. First, I describe my methodological approach of the empirical analysis. Second, I provide the results of my empirical examination on the impact of disclosure and shareholder protection on compensation practices. Third, I present results on the interaction of shareholder protection and firm-level governance with respect to executive compensation.

Empirical strategy

I am interested in the effect of firm characteristics, firm-specific governance mechanisms, and regulatory differences on compensation policies. Generally, I estimate a model of the following form:

$$\begin{aligned} \textit{Compensation} = \beta_0 &+ \beta_1 \textit{(firm characteristics)} + \beta_2 \textit{(board structure)} \\ &+ \beta_3 \textit{(ownership structure)} + \beta_4 \textit{(institutional environment)} \\ &+ \beta_5 \textit{(other controls)} + \epsilon_i \end{aligned} \tag{6.4}$$

Henceforth, *compensation* may represent various measures of executive compensation. Caution is required, since some of my endogenous variables are dummy variables or restricted variables. While in general, I use OLS methods, in these cases, I use probit and tobit regression methods, respectively. To mitigate the skewness of endogenous variables, I take logarithms of respective variables. Since I am interested in the effect of regulatory differences, I estimate throughout two-way fixed effects models with fixed-time

and fixed-industry effects.[64] To investigate the relationship between compensation and non-institutional governance mechanisms under certain institutional conditions (e.g., strong shareholder protection), I extend the regression models by adding interaction terms. I construct interaction terms of selected firm-specific governance variables with different levels of shareholder protection (ADRI_DLLS, ADRI_HIGH, ADRI_HIGHEST). I calculate mean-centered variables in interaction terms in order to interpret coefficients more intuitively and to reduce multicollinearity problems. For a better understanding in interpreting interaction effects with centered variables, see figure A.1.

6.5.1 Impact of the institutional environment on executive compensation

Pay-for-performance

I use measures of stock-based and total incentive pay as proxy pay-for-performance sensitivities in executive compensation contracts. Table 6.7 reports coefficients of a two-way fixed effects tobit regression on the relative amount of stock-based incentives.[65] I find the shareholder protection to be negatively correlated with the relative amount of stock-based incentives. Recall that a higher value of ADRI_DLLS indicates a higher minority shareholder protection. An increase from a median ADRI_DLLS score to the highest possible score reduces the relative amount of stock-based compensation by 7.5% or 150k EUR stock-based pay. The alternative shareholder pro-

[64] See *Fahlenbrach (2009)* and *Zhou (2001)* for a discussion of the problem of firm-fixed effects in the presence of rarely changing variables.

[65] Table A.2 presents coefficients of all variables included in the regression model.

tection index (ADRI_S) has the same effect on relative stock-based compensation. Thus, the results are in line with the substitution hypothesis because shareholders trade off pay-for-performance and strong shareholder protection rights. Consequently, these findings indicate that pay-for-performance sensitivity is lower in countries with high shareholder protection. Shareholders in high-protection countries rely less on the interest alignment effect of pay-for-performance, because strong shareholder rights by law facilitate their control of managersť behavior and therefore reduce the risk of moral hazard. In turn, shareholders that are less protected by law establish higher pay-for-performance in compensation contracts to align interests between them and the managers. Turning to the second dimension of institutional governance mechanisms, disclosure indices are positively related to pay-for-performance with economically large effects. For instance, an increase from a median disclosure (DSRI) score to the highest score means a 28.5% increase in the relative amount of stock-based compensation. For absolute pay levels this means 550k EUR more stock-based compensation. Disclosure requirements that reveal self-dealing transactions by the controlling shareholder (ASD_DISCLOSURE, ASD_POST_DISCLOSURE) also have a positive effect on pay-for-performance sensitivity. Essentially, the positive sign of the disclosure variables supports the complementary hypotheses. Hence, different disclosure requirements regarding prospectus disclosure as well as disclosure of self-dealing transactions by the controlling shareholder increase pay-for-performance sensitivity. One reason for this relationship might be that in countries with high prospectus disclosure requirements, shareholders are more confident and encouraged to implement higher pay-for-performance since they have improved monitoring and controlling abilities. In order to combine these two different perspectives, the regression models in column 6 and 7 include the ADRI_DLLS, ADRI_S and the DSRI. The results of both

models indicate that I can support the substitution hypothesis with respect to shareholder protection and the complementary hypothesis regarding disclosure levels.

Table 6.7: Tobit regression analysis of relative amount of stock-based incentives

Dep. variable	**SBI_REL**						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ADRI_DLLS	-0.028 ***						-0.033 ***
	(-3.73)						(-4.67)
ADRI_S		-0.051 ***				-0.031 ***	
		(-9.42)				(-5.73)	
ASD_DISCLOSURE			0.130 ***				
			(5.58)				
ASD_POST_DISCLOSURE				0.279 ***			
				(9.06)			
DSRI					0.494 ***	0.425 ***	0.503 ***
					(12.87)	(10.61)	(13.37)
Firm characteristics	yes	yes	yes	yes	yes	yes	yes
Non-institutional governance	yes	yes	yes	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes	yes	yes	yes
Industry-fixed effects	yes	yes	yes	yes	yes	yes	yes
No of observ.	2306	2306	2306	2306	2306	2306	2306
McKelvey and Zavoina R2	0.515	0.530	0.514	0.526	0.541	0.549	0.547

Notes: The table reports coefficients of a two-way fixed effects tobit regression explaining the relative amount of stock-based incentives (SBI). All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Table A.2 presents coefficients of all variables included in the regression model. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

My results hold when I control for additional country characteristics. Table 6.8 show that coefficient estimates of shareholder protection and disclosure remain quantitatively and qualitatively similar. The effect of disclosure requirements on pay-for-performance is even stronger when controlling for law enforcement quality (RULE_OF_LAW) and stock market development (MCAP_GPD). The quality of law enforcement as well as the level of stock market development seem to establish higher pay-for-performance sensitivity. In the following analyses, I keep these two additional country-level control variables to control for additional dimensions of institutional environment.

Table 6.8: Tobit regression analysis of relative amount of stock-based incentives with additional country characteristics

Dep. variable	**SBI_REL**						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ADRI_DLLS	-0.032 ***						-0.048 ***
	(-4.14)						(-6.58)
ADRI_S		-0.051 ***				-0.032 ***	
		(-9.29)				(-5.81)	
ASD_DISCLOSURE			0.129 ***				
			(5.56)				
ASD_POST_DISCLOSURE				0.341 ***			
				(10.18)			
DSRI					0.561 ***	0.492 ***	0.600 ***
					(13.21)	(11.23)	(14.24)
RULE_OF_LAW	0.036	0.028	-0.004	0.108 ***	0.119 ***	0.121 ***	0.177 ***
	(1.17)	(0.95)	(-0.15)	(3.49)	(3.98)	(4.07)	(5.78)
MCAP_GDP	0.0003 **	0.0002	0.0004 **	0.0004 ***	0.0004 **	0.0004 **	0.0005 ***
	(2.25)	(1.32)	(2.48)	(3.05)	(-2.41)	(-2.48)	(-2.90)
Firm characteristics	yes	yes	yes	yes	yes	yes	yes
Non-institutional governance	yes	yes	yes	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes	yes	yes	yes
Industry-fixed effects	yes	yes	yes	yes	yes	yes	yes
No of observ.	2306	2306	2306	2306	2306	2306	2306
McKelvey and Zavoina R2	0.515	0.530	0.514	0.531	0.546	0.555	0.558

Notes: The table reports coefficients of a two-way fixed effects tobit regression explaining the relative amount of stock-based incentives (SBI). All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Table A.2 presents coefficients of all variables included in the regression model.

Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

The findings of table 6.8 are reinforced by the analysis in table 6.9. This table presents the regression results of two additional measures for pay-for-performance. I again find a negative influence of shareholder protection, but a positive influence of disclosure rules on pay-for-performance sensitivity. The probability of stock-based grants increases in the levels of shareholder protection and decreases in levels of disclosure requirements. Furthermore, the relative amount of total performance-based pay (INC_REL) is influenced by the institutional environment in the same way as for SBI_REL and SBI_DUMMY. Overall, these findings suggest that I can support both theories, the substitution and complementary hypothesis, depending on the dimension of institutional environment that is considered. In practice, this means that firms in countries with low shareholder protection and high disclosure requirements implement high pay-for-performance sensitivities in compensation contracts.

Table 6.9: Regression analysis of pay-for-performance sensitivities

Dep. variable	**SBI_DUMMY**		**SBI_REL**		**INC_REL**		**SBI_DUMMY**		**SBI_REL**		**INC_REL**	
Model	(1)		(2)		(3)		(4)		(5)		(6)	
ADRI_DLLS	-0.201	***	-0.032	***	-0.043	***	-0.318	***	-0.048	***	-0.057	***
	(-3.30)		(-4.14)		(-7.49)		(-4.88)		(-6.58)		(-10.54)	
DSRI							2.810	***	0.600	***	0.447	***
							(6.92)		(14.24)		(12.63)	
RULE_OF_LAW	0.949	***	0.036		0.096	***	1.460	***	0.177	***	0.201	***
	(4.94)		(1.17)		(3.60)		(7.61)		(5.78)		(7.07)	
MCAP_GDP	0.004	**	0.000	**	0.000	**	-0.001		0.000	***	-0.001	***
	(2.12)		(2.25)		(-2.40)		(-0.57)		(-2.90)		(-7.85)	
Firm characteristics	yes		yes		yes		yes		yes		yes	
Non-institutional governance	yes		yes		yes		yes		yes		yes	
Year-fixed effects	yes		yes		yes		yes		yes		yes	
Industry-fixed effects	yes		yes		yes		yes		yes		yes	
No of observ.	2135		2135		2112		2135		2135		2112	
McKelvey and Zavoina R2 / McFadden adj. R2	0.322		0.515		0.493		0.342		0.558		0.542	

Notes: The table reports coefficients of a two-way fixed effects tobit (for SBI_REL, INC_REL) and probit (for SBI_DUMMY) regression explaining pay-for-performance sensitivities. All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if $p<0.1$, ** if $p<0.05$, *** if $p<0.01$.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

Level of total pay

Table 6.10 reports coefficients of a two-way fixed effect OLS regression on the level of total pay. Examining the regulatory indicators, I find that Anti-Director Rights Index alone is negatively correlated with total pay (column 1). Disclosure requirements indices are again positively related to total pay. However, when I test my enhanced model combining the two perspectives (shareholder protection and disclosure rules) the ADRI_DLLS index becomes insignificant. This result is in line with my substitution hypothesis since I expect only a minor impact of institutional setting on total pay levels. In contrast, all disclosure requirements indices are positively related to total pay with economically large effects. An increase from a median DSRI score to the highest score leads to 90% more total compensation. For instance, executives switching from a country with average disclosure requirements (e.g., Norway or Denmark) to the US receive 90% more total pay, holding all else (firm size, industry, etc.) constant. Overall, it seems that shareholder protection plays a minor role in total compensation levels, but prospectus disclosure strongly influences total pay levels in a positive way. This effect is driven by the fact that stock-based and incentive pay as substantial components of total pay are higher in countries with high disclosure requirements (table 6.8) .

Table 6.10: Regression analysis of total compensation

Dep. variable	**TOTAL_LN**						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ADRI_DLLS	0.018						-0.028
	(0.95)						(-1.61)
ADRI_S		-0.066 ***				-0.009	
		(-4.07)				(-0.57)	
ASD_DISCLOSURE			0.301 ***				
			(5.43)				
ASD_POST_DISCLOSURE				0.693 ***			
				(7.88)			
DSRI					1.679 ***	1.662 ***	1.704 ***
					(16.06)	(15.07)	(16.13)
RULE_OF_LAW	-0.201 ***	-0.161 **	-0.202 ***	0.000	0.109 *	0.109 *	0.138 **
	(-3.18)	(-2.56)	(-3.30)	(-0.01)	(1.74)	(1.74)	(2.14)
MCAP_GDP	0.0002	0.0002	0.0003	0.0003	-0.0020 ***	-0.0020 ***	-0.0020 ***
	(0.76)	(0.32)	(0.68)	(1.28)	(-6.45)	(-6.43)	(-6.48)
Firm characteristics	yes	yes	yes	yes	yes	yes	yes
Non-institutional governance	yes	yes	yes	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes	yes	yes	yes
Industry-fixed effects	yes	yes	yes	yes	yes	yes	yes
No of observ.	2325	2325	2325	2325	2325	2325	2325
Adj. R2	0.571	0.573	0.576	0.581	0.622	0.621	0.622

Notes: The table reports coefficients of a two-way fixed effects regression explaining log total compensation. All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

6.5.2 Interaction between institutional and non-institutional governance

Besides the main effects of institutional setting reported above, I test how the institutional environment affects the influence of non-institutional governance mechanisms (e.g., ownership structure) on pay. Therefore, I use interaction terms to identify possible conditioning effects. I again begin by analyzing the pay-for-performance sensitivities and continue with the presentation of the results on total pay.

Pay-for-performance

Table 6.11 shows the results of a two-way fixed effect regression on the relative amount of stock-based compensation. Ownership concentration variables representing firm-specific governance mechanisms were reported in the regression table. To account for different levels of shareholder protection, I use the ADRI_DLLS, ADRI_HIGH, and ADRI_HIGHEST variables. I also include the level of prospectus disclosure requirements (DSRI). To investigate possible interaction effects, interaction terms of each shareholder protection variable with each ownership variables are entered to the regression analysis. My results support the findings of *Kraft & Niederprum (1999)*, *Mehran (1995)*, and *Fahlenbrach (2009)* concerning the substitutional effect of ownership concentration on pay-for-performance. In all regression models the variables of ownership concentration enter the regression significantly negatively, which supports the traditional substitution hypothesis. Thus, firms with low institutional and non-institutional ownership concentration impose higher pay-for-performance sensitivity on their managers. The main effects of institutional governance mechanisms such as share-

holder protection (ADRI_DLLS) and disclosure requirements (DSRI) on pay-for-performance remain the same as above in table 6.8. Thus, pay-for-performance sensitivity decreases in shareholder protection while increasing in levels of disclosure. In the next step, I examine the combined effect of both institutional and non-institutional governance to determine the extent to which the institutional environment influences the relation between firm-specific governance and pay. The interaction terms represent possible moderating effects between institutional and non-institutional governance mechanisms. Interaction terms of shareholder protection levels (ADRI_DLLS, ADRI_HIGH, ADRI_HIGHEST) and ownership concentration (OW_MA NAGEMENT, OW_NON_INSTITUTIONAL, OW_INSTITUTIONAL) are significant over all models except for the interaction terms including management ownership. The negative direction of both the interaction effects and main effects of ownership concentration indicate that shareholder protection has a strengthening effect on the impact of ownership concentration on pay-for-performance sensitivity. More precisely, the substitution effect of ownership concentration is enhanced by high shareholder protection. In other words, the substitutional effect of blockholders on pay-for-performance is enforced in countries with high shareholder protection. Non-institutional blockholder as well as institutional blockholders reduce pay-for-performance the more their interests are protected by law. Hence, from a shareholder perspective, contracts with high pay-for-performance sensitivity are less essential for interest alignment and the prevention of moral hazard. This effect supports my enhancing hypothesis.

Table 6.11: Regression analysis of pay-for-performance sensitivity with interaction effects

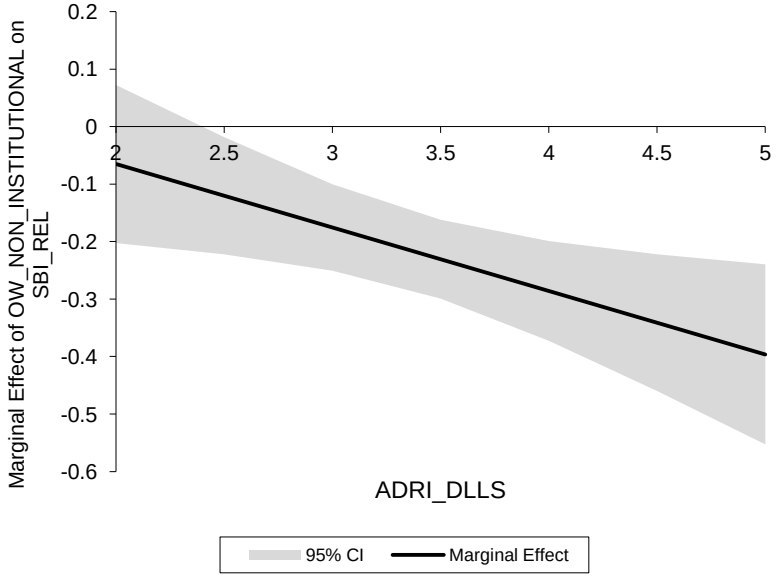
Dep. variable	**SBI_REL**			
Model	(1)	(2)	(3)	(4)
Non-institutional Governance (ownership)				
FREE_FLOAT	0.166 ***			
	(6.16)			
OW_MANAGEMENT		0.005	0.171	0.221
		(0.04)	(1.16)	(1.52)
OW_NON_INSTITUTIONAL		-0.231 ***	-0.136 ***	-0.218 ***
		(-6.60)	(-2.98)	(-5.94)
OW_INSTITUTIONAL		-0.085 **	-0.053	-0.101 ***
		(-2.39)	(-1.21)	(-2.67)
Institutional Governance				
DSRI	0.621 ***	0.624 ***	0.581 ***	0.597 ***
	(14.55)	(14.69)	(13.66)	(14.14)
ADRI_DLLS	-0.037 ***	-0.050 ***		
	(-5.19)	(-6.40)		
ADRI_HIGH			-0.079 ***	
			(-5.62)	
ADRI_HIGHEST				-0.093 ***
				(-5.95)
Non-institutional Governance vs. Institutional Governance				
ADRI_DLLS x FREE_FLOAT	0.135 ***			
	(4.51)			
ADRI_DLLS x OW_MANAGEMENT		-0.393 ***		
		(-2.78)		
ADRI_DLLS x OW_NON_INSTITUTIONAL		-0.110 **		
		(-2.49)		
ADRI_DLLS x OW_INSTITUTIONAL		-0.008		
		(-0.18)		
ADRI_HIGH x OW_MANAGEMENT			-0.676 ***	
			(-2.79)	
ADRI_HIGH x OW_NON_INSTITUTIONAL			-0.163 ***	
			(-2.70)	
ADRI_HIGH x OW_INSTITUTIONAL			-0.087	
			(-1.18)	
ADRI_HIGHEST x OW_MANAGEMENT				-0.637 ***
				(-2.68)
ADRI_HIGHEST x OW_NON_INSTITUTIONAL				-0.127
				(-1.58)
ADRI_HIGHEST x OW_INSTITUTIONAL				0.043
				(0.48)
Firm characteristics	yes	yes	yes	yes
Non-institutional governance	yes	yes	yes	yes
Additional institutional governance	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes
Industry-fixed effects	yes	yes	yes	yes
No of observ.	2305	2306	2306	2306
McKelvey and Zavoina R2	0.564	0.578	0.564	0.569

Notes: The table reports coefficients of a two-way fixed effects tobit regression explaining pay-for-performance sensitivity (SBI_REL) with interaction effects of institutional and non-institutional governance. All variables in interaction terms are mean-centered to interpret coefficients more intuitively and to reduce multicollinearity problems. As additional control variables for institutional governance I included RULE_OF_LAW and MCAP_GDP. All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

Because interpretation of interaction terms can often be unintuitive, figure 6.8 illustrates the marginal effect of the non-institutional ownership concentration over different levels of shareholder protection (effect of column 2 in table 6.11).[66] The figure shows that the negative effect of non-institutional ownership on pay-for-performance becomes stronger when shareholder protection increases. Hence, shareholders seem to consider their protection by corporate law and firm-specific governance mechanisms when it comes to specifying pay-for-performance sensitivity in compensation contracts.

Figure 6.8: Marginal effect of non-insitutional ownership on pay-for-performance (SBI_REL)



Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

[66] Technical details of interaction terms with mean-centered variables are presented in figure A.1.

Level of total pay

Table 6.12 presents the results of a two-way fixed effect regression on the total pay level. As above, I use ownership concentration variables as firm-specific governance mechanisms. Different levels of shareholder protection are represented by the ADRI_DLLS, ADRI_HIGH, and ADRI_HIGHEST variables. I again include the level of disclosure requirements (DSRI). The composition of interaction terms is the same as for the pay-for-performance regressions (see table 6.11). The adjusted R2 of about 0.6 indicates that 60% of the variation in compensation across executives in the 17 countries is explained by firm characteristics, firm-specific governance variables, and institutional environment indicators. In all regression models, I see a negative relationship of ownership concentration and total pay supporting the traditional substitution hypothesis. This means that, together with the findings from table 6.11, firms impose higher pay-for-performance (stock-based incentives) when both institutional and non-institutional ownership concentration is low. However, in contrast, those firms pay more total compensation to compensate managers with riskier pay (stock-based incentives) for bearing incentive risk. Management ownership is positively associated with total pay. The theoretical prediction on the effect of management ownership on executive pay is inconclusive. On the one hand, management ownership makes it easier for executives to extract rents from other shareholders. Thus, management ownership is expected to have a positive impact on total pay. On the other hand, executives with large stockholdings are likely to be motivated by their ownership and not by annual flow pay (*Core, Guay & Verrecchia, 2003*). My results suggest that managerial rent extraction increases in inside ownership. This relation is moderated by strong shareholder protection. Strong shareholder protection reduces the extent to which insider

ownership facilitates managerial rent extraction from minority shareholders.

The effects of institutional governance variables are consistent with the main effects in table 6.10. Hence, total pay significantly increases in levels of disclosure, but shareholder protection has no significant effect. The interaction terms are highly significant over all regression models. In contrast to the findings on pay-for-performance sensitivity, the interaction terms enter total pay regressions with the opposite sign compared to the signs of ownership concentration. This opposite effect indicates that shareholder protection has a buffering influence on the impact of ownership concentration on total pay. Essentially, the substitution effect of ownership concentration is decreasing in high shareholder protection. In other words, the monitoring by outside blockholders fairly acts as a substitute for total pay in high-protective countries.

Table 6.12: Regression analysis of total pay with interaction effects

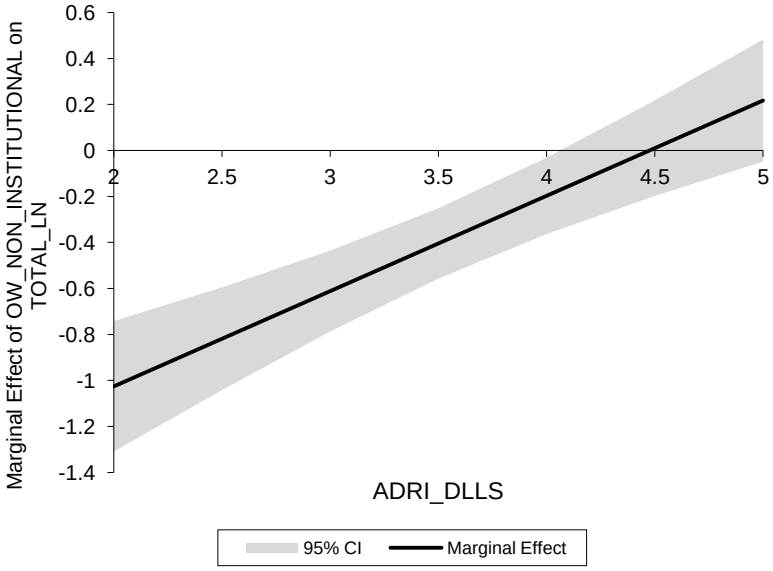
Dep. variable	TOTAL_LN							
Model	(1)		(2)		(3)		(4)	
Non-institutional Governance (ownership)								
FREE_FLOAT	0.401	***						
	(6.22)							
OW_MANAGEMENT			0.478	**	0.690	**	0.827	***
			(1.98)		(2.10)		(2.60)	
OW_NON_INSTITUTIONAL			-0.404	***	-0.629	***	-0.594	***
			(-5.18)		(-5.37)		(-6.94)	
OW_INSTITUTIONAL			-0.362	***	-0.524	***	-0.483	***
			(-3.89)		(-4.31)		(-4.68)	
Institutional Governance								
DSRI	1.632	***	1.689	***	1.656	***	1.653	***
	(15.77)		(16.03)		(15.77)		(15.99)	
ADRI_DLLS	-0.035	**	-0.037	**				
	(-1.98)		(-2.14)					
ADRI_HIGH					-0.120	***		
					(-3.52)			
ADRI_HIGHEST							-0.032	
							(-0.88)	
Non-institutional Governance vs. Institutional Governance								
ADRI_DLLS x FREE_FLOAT	-0.252	***						
	(-3.89)							
ADRI_DLLS x OW_MANAGEMENT			-0.505	***				
			(-3.09)					
ADRI_DLLS x OW_NON_INSTITUTIONAL			0.414	***				
			(5.34)					
ADRI_DLLS x OW_INSTITUTIONAL			0.282	***				
			(2.75)					
ADRI_HIGH x OW_MANAGEMENT					-0.606			
					(-1.63)			
ADRI_HIGH x OW_NON_INSTITUTIONAL					0.461	***		
					(3.17)			
ADRI_HIGH x OW_INSTITUTIONAL					0.449	**		
					(2.49)			
ADRI_HIGHEST x OW_MANAGEMENT							-1.270	***
							(-3.50)	
ADRI_HIGHEST x OW_NON_INSTITUTIONAL							0.985	***
							(6.31)	
ADRI_HIGHEST x OW_INSTITUTIONAL							0.547	**
							(2.54)	
Firm characteristics	yes		yes		yes		yes	
Non-institutional governance	yes		yes		yes		yes	
Additional institutional governance	yes		yes		yes		yes	
Year-fixed effects	yes		yes		yes		yes	
Industry-fixed effects	yes		yes		yes		yes	
No of observ.	2324		2325		2325		2325	
Adj. R2	0.614		0.617		0.615		0.618	

Notes: The table reports coefficients of a two-way fixed effects OLS regression explaining total pay with interaction effects of institutional and non-institutional governance. All variables in interaction terms are mean-centered to interpret coefficients more intuitively and to reduce multicollinearity problems. As additional control variables for institutional governance I included RULE_OF_LAW and MCAP_GDP. All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

Figure 6.9 presents the marginal effect of the non-institutional ownership concentration over different levels of shareholder protection (column 2 in table 6.12) on total pay. The marginal effect of ownership concentration varies from -1 to 0.1. By increasing shareholder protection the negative, substitutional effect of ownership concentration on total pay moves toward zero. This result supports my weakening hypothesis.[67]

Figure 6.9: Marginal effect of non-insitutional ownership on total pay (TOTAL_LN)



Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

[67]Technical details of interaction terms with mean-centered variables are presented in figure A.1.

6.6 Robustness tests

In this section, I discuss three robustness checks of the results reported in this chapter: Model specification, robustness of regression with interaction terms, sample variation, robustness of measures of institutional environment.

6.6.1 Model specifications

First, I check for model specification and internal validity of my regression. Due to centering interaction variables, I do not experience multicollinearity problems even in regression analyses with interaction terms when observing variance inflation factors (highest VIF is 4.05). Furthermore, I consider alternative measures using several variables. For instance, I use market capitalization and total assets as a proxy for firm size. Also I use a three-year and a five-year window to calculate volatility.

6.6.2 Alternative standard error estimation

In my base models, I use a two-way fixed effect pooled regression with industry and year-fixed effects estimating Huber-White robust standard errors. Using this model, I follow *Fahlenbrach (2009)* and others. It assumes that unobservable firm-specific factors are sufficiently captured by the industry association. *Petersen (2009)* suggests an extension of the Huber-White estimator by clustering by observations (the Huber-White-Sandwich estimator). Moreover, Petersen argues that in most cases panel regressions should

estimate standard errors clustered on a firm-level with year-fixed effects. Therefore, I repeated my regression and use the sandwich estimator of variance and allow for clustering on a firm-level. I still use time fixed effects (year dummies). The results presented in table 6.13 confirm my previous results. However, by using year dummies, I assume that time effects are fixed. When time effects are wrongly assumed to be fixed, even standard errors clustered by firm can be biased. Since researchers often do not know the precise form of the dependence, recently, *Petersen (2009)* and *Thompson (2011)* propose using a two-dimensional clustering of standard errors. Following this view, I use standard error estimation allowing for clustering at the firm and time level. In doing so, standard errors are robust against arbitrary within-firm autocorrelation and arbitrary time cross-panel correlation and thus allow for correlations among firms in the same year and different years in the same firm. Again, the table shows that my findings remain robust.

Table 6.13: Robustness: Alternative estimation of standard errors

SE	Clustered by firm				Clustered by firm and year			
Dep. variable	**SBI_REL**		**TOTAL_LN**		**SBI_REL**		**TOTAL_LN**	
Model	(1)		(2)		(3)		(4)	
ADRI_DLLS	-0.048	***	-0.029		-0.047	***	-0.034	
	(-4.72)		(-1.13)		(-6.73)		(-1.16)	
DSRI	0.600	***	1.701	***	0.590	***	1.634	***
	(10.05)		(10.89)		(14.43)		(8.38)	
RULE_OF_LAW	0.177	***	0.138		0.167	***	0.117	
	(4.28)		(1.45)		(6.38)		(1.61)	
MCAP_GDP	0.000	**	-0.002	***	0.000		-0.001	***
	(-2.04)		(-4.57)		(0.01)		(-3.47)	
Firm characteristics	yes		yes		yes		yes	
Non-institutional governance	yes		yes		yes		yes	
Year-fixed effects	yes		yes		no		no	
Industry-fixed effects	yes		yes		yes		yes	
No of observ.	2306		2325		2306		2325	

Notes: The table reports coefficients of tobit and OLS regressions explaining the relative amount of stock-based incentives (SBI) and total pay levels with different standard error estimations. Some regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

6.6.3 Variation in interaction terms

In order to validate the results from regression analyses with interaction terms, I interact other institutional governance indices such as the disclosure requirement index (DSRI) and the revised Anti-Director Rights Index (ADRI_S) with firm-specific governance variables. For the sake of brevity I do not report regression results. The results correspond to my base model with the Anti-Director Rights Index (ADRI_DLLS). Thus, my results seem to be independent of the choice of the institutional environment dimension.

6.6.4 Alternative measures of the institutional environment

Finally, I repeated regression analyses with alternative proxies for institutional setting and regulation. Regarding my first dimension of institutional environment that influences executive pay, shareholder protection, I used other indices that somehow act as proxies for a shareholder-friendly institutional setting. In table 6.14, I report regression results of pay-for-performance sensitivity on alternative institutional governance indicators. I use an index of public enforcement (PUBLIC_ENFORCEMENT) including fines and prison terms for self-dealing and an index measuring the strength of the legal system and the popular observance of the law (LAW_AND_ORDER). The results show that these indices influence pay-for-performance sensitivity in a similar way as my Anti-Director Rights Index. This enforces my finding that better protection of shareholders and enhanced shareholder rights substitute pay-for-performance sensitivity.

Table 6.14: Robustness: Alternative proxies for shareholder protection

Dep. variable	**SBI_REL**			
Model	(1)	(2)	(3)	(4)
PUBLIC_ENFORCEMENT	-0.233 ***		-0.113 ***	
	(-10.10)		(-4.20)	
LAW_AND_ORDER		-0.094 ***		-0.047 ***
		(-7.03)		(-3.60)
DSRI			0.432 ***	0.522 ***
			(8.74)	(11.89)
Firm characteristics	yes	yes	yes	yes
Non-institutional governance	yes	yes	yes	yes
Additional institutional governance	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes
Industry-fixed effects	yes	yes	yes	yes
No of observ.	2306	2306	2306	2306
McKelvey and Zavoina R2	0.535	0.523	0.551	0.550

Notes: The table reports coefficients of a two-way fixed effects tobit regression explaining the relative amount of stock-based incentives (SBI) with alternative proxies for sharholder protection. All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification.Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

In table 6.15, I report regression results on the second domain of institutional environment, the proxies for disclosure. I applied alternative proxies such as the legal enforcement index (LEGAL_ENFORCEMENT) and an index of government's regulatory quality (REGULATORY_QUALITY). The regression analysis with these variables yields similar results to my baseline models. Higher disclosure in the sense of people's perception of government's ability to provide sound policies and the enforcement of contracts encourage shareholders to grant performance-based payments.

Table 6.15: Robustness: Alternative proxies for disclosure

Dep. variable	**SBI_REL**			
Model	(1)	(2)	(3)	(4)
LEGAL_ENFORCEMENT	0.069 ***		0.066 ***	
	(9.97)		(9.40)	
REGULATORY_QUALITY		0.039		0.136 ***
		(0.85)		(2.58)
ADRI_DLLS			-0.019 **	-0.041 ***
			(-2.48)	(-4.78)
Firm characteristics	yes	yes	yes	yes
Non-institutional governance	yes	yes	yes	yes
Additional institutional governance	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes
Industry-fixed effects	yes	yes	yes	yes
No of observ.	2306	2306	2306	2306
McKelvey and Zavoina R2	0.531	0.509	0.533	0.516

Notes: The table reports coefficients of a two-way fixed effects tobit regression explaining the relative amount of stock-based incentives (SBI). All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification.Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if $p<0.1$, ** if $p<0.05$, *** if $p<0.01$.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

6.6.5 Sample variation

To check the robustness of my findings in general, I repeat my analyses using a CEO-only dataset. The results with CEO data are consistent with my findings of the base models, which comprise data about all executives. In a further robustness check, I include financials, which were previously excluded because of different pay practices. I find that my results are robust when financials are included.

Exclusion of US and UK firms

Previous work highlights that country's legal origin is an important determinant of the country's investor protection (*Djankov et al., 2008*; *La Porta et al., 1998*). As documented in my sample description (table 6.2) a large number of firm observations are from the common law countries US and UK. In fact, English common law countries historically developed a different institutional environment and different pay practices compared to civil law countries. For example *La Porta et al. (1998)* argue that common law countries offer greater minority shareholder protection. Nonetheless, this view is challenged by other authors (e.g., *Spamann, 2010*). Moreover, pay practices developed differently across legal origins. For instance, related cross-country studies on executive compensation show that common law countries like US and UK rather use stock-based compensation than Continental European firms (*Conyon & Murphy, 2000*, *Conyon, Core & Guay, 2010*, *Fernandes et al., 2010*). These results are in line with my empirical findings. To make sure that my findings are not just driven by common law firm observations, I repeat my regression analyses without US and UK firms. Table 6.16 presents regression results for the baseline model of pay-for-performance sensitivity

excluding US and UK firms. The results suggest that my findings regarding pay-for-performance sensitivity hold for the subsample of Continental European firms.

Table 6.16: Robustness: Regression analysis of pay-for-performance sensitivities exluding US and UK firms

Dep. variable	**SBI_DUMMY**		**SBI_REL**		**INC_REL**		**SBI_DUMMY**		**SBI_REL**		**INC_REL**	
Model	(1)		(2)		(3)		(4)		(5)		(6)	
ADRI_DLLS	-0.489	***	-0.065	***	-0.033	***	-0.671	***	-0.102	***	-0.042	***
	(-6.23)		(-4.58)		(-3.08)		(-7.44)		(-6.33)		(-3.37)	
DSRI							3.148	***	0.620	***	0.141	
							(5.00)		(5.75)		(1.58)	
RULE_OF_LAW	0.878	***	0.068	**	0.144	***	1.487	***	0.186	***	0.171	***
	(4.36)		(1.99)		(5.38)		(6.40)		(4.55)		(5.11)	
MCAP_GDP	0.001		0.000		-0.001	***	-0.002		-0.001	***	-0.001	***
	(0.84)		(-0.39)		(-5.52)		(-1.18)		(-3.26)		(-5.42)	
Firm characteristics	yes		yes		yes		yes		yes		yes	
Non-institutional governance	yes		yes		yes		yes		yes		yes	
Year-fixed effects	yes		yes		yes		yes		yes		yes	
Industry-fixed effects	yes		yes		yes		yes		yes		yes	
No of observ.	814		814		786		814		814		786	
McKelvey and Zavoina R2 / McFadden adj. R2	0.331		0.528		0.479		0.355		0.562		0.481	

Notes: The table reports coefficients of a two-way fixed effects tobit (for SBI_REL, INC_REL) and probit (for SBI_DUMMY) regression explaining pay-for-performance sensitivities. All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if $p<0.1$, ** if $p<0.05$, *** if $p<0.01$.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

Results of table 6.17 indicated that the effects of institutional variables on total pay also continue to hold in Continental European firms. As in the previous model on total pay the ADRI_DLLS index is insignificant. This result is in line with my substitution hypothesis that expects only a small influence of shareholder protection on total pay levels. By contrast, the ADRI_S is significant positively related to total pay in the subsample of Continental European firms. However, consistent with my previous findings, the disclosure requirements indices are positively related to total pay with economically large effects. One exception is the ASD_POST_DISCLOSURE for which I find no significant correlation with total pay levels. In summary, my findings seem not to be driven by US or UK firms and I conclude that institutional environment also matters in executive compensation in Continental European firms.

Table 6.17: Robustness: Regression analysis of total compensation exluding US and UK firms

Dep. variable	**TOTAL_LN**						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ADRI_DLLS	0.034						-0.008
	(1.22)						(-0.30)
ADRI_S		0.134 ***				0.107 ***	
		(4.98)				(3.91)	
ASD_DISCLOSURE			-0.573 ***				
			(-5.53)				
ASD_POST_DISCLOSURE				-0.104			
				(-0.85)			
DSRI					0.883 ***	0.577 ***	0.904 ***
					(4.24)	(2.71)	(4.12)
RULE_OF_LAW	-0.014	0.066	-0.029	-0.026	0.121	0.131 *	0.128
	(-0.21)	(0.97)	(-0.42)	(-0.31)	(1.62)	(1.75)	(1.62)
MCAP_GDP	0.000	0.000	-0.001 **	-0.001	-0.001 ***	-0.001 **	-0.001 ***
	(-1.39)	(-0.84)	(-2.18)	(-1.58)	(-3.37)	(-2.18)	(-3.36)
Firm characteristics	yes	yes	yes	yes	yes	yes	yes
Non-institutional governance	yes	yes	yes	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes	yes	yes	yes
Industry-fixed effects	yes	yes	yes	yes	yes	yes	yes
No of observ.	833	833	833	833	833	833	833
Adj. R2	0.581	0.599	0.597	0.581	0.593	0.603	0.593

Notes: The table reports coefficients of a two-way fixed effects regression explaining log total compensation. All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of firm characteristics, non-institutional governance mechanisms, year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a)*.

6.7 Summary

The majority of current empirical research on executive compensation focuses on the influence of firm-specific governance mechanisms like ownership or board structure. The existing literature on executive compensation remains quite silent on institutional environment influences. It is the objective of this chapter, to shed light on this issue. I examine two questions regarding institutional governance mechanisms: 1) Does the institutional environment have an impact on the compensation structure (and level); 2) Is there an interaction effect between the institutional environment and firm-specific governance mechanisms?

First, examining pay levels and pay-for-performance measures, I find evidence that institutional governance structures have a substantial impact on pay. I show that pay-for-performance sensitivity increases in levels of disclosure and decreases in the levels of shareholder protection. In practice, this means that firms in countries with low shareholder protection and high disclosure requirements implement higher pay-for-performance sensitivities. By contrast, total pay levels are not strongly affected by shareholder protection, but they increase in levels of disclosure requirements.

Second, I expect a moderating effect of institutional setting on non-institutional governance mechanisms when it comes to designing compensation packages. More precisely, the impact of firm-specific governance on pay depends on institutional setting and regulation. Thus, shareholders consider both their protection by law and existing firm-specific governance mechanisms when they decide on compensation contracts. I call a strengthening interaction effect the *enhancing hypothesis* and a weakening interaction the

weakening hypothesis. I find that the traditional substitution effect of pay-for-performance and strong firm-specific governance (ownership concentration) is enhanced by high shareholder protection. Hence, firms operating in countries with strong shareholder protection and having strong internal governance (e.g., high ownership concentration) implement even less pay-for-performance, because pay-for-performance then becomes less important in the alignment of interests between managers and shareholders. Regarding total pay, I find evidence indicating that shareholder protection has a weakening effect on the impact of firm-specific governance mechanisms on total pay, which means that the traditional substitution effect of ownership concentration on total pay is decreasing in high shareholder protection. Thus, firms having strong internal governance mechanisms pay their executives higher total pay according to how much more their shareholders are protected by the law. Overall, these findings suggest that I can support both the enhancing and weakening hypothesis depending on whether pay-for-performance sensitivities or total pay is considered.

Given these results, I finally conclude that the institutional environment does matter substantially in executive compensation.

7 Regulation, compensation and risk taking in banks: Evidence from the financial crises of 2007/2008[68]

7.1 Introduction

In the wake of the financial market crisis of 2008 it has been argued that excessive risk taking in the banking industry is one of the fundamental causes of the economic slump. It has been argued that ill-designed incentives have induced bank executives to engage in high-risk projects. While taking risks is essential to all entrepreneurial activities, pre-crises risk taking in the banking industry has - from our current ex-post perspective - generally been considered to be massive and even excessive. However, arguments that risk taking was induced by (poorly designed) executive incentives rest on shaky foundations. From a theoretical perspective, execu-

[68]This chapter is partly based on *Hüttenbrink, Kaserer & Rapp (2012a)* and *Hüttenbrink, Kaserer & Rapp (2012b)*.

tives are faced with the problem that the value of their human capital is closely linked to the risk of the bank. Being unable to diversify this risk, it is often argued that they are more risk-averse than shareholders, which eventually results in inefficient low levels of risk taking. Accordingly, shareholders have to implement compensation schemes that provide appropriate risk taking incentives. Incentives, however, are always involved with additional risk exposure for the executives (*Lambert & Larcker, 2001*; *Demsetz & Lehn, 1985*; *Kane, 1985*). In line with this view, *Fahlenbrach & Stulz (2011)* find that bank executives face substantial losses during the recent credit crises, but no strong evidence for excessive risk taking induced by compensation structures. Neither from an empirical nor from a theoretical background is it clear how compensation relates to risk taking. While recent US related studies on the financial crisis (*Chesney, Stromberg & Wagner, 2011*; *Cheng, Hong & Schenkman, 2011*; *Suntheim, 2011*) find that CEO incentives had an impact on risk taking, *Fahlenbrach & Stulz (2011)* do not find a strong relationship between compensation practices and stock performance during the crisis. Furthermore, *Aebi, Sabato & Schmid (2011)* find no significant relationship between a bank's performance during the crisis and standard firm-level governance variables such as CEO ownership and board independence.[69]

In this chapter I argue that since banks were at the center of the financial crisis, attention must be paid to the interaction of compensation structures and bank-specific regulation. In fact, it has been argued that lax regulatory regimes facilitated managers' wrongdoing and banks' excessive risk taking. Consequently, many governments overhauled corporate law and compen-

[69]See *Mehran, Morrison & Shapiro (2011)* for an overview of studies on corporate governance, particularly on executive compensation in banks in the context of the recent credit crisis.

sation guidelines and tried to tie compensation to long-term performance. For instance, according to the Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 951 n., federal regulators are endowed with the power to prohibit any compensation structure that encourages inappropriate risk taking in covered financial institutions. Similarly, European countries such as the UK, France, and Germany had adopted overhauled compensation regulations following recommendations of the Financial Stability Board (FSB). Moreover, according to the draft for the CRD IV regulation, the transformation of the Basel III proposals into EU law, detailed rules will govern compensation policies of European banks. However, only little empirical evidence on the recent crisis suggests that regulation of the banking sector had an impact on bank risk taking (*Beltratti & Stulz, 2012*).

This chapter aims to make a contribution with respect to this issue. The recent financial crisis, as a macroeconomic shock, is well suited for carving out the relationship among bank risk, manager's incentives and regulatory aspects. In fact, many banks with different compensation practices as well as many countries with different institutional and regulatory settings were affected by the recent crisis. This should give me the ability to analyze country differences in bank regulation by addressing two main questions.

First, I scrutinize whether shareholders react to the level of regulation by adjusting manager's incentives to achieve their desired level of risk exposure. Second, I investigate how banking regulation such as activity restrictions or capital requirements relates to ex-ante risk taking and ex-post losses. It should be noted in this regard that country-specific settings and regulations

such as accounting standards and shareholder protection have an impact on corporate decision-making (*La Porta et al., 2002*; *Bushman & Smith, 2001*; *La Porta et al., 2000b*). Therefore, I expect the regulations of the banking industry to moderate the relationship between incentives and risk taking. I use a novel dataset to build up the link among bank risk, bank regulation and incentives. So far, there is only very little evidence on non-US banks (*Erkens, Hung & Matos, 2012*; *Beltratti & Stulz, 2012*) regarding regulation and bank risk. Therefore, I created a comprehensive dataset containing detailed information on firm characteristics, compensation, and regulatory indicators for 352 banks from 14 European countries and the US. The use of a large sample of banks across 15 countries ensures the sufficient heterogeneity of country-specific bank regulatory settings. Following the literature, I define the main crisis period as from July 1, 2007 to December 31, 2008. I incorporate two types of bank risk. On the one hand, I calculate common bank risk measures for the pre-crisis period to capture ex-ante risk taking. On the other hand, I use stock performance as an ex-post proxy for excessive tail risks taken prior to the crisis. I verify my results by using an empirical design that accounts for the endogenous nature of the relationship between firm risk and incentives.

I will shed some light on the direct effects of incentives and regulation rules on bank risk taking as well as explore how incentives induce risk taking depending on the degree of banking regulation. While extant literature focuses on stock-based compensation as risk taking incentive I also examine the role of short-term cash bonuses on managerial risk taking.

7.2 Data and methodology

This section describes the sample construction and the data collection process. It also provides an overview of the variables that I use in my empirical analysis of this chapter.

7.2.1 Sample construction

My sample consists of large, publicly traded European and US banks. I select all banks from the Thomson Reuters Database that were listed in the Industry Classification Benchmark (ICB) Subsector 8355 and with assets in excess of 0.8 billion Euros which corresponds to $1 billion at the end of 2006.[70] I exclude banks without detailed balance sheet information, stock price data and information on bank regulation. Particularly, I exclude banks when I could not obtain information on executive compensation either from annual reports for European banks or from ExecuComp for US banks. I end up with a sample of 352 banks from Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherland, Portugal, Spain, Sweden, Switzerland, United Kingdom and the US. Table 7.1 provides the geographical distribution of banks in my sample.

[70]The Industry Classification Benchmark (ICB) is an industry classification system developed by Dow Jones and FTSE. Individual companies are categorized into subsectors based primarily on the source of the majority of revenues.

Table 7.1: Sample description of banks

Country	No. of small banks	No. of large banks	No. of all banks
Austria	3	5	8
Denmark	11	4	15
Finland	1	0	1
France	1	4	5
Germany	4	8	12
Greece	0	4	4
Ireland	0	3	3
Italy	2	10	12
Netherland	0	2	2
Portugal	1	4	5
Spain	0	7	7
Sweden	0	4	4
Switzerland	8	14	22
United Kingdom	0	9	9
Europe	**31**	**78**	**109**
United States	145	98	243
Total	**176**	**176**	**352**

Notes: The table reports the geographical distribtion of my sample in 2006. It also provides the distribution of small and large banks across countries. Large (small) banks are banks located above (equal or below) the median of the sample distribution of market capitalization. All variables are described in table 7.2.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

7.2.2 Measures of executive compensation

I measure executive compensation in banks similar to section 6.2.2 for non-financial firms. Compensation data for US banks is available from commercial databases. Since there is no database that covers my European bank sample, I had to collect compensation data from individual annual reports. For US banks I used ExecuComp. As for the non-financial panel analysis I do not take into account stock options that had already been exercised, or which had been awarded previously. Pensions are not included due to a

lack of transparency and comparability.

Measures of compensation structure

I use three different measures to describe bank compensation structure both for an average executive and CEO data. First, I calculate the ratio of total incentives (stock-based incentives + cash bonus) to total compensation in 2006:

$$INC\_REL_i = \frac{Value\ of\ Stock\ and\ Option\ Grants_i + Annual\ Cash\ Bonus_i}{Total\ Compensation_i} \tag{7.1}$$

Second, I use bonus compensation that is tied to annual performance in 2006 as proxy short-term incentives. I normalize annual cash bonus by total compensation:

$$BONUS\_REL_i = \frac{Annual\ Cash\ Bonus_i}{Total\ Compensation_i} \tag{7.2}$$

Third, for my stock-incentive measures, I follow *Bergstresser & Philippon (2006)*, *Cornett, McNutt & Tehranian (2010)*, *Fernandes et al. (2010)*, *Mehran (1995)* and others and normalize the time value of stock and option grants by the level of total compensation:

$$SBI\_REL_i = \frac{Value\ of\ Stock\ and\ Option\ Grants_i}{Total\ Compensation_i} \tag{7.3}$$

Another approach is to measure the incentives evolved from the equity portfolio held by executives. This ownership incentive measure is calculated by the sum of equity percentage and delta weighted options owned (e.g., *Core & Guay, 1999*; *Fahlenbrach, 2009*). I could not adopt this approach, because there is no detailed option plan information for European Banks available. However, I take account of equity risk exposure of bank executives by including the ownership stake of all executives (OW_MANAGEMENT) divided by total shares outstanding. Moreover, *Anderson & Fraser (2000)* document that managerial shareholdings have an impact on bank's risk policy. Controlling for outside ownership concentration as a proxy for the monitoring ability of blockholders, I take the ownership stake held by the five largest outside investors (OW_OUTSIDE). Furthermore, shareholder concentration also relates to bank risk taking. For instance, *Haw et al. (2010)* show in an international sample that banks with concentrated control exhibit higher risks and poorer performance, relative to widely held banks.

Controlling for an absolute pay level I use a measure of annual fix compensation (salary + other compensation). I take residual fixed compensation (FIX_EX) from a simple regression model containing size-, country- and industry-effects. Essentially, excess fixed compensation is calculated by the residuals of a simple regression of fix compensation (salary + others) on market capitalization, country and industry dummies. I use this measure because fixed compensation itself would lead to multicollinearity problems as fixed compensation is highly correlated with other control variables such as market capitalization.

7.2.3 Measures of bank regulation

There are many country-level indices available from the law and finance literature, characterizing a variety of government regulation aspects (e.g., minority shareholder protection, anti-self dealing). Empirical studies on bank performance and risk taking, so far, provide little evidence on the role of regulatory environment. Related work on bank performance during the financial crisis 2007-2008 (e.g., *Beltratti & Stulz, 2012*; *Erkens, Hung & Matos, 2012*) also examine the impact of regulatory indicators which are not related to bank-specific regulation (e.g., Anti-director Rights Index from *La Porta et al., 1998*). By contrast, I focus on country-level indicators that characterize bank-specific regulation and might directly affect bank decision-making. I incorporate the following indices on bank regulation presented in *Barth, Caprio & Levine (2004, 2006)*.[71]

(1) *Official:* Index of the capabilities and power of the bank supervisory authority. It includes the rights of auditors, possibility of changing the internal organizational structure, suspension of board decisions, and power to intervene in a bank. The scale is from 1 to 14 (higher values indicate stronger supervisory power).

(2) *Restrict:* Index of regulatory restrictions on bank activities. This index measures regulatory barriers to banks engaging in real estate activities (e.g. real estate investments), securities market activities (e.g., underwriting, brokering, dealing), insurance activities (e.g., insurance underwriting), and the ownership of nonfinancial firms. The scale is from 1 to 14 (higher values

[71]The country-level regulations and supervisory practices were gathered in a survey of *Barth, Caprio & Levine (2004)* using data primarily from 1999. I take the regulation indices based on this survey reported in *Caprio, Laeven & Levine (2007)*.

indicate tighter restrictions in bank activities).

(3) *Independence:* Index of independence of supervisory authority from the government. It measures the extent to which the supervisory agency is legally secured from the banking system and independent from the government. The scale is from 1 to 6 (higher values indicate a higher independence of supervisory authority).

(4) *Capital:* Index of bank capital regulation. The index incorporates regulatory restricts on bank capital and capital stringency. It measures the regulatory approach to assessing and verifying the degree of capital at risk in a bank. The scale is from 1 to 9 (higher values indicate stricter capital requirements).

(5) *Regulation:* Average of the four bank regulation indices above. Hence, higher values indicate a greater overall bank regulation.

For the sake of simplicity and better interpretation I use the overall bank regulation index (REG) in my regression. Since the law and finance literature contends the importance of shareholder protection, I include the revised Anti-Director Rights Index (ADRI_DLLS) from *Djankov et al. (2008)* as control variable. To control for the development of stock markets I calculate the ratio of market capitalization of listed firms to GDP (MCAP_GDP).

7.2.4 Measures of bank risk

I use both ex-ante risk taking measures and ex-post tail risk measures to show whether incentives had any impact on risk taking prior to the crisis.

Since firm risk appears in many types of risk, it is difficult to calculate a universal proxy for ex-ante risk taking. Therefore, I use several measures to cover different aspects of bank risk. Additionally, for reasons of clarity and comprehensibility, I construct an aggregated ex-ante risk score that indicates the overall bank risk.

Equity risk

My first group of risk measures describes equity risk as a proxy for bank risk. First, equity risk measures are used as risk proxies for banks by other studies on bank risk (*Low, 2009*; *Pathan, 2009*; *Chen, Steiner & Whyte, 2006*). Second, using equity risk is appropriate since equity-based compensation is tied to bank's equity. My two measures of equity risk are TOTAL_RISK and FIRM_RISK. To calculate my two measures I implement a two-index market model following prior studies on bank risk (*Chen, Steiner & Whyte, 2006*; *Pathan, 2009*). I use monthly stock returns from January 2004 to December 2006 and estimate for each bank the following model:

$$Return_{i,t} = \alpha_i + \beta_{1,i}(Market\ Return)_t + \beta_{2,i}(Interest)_t + \epsilon_{i,t} \tag{7.4}$$

Where:
i and t denote bank i at time t.
Market Return = S&P 1500, MSCI Europe, and FTSE 350 for US, EU and UK banks respectively;
Interest = three-month US T-bill, three-month EURIBOR, three-month LIBOR for US, EU and UK banks respectively;

By estimating this model, FIRM_RISK is calculated as the standard devia-

tion of the residuals $\epsilon_{i,t}$. TOTAL_RISK is proxied by the standard deviation of the monthly stock returns. Both variables for total risk and firm risk are annualized.

Probability of default

My second dimension of bank risk taking includes the probability that a bank will default within one year. The variable I use is called EDF (Expected Default Frequency) created by Moody's KMV. The probability of default is derived from a modification of Merton's (1974) structural credit risk model and commonly used by risk managers and investors. By definition the EDF scale ranges from 0.01% to 35%. Because the EDF is likely to be skewed, I follow *Covitz & Downing (2007)* and *Cheng, Hong & Schenkman (2011)* by using the natural logarithm of EDF in my analysis.

Insolvency risk

I incorporate the bank's Z-SCORE to account for an accounting based measure of bank insolvency. The Z-SCORE indicates bank's distance from bankruptcy (*Boyd, Graham & Hewitt, 1993*; *Roy, 1952*). The variable is calculated with the average bank's return on assets plus the capital asset ratio divided by the standard deviation of asset returns over the period 2003-2006. It measures how many standard deviations of ROA are needed to take the capital ratio to zero. It indicates how thick or thin the bank's capital cushion is relative to its earnings risk. To make interpretations of this variable comparable with my other risk measures I use the inverse form of the z-ccore to ensure that higher values indicate higher risk.

Pre-crisis risk

Finally, I construct an aggregated pre-crisis risk score that indicates overall risk taking. The PRE_RISK_SCORE is calculated as the equally-weighted average of the z-transformation of the above ex-ante risk measures. An alternative method to calculate an aggregated risk score using a principal components analysis yields loadings that are very similar to the average score. Higher values of this risk proxy indicate higher overall bank risk.

Stock performance

The financial crisis as a large macroeconomic shock was likely to reveal tail risks taken by the managers prior to the crisis. Hence, stock performance can be interpreted as an ex-post outcome of ex-ante risk taking. In other words, the downside of pre-crisis risk taking was exposed by stock performance during the crisis. I measure bank performance as buy-and-hold stock returns during the financial crisis. In line with other studies (*Beltratti & Stulz, 2012*; *Erkens, Hung & Matos, 2012*; *Fahlenbrach & Stulz, 2011*) I define my crisis period as starting in July 2007 and ending in December 2008.

A summary of all variables used in this chapter is shown in table 7.2.

Table 7.2: Definition of variables

Variable	Description
	Bank Risk
TSR_07/08	Total shareholder return (defined as capital gains plus dividends) from July 2007 to December 2008
TSR_08	Total shareholder return (defined as capital gains plus dividends) from January 2008 to December 2008
TSR_LEHMAN	Total shareholder return (defined as capital gains plus dividends) from January 2007 to September 15, 2008 (bankruptcy of Lehman Brothers)
TOTAL_RISK	The standard deviation of the monthly bank stock returns from January 2004 to December 2006
FIRM_RISK	The standard deviation of the error terms in Eq. (1)
EDF	Natural logarithm of average of monthly Expected Default Frequency (one-year) from Moody's KMV in 2006
Z-SCORE	The inverse z-score which is the bank's return on assets plus the capital asset ratio divided by the standard deviation of asset returns over the period 2003-2006
PRE_RISK_SCORE	Pre-crisis period risk is calculated as the equally-weighted average of the above z-transformed ex-ante risk measures
	Compensation
TOTAL	Average total compensation (salary, other, bonus, stocks, options) per executive (in tsd. EUR) in 2006
LN_TOTAL	Natural logarithm of 1 plus total average compensation per executive (in tsd. EUR)
INC_REL	Total relative amount of incentives. Fraction of overall pay that is granted in form of equity-based compensation and cash bonus
BONUS_REL	Annual cash bonus granted in 2006 divided by total compensation
BONUS_FIX_REL	Annual cash bonus granted in 2006 divided by fix compensation (salary + other)
SBI_REL	Stock-based compensation (LTIP, restricted shares, and stock options) granted in 2006 divided by total compensation
SBI_FIX_REL	Stock-based compensation granted in 2006 divided by fix compensation (salary + other)
FIX_EX	Residuals of regression of logarithm of fix compensation (salary + other) on market capitalization, industry and country dummies in 2006
CEO_TOTAL	CEO total compensation (in tsd. EUR) in 2006
CEO_BONUS_REL	Annual CEO cash bonus granted in 2006 divided by CEO total compensation
CEO_SBI_REL	CEO stock-based compensation (LTIP, restricted shares, and stock options) granted in 2006 divided by total compensation

continued on next page...

Table 2 (continued)

Variable	Description
	Bank Characeristics
MCAP	Market capitalization (in mil. EUR) as at the end of fiscal year 2006
MCAP_LN	Natural logarithm of 1 plus market capitalization at the end of fiscal year 2006
TIER1	Tier-1-capital divided by risk weighted assets at the end of fiscal year 2006
LOANS_TO_ASSETS	Loans divided by total assets at the end of fiscal year 2006
MTB	Market-to-book value of equity measured as year end market cap divided by common equity at the end of fiscal year 2006
ROE	Net income divided the book value of common equity at the end of fiscal year 2006
ROE_LAG	Net income divided the book value of common equity at the end of fiscal year 2005
LEVERAGE	Leverage measured by long-term debt to common equity at the end of fiscal year 2006
STAFF_INC	Sensitivity of average employee salary to return on equity. Measured by the coefficient of return on equity in a simple regression of staff costs per employee on market capitalization and return on equity for the period 2002-2006.
TSR	Total shareholder return (defined as capital gains plus dividends) for the year 2006
TSR_LAG	Total shareholder return (defined as capital gains plus dividends) for the year 2005
OW_MANAGEMENT	Fraction of voting rights held by the management board
OW_OUTSIDE	Fraction of voting rights held by outside investors
CEO_DUAL	Dummy variable which takes the value 1 in case that the CEO also chairs the board of directors during the fiscal year
BOD_EXEC	Number of executive directors serving on the board
BOD_NON_EXEC	Number of non-executive directors serving on the board
	Regulation
OFFICIAL	Index of bank supervisory power taken from *Caprio, Laeven & Levine (2007)*
RESTRICT	Index of regulatory restrictions on bank activities taken from *Caprio, Laeven & Levine (2007)*
INDEPENDENCE	Index of independence of supervisory authority from the government taken from *Caprio, Laeven & Levine (2007)*
CAPITAL	Index of bank capital regulation taken from *Caprio, Laeven & Levine (2007)*
REG	Average of the four bank regulation indices above
ADRI_DLLS	Anti-director rights index pioneered by *La Porta et al. (1998)* and recently revised by *Djankov et al. (2008)*
MCAP_GDP	Market capitalization of all listed firms in a country divided by the gross domestic product (GPD)

Notes: The table describes the set of variables that I use in the empirical analysis (section 7.5). I use accounting and capital market data from Thomson Financial Worldscope and Datastream. For US firms I gathered compensation data from the ExecuComp database. All other firm-specific governance variables are hand-collected from annual reports and SEC filings, respectively. The governance indices are from the literature as cited in the table.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

7.3 Executive compensation practices in the banking sector

So far, there is only very little evidence on compensation practices in European banks in the period prior to the financial crisis of 2007/2008. In this section, I give an overview of executive remuneration policies in European banks from 17 countries in 2006. In contrast to the empirical analysis following in the next section, I do not exclude countries for which I could not obtained regulatory indicators since this section only provides a survey of remuneration and bank risk related issues.[72]

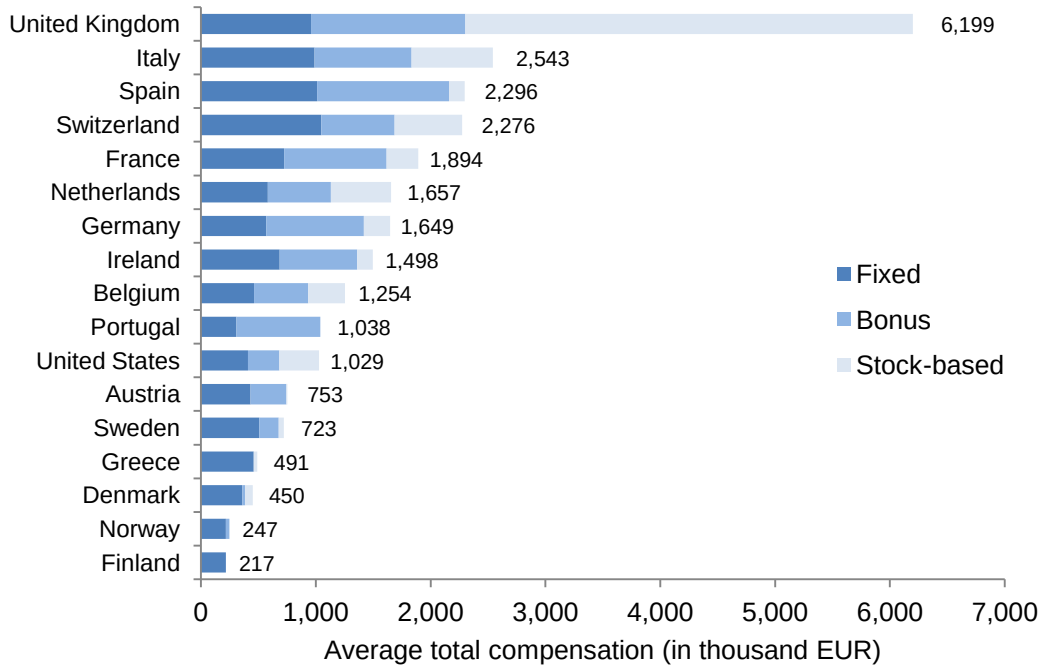
Country-level comparison of compensation practices

Figure 7.1 reveals a substantial heterogeneity of the average total pay level and the structure of executive compensation in 2006 on the country level. With an average of EUR 1,228k EUR in 2006, bank executives from United Kingdom, Italy and Spain have an above-average total compensation. Conspicuous here is the gap between companies in United Kingdom and other countries. This is particularly due to high bonuses and stock-based packages granted in banks from the United Kingdom. A bank executive from the United Kingdom has on average 6199k EUR total compensation and hence five times more than an average European and American counterpart. Again, as discussed in the previous chapter for non-financial firms, both to-

[72] In the empirical analysis section I exclude Belgium and Norway as *Caprio, Laeven & Levine (2007)* do not report regulatory indicators for these countries. However, since this section only presents compensation practices and bank risk polices, I do not exclude Belgium and Norway.

tal compensation and variable compensation in the Scandinavian countries is in general far lower than elsewhere in Europe. However, one has to be careful interpreting simple descriptive statistics as British banks in the sample are significantly larger than most of the other European banks. Nonetheless, it is notable that fixed compensation in banks is relatively high compared to non-financial firms. Moreover, short-term oriented bonuses seem to play a more important role in performance-based pay than stock-based compensation. The amount of long-term incentives in the form of stocks and stock options is remarkably low in most countries except for the United Kingdom.

Figure 7.1: Average total compensation in banks per country in 2006 (in thousand EUR)



Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012b)*.

Differences in pay arragements between the banking sector and other industries

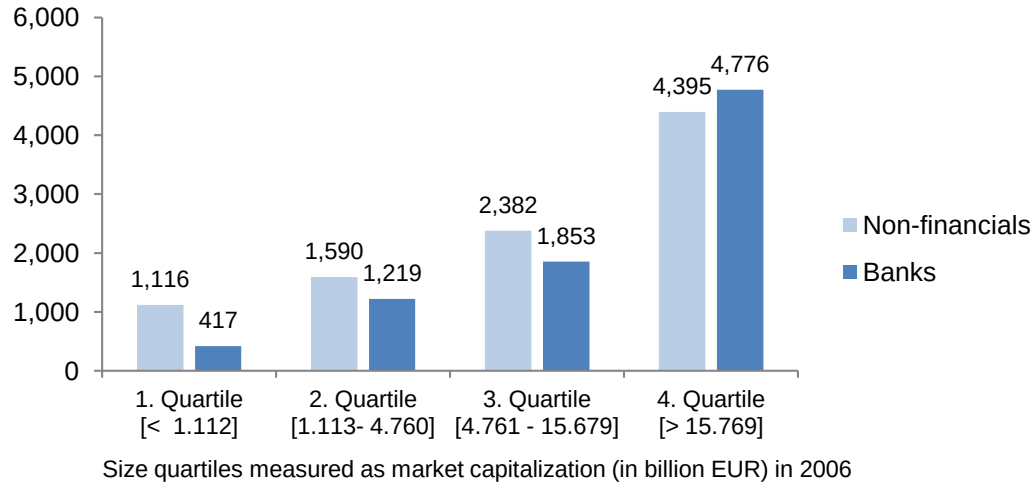
The previous section raises the question whether the composition of executive compensation is a phenomenon of the banking sector. Furthermore, many commentators - based on anecdotal evidence - argue that bankers' pay is too high. To shed more light in this debate, I compare executive remuneration policies in banks with those in non-financial firms. Since a number of studies have demonstrated that firm size is a significant determinant of the total pay level[73], I divide banks and non-financials into four size quartiles - measured according to market capitalization distribution of the merged sample - and calculate the mean compensation within each quartile.[74] The comparison of size-adjusted total pay levels presented in figure 7.2 cannot confirm the speculation of overpaid bank executives. Only in the highest quartile ($>$ 15.7 billion EUR), on average bank executives receive slightly higher total compensation than executives from other non-financial industries.

Besides examining differences in total pay levels, the structure of pay arrangements plays an important role in executive decision making. Figure 7.3 illustrates the comparison between banks and non-financials along the three groups of pay (fixed, bonus, stock-based) clustered by firm size. It can be seen that the proportion of fixed compensation at banks in each size class is significantly higher than in other firms. On average across all size classes, the relative amount of fixed compensation in the banking sector is about 20 percentage points higher than in other industries. The propor-

[73] E.g., *Core & Guay (1999)*, *Fahlenbrach (2009)*, *Mehran (1995)*.

[74] The following results do not rely on how company size is measured, i.e. equivalent results are shown regardless of whether total assets or number of employees is used.

Figure 7.2: Average total compensation by firm size (in thousand EUR) in banks vs. non-financial firms (size measured by market capitalization in billion EUR)

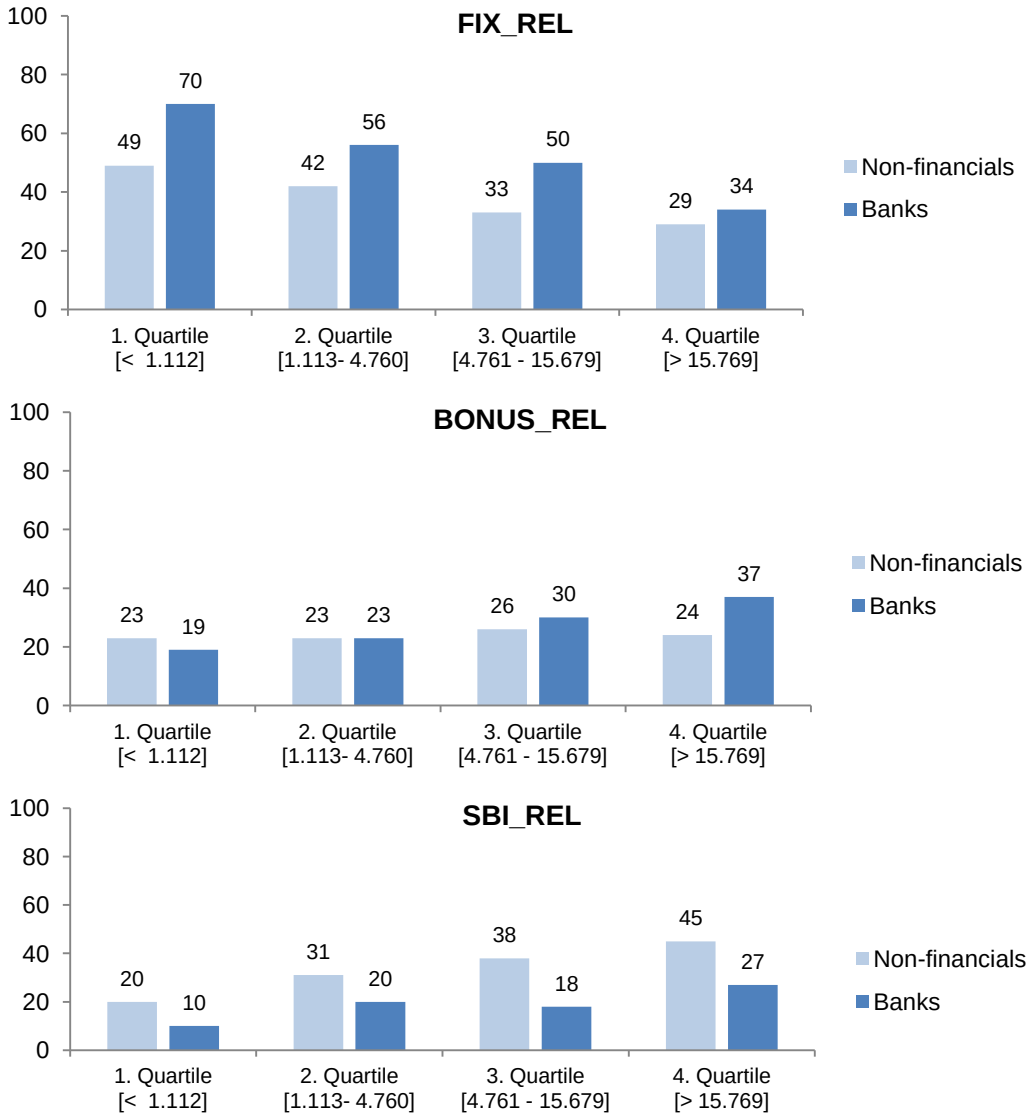


Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012b)*.

tion of fixed (variable) compensation in both groups decreases (increases) in firm size. Stock-based compensation, regardless of size, plays a minor role in banks relative to non-financial firms. Surprisingly, short-term oriented bonus compensation is noticeably higher in banks.

Finally, I examine how hard European and US banks were hit by the financial crisis of 2007/2008. Figure 7.4 illustrates the extent to which the banking sector of a particular country suffered from the financial crisis, as measured by the average stock market performance between July 2007 and December 2008. Particularly banks from Ireland, Belgium, United Kingdom, France and Denmark suffered from large losses during the financial crisis. Stock market prices of banks from the Netherlands, Austria and Switzerland were less affected by the financial crisis. Since I view stock performance

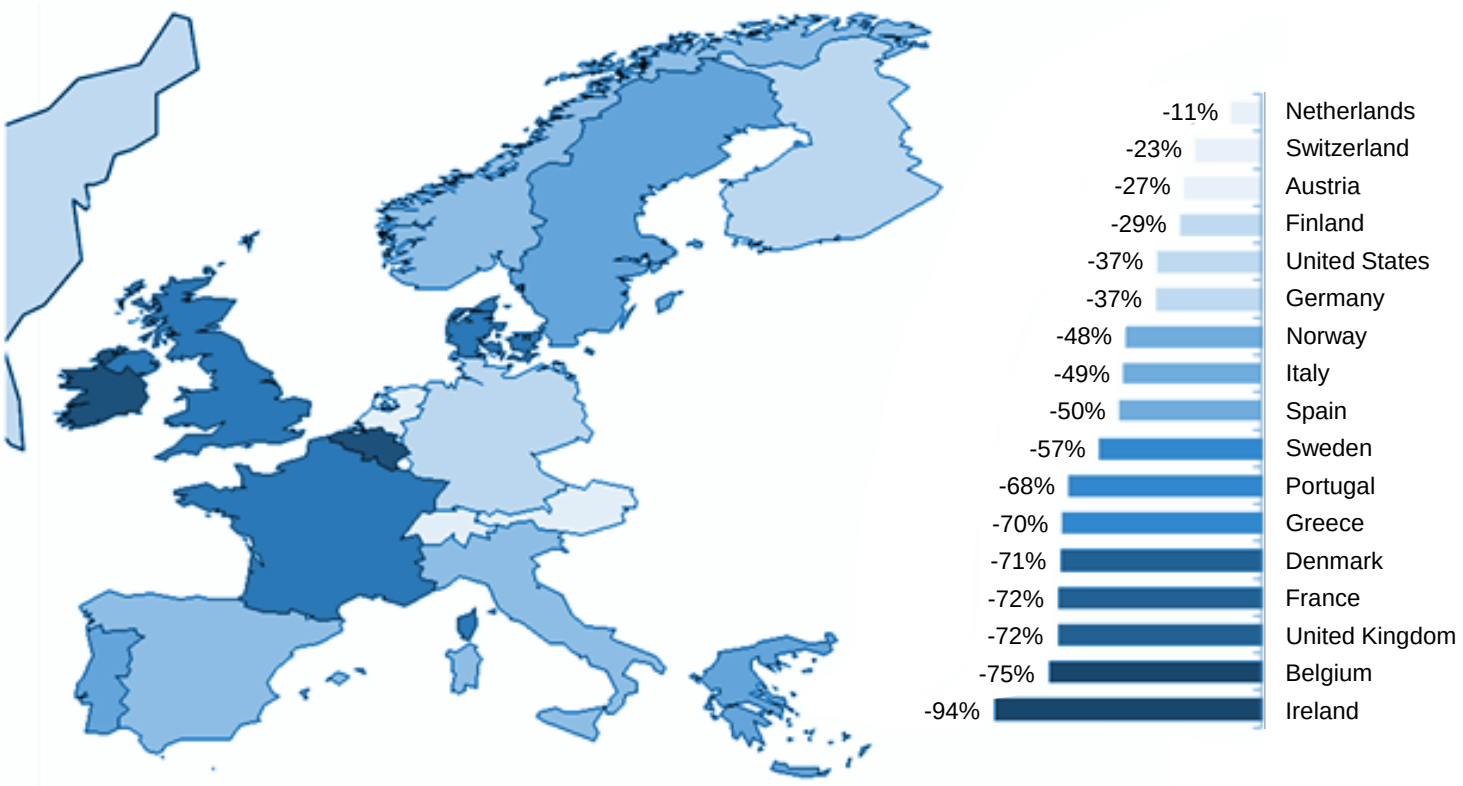
Figure 7.3: Compensation structure by firm size (in thousand EUR) in banks vs. non-financial firms (size measured by market capitalization in billion EUR)



Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012b)*.

during the crisis as an ex-post outcome of risks taken prior to the crisis, risk taking in banks seems to vary heavily across countries. This high variation across countries points to the relevance of country characteristics such as the legal environment regarding risk taking in the banking sector. Accordingly, I look more closely at differences in country characteristics in the following section. In particular, I am interested in differences in bank-related regulatory rules and institutions.

Figure 7.4: Geographic distribution of stock performance during the financial crisis of 2007/2008



Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012b)*.

7.4 Bank regulation in Europe and the US

Summary statistics of my regulatory indicators show that there is a large variation in bank regulation in my sample. Moreover, the variables of bank regulation are negatively skewed. Table 7.3 provides more details on country-level regulation. It gives an overview of the bank regulation across the countries and underlines the heterogeneity across countries. I observe the highest regulation of the banking sector in the US. The banking system in the US have the most powerful supervisory authorities, the tightest bank activity restrictions, the highest independence of the supervisory, and the strictest capital requirements (except for Austria). Thus, the overall bank regulation index (REG) of the US ranks highest with a score of 8.30. Surprisingly, Portugal has the second highest overall regulation score. France and Denmark exhibit the most lax regulatory system. Interestingly, there are some countries such as Italy and Austria that have a great heterogeneity across different regulatory dimensions. For instance, while Austria implemented a powerful supervisory authority it has only minor bank activity restrictions. By contrast, Italy has a weak banking supervisory authority, but implemented tight restrictions on bank activities. This incident suggests that countries compensate differences in the regulatory system. For instance, when it's hard to establish a powerful supervisory authority, imposing tighter restrictions might achieve the desired level of regulation of the banking system.

Table 7.3: County-level bank regulation

	OFFICIAL	RESTRICT	INDEPENDENCE	CAPITAL	REG	ADRI_DLLS	MCAP_GDP
Austria	13	5	1	5	6.0	2.5	60
Denmark	8	8	1	2	4.8	4	84
Finland	8	7	1	4	5.0	3.5	128
France	7	6	3	2	4.5	3.5	107
Germany	10	5	4	1	5.0	3.5	56
Greece	10	9	1	3	5.8	2	79
Ireland	9	8	4	1	5.5	5	74
Italy	6	10	2	4	5.5	2	55
Netherland	8	6	4	3	5.3	2.5	115
Portugal	13	9	4	3	7.3	2.5	53
Spain	9	7	3	4	5.8	5	107
Sweden	6	9	3	3	5.3	3.5	144
Switzerland	13	5	3	3	6.0	3	310
United Kingdom	11	5	4	3	5.8	5	156
United States	13	12	4	4	8.3	3	146
Median	9	7	3	3	5.5	3.5	107

Notes: The table reports descriptive statistics on the bank regulation indicators. The country-level indicators were taken from *Caprio, Laeven & Levine (2007)*. All variables are described in table 7.2.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

Before continuing with the empirical analysis, table 7.4 shows summary statistics of the entire bank sample. I summarize relevant facts about bank risk, compensation of bank executives, regulation and bank characteristics.

The average (median) market capitalization at the end of 2006 is 7.96 billion Euros (0.70 billion Euros). The relatively low median value compared to the mean suggests that my sample covers a lot of small and mid-size banks, but also some very large banks. As *Fahlenbrach & Stulz (2011)* note, studies that only use the ExecuComp database for compensation data suffer from a bias towards larger firms. Since I also obtained compensation data from annual reports by hand I am able to incorporate smaller banks into my study. Regarding bank risk, average total shareholder return during the crisis as my proxy for excessive tail risks is significantly negative with -40.64% for the period July 2007 - December 2008. Thus, the majority of European and US banks were heavily hit by the financial crisis. Only 57 banks in my sample had positive stock return for the crisis period. Average TOTAL_RISK and FIRM_RISK for December 2006 as proxies for risk taking prior to the crisis are 18.70% and 16.86% respectively. This relatively low stock volatility is due to the high stock market growth in the years 2004-2006, because volatility tends to go down when stock prices increase (*Dumas, Fleming & Whaley, 1998*). The mean (median) logarithm of the one-year probability of default is -2.76 (-2.69) which equals a 0.06% (0.07%) default probability. By definition Moody's KMV Expected Default frequency is capped at 35%. Hence, if the probability of default within one-year exceeds 35%, it is winsorized to the 35% level. The mean (median) of the Z-SCORE, the inverse of banks distance to bankruptcy, is 0.03 (0.02). These values are similar to those reported by *Beltratti & Stulz, 2012* for the same period. The mean

value of my pre-crisis risk indicator (PRE_RISK_SCORE) is almost zero by definition, since it is calculated by the average of the z-transformations of the ex-ante risk measures.[75]

The mean value of total compensation for an average executive is 1,251 thousand Euros while the average total compensation for a CEO is 2,153 thousand Euros. Although there are executives receiving no variable pay, on average (median) a bank executive receives 39.24% (38.11%) of total compensation in form of variable pay. The mean (median) value of relative bonus compensation for 2006 performance for an average executive is 23.27% (22.56%) and the mean (median) value of relative stock-based compensation granted in 2006 is 15.45% (8.73%). The difference between the mean and median value of stock-based incentives suggests that there are some banks which grant relatively high stock-based packages. Moreover, annual bonus compensation as a short-term incentive seems to play an important role in motivating and incentivizing bank managers.

[75] As I could not calculate all risk measures for every bank I end up with a different number of observations for each risk measure. Otherwise the mean of the average of z-transformed variables would be exactly zero.

Table 7.4: Summary statistics

VARIABLE	MEAN	MEDIAN	MIN	MAX	Obs.
Bank Risk					
TSR_07/08	-40.64	-43.56	-99.99	67.37	349
TSR_08	-31.94	-34.48	-99.99	67.91	349
TSR_LEHMAN	-31.41	-31.07	-99.87	56.81	349
TOTAL_RISK	18.7	17.56	2.1	68.89	331
FIRM_RISK	16.86	15.56	2.09	68.03	329
EDF	-2.76	-2.69	-4.61	3.56	334
Z-SCORE	0.03	0.02	0.001	0.27	293
PRE_RISK_SCORE	0.00	-0.10	-1.24	4.60	275
Compensation					
TOTAL	1251.75	471.26	0.53	25274.96	352
INC_REL	39.24	38.11	0	97.42	329
BONUS_REL	23.27	22.56	0	79.74	329
BONUS_FIX_REL	63.43	37.5	0	956	329
SBI_REL	15.45	8.73	0	97.41	352
SBI_FIX_REL	64.91	14.96	0	3778.6	329
FIX_EX	0	-44.5	-957.32	4930.83	329
CEO_TOTAL	2153.42	787.19	0	43822.04	307
CEO_BONUS_REL	25.42	23.74	0	79.67	298
CEO_SBI_REL	18.49	8.22	0	96.5	302
Bank Characteristics					
MCAP	7963.65	699.97	25.34	218000	352
MCAP_LN	7.01	6.55	3.23	12.29	352
TIER1	10.96	10.25	6.54	23.65	328
LOANS_TO_ASSETS	69.46	70.92	30.67	91.44	352
MTB	2.03	1.98	0.46	3.65	352
ROE_LAG	13.18	13.16	2.01	24.54	350
ROE	12.78	12.62	2.64	26.08	351
STAFF_INC	-0.04	0.00	-14.04	2.05	352
LEVERAGE	22.83	18.72	3.35	67.79	352
TSR_LAG	9.17	4.45	-27.82	74.87	338
TSR	17.72	16.03	-17.43	81.82	347
OW_MANAGEMENT	4.39	1.43	0	86.65	352
OW_OUTSIDE	16.89	11.08	0	97.09	352
CEO_DUAL	0.37	0	0	1	352
BOD_NON_EXEC	10.99	11	0	27	352
BOD_EXEC	5.36	5	0	23	352
Regulation					
OFFICIAL	12.04	13	6	13	352
RESTRICT	10.37	12	5	12	352
INDEPENDENCE	3.59	4	1	4	352
CAPITAL	3.65	4	1	5	352
REG	7.41	8.25	4.5	8.25	352
ADRI	3.12	3	2	5	352
MCAP_GDP	141.22	145.66	53.44	309.92	352

Notes: The table reports summary statistics for the variables based on a sample of 352 European and US banks. All compensation level values are in thousand Euros. Compensation granted in currencies other than Euro are transformed to Euro by using the average of monthly exchange rates of the corresponding year. All bank characteristic variables except the ownership measures are winzorized at the 2%-level. All variables are described in table 7.2.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

7.5 Empirical results

In this section, I lay out my empirical strategy and present the empirical results. First, my initial approach is to understand how incentives of bank executives relate to bank regulation. In other words, I aim to investigate whether shareholders react to bank regulation by adjusting executives' incentives. In the next step, I provide the results of my empirical examination on the impact of managerial incentives and bank regulation of bank risk taking in the context of the recent financial crisis of 2007/2008. Finally, I present results on the interaction of bank regulation and banks' executive compensation with respect to bank risk taking

7.5.1 Impact of bank regulation on compensation policies

In this section, I analyze if shareholders consider the regulatory setting their bank operates in when it comes to designing compensation contracts. In other words, do shareholders respond to regulation in the banking sector either by increasing or decreasing managers' incentives? Existing literature discusses a variety of firm-specific governance mechanisms that determine executive compensation. Recently, *Bryan, Nash & Patel (2010)* and *Hüttenbrink, Rapp & Wolff (2011a)* find evidence that compensation is also affected by country-level governance. I use a similar approach by regressing compensation on my aggregated measure of bank regulation. I also use common firm characteristics and general country-level indicators such as shareholder protection and macroeconomic variables as control variables. Effectively, I estimate variants of the following model:

$$Compensation = \beta_0 + \beta_1(Regulation) + \beta_2(Board/Ownership) + \beta_3(Bank\ characteristics) + \beta_4(Industry\ dummies) + \epsilon_i \tag{7.5}$$

Where:

Compensation = INC_REL, SBI_REL, BONUS_REL;

Regulation = REG, ADRI_DLLS, MCAP_GDP;

Bank characteristics = MCAP_LN, LEVERAGE , TSR, TSR_LAG, ROE, ROE_LAG;

Board/Ownership = CEO_DUAL, BOD_EXEC, BOD_NON_EXEC, OW_MANAGEMENT,OW_OUTSIDE;

Table 7.5 reports regression results on three models for both the entire sample and subsample containing European banks in which I study the impact of bank regulation on compensation structure. The coefficient estimate on overall bank regulation (REG) is positive and is statistically significant at the 1% level for total incentives, bonus and stock-based compensation for the entire sample.[76] This suggests that stronger regulation increases the amount of pay that is performance related, but reduces the fraction of fixed pay. Thus, shareholders of banks seem to grant more short-term incentives and long-term incentives when the banking system is highly regulated. This result supports the conjecture that shareholders of high-regulated banks react to regulation and implement contracts with high pay-for-performance sensitivity. Regression results for the subsample of European banks reinforce

[76] In unreported regressions I find that my aggregated regulation index is negative and significant for fixed compensation. This is supportive of the argument that regulation increases overall incentives.

this conjecture although I did not expect same significance because statistical significance is strongly influenced by the number of observations.[77] Another explanation is that regulators pressure firms to adopt effective internal governance mechanisms (*Becher & Frye, 2011*). However, the sign of the coefficient of REG for stock-based compensation is insignificant. Finally, the results indicate that shareholders consider bank regulation when designing compensation contracts. Shareholders of banks operating in a high-regulated environment tend to grant both higher short-term and long-term incentives to their managers by increasing the fraction of bonus and stock-based compensation.

[77] I also find similar results for a subsample of large banks (median split of market capitalization).

Table 7.5: Regression analysis of compensation structure on regulation in 2006

Dep. variable	INC_REL		BONUS_REL		SBI_REL		INC_REL		BONUS_REL		SBI_REL	
Sample	Full sample						European banks					
Model	(1)		(2)		(3)		(4)		(5)		(6)	
Regulation												
REG	11.538	***	6.783	***	10.018	***	10.600	*	11.199	**	-14.042	
	(7.09)		(4.82)		(5.55)		(1.99)		(2.37)		(-1.50)	
ADRI_DLLS	5.211	**	2.689		7.018	***	4.277		2.779		4.896	
	(2.30)		(1.38)		(2.72)		(1.29)		(0.94)		(1.17)	
MCAP_GDP	-0.012		-0.085	***	0.078	***	0.046		-0.040		0.165	***
	(-0.37)		(-2.98)		(2.98)		(0.98)		(-0.94)		(2.88)	
Board & Ownership												
OW_MANAGEMENT	-0.002		0.147		-0.145		0.154		0.202		-6.795	
	(-0.020)		(1.43)		(-1.09)		(0.36)		(0.53)		(-0.45)	
OW_OUTSIDE	0.097		0.080		0.093		-0.130		-0.186		0.161	
	(1.34)		(1.28)		(1.25)		(-0.89)		(-1.42)		(1.04)	
CEO_DUAL	-1.557		-4.089	*	2.652		-13.665		-9.252		-27.707	
	(-0.62)		(-1.88)		(0.98)		(-1.00)		(-0.76)		(-1.48)	
BOD_NON_EXEC	-0.129		0.356		-0.617	*	1.154		2.523	***	-1.853	
	(-0.39)		(1.25)		(-1.69)		(1.27)		(3.09)		(-1.54)	
BOD_EXEC	-0.443		-0.481		-0.004		-1.200		-0.284		-1.921	
	(-0.94)		(-1.17)		(-0.01)		(-1.23)		(-0.31)		(-1.64)	
Bank Characteristics												
MCAP_LN	9.428	***	4.035	***	7.328	***	10.207	***	6.481	***	10.359	***
	(10.26)		(5.08)		(7.50)		(4.81)		(3.38)		(4.10)	
LEVERAGE	0.282	***	0.207	**	0.049		0.400	*	0.092		0.410	
	(2.80)		(2.40)		(0.45)		(1.74)		(0.45)		(1.43)	
ROE_LAG	0.176		0.441		-0.430		1.213		1.616	*	-0.008	
	(0.50)		(1.45)		(-1.12)		(1.31)		(1.92)		(-0.01)	
ROE	0.192		0.114		35.764		-1.136		-1.121		0.346	
	(0.54)		(0.37)		(0.93)		(-1.45)		(-1.60)		(0.35)	
TSR_LAG	0.093		0.012		0.096		0.064		-0.036		0.247	
	(1.63)		(0.24)		(1.53)		(0.52)		(-0.31)		(1.28)	
TSR	-0.055		0.093		-0.239	***	0.015		0.369	**	-0.870	***
	(-0.79)		(1.55)		(-3.10)		(0.09)		(2.32)		(-3.29)	
Industry-fixed effects	yes		yes		yes		yes		yes		yes	
No of observ.	315		315		335		85		85		116	

Notes: The table reports coefficients of tobit regressions of compensation variables on regulation and firm-specific control variables. Values in parentheses are robust t-statistics. All regression models are complemented by a set of industry dummies based on SIC industry code classification. All variables are described in table 7.2. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

7.5.2 Risk taking during the crisis, compensation and bank regulation

I am interested in how compensation has affected bank risk taking prior to the crisis and accordingly to what extent banks were hit during the crisis because of ex-ante risks. Therefore, I regress different ex-ante risk measures and cumulative stock returns of European and US banks during the crisis period on pre-crisis compensation variables and control variables. To make interpretations of my tail risk measure (stock performance) comparable with my other ex-ante risk measures I use the negative total shareholder return. Thus, as the other risk measures, higher values of -TSR_07/08 indicate higher tail risks. Total risk and firm risk are proxies for stock market risks while probability of default and z-score rather act as accounting-based risk measures. To control for differences in capital structure and size effects I include several bank characteristics, such as market capitalization, tier-1-ratio, loans-to-assets ratio, market-to-book ratio. Further, I include accounting performance measured by the return on equity and stock returns in 2006.[78] I also include ownership variables to capture potential effects of outside or managerial ownership. Moreover, I control for industry effects by including industry dummies (4-digit SIC). I examine whether existing bank regulation rules mitigate excessive bank risk taking by extending my models to my country-level indicator (REG) that assesses different dimensions of bank regulation. To address the potential cross-sectional dependence in the error terms, I use robust standard errors clustered by firm. The baseline model (eq. (7.6)) is specified as follows:

[78] I control for stock performance in 2006 because crisis performance might reverberate a reversal of the performance prior to the crisis (*Beltratti & Stulz, 2012*).

$$\begin{aligned} Risk = \beta_0 + \beta_1(Compensation) + \beta_2(Regulation) \\ + \beta_3(Bank\ characteristics) + \beta_4(Industry\ dummies) + \epsilon_i \end{aligned} \tag{7.6}$$

Where:

Risk = -TSR_07/08, TOTAL_RISK, FIRM_RISK, EDF, Z-SCORE, PRE_RISK_SCORE;

Compensation = INC_REL, SBI_REL, BONUS_REL;

Regulation = REG, ADRI_DLLS, MCAP_GDP;

Bank characteristics = OW_MANAGEMENT, OW_OUTSIDE, MCAP_GDP, TIER1, MTB, STAFF_INC, LEVERAGE, LOANS_TO_ASSETS, TOTAL_RISK, TSR, ROE;

I include excess fixed compensation (FIX_EX) to control for an absolute level of compensation. Table 7.6 reports regression results for six models in which I examine the effect of total incentives and bank regulation on risk taking. The coefficient for total incentives (INC_REL) is positive in every model and is statistically significant for all models except for the probability of default (EDF). A one-standard deviation increase in INC_REL is associated with a decrease in total shareholder returns of 7.77 percentage points. Volatility of stock returns TOTAL_RISK is increased by almost one percentage point for a one-standard deviation increase of INC_REL. This evidence indicates that increasing manager's incentives is associated with higher risk taking. In other words, increasing the fraction of variable pay in total annual compensation induce bank managers to take higher risks.

Overall regulation of the banking sector (REG) enters the regression with a significantly negative coefficient in all regression models except for probability of default. This effect is economically large. An increase from the lowest REG score to the highest score means an increase in returns of 18.45 percentage points during the crisis. For instance, a bank switching from a country with lowest bank regulation (e.g., France) to the US would have 3.68 percentage points less stock volatility (TOTAL_RISK) holding all else (firm size, capital structure, etc.) constant. Comparing the economic effect of regulation among risk measures reveals that the regulation of banks strongly affects tail risk activities engaged by bank managers. Regular risks that are captured by common risk indicators such as probability of default or volatility of stock returns are rather less mitigated by regulation than excessive tail risks such as off-balance sheet activities or risk lending activities.[79] The key implication of these results is that regulation can decrease bank risk in general and effectively diminish excessive risk taking activities.

[79]Relative marginal effects for TSR_07/08 (TOTAL_RISK) is -0.11 (-0.05).

Table 7.6: Regression analysis of bank risk on total incentives and bank regulation

Dep. variable	-TSR_07/08		TOTAL_RISK		FIRM_RISK		EDF		Z-SCORE		PRE_RISK_SCORE	
Model	(1)		(2)		(3)		(4)		(5)		(6)	
Compensation												
INC_REL	0.331	***	0.039	**	0.044	***	0.001		0.0001	**	0.005	**
	(3.08)		(2.07)		(2.61)		(0.18)		(2.31)		(2.01)	
FIX_EX	0.008	***	0.001	***	0.001	***	-0.0001		0.0001		0.0001	
	(3.59)		(2.76)		(2.64)		(-0.24)		(0.51)		(1.12)	
Regulation												
REG	-4.920	**	-0.987	**	-1.063	***	-0.033		-0.009	***	-0.162	***
	(-2.05)		(-2.47)		(-2.82)		(-0.49)		(-3.86)		(-2.76)	
ADRI_DLLS	6.798	**	-0.523		-0.690		-0.038		-0.005		-0.092	
	(2.02)		(-0.95)		(-1.49)		(-0.34)		(-1.49)		(-1.28)	
MCAP_GDP	0.091	*	-0.013		-0.010		0.002		-0.0001		-0.0013	
	(1.81)		(-1.19)		(-1.01)		(1.12)		(-0.93)		(-0.81)	
Ownership												
OW_MANAGEMENT	0.236		0.121	***	0.118	***	0.005		0.001	**	0.012	***
	(1.38)		(3.50)		(3.36)		(1.35)		(2.19)		(3.62)	
OW_OUTSIDE	-0.056		0.009		0.004		0.003		0.0001		0.002	
	(-0.40)		(0.36)		(0.17)		(0.80)		(0.84)		(0.58)	
Bank Characteristics												
MCAP_LN	2.420		-1.718	***	-1.785	***	-0.337	***	-0.003	**	-0.217	***
	(1.44)		(-5.89)		(-6.75)		(-7.69)		(-2.18)		(-6.82)	
TIER1	-1.837	**	0.188		0.154		-0.039	**	0.0001		-0.002	
	(-2.51)		(1.52)		(1.30)		(-2.11)		(-0.52)		(-0.11)	
MTB	-17.473	***	1.687	***	1.675	***	-0.063		0.004		0.187	**
	(-3.97)		(2.65)		(2.95)		(-0.62)		(1.28)		(2.44)	
STAFF_INC	-3.392	***	0.251		0.347	*	-0.064	***	-0.001		-0.001	
	(-3.12)		(1.20)		(1.66)		(-2.60)		(-1.45)		(-0.06)	
LEVERAGE			0.028		0.021		0.012	**	0.001	***	0.006	
			(0.87)		(0.67)		(2.09)		(3.46)		(1.49)	
LOANS_TO_ASSETS	0.684	***										
	(4.79)											
TOTAL_RISK	2.061	***										
	(5.56)											
ROE	47.787											
	(0.79)											
TSR	-0.100											
	(-0.83)											
Industry-fixed effects	yes		yes		yes		yes		yes		yes	
No of observ.	297		297		297		302		265		248	
adj. R2	0.305		0.182		0.220		0.329		0.288		0.250	

Notes: The table reports coefficients of a OLS regression of risk measures on total incentives, bank regulation and firm-specific variables. All regression models are complemented by a set of industry dummies based on SIC industry code classification. All variables are described in table 7.2. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

For further examination of incentive effects on bank risk taking I substitute my total incentive variable for its components, bonus (SBI_REL) and stock-based compensation (SBI_REL). The results presented in table 7.7 reinforce the findings of table 7.6. As it turns out, the main driver of incentives regarding risk taking prior to the crisis is the annual bonus compensation. The coefficient for relative bonus compensation (BONUS_REL) is positive in every model and is statistically significant for all models. Stock-based compensation (SBI_REL) seems to play a minor role in determining ex-ante risk taking, but an important role in excessive tail risks. A one-standard deviation increase in BONUS_REL is associated with an increase in TOTAL_RISK (EDF) of 1.37 percentage points (0.15%). For instance, increasing the relative amount of bonus compensation by one-standard deviation from 23% (mean) to 40% means that the probability of default within one year increases by 0.15%. These results support my hypothesis that short-term incentives such as bonuses increase manager's risk appetite. The outcome of the effect that managers are incentivized to focus on the short run is reflected by all risk measures. Interestingly, my results indicate that stock-based incentives encourage managers to engage in excessive tail risks. This effect is only captured by stock performance during the crisis as my tail risk proxy and could not be revealed by common risk measures like probability of default and z-score. This suggests that there was a certain rationale behind stock-based packages and excessive risks. One explanation for these results is that managers with incentives tied to banks stock performance invested in projects that they believed would increase shareholder wealth, but these risky projects turned out to be worse during the crisis. This is in line with findings of *Fahlenbrach & Stulz (2011)* who find that CEOs did not reduce their holdings of shares in anticipation of poor performance.

Table 7.7: Regression analysis of bank risk on compensation structure and bank regulation

Dep. variable	-TSR_07/08		TOTAL_RISK		FIRM_RISK		EDF		Z-SCORE		PRE_RISK_SCORE	
Model	(1)		(2)		(3)		(4)		(5)		(6)	
Compensation												
SBI_REL	0.356	***	0.004		0.022		-0.007	**	0.0001		-0.00001	
	(3.21)		(0.20)		(1.18)		(-2.10)		(1.10)		(-0.01)	
BONUS_REL	0.299	*	0.081	***	0.072	***	0.009	**	0.0001	**	0.010	***
	(1.92)		(3.59)		(3.49)		(2.53)		(2.49)		(3.40)	
FIX_EX	0.008	***	0.001	***	0.001	***	0.0001		0.0001		0.0001	
	(3.47)		(3.52)		(3.18)		(0.26)		(0.72)		(1.54)	
Regulation												
REG	-4.912	**	-0.945	**	-1.036	***	-0.026		-0.009	***	-0.145	**
	(-2.04)		(-2.41)		(-2.76)		(-0.38)		(-3.84)		(-2.56)	
ADRI_DLLS	6.754	**	-0.432		-0.630		-0.018		-0.005		-0.090	
	-2.020		(-0.77)		(-1.32)		(-0.16)		(-1.45)		(-1.21)	
MCAP_GDP	0.087	*	-0.007		-0.007		0.003		0.0001		-0.001	
	-1.730		(-0.67)		(-0.64)		-1.570		(-0.67)		(-0.41)	
Ownership												
OW_MANAGEMENT	0.241		0.110	***	0.110	***	0.0001		0.001	**	0.01	***
	(1.39)		(3.24)		(3.18)		(0.96)		(2.09)		(3.26)	
OW_OUTSIDE	-0.053		0.007		0.003		0.003		0.0001		0.002	
	(-0.38)		(0.27)		(0.11)		(0.75)		(0.77)		(0.49)	
Bank Characteristics												
MCAP_LN	2.408		-1.670	***	-1.753	***	-0.326	***	-0.003	**	-0.204	***
	(1.44)		(-5.86)		(-6.73)		(-7.56)		(-2.03)		(-6.70)	
TIER1	-1.848	**	0.189		0.155		-0.038	**	-0.0003		-0.002	
	(-2.49)		(1.60)		(1.34)		(-2.27)		(-0.54)		(-0.13)	
MTB	-17.592	***	1.596	**	1.614	***	-0.084		0.004		0.167	**
	(-4.01)		(2.51)		(2.83)		(-0.87)		(1.09)		(2.19)	
STAFF_INC	-3.369	***	0.192		0.308		-0.077	***	-0.001		-0.010	
	(-3.12)		(0.85)		(1.40)		(-3.22)		(-1.63)		(-0.46)	
LEVERAGE			0.018		0.014		0.009	*	0.001	***	0.005	
			(0.55)		(0.44)		(1.76)		(3.45)		(1.33)	
LOANS_TO_ASSETS	0.680	***										
	(4.67)											
TOTAL_RISK	2.083	***										
	(5.55)											
ROE	50.102											
	(0.81)											
TSR	-0.095											
	(-0.79)											
Industry-fixed effects	yes		yes		yes		yes		yes		yes	
No of observ.	297		297		297		302		265		248	
adj. R2	0.313		0.201		0.239		0.369		0.314		0.281	

Notes: The table reports coefficients of a OLS regression of risk measures on compensation structure, bank regulation and firm-specific variables. All regression models are complemented by a set of industry dummies based on SIC industry code classification and country dummies. All variables are described in table 7.2. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

Again, overall regulation of the banking sector (REG) is significantly negative in all regression models except for probability of default. The effects are economically large and similar to the effects of the previous regressions. For instance, an increase from the lowest REG score to the highest score is associated with an increase in returns of 18.42 percentage points during the crisis and a decrease of stock volatility of 3.54 percentage points.

7.5.3 Interaction of bank regulation and compensation

Since I predict that the impact of compensation on bank risk taking varies with different levels of government regulation, I incorporate interaction terms of compensation and regulation variables. By including interaction terms I test how incentives induce risk taking depending on outside regulation. To reduce common multicollinearity problems with interaction terms I center all interacted variables. The enhanced model is specified as follows:

$$\begin{aligned} Risk = {} & \beta_0 + \beta_1 (Compensation) + \beta_2 (Regulation) \\ & + \beta_3 (Compensation\ x\ Regulation) + \beta_4 (Bank\ characteristics) \\ & + \beta_5 (Industry\ dummies) + \epsilon_i \end{aligned} \tag{7.7}$$

Where:

Risk = -TSR_07/08, PRE_RISK_SCORE;

Compensation = INC_REL, SBI_REL, BONUS_REL;

Regulation = REG, ADRI_DLLS, MCAP_GDP;

Bank characteristics = OW_MANAGEMENT, OW_OUTSIDE, MCAP, TIER1, MTB, STAFF_INC, LEVERAGE, LOANS_TO_ASSETS, TOTAL_RISK, TSR, ROE;

Table 7.8 reports regression results on bank risk, compensation structure and bank regulation. For the sake of brevity I report only results for regressions estimating -TSR_07/08 and PRE_RISK_SCORE. The main effect of bonus and total incentives is still positive and significant for all risk measures. The argument holds that a higher fraction of incentives to total compensation and particularly bonus compensation increases risk taking by banks. Stock-based incentives remain significant and risk-enhancing only for -TSR_07/08. As in all previous regressions, overall regulation of the banking sector (REG) is significantly negative in all regression models except for probability of default. The effects remain economically large and similar to the effects of the previous regressions

Table 7.8: Regression analysis of bank risk on interaction between compensation structure and bank regulation

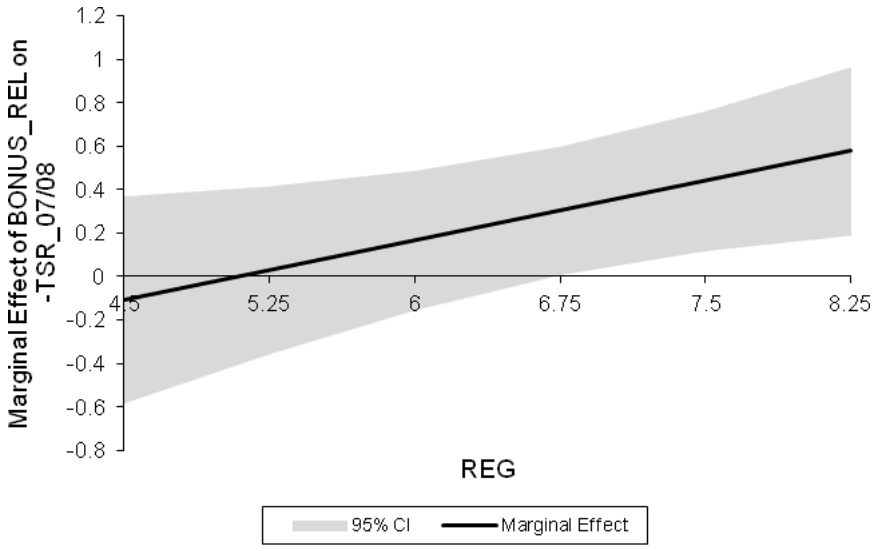
Dep. variable	-TSR_07/08		PRE_RISK_SCORE		-TSR_07/08		PRE_RISK_SCORE	
Model	(1)		(2)		(3)		(4)	
Compensation								
INC_REL	0.402	***	0.004	*				
	(3.84)		(1.87)					
SBI_REL					0.359	***	-0.0003	
					(3.33)		(-0.14)	
BONUS_REL					0.439	***	0.0102	***
					(2.68)		(3.75)	
FIX_EX	0.009	***	0.0001		0.009	***	0.0001	
	(3.80)		(0.98)		(3.40)		(1.39)	
Regulation								
REG	-5.333	**	-0.162	***	-4.801	**	-0.143	**
	(-2.26)		(-2.74)		(-2.07)		(-2.51)	
ADRI_DLLS	7.376	**	-0.100		7.693	**	-0.096	
	(2.18)		(-1.36)		(2.28)		(-1.29)	
MCAP_GDP	0.103	*	-0.001		0.099	*	-0.001	
	(1.91)		(-0.69)		(1.87)		(-0.50)	
Regulation x Compensation								
REG x INC_REL	0.148	***	-0.001					
	(2.61)		(-0.61)					
REG x SBI_REL					0.100		-0.010	
					(1.32)		(-0.62)	
REG x BONUS_REL					0.182	**	0.0007	
					(2.15)		(0.38)	
Ownership								
OW_MANAGEMENT	0.292		0.009	***	0.262		0.011	***
	(1.52)		(2.80)		(1.58)		(3.17)	
OW_OUTSIDE	-0.040		0.003		-0.067		0.002	
	(-0.29)		(0.87)		(-0.50)		(0.51)	
Bank Characteristics								
MCAP_LN	1.519		-0.220	***	2.503		-0.198	***
	(0.93)		(-6.81)		(1.54)		(-6.17)	
TIER1	-2.044	***	-0.006		-1.939	**	-0.001	
	(-2.64)		(-0.44)		(-2.56)		(-0.12)	
MTB	-18.209	***	0.146	*	-17.789	***	0.159	**
	(-4.26)		(1.92)		(-4.20)		(2.15)	
STAFF_INC	-3.702	***	0.001		-3.912	***	-0.012	
	(-3.79)		(0.07)		(-4.06)		(-0.54)	
LEVERAGE			0.006				0.005	
			(1.60)				(1.35)	
LOANS_TO_ASSETS	0.572	***			0.602	***		
	(3.68)				(3.99)			
TOTAL_RISK	1.817	***			2.013	***		
	(4.71)				(5.39)			
ROE	0.408				0.327			
	(0.68)				(0.53)			
TSR	-0.127				-0.100			
	(-1.02)				(-0.83)			
Industry-fixed effects	yes		yes		yes		yes	
No of observ.	290		243		297		248	
adj. R2	0.316		0.249		0.313		0.281	

Notes: The table reports coefficients of a OLS regression of risk measures on the interaction of compensation structure and bank regulation. All regression models are complemented by a set of industry dummies based on SIC industry code classification. All variables are described in table 7.2. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

The coefficient of the interaction term of bonus and regulation is positive and significant at the 1% level for -TSR_07/08. This result supports the hypothesis that predicts an enhancement effect of regulation. As the interpretation of interaction terms is sometimes not intuitive, figure 7.5 illustrates the marginal effect of the BONUS_REL over different levels of bank regulation (effect of column 3 in table 7.8). Figure 7.5 shows that the

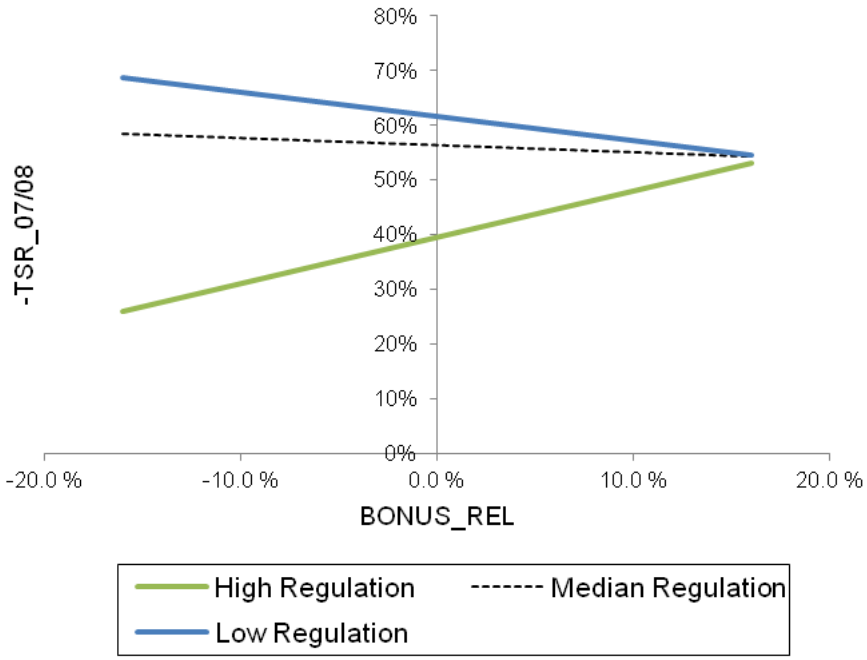
Figure 7.5: Marginal effect of bonus on -TSR_07/08



Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

negative effect of bonuses on risk becomes stronger when bank regulation increases. An illustration of the predicted level of risk under different incentive and regulation levels (figure 7.6) shows that tighter regulation generally reduces risk taking, but also demonstrates the downside of restricting and supervising banks with respect to executive incentives. The steeper slope of the high-regulation line indicates that short-term incentives lead to higher risk taking in a tight regulatory environment compared to lax regulatory regimes.

Figure 7.6: Absolute effect of bonus on -TSR_07/08

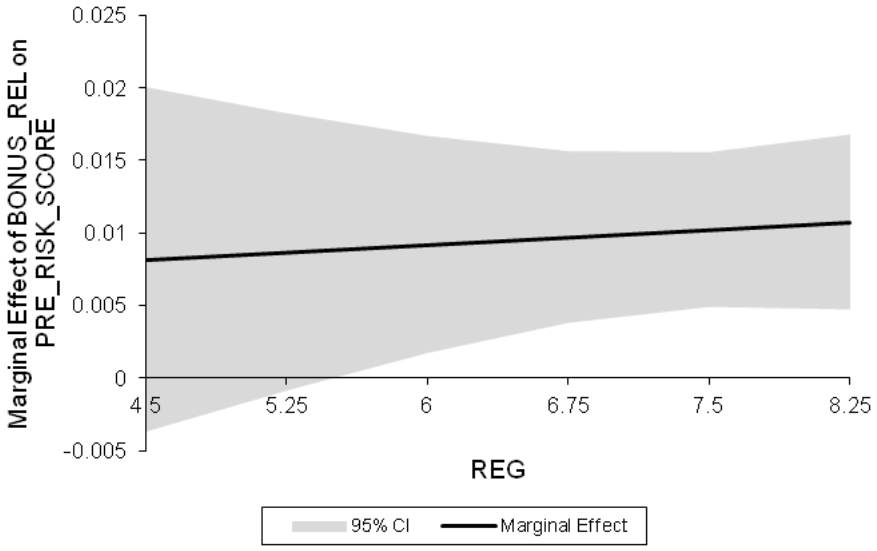


Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

I argue that highly incentivized managers who focus on short performance find it hard to achieve high returns in a regulatory environment with tight bank activity restrictions or high capital requirements. As I showed earlier, shareholders aim to mitigate the effect of regulation by providing stronger incentives to overcome managerial risk aversion. Consequently, managers who face both high regulation and high incentives are induced to engage in high-yield and risky financial activities to meet shareholders' demands or achieve own incentive goals. These high-risk investments ("tail risks") were mainly exposed by the financial crisis rather than common risk indicators. Figure 7.7 highlights that the marginal effect of short-term incentives on my aggregated measure for ex-ante risk taking is not connected to the level

of bank regulation and supervision.

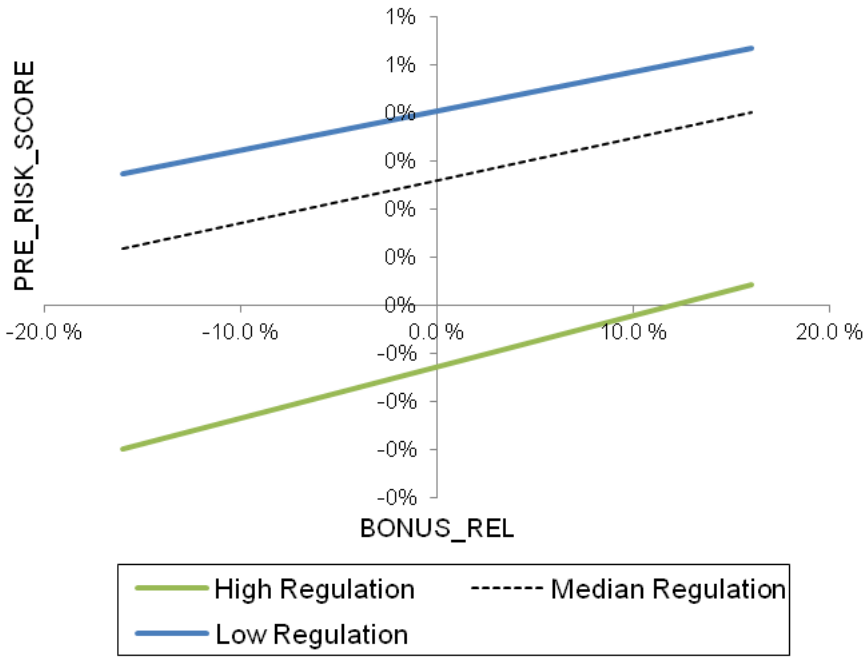
Figure 7.7: Marginal effect of bonus on PRE_RISK_SCORE



Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

Moreover, the absolute effect of my estimated model (figure 7.8) shows that there seems to be no significant moderation of the regulation regarding the relationship between incentives and risk. One explanation could be that these short-term incentives induced managers to engage in risky off-balance sheet activities which were exposed only because of the exceptional crisis situations, but they were not being assessed by accounting based risk measures.

Figure 7.8: Absolute effect of bonus on PRE_RISK_SCORE



Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

7.6 Robustness tests

In this section, I discuss several robustness checks of the results reported in this chapter: Model specifications, estimation of standard errors, robustness of risk measures, sample selection, endogeneity of risk and incentives.

7.6.1 Model specifications

First, I check for model specification and internal validity of my regression. As in the previous chapter, I do not experience multicollinearity problems even in regression analyses with interaction terms when observing variance inflation factors (VIF < 3.15) due to centering interaction variables. Moreover, I consider alternative measures using different variables. For instance, I use the number of employees instead of market capitalization as a proxy for firm size. Furthermore, I normalize the amount of bonus and stock-based incentives with fixed compensation instead of total compensation. These modifications yield similar results compared to the base specification. Moreover, I calculate the two-index market model with weekly instead of monthly data. In unreported regressions, I find that this modification yields similar results.

7.6.2 Alternative standard error estimation

It is common practice when using panel data to adjust standard errors for correlation either across firms or across time. By contrast to the previous chapter, my bank sample is a one-dimensional data set with only cross-sectional data at one point of time (2006). Since I did not obtain a time series of my observations I cannot examine changes over the course of time. Therefore, I do not face potentially biased standard errors that occur if the residuals are correlated across both time and firms as outlined in *Thompson (2011)*. An alternative way to use Huber-White robust standard errors is to allow for clustering on the country level. This allows me to ensure that my results are robust against a coarse definition of the clus-

ter. In unreported regressions, I find that using standard errors clustered by country does not change the results in a qualitative and quantitative manner.

7.6.3 Alternative measures of risk taking

Since I argue that tail risks taken by banks prior to the crises were exposed by the crisis and result in poor stock performance, I apply alternative measures of tail risks. I calculated the total shareholder return for the year 2008 (TSR_08) and for the period January 2007 to the bankruptcy of Lehman on September 15, 2008 (TSR_LEHMAN). Table 7.9 presents results of regressions based on eq. (7.7) with my previous tail risk measure and two alternative tail risk measures. I find similar results when using TSR_08. Bank regulation has a risk-reducing effect while bonuses and the interaction of bonuses with regulation increase the extent to which banks where hit during the crisis. By contrast to TSR_07/08, the interaction of SBI_REL and BONUS_REL is significant for TSR_08. Although the results for TSR_LEHMAN exhibit insignificant correlations, the coefficient of the main effects and interaction terms are qualitatively similar to results of the other tail risk measures.

Table 7.9: Robustness: Alternative tail risk measures

Dep. variable	-TSR_07/08		-TSR_08		-TSR_LEHMAN	
Model	(1)		(2)		(3)	
Compensation						
SBI_REL	35.952	***	33.111	***	29.599	***
	(3.33)		(2.85)		(2.89)	
BONUS_REL	43.989	***	39.811	**	39.213	***
	(2.68)		(2.36)		(3.16)	
FIX_EX	0.009	***	0.009	***	0.007	***
	(3.40)		(3.56)		(3.21)	
Regulation						
REG	-4.801	**	-5.426	**	1.647	
	(-2.07)		(-2.37)		(0.73)	
ADRI_DLLS	7.693	**	7.259	**	8.368	***
	(2.28)		(2.07)		(2.62)	
MCAP_GDP	0.099	*	0.078		0.128	**
	(1.87)		(1.41)		(2.35)	
Regulation x Compensation						
REG x SBI_REL	10.019		16.671	**	1.476	
	(1.32)		(2.02)		(0.18)	
REG x BONUS_REL	18.255	**	18.521	**	7.417	
	(2.15)		(2.20)		(0.98)	
Ownership						
OW_MANAGEMENT	0.262		0.223		0.268	**
	(1.58)		(1.23)		(2.13)	
OW_OUTSIDE	-0.067		-0.024		-0.140	
	(-0.50)		(-0.19)		(-1.02)	
Bank Characteristics						
MCAP_LN	2.503		2.134		1.094	
	(1.54)		(1.26)		(0.72)	
TIER1	-1.939	**	-1.681	**	-1.801	***
	(-2.56)		(-2.31)		(-2.72)	
MTB	-17.789	***	-17.094	***	-14.362	***
	(-4.20)		(-3.93)		(-3.85)	
STAFF_INC	-3.912	***	-3.680	***	-3.991	***
	(-4.06)		(-3.57)		(-4.58)	
LOANS_TO_ASSETS	0.602	***	0.414	**	0.746	***
	(3.99)		(2.52)		(5.04)	
TOTAL_RISK	2.013	***	1.896	***	1.582	***
	(5.39)		(4.52)		(4.58)	
ROE	32.654		47.238		29.811	
	(0.53)		(0.75)		(0.54)	
TSR	-0.100		-0.109		0.080	
	(-0.83)		(-0.81)		(0.73)	
Industry-fixed effects	yes		yes		yes	
No of observ.	297		297		297	
adj. R2	0.313		0.283		0.294	

Notes: The table reports coefficients of OLS regressions of alternative risk tail measures on the interaction of compensation and regulation. All regression models are complemented by a set of industry dummies based on SIC industry code classification. All variables are described in table 7.2. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

7.6.4 Sample variation

Since I have a broad sample that consists of many small banks, I want to test whether the results were driven by small banks. Panel A of table 7.10 reports regression results based on eq. (7.7) for large banks only. These regression models produce results which remain qualitatively and also quantitatively similar to those presented earlier. My previous results suggest that country differences do matter regarding the impact of compensation on performance and risk. Thus, I want to test whether my results are driven by US banks only. Therefore, I test my regression with interaction terms on a subsample excluding US banks as the US exhibits the highest regulation of the banking industry. Again, I present regression results on alternative tail risk measures. Panel B of table 7.10 reports regression results based on eq. (7.7) for European banks. Due to the reduced number of observation I did not expect similar statistical significance. Notwithstanding the reduced sample, the results for the interaction terms of BONUS_REL and REG are significant and similar to those of my base regressions. These findings underline my previous hypothesis that incentives for short-termism are enhanced by tight regulation and seem to encourage managers to take even more excessive risks. Therefore, in countries with strong capital requirements and tight restrictions, short-term incentives induce managers to select risky projects or projects that bypass restrictions in order to achieve their goals.

Table 7.10: Robustness: Regression analysis of large banks and European banks

Dep. variable	-TSR_07/08		-TSR_08		-TSR_LEHMAN	
Panel A: Large banks						
Model	(1)		(2)		(3)	
Compensation						
SBI_REL	32.377	**	29.406	**	25.316	*
	(2.30)		(2.17)		(1.77)	
BONUS_REL	28.815		30.257		38.665	**
	(1.36)		(1.50)		(2.21)	
FIX_EX	0.0077	**	0.0080	***	0.0076	**
	(2.47)		(2.64)		(2.25)	
Regulation						
REG	-3.098		-3.068		1.192	
	(-0.88)		(-0.95)		(0.34)	
ADRI_DLLS	5.581		5.580		8.674	**
	(1.52)		(1.50)		(2.34)	
MCAP_GDP	0.042		0.005		0.092	
	(0.66)		(0.09)		(1.35)	
Regulation x Compensation						
REG x SBI_REL	10.473		17.926	*	2.697	
	(1.06)		(1.70)		(0.25)	
REG x BONUS_REL	18.975		22.662	**	19.296	*
	(1.65)		(2.04)		(1.89)	
Ownership						
OW_MANAGEMENT	0.071		-0.076		0.024	
	(0.33)		(-0.31)		(0.12)	
OW_OUTSIDE	-0.008		0.121		-0.122	
	(-0.04)		(0.67)		(-0.56)	
Bank characteristics						
MCAP_LN	5.419	**	6.825	***	0.363	
	(2.11)		(2.95)		(0.13)	
TIER1	-1.722		-1.221		-1.962	*
	(-1.44)		(-1.31)		(-1.84)	
MTB	-21.475	***	-18.473	***	-19.666	***
	(-3.62)		(-3.22)		(-3.37)	
STAFF_INC	-16.201	*	-18.124	**	-15.652	**
	(-1.92)		(-2.22)		(-2.08)	
LOANS_TO_ASSETS	0.516	**	0.320		0.544	**
	(2.50)		(1.49)		(2.48)	
TOTAL_RISK	2.096	***	2.297	***	1.919	***
	(3.60)		(4.38)		(3.22)	
ROE	1.638	*	1.500	*	1.123	
	(1.90)		(1.90)		(1.35)	
TSR 2006	0.059		0.042		0.129	
	(0.34)		(0.24)		(0.75)	
Industry-fixed effects	yes		yes		yes	
No of observ.	145		145		145	
adj. R2	0.342		0.388		0.266	

continued on next page...

Panel B: European banks						
Model	(1)		(2)		(3)	
Compensation						
SBI_REL	120.267		107.386		173.914	*
	(1.46)		(1.14)		(1.95)	
BONUS_REL	60.065		70.912	*	77.086	**
	(1.59)		(1.78)		(2.14)	
FIX_EX	0.0044		0.0050		0.0022	
	(1.16)		(1.28)		(0.57)	
Regulation						
REG	-4.341		-6.447		-3.295	
	(-0.59)		(-0.84)		(-0.42)	
ADRI_DLLS	4.417		4.630		3.251	
	(1.42)		(1.40)		(1.03)	
MCAP_GDP	-0.045		-0.060		0.028	
	(-0.60)		(-0.79)		(0.37)	
Regulation x Compensation						
REG x SBI_REL	48.391		52.187		67.917	
	(1.19)		(1.22)		(1.52)	
REG x BONUS_REL	34.885	*	42.814	**	36.085	
	(1.72)		(2.11)		(1.65)	
Ownership						
OW_MANAGEMENT	0.244		0.209		0.223	
	(1.33)		(1.00)		(1.18)	
OW_OUTSIDE	-0.170		-0.049		-0.242	
	(-0.79)		(-0.26)		(-0.94)	
Bank Characteristics						
MCAP_LN	-0.850		-0.001		-0.499	
	(-0.28)		(-0.00)		(-0.14)	
TIER1	-1.274		-1.237		-2.262	
	(-0.86)		(-0.89)		(-1.32)	
MTB	4.861		8.181		0.184	
	(0.56)		(0.94)		(0.02)	
STAFF_INC	-1.657		0.056		-7.241	
	(-0.19)		(0.01)		(-0.77)	
LOANS_TO_ASSETS	-0.275		-0.475		0.073	
	(-0.99)		(-1.57)		(0.26)	
TOTAL_RISK	0.333		0.606		0.055	
	(0.45)		(0.85)		(0.08)	
ROE	87.207		64.392		79.201	
	(0.98)		(0.76)		(0.89)	
TSR	0.128		0.000		0.331	*
	(0.69)		(-0.00)		(1.82)	
Industry-fixed effects	yes		yes		yes	
No of observ.	79		79		79	
adj. R2	0.139		0.154		0.162	

Notes: The table reports coefficients of OLS regressions of alternative risk tail measures on the interaction of compensation and regulation. Panel BA reports regression results only for large banks. Large banks are banks located above the median of the sample distribution of market capitalization. Panel B reports regression results only for European banks. All regression models are complemented by a set of industry dummies based on SIC industry code classification. All variables are described in table 7.2. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

7.6.5 Simultaneous approach of risk and compensation

To control for the endogenous nature of the relationship between firm risk and incentives I test my hypothesis that short-term incentives increase risk taking using a simultaneous approach that includes compensation and risk taking variables. I use three-stage regressions (3SLS) to diminish the endogeneity problem (if any) from simultaneity bias by fully incorporating the information that is related to the error covariances. In doing so, the three-stage estimates are asymptotically most efficient and converges to the true parameters faster than the two-stage least square and the ordinary least square estimate (*Judge et al., 1988*). My instruments for SBI_REL and BONUS_REL are based on common determinants documented by existing literature that do not directly have an impact on firm risk. I estimate the following model for SBI_REL and BONUS_REL, respectively:

$$\begin{aligned} SBI\_REL \; &= \alpha + \beta_1(PRE\_RISK\_SCORE) + \beta_2(REG) \\ &+ \beta_3(ADRI\_DLLS) + \beta_4(MCAP\_GDP) + \beta_5(MCAP) \\ &+ \beta_6(TSR\_LAG) + \beta_7(TSR) + \beta_8(ROE\_LAG) + \beta_9(ROE) \\ &+ \beta_{10}(BOD\_NEXEC) + \beta_{11}(Industry\ Dummies) + \epsilon \end{aligned} \tag{7.8}$$

$$\begin{aligned} BONUS\_REL \; &= \alpha + \beta_1(PRE\_RISK\_SCORE) + \beta_2(REG) \\ &+ \beta_3(ADRI\_DLLS) + \beta_4(MCAP\_GDP) + \beta_5(MCAP) \\ &+ \beta_6(TSR\_LAG) + \beta_7(TSR) + \beta_8(ROE\_LAG) + \beta_9(ROE) \\ &+ \beta_{10}(BOD\_NEXEC) + \beta_{11}(Industry\ Dummies) + \epsilon \end{aligned} \tag{7.9}$$

Finally, I treat PRE_RISK_SCORE, BONUS_REL and SBI_REL as endogenous by simultaneously solving both equations eq. (7.8) and eq. (7.9) together with eq. (7.6) using the three-stage least squares (3SLS) estimation method. My results in table 7.11 underline my previous results presented in table 7.7. I find that overall risk taking prior to the crisis is positively and significantly related to annual bonuses. In addition, the effect of banking regulation remains significant for both compensation structure and pre-crisis risk taking. Using other ex-ante risk measures yields similar results. This reinforces the hypothesis that short-term incentives for managers led to higher risk taking in the context of the financial crisis in of 2007/2008, while tighter regulatory rules dampened excessive risk taking in the banking industry.

Table 7.11: Robustness: Simultaneous regression analysis of pre-crisis risk score and compensation

Dep. variable	PRE_RISK_SCORE		SBI_REL		BONUS_REL	
Compensation						
SBI_REL	0.012					
	(0.92)					
BONUS_REL	0.034	***				
	(3.12)					
FIX_EX	0.000					
	(0.55)					
Risk						
PRE_RISK_SCORE			-6.83		13.02	
			(-0.80)		(1.51)	
Regulation						
REG	-0.213	**	4.008	***	4.334	***
	(-2.39)		(2.99)		(3.24)	
ADRI_DLLS	-0.121		1.907		1.543	
	(-1.50)		(0.97)		(0.78)	
MCAP_GDP	0.002		0.054	*	-0.077	***
	(1.11)		(1.91)		(-2.72)	
Bank Characteristics						
LEVERAGE	0.005					
	(1.29)					
MTB	0.003					
	(0.06)					
TIER1	0.015					
	(0.94)					
STAFF_INC	-0.017					
	(-0.57)					
MCAP	-0.333	***	5.136	***	4.838	***
	(-3.64)		(3.64)		(3.41)	
TSR_LAG			0.078		0.033	
			(1.30)		(0.61)	
TSR			-0.117	*	0.057	
			(-1.68)		(0.90)	
ROE_LAG			-0.282		0.195	
			(-0.88)		(0.76)	
ROE			0.088		0.243	
			(0.27)		(0.91)	
BOD_NEXEC			-0.647	**	0.240	
			(-2.11)		(0.89)	
Industry-fixed effects	yes		yes		yes	
No of observ.	277		277		277	

Notes: The table reports coefficients of a three-stage least square regression (3sls) estimating simultaneously the relation between pre-crisis risk score and compensation in 2006. All regression models are complemented by a set of industry dummies based on SIC industry code classification. All variables are described in table 7.2. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Kaserer & Rapp (2012a)*.

7.7 Summary

It is widely believed that excessive risk taking by banks, due to the systemic risk they pose on the whole economy, were the root of the economic crisis. On the basis of anecdotal evidence many critics argue that ill-designed compensation contracts of executives are the driver of excessive risks taken by many banks. Until recently, the literature on compensation and risk for the banking industry was remarkably sparse. Emerging empirical evidence on the financial crisis regarding the relationship between risk taking and incentives is mixed.

First, the results suggest that bank risk is affected by executive pay arrangements. My analysis highlights that short-term incentives in form of bonuses increase pre-crisis risk taking in banks. Stock-based incentives only seem to encourage managers to engage in certain tail risks that were captured by stock performance during the crisis but not by common risk measures like probability of default and z-score. A potential explanation for these results is that managers with incentives tied to bank's stock prices invested in projects that they believed would increase shareholder wealth, but these risky projects turned out to be worse during the crisis.

Second, this chapter demonstrates that shareholders respond to the existing regulation of the banking industry when deciding on incentives schemes. Shareholders of high-regulated banks tend to grant higher bonuses and more stock-based compensation. One explanation is that by doing so bank managers operating in a restricted environment are incentivized to outperform competitors and generate higher short-term profits.

Third, the results suggest that powerful supervisory authorities or tight regulation rules (e.g., capital requirements, activity restrictions) could reduce excessive risk taking. However, tight regulation boosts the risk-taking effect of short-term incentives. Hence, managers who face both high regulation and high incentives are induced to engage in risky projects such as special purpose vehicles (SPVs) to meet shareholders' demands and/or achieve own incentive goals. The fact that accounting-based risk measures do not reveal this relationship is in line with the view that highly incentivized managers have invested in risky off-balance sheet activities prior to the crisis.

8 Conclusion

8.1 Summary of the main results

In this thesis, I postulate that the institutional environment is an important factor in issues surrounding executive compensation. My empirical analysis includes two main fields of interest.

In the first step, I break new ground in compensation literature by asking how the institutional environment influences the design and effect of executive compensation.

Second, because banks are at the center of governmental regulations and lie at the heart of financial stability of economies worldwide, I examine how executive incentives and bank regulations relate to bank risk taking. As the recent financial crisis once again demonstrated that the failure of an important financial institution poses a major risk to the economy, it is tremendously important to understand the drivers of risk taking in banks.

My empirical evidence is presented along these two steps.

Institutional environment, corporate governance, and executive compensation

The majority of current empirical research on executive compensation focuses on the influence of firm-specific governance mechanisms, such as ownership or board structure. The existing literature on executive compensation remains quite silent on institutional environment influences. As such, it is the objective of my dissertation to shed light on this issue. Therefore, I analyze a comprehensive dataset containing detailed information on firm characteristics, compensation, and institutional differences for all firms listed in S&P 500 and MSCI Europe for the period 2005-2008. I collected information from annual reports of almost 15,000 executives over 2,766 firm-years and across 14 European countries and the US.

First, I argue that the level and structure of compensation is related to the institutional environment in which the firm operates. Examining pay levels and pay-for-performance measures, I find evidence that institutional governance structures have a substantial impact on pay. I show that pay-for-performance sensitivity increases with the level of disclosure and decreases with level of shareholder protection. In practice, this means that firms in countries with low shareholder protection and high disclosure requirements implement higher pay-for-performance sensitivities. By contrast, total pay levels are not strongly affected by shareholder protection, but they increase with levels of disclosure requirements.

Second, I expect a moderating effect of the institutional setting on non-institutional governance mechanisms when it comes to designing compensation packages. Thus, shareholders consider both their legal protection and existing firm-specific governance mechanisms when they decide on compen-

sation contracts. I call a strengthening interaction effect the *enhancing hypothesis*, and a weakening interaction the *weakening hypothesis*. I find that the traditional substitution effect of pay-for-performance and strong firm-specific governance (ownership concentration) is enhanced by high shareholder protection. Hence, firms operating in countries with strong shareholder protection and having strong internal governance (e.g., high ownership concentration) implement even less pay-for-performance, because pay-for-performance then becomes less important in the alignment of interests between managers and shareholders. Regarding total pay, I find evidence indicating that shareholder protection has a weakening effect on the impact of firm-specific governance mechanisms on total pay, which means that the traditional substitution effect of ownership concentration on total pay decreases with high shareholder protection. Thus, firms with strong internal governance mechanisms pay their executives higher total amounts, according to how much more their shareholders are protected by the law. Overall, these findings suggest that I can support both the enhancing and weakening hypotheses, depending on whether pay-for-performance sensitivities or total pay is considered.

Regulation, compensation and risk taking in banks: Evidence from the financial crises of 2007/2008

In the aftermath of the recent crisis, much attention is paid to bank risk behavior and executive incentives. Until recently, the literature on compensation and risk for the banking industry was remarkably sparse. Emerging empirical evidence on the financial crisis regarding the relationship between risk taking and incentives is mixed. I shed more light on this issue and contribute to the literature by analyzing a novel dataset of 352 banks in 14

European countries and the US.

First, my analysis highlights that short-term incentives in the form of bonuses increase risk taking in banks. I find this relationship for both ex-ante risk measures and stock performance during the crisis as ex-post proxy for excessive "tail risks". Stock-based incentives only seem to encourage managers to engage in certain tail risks that were captured by stock performance during the crisis, but not by common risk measures, such as probability of default and z-score. An explanation for these results is that managers with incentives tied to their bank's stock prices invested in projects that they believed would increase shareholder wealth; however, these risky projects turned out to be worse during the crisis. This is in line with the finding of *Fahlenbrach & Stulz (2011)*, who show that bank CEOs did not reduce their stock holdings ahead of the crisis.

Second, my results point to the roles of bank regulation and shareholders in bank risk. I find that shareholders consider the existing regulation of the banking industry when deciding on executive incentives. Shareholders of highly regulated banks tend to grant higher bonuses and more stock-based compensation. One explanation is that short-term oriented shareholders try to incentivize bank managers operating in a restricted environment to outperform competitors and generate high profits in a short time.

Third, my analysis identifies bank regulation as an instrument to moderate bank risk. My results suggest that powerful supervisory authorities or tight regulation rules (e.g., capital requirements, activity restrictions) could prevent banks from taking excessive risks.

Fourth, since my first empirical analysis (**chapter 6**) highlights the importance of the institutional setting in compensation issues, I examine whether bank regulation interacts with executive compensation with respect to bank risk taking. My results indicate that tight regulation has a drawback regarding the impact of incentives on bank risk, because the effect of incentives for short-termism is enhanced by tight regulation and seems to encourage managers to take even more excessive risks. Thus, managers who face both high regulation and high incentives are induced to engage in risky projects, such as off-balance activities, to either meet shareholders' demands or achieve their own incentive goals. The fact that accounting-based risk measures, such as probability of default or z-score, could not detect this relationship supports the view that highly incentivized managers invest in risky off-balance sheet activities.

8.2 Contribution and implications

The empirical findings of my dissertation contribute to the literature in many different ways and have implications for policymakers, regulators, and investors.

Institutional environment, corporate governance, and executive compensation

First, this dissertation analyzes a novel, sound panel dataset of European public firms. Due to the low disclosure requirements in Europe until 2005, most studies rely on US compensation data, provided by a professional database (ExecuComp). By contrast, this dissertation is the first study to

examine a solid, hand-collected sample of firms from 16 European countries.

Second, current empirical research on executive compensation is mostly limited to the examination of firm-specific governance mechanisms.[80] To my knowledge, it is the first study to analyze intensively the influence of both institutional governance and firm-level governance on executive pay.

Third, this study represents the first consideration of interaction effects between firm-specific governance mechanisms and institutional governance mechanisms with respect to executive compensation. Thus, it extends the ongoing discussion of possible substitutional or complementary interactions between governance mechanisms to the dimension of institutional governance structures.

The implications are particular important to European legislators who face several challenges regarding the regulation of executive pay.

First, there is great geographic discrepancy in Europe, in terms of both compensation and transparency. In order to push the development of a cross-border European capital market, future legislation should endeavor to equalize the European playing field with respect to the transparency of management board compensation. Nevertheless, publication of compensation levels can actually have the negative effect of generally raising pay. The better alternative would be to make the performance criteria on which the variable compensation components depend more transparent and compre-

[80] One exception is the work of *Bryan, Nash & Patel (2010)*. However, as discussed in section 5.1, this paper has some shortcomings regarding the sample selection and omitted variables.

hensible. This would give investors a way to stay informed regarding the common standards governing compensation structures and conventions in Europe.

Second, I suggest that country-specific differences in compensation practices must be taken into account when passing new legislation. My results indicate that shareholders trade off institutional governance mechanisms and pay-for-performance sensitivity in pay arrangements when it comes to aligning managersť incentives. Moreover, the effects of firm-level governance mechanisms are moderated by the quality of the institutional environment surrounding the firm. Hence, regulators and policymakers should consider these interactions when deciding on executive pay regulations.

Given the significant country differences regarding disclosure and shareholder protection, it can be assumed that the development and enforcement of Europe-wide rules for executive compensation will be a challenging task.

Finally, given these results, I conclude that the institutional environment does matter substantially in executive compensation. I argue that ignoring the institutional environment in which the firm operates leads to incomplete implications for executive compensation in general, and sometimes deficient conclusions on the impact of internal, firm-specific governance mechanisms on executive pay in particular.

Regulation, compensation and risk taking in banks: Evidence from the financial crises of 2007/2008

First, I use a novel dataset to build up the link among bank risk, bank

regulation, and incentives. To date, there is only very little evidence on non-US banks (*Erkens, Hung & Matos, 2012*; *Beltratti & Stulz, 2012*) regarding regulation and bank risk. In fact, these studies do not incorporate both regulatory aspects and executive incentives. I created a comprehensive dataset containing detailed information on firm characteristics, compensation, and regulatory indicators for 352 banks from 14 European countries and the US.

Second, as *Fahlenbrach & Stulz (2011)* note, studies that only use professional databases, such as ExecuComp, for US compensation data suffer from a bias toward larger firms. Because I also obtained compensation data from annual reports by hand, I am able to incorporate smaller banks into my study, allowing me to explore the risk-taking behavior of smaller banks as well as large banks.

Third, my analysis on bank risk taking uses a comprehensive set of ex-ante risk measures, such as the z-score, probability of default, stock return volatility, as well as an ex-post proxy of excessive "tail risks" that were exposed in the wake of the financial crisis. While most studies only rely on stock performance as an ex-post risk measure, I consider different dimensions of bank risk. Doing so should make my empirical findings and conclusions more robust.

Fourth, to the best of my knowledge, this is the first analysis that examines how regulation and compensation interact with respect to risk taking. While my results suggest that supervision or regulation could reduce bank risk taking, tighter regulation exacerbates the risk-enhancing impact of short-term incentives on bank risk, thereby encouraging managers to take even more excessive risks.

The implications of the results on bank risk taking are three-fold.

First, I argue that short-term incentives, such as bonuses, induce managerial risk taking. Thus, regulators should establish rules and guidelines that tie compensation to long-term performance. In the aftermath of the recent crisis, many governments in Europe, as well as the US, already passed legislation in this direction.

Second, powerful supervision and tighter regulation, such as capital requirements or activity restrictions, could prevent excessive risk taking by banks. Thus, at least to some extent, governmental regulation seems to be able to dampen excessive risks in the banking industry, thereby reducing the fragility of the financial system.

Third, it is not clear whether managerial risk taking in banks has been the result of self-interested managers who tried to extract rents from shareholders or risk-seeking shareholders who incentivized managers to take excessive risks. Consequently, it is doubtful whether a partial pay regulation might solve the problem of excessive risk taking.

In any case, policymakers and regulators should consider shareholders' reactions to regulation. The interactions between regulation and incentives could jeopardize efforts to stabilize and regulate the banking system in order to prevent the next financial collapse.

8.3 Avenues for future research

In general, my empirical findings suggest that the institutional environment plays a significant role in executive compensation. Thus, future research that analyzes cross-country compensation data should incorporate essential country differences, such as legal shareholder protection or a measure of transparency, to avoid drawing inappropriate conclusions.

Although I have performed several robustness checks, my analysis will have to be challenged on the way I measure pay-for-performance sensitivity. Unfortunately, contemporaneous disclosure requirements in Europe and the complexity of European compensation schemes, particularly restricted stock and option plans, do not allow researchers to incorporate the existing stock and option portfolios of managers in the calculation of pay-for-performance sensitivity.[81] While this is common practice for empirical studies of US firms, (potential) future improvements regarding compensation disclosure might enable the calculation of the more comprehensive managerial equity incentives for European firms. In addition, more transparency would endow researchers with comparable compensation measures for further multinational analyses on executive pay.

There is a worldwide tendency toward more disclosure regarding executive pay, even in historically secretive countries. As a result, future research might be able to overcome the problems that arise from the selection bias of countries with high disclosure requirements or firms that voluntarily disclose remuneration practices.

[81] For US firms, *Hall & Liebman (1998)* and *Core & Guay (1999)* argue that most CEO equity incentives come from the existing stock and option portfolios, and not from annual play flows.

To date, research on institutional environment effects has relied on time-invariant indices, measuring shareholder protection or disclosure requirements at a particular point in time-often, many years prior. Because the law and finance literature have raised a growing awareness of economic research for countries' legal systems, one can expect that those indices will be updated more frequently. Other indices from secondary databases, such as the World Bank's database of political institutions, are already updated on a yearly basis. Under this condition, future research will be able to study how changes in institutional environment over time relate to executive compensation.

In the case of risk taking in banks, my analysis could not clarify whether managerial risk taking in banks stems from self-interested managers or from risk-seeking shareholders. Thus, it should be a promising approach to scrutinize the rationale behind managerial risk taking, therefore allowing policymakers and regulators to understand how to prevent excessive risks.

Moreover, my findings highlight that common risk measures, such as probability of default or z-score, could not detect the risk-inducing effect of certain managerial incentives. I speculate that this might be evidence for off-balance sheet activities. However, analyzing this phenomenon in more detail could be a promising avenue for future research, in order to have a better understanding of how certain incentives induce managers to take excessive risks that are hidden from financial or legal observation.

Appendix

Interpreting interaction terms in regression

Moderating effects oder conditional hypotheses can be tested using interaction models. To investigate the the relationship between compensation and firm-specific governance mechanisms under a certain condition (e.g., strong shareholder protection), I estimate the following base regression model (1). I assume that Y (total pay) and X (ownership concentration) are continuous variables, while Z (high/low protection) is a dichotomous variable:

$$Y = \beta_0 + \beta_x X + \beta_z Z + \beta_{xz} XZ + \epsilon \tag{1}$$

I use mean-centered variables in order to interpret coefficients more intuitively and to reduce multicollinearity problems, since centered variables have low intercorrelation, while uncentered variables have higher intercorrelation, thus higher collinearity. The resulting equation is:

$$Y = \beta_0 + \beta_x(X - \overline{X}) + \beta_z Z + \beta_{xz}(X - \overline{X})Z \tag{2}$$

Rearranging leads to :

$$Y = \beta_0 + \beta_x\overline{X} + \beta_x X + (\beta_z - \beta_{xz}\overline{X})Z + \beta_{xz} XZ \tag{3}$$

Interpreting the coefficients

The effect of X on Y is the partial derivative with respect to X:

$$\frac{\partial Y}{\partial X} = \beta_x + \beta_{xz} Z \tag{4}$$

Eq. (4) shows that the effect of a change in X on Y depends on the value of the conditioning variable Z. The coefficient β_x on X only captures the effect of X on Y when Z is zero. When condition Z is present, i.e., Z = 1, the marginal effect of X is:

$$\frac{\partial Y}{\partial X} = \beta_x + \beta_{xz} \tag{5}$$

When condition Z is absent, i.e., Z=0, the marginal effect of X is simplified to:

$$\frac{\partial Y}{\partial X} = \beta_x \tag{6}$$

Figure 1 graphically visualizes this interaction model. I assume that β_0, β_x, β_z and β_{xz} are positive. The figure illustrates the hypothesis that Y is more increasing in X when Z is present than Z is absent.

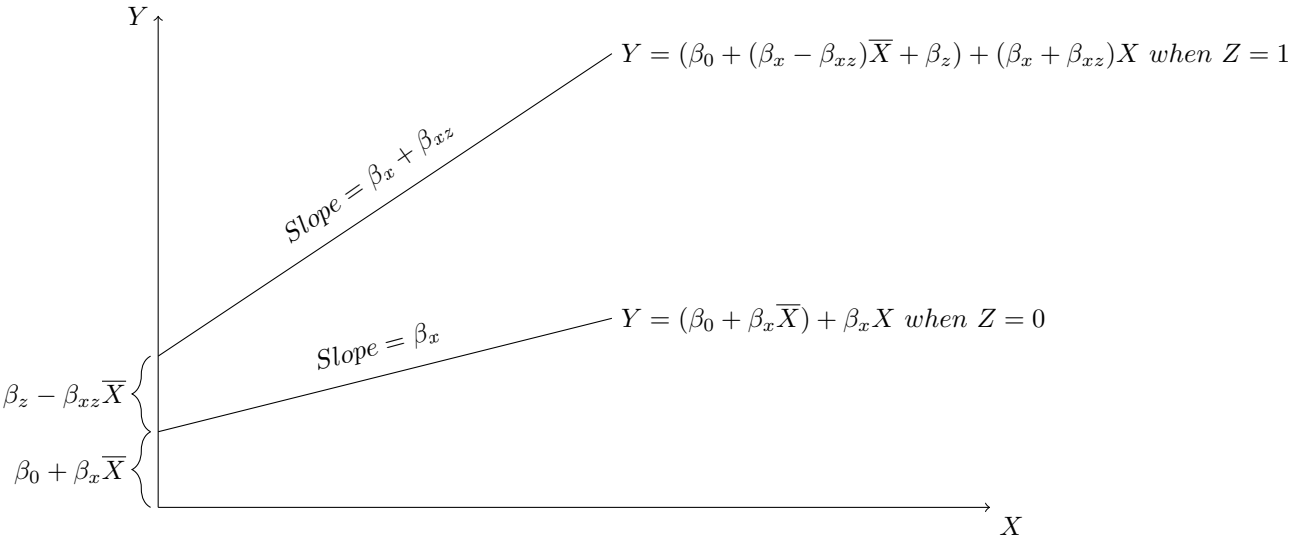


Figure A.1: Illustration of the interaction model

Table A.2: Extensive regression results

Dep. variable	**SBI_REL**		**INC_REL**		**TOTAL_LN**		**SBI_REL**		**INC_REL**		**TOTAL_LN**	
Method	Tobit		Tobit		OLS		Tobit		Tobit		OLS	
Firm Characteristics												
SIZE_SALES	0.049	***	0.058	***	0.376	***	0.025	***	0.035	***	0.320	***
	(10.12)		(15.93)		(31.00)		(6.14)		(11.53)		(30.20)	
MAREKT/BOOK	0.009	***	0.006	***	0.024	***	0.004	***	0.003	***	0.009	**
	(5.51)		(4.90)		(6.20)		(3.20)		(3.62)		(2.57)	
TSR	-0.001	***	0.000	**	-0.001		0.000		0.001	***	0.000	
	(-2.99)		(2.06)		(-1.03)		(-1.19)		(3.84)		(0.86)	
TSR_LAG	0.000		0.000	***	0.001		0.001	***	0.001	***	0.002	***
	(-0.10)		(3.00)		(1.32)		(3.26)		(6.67)		(4.48)	
CASH_FLOW	-0.156	***	-0.195	***	-0.595	***	-0.133	***	-0.143	***	-0.331	***
	(-6.70)		(-10.08)		(-9.36)		(-5.31)		(-7.77)		(-5.72)	
RISK	-0.090		-0.321	*	-0.536		-0.057		-0.254		0.612	
	(-0.40)		(-1.77)		(-0.97)		(-0.28)		(-1.57)		(1.21)	
LEVERAGE	-0.112	**	-0.124	***	-0.277	**	-0.062	*	-0.113	***	-0.338	***
	(-2.49)		(-3.48)		(-2.55)		(-1.66)		(-3.89)		(-3.67)	
RND_RATIO	-0.464	**	-0.341	**	-0.760	*	0.624	***	0.455	***	1.688	***
	(-2.34)		(-2.32)		(-1.87)		(3.96)		(3.84)		(4.42)	
DIVERSIFICATION	0.102	***	0.082	***	0.197	***	0.033		0.045	***	0.075	
	(4.10)		(4.49)		(3.08)		(1.60)		(3.23)		(1.42)	
Non-instutional Governance												
BOD_EXEC							-0.003		-0.006	***	-0.062	***
							(-1.27)		(-3.32)		(-12.24)	
CEO_DUAL							-0.003		-0.003		0.071	**
							(-0.23)		(-0.37)		(2.02)	
CEO_TENURE							0.004		0.012	***	0.042	***
							(0.90)		(3.39)		(3.43)	
BOD_NON_EXEC_IND							0.224	***	0.089	***	-0.036	
							(5.51)		(2.63)		(-0.36)	
RC_IND							-0.049		0.035		-0.113	
							(-1.42)		(1.17)		(-1.45)	
OW_MANAGEMENT							0.022		0.139		0.416	*
							(0.21)		(1.53)		(1.91)	
OW_NON_INSTITUTIONAL							-0.227	***	-0.117	***	-0.361	***
							(-6.57)		(-4.38)		(-4.61)	
OW_INSTITUTIONAL							-0.081	**	-0.095	***	-0.421	***
							(-2.28)		(-3.22)		(-4.52)	
Institutional Governance												
ADRI							-0.076	***	-0.054	***	-0.016	
							(-6.74)		(-5.68)		(-0.70)	
DSRI							0.541	***	0.292	***	1.392	***
							(8.80)		(5.82)		(9.66)	
RULE_OF_LAW							0.179	***	0.229	***	0.226	***
							(5.75)		(8.42)		(3.56)	
MCAP_GDP							-0.001	***	-0.001	***	-0.002	***
							(-4.04)		(-5.20)		(-4.69)	
PURCHASING_POWER							0.182	***	-0.225	***	-0.564	***
							(2.60)		(-3.74)		(-3.84)	
TAX_DIFFERENTIAL							-0.003	***	-0.002	**	-0.003	
							(-3.23)		(-2.36)		(-1.44)	
Year-fixed effects	yes		yes		yes		yes		yes		yes	
Industry-fixed effects	yes		yes		yes		yes		yes		yes	
No of observ.	2577		2540		2621		2306		2277		2325	
Adj.R2	0.269		0.293		0.407		0.566		0.552		0.616	

Notes: The table reports all coefficients of a two-way fixed effects tobit, probit and OLS regression used before to explain pay-for-performance sensitivities (SBI_REL, INC_REL) and total pay (TOTAL_LN). All regression models are complemented by a set of industry dummies based on the Fama-French 49 industry sectors classification. Coefficients of year and industry dummies are not reported to conserve space. All variables are described in table 6.3. Values in parentheses are robust t-statistics. * if p<0.1, ** if p<0.05, *** if p<0.01.

Source: Own work based on *Hüttenbrink, Rapp & Wolff (2011a).*

Bibliography

Aebi, V., Sabato, G. & Schmid, M., 2011, 'Risk management, corporate governance, and bank performance in the financial crisis', *Journal of Banking and Finance*, Forthcoming.

Aggarwal, R. & Samwick, A., 1999, 'The other side of the tradeoff: The impact of risk on executive compensation', *Journal of Political Economy*, 107: 65-105.

Aggarwal, R.K. & Samwick, A.A., 2003, 'Performance incentives within firms: The effect of managerial responsibility', *Journal of Finance*, 58: 1613-1649.

Aggarwal, R., Erel, I., Ferreira, M. & Matos, P., 2011, 'Does governance travel around the world? Evidence from institutional investors', *Journal of Financial Economics*, 100: 154-181.

Aguilera, R.V. & Jackson, G., 2003, 'The cross-national diversity of corporate governance: dimensions and determinants', *Academy of Management Review*, 28: 447-465.

Aguilera, R.V. & Cuervo-Cazurra, A., 2003, 'Codes of good governance', *Corporate Governance: An International Review*, 17: 376-387.

Akerlof, G., 1970, 'The market for lemons: Quality uncertainty and the market mechanism', *Quarterly Journal of Economics*, 89: 488-500.

Amihud, Y. & Lev, B., 1981, 'Risk reduction as a managerial motive for conglomerate mergers', *Bell Journal of Economics*, 12: 605-617.

Anderson, R.C. & Fraser, D.R., 2000, 'Corporate control, bank risk-taking, and the health of the banking industry', *Journal of Banking*

and Finance, 24: 1383-1398.

Armstrong, C. & Vashishtha, R., 2011, 'Executive stock options, differential risk taking incentives, and firm value', *Journal of Financial Economics*, Forthcoming.

Arrow, K., 1965, 'Aspects of the theory of risk bearing', *Yrjo Jahnssonis Saatio*, Helsinki.

Baker, G. P., Gibbons, R. & Murphy, K.J., 2002, 'Relational contracts and the theory of the firm', *The Quarterly Journal of Economics*, 117: 39-84.

Baker, M. & Gompers, P.A., 2003, 'The determinants of board structure at the initial public offering', *Journal of Law and Economics*, 46: 569-597.

Baker, G. P. & Hall, B., 2004. 'CEO incentives and firm size', *Journal of Labor Economics*, 22: 767-798.

Balachandran, S., Kogut, B. & Harnal, H., 2010, 'The probability of default, excessive risk, and executive compensation: A study of financial services firms from 1995 to 2008', *Columbia Business School Discussion Paper*.

Bancel, F. & Mittoo, U., 2004, 'Cross-country determinants of capital structure choice: A survey of european firms', *Financial Management*, 33: 103-132.

Barth, J.R., Caprio, G. & Levine, R., 2004, 'Bank regulation and supervision: what works best?', *Journal of Financial Intermediation*, 13: 205-248.

Barth, J.R., Caprio, G. & Levine, R., 2006, 'Rethinking bank regulation: till angels govern', *Cambridge Univ. Press*, New York.

Beatty, R.P. & Zajac, E.J., 1994, 'Managerial incentives, monitoring, and risk bearing: A study of executive compensation, ownership, and board structure in initial public offerings', *Administrative Science Quarterly*, 39: 313-335.

Bebchuk, L.A, J.M. Fried & Walker, D.I., 2002, 'Managerial power and rent extraction in the design of executive compensation', *Working Paper*, University of Chicago Law Review.

Bebchuk, L.A & Fried, J.M., 2004, 'Pay without performance: the unfulfilled promise of executive Compensation', *Harvard University Press.*

Bebchuk, L. & Cohen, A., 2005, 'The costs of entrenched boards', *Journal of Financial Economics*, 78: 409-433.

Bebchuk, L.A. & Spamann, H., 2010, 'Regulating bankers' pay', *Georgetown Law Journal*, 98: 247-287.

Becher, D., Campbell, T. & Frye, M., 2005, 'Incentive compensation for bank directors: The impact of deregulation', *Journal of Business*, 78: 1753-1777.

Becher, D. & Frye, M., 2011, 'Does regulation substitute or complement governance?', *Journal of Banking and Finance*, 35: 736-751.

Becht, M., Bolton, P. & Röell, A., 2003, 'Corporate governance and control', *Handbook of the economics of finance*, North Holland, Amsterdam.

Beltratti, A. & Stulz, R.M., 2012, 'Why did some banks perform better during the credit crisis? A cross-country study of the impact of governance and regulation', *Journal of Financial Economics*, Forthcoming.

Bergstresser, D. & Philippon, T., 2006. CEO incentives and earnings management. *Journal of Financial Economics*, 80: 511-529.

Berle, A.A. & Means, G.C., 1932, 'The modern corporation and private property', *Harcourt Brace and World*, New York.

Bertrand, M. & Mullainathan, S., 1999, 'Is there discretion in wage setting? A test using takeover legislation', *The Rand Journal of Economic*, 30: 535-554.

Bertrand, M. & Mullainathan, S., 2001, 'Are CEOs rewarded for luck? The ones without principals are', *Quarterly Journal of Economics*, 116: 901-932.

Bhagat, S. D., Carey, C. & Elson, C., 1999, 'Directors ownership, corporate performance and management turnover', *The Business Lawyer*, 54: 885-919.

Bhide, A., 1994, 'How entrepreneurs craft strategies that work', *Harvard Business Review*, 72: 150-161.

Bizjak, J.M., Brickley, A. & Coles, L. 1993, 'Stock-based incentive compensation and investment behaviour', *Journal of Accounting and Economics*, 16: 349-372.

Bizjak, J.M., Lemmon, M.L. & Naveen, L., 2008, 'Does the use of peer groups contribute to higher pay and less efficient compensation?', *Journal of Financial Economics*, 90: 152-168.

Black, F. & Scholes, M., 1973, ' The pricing of options and corporate liabilities', *Journal of Political Economy*, 81: 637-654.

Black, B.S., 2001, 'The legal and institutional preconditions for strong securities market', *UCLA Law Review*, 48: 781-858.

Bogle, J.C., 2008, 'Reflections on CEO compensation', *Academy of Management Perspectives*, 22: 21-25.

Booth, L., Aivazian, V., Demirguc-Kunt, A. & Maksimovic, V., 2001, 'Capital structure in developing countries', *Journal of Finance*, 56: 87-130.

Boyd, J.H., Graham, S.L. & Hewitt, R.S., 1993, 'Bank holding company mergers with nonbank financial firms: Effects on the risk of failure', *Journal of Banking and Finance*, 17: 43-63.

Boyd, J.H., Chang, C. & Smith, B.D., 1998, 'Moral hazard under commercial and universal banking', *Journal of Money, Credit and Banking*, 30: 426-468.

Brockman, P. & Unlu, E., 2009, 'Dividend policy, creditor rights, and the agency costs of debt', *Journal of Financial Economics*, 92: 276-299.

Brick, I.E., Palmon, O. & Wald, J.K., 2006, 'CEO compensation, director compensation, and firm performance: Evidence of cronyism?',

Journal of Corporate Finance, 12: 403-423.

Bruce, A., Hong, T.W. & Main, B.G.M., 2005, 'Top executive remuneration: a view from Europe', *Journal of Management Studies*, 42: 1493-1506.

Bryan, S., Hwang, L. & Lilien, S., 2000, 'CEO stock-based compensation: An empirical analysis of incentive-intensity, relative mix, and economic determinants', *Journal of Business*, 73: 661-693.

Bryan, S.H., Nash, R.C. & Patel, A., 2010, 'How legal system affects the equity mix in executive compensation', *Financial Management*, 39: 43-63.

Burkart, M., Gromb, D. & Panuzi, F., 1997, 'Large shareholders, monitoring, and the value of the firm', *The Quarterly Journal of Economics*, 112: 693-728.

Burkart, M., Panunzi, F. & Shleifer, A., 2003, 'Family firms', *Journal of Finance*, 58: 2167- 2201.

Burns, N. & Kedia, S., 2006, ' The impact of performance-based compensation on misreporting', *Journal of Financial Economics*, 79: 35-67.

Buser, S.A. and Chen, A.H. & Kane, E.J., 1981, 'Federal deposit insurance, regulatory policy, and optimal bank capital', *Journal of Finance*, 36: 51-60.

Bushman, R. M. & Smith, A. J., 2001, Financial accounting information and corporate governance. *Journal of Accounting and Economics*, 32: 237-333.

Cadbury, A., 2000, 'Preface to: Corporate governance - A framework for implementation', *World Bank*, Washington, DC.

Carmara, A., Popova, I. & Simkins, B., 2012, 'A comparative study of the probability of default for global financial firm', *Journal of Banking and Finance*, 36: 717-732.

Caprio, G., Laeven, L. & Levine, R., 2007, 'Governance and bank valuation', *Journal of Financial Intermediation*, 16: 584-617.

Carey, D. & Tchilinguirian, H., 2000, 'Average effective tax rates on capital, labor and consumption', *OECD Economics Department Working Paper 258*.

Carpenter, J., 2000, 'Does option compensation increase managerial risk appetite?', *Journal of Finance*, 55: 2311-2331.

Castro, R., Clementi, G.L. & MacDonald, G., 2004, 'Investor protection, optimal incentives, and economic growth', *Quarterly Journal of Economics*, 119: 1131-1175.

Chen, C.R., Steiner, T.L. & Whyte, A.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. & Schenkman,J.A., 2011, 'Yesterdays heroes: Compensation and creative risk taking', *Working Paper*, SSRN Library.

Chesney, M., Stromberg, J. & Wagner,A.F., 2010, 'Risk taking incentives, governance, and losses in the financial crisis', *Working Paper*, SSRN Library.

Chhaochharia, V. & Grinstein, Y., 2009, 'CEO compensation and board structure' *Journal of Finance*, 64: 231-261.

Choe, C., 2003, 'Leverage, Volatility and Executive Stock Option', *Journal of Corporate Finance*, 9: 591-609.

Claessens, S. & Klapper, L., 2005, 'Bankruptcy around the world: Explanation of its relative use', *American Law and Economics Review*, 7: 253-283.

Clark, R. C., 1986, 'Corporate law', *Little, Brown and Company*, Boston.

Coles, J., Daniel, N. & Naveen, L., 2006, 'Managerial incentives and risk-taking', *Journal of Financial Economics*, 79: 431-468.

Collins, D. & Hribar, P., 2000, 'Earnings-based and accrual-based market anomalies: one effect or two?', *Journal of Accounting and Economics*, 29: 101-123.

Comment, R. & Schwert, G.W., 1995, 'Poison or placebo? Evidence

on the deterrence and wealth effects of modern antitakeover measures', *Journal of Financial Economics*, 31: 3-43.

Conyon, M. & Murphy, K., 2000, 'The prince and the pauper? CEO pay in the United States and United Kingdom', *The Economic Journal*, 110: 640-671.

Conyon, M.J. & Freeman, R.B., 2004, 'Shared modes of compensation and firm performance: U.K. evidence', *In Seeking a Premier Economy: The Economic Effects of British Economic Reforms, 1980-2000*, NBER, University of Chicago Press: 109-146.

Conyon, M., Core, J. & W. Guay, 2010, 'Are US CEOs paid more than UK CEOs? Inferences from risk-adjusted pay', *Review of Financial Studies*, 24: 1-37.

Core, J. & Guay, W., 1999, 'The use of equity grants to manage optimal equity incentive levels', *Journal of Accounting and Economics*, 28: 151-184.

Core, J. & Guay, W., 2002, 'Estimating the value of employee stock option portfolios and their sensitivities to price and volatility', *Journal of Accounting Research*, 40: 613-630.

Core J., Guay W. & Verrecchia R., 2003, 'Price versus non-price performance measures in optimal CEO compensation contracts', *The Accounting Review*, 78: 957-981.

Core J., Guay W. & Larcker, D., 2003, 'Executive compensation and incentives: a survey', *Federal Reserve Bank of New York Economic Policy Review*, 9: 27-50.

Core, J., Guay, W. & Thomas, R., 2005, 'Is U.S. CEO compensation inefficient pay without performance?: A Review of Lucian Bebchuk and Jesse Fried, Pay without performance: the unfulfilled promise of executive compensation', *Michigan Law Review*, 103: 1142-1185.

Cornett, M.M., McNutt, J.J. & Tehranian, H., 2010, 'The financial crises: Did corporate governance affect the performance of publicly-traded U.S. bank holding companies?' *Working Paper*, SSRN Library.

Covitz, D. & Downing, C., 2007, 'Liquidity or credit risk? the determinants of very short-term corporate yield spreads', *Journal of Finance*, 62: 2303-2328.

Crawford, A., Ezzell, J. & Miles, J., 1995, 'Bank CEO pay-performance relations and the effects of deregulation', *Journal of Business*, 68: 231-256.

Croci, E., Gonenc, H. & Ozkan, N., 2011, 'CEO compensation, family control, and institutional investors in continental europe', *Working Paper*, SSRN Library.

Cronqvist, H. & Fahlenbrach, F., 2009, 'Large shareholders and corporate policies', *Review of Financial Studies*, 22: 3941-3976.

Cull, R., Senbet, L.W. & Sorge, M., 2001, 'Deposit insurance and financial development', *Working Paper*, World Bank.

Cyert, R. M., Kang, S.-H. & Kumar, P., 2002, 'Corporate governance, takeovers, and top-management compensation: Theory and evidence', *Management Science*, 48: 453-469.

Damodaran, A., 2007, 'Strategic risk taking: A framework for risk management', *Wharton School Publishing*, Pennsylvania.

David, R. & Brierley, J.E., 1985, 'Major legal systems in the world today: an introduction to the comparative study of law', *Stevens and Sons*, London.

David, P., Kochhar, R. & Levitas, E., 1998, 'The effect of institutional investors on the level and mix of CEO compensation', *Academy of Management Journal*, 41: 200-208.

Davis, L.E. & North, D.C., 1971, 'Institutional change and American economic growth', *Cambridge University Press*, Cambridge.

Dechow, P.M. & Sloan, R.G., 1991, 'Executive incentives and the horizon problem: An empirical investigation', *Journal of Accounting and Economics*, 14: 51-89.

Del Guercio, D. & Hawkins, J., 1999, 'Aggregation and linearity in the

provision of intertemporal incentives', *Journal of Financial Economics*, 52: 293-340.

Demirguc-Kunt, A. & Maksimovic, V., 1998, 'Law, finance, and firm growth', *Journal of Finance*, 53: 2107-2137.

Demirguc-Kunt, A. & Detragiache, E., 2002, 'Does deposit insurance increase banking system stability? An empirical investigation', *Journal of Monetary Economics*, 49: 1373-1406.

Demirguc-Kunt, A. & Kane, E.J., 2002, 'Deposit insurance around the globe: Where does it work?', *Journal of Economic Perspectives*, 16: 175-195.

Demsetz, H. & Lehn K., 1985, 'The structure of corporate ownership: Causes and consequences' *Journal of Political Economy*, 93: 1155-1177.

Denis, D. & McConnell, J., 2003, 'International corporate governance', *Journal of Financial and Quantitative Analysis*, 38: 1-36.

Devers, C.E., Cannella, A.A., Reilly, G.P. & Yoder, M.E., 2007, 'Executive compensation: A multidisciplinary review of recent developments', *Journal of Management*, 33: 1016-1072.

Dittmann, I. & Maug, E.G., 2007, 'Lower salaries and no options? On the optimal structure of executive pay', *Journal of Finance*, 62: 303-343.

Dittmann, I., Maug, E. & Zhang, D., 2011, 'Restricting CEO Pay', *Journal of Corporate Finance*, 17: 1200-1220.

Dittmar, A., Mahrt-Smith, J. & Servaes, H., 2003, 'International corporate governance and corporate cash holdings', *Journal of Financial and Quantitative Analysis*, 38: 111-133.

Djankov, S., La Porta, R., Lopez-de-Silanes, F. & Shleifer, A., 2008, 'The law and economics of self dealings', *Journal of Financial Economics*, 88: 430-465.

Döscher, T. & Friedl, G., 2011, 'Corporate governance, stakeholder power, and executive compensation', *OR Spectrum*, 33: 309-331.

Dumas, B., Fleming, J. & Whaley, R.E., 1998, 'Implied volatility functions: Empirical tests', *The Journal of Finance*, 53: 2059-2106.

Durnev, A. & Kim, H., 2005, 'To steal or not to steal: firm attributes, legal environment, and valuation', *Journal of Finance*, 60: 1461-1493.

Eisenbeis, R. & Wall, L.D., 1984, 'Risk considerations in deregulating bank activities', *Federal Reserve Bank of Atlanta Economic Review*, 69: 6-19.

Eisenhardt, K. M., 1989, 'Agency theory: An assessment and review', *Academy of Management Review*, 15: 57-74.

Elston, J.A. & Goldberg, L.G., 2003, 'Executive compensation and agency costs in Germany', *Journal of Banking and Finance*, 27: 1391-1410.

Erkens, D., Hung, M. & Matos, P., 2012, 'Corporate governance in the 2007-2008 financial crisis: Evidence from financial institutions worldwide', *ECGI Finance Working Paper No. 249/2009*, SSRN Library.

Fahlenbrach R., 2009, 'Shareholder rights, boards, and CEO compensation', *Review of Finance*, 13: 81-113.

Fahlenbrach, R. & Stulz, R. M., 2011, 'Bank CEO incentives and the credit crisis', *Journal of Financial Economics*, 99: 11-26.

Faleye, O., Mehrotra, V. & Morck, R.K., 2006, 'When labor has a voice in corporate governance', *Journal of Financial and Quantitative Analysis*, 41: 489-510.

Fama, E. & Jensen, M., 1983, 'Separation of ownership and control', *Journal of Law and Economics*, 26: 301-325.

Faulkender, M., Kadyrzhanova, D., Prabhala, N. & Senbet, L.W., 2010, 'Executive compensation: An overview of research on corporate practices and proposed reforms', *Journal of Applied Corporate Finance*, 74: 107-118.

Fernandes, N., Ferreira, M.A., Matos, P. & K.J. Murphy, 2010,

'The pay divide:(Why) are us top executives paid more?', *Working Paper*, SSRN Library

Ferreira, M.A. & Matos, P., 2008, 'The colors of investors' money: The role of institutional investors around the world', *Journal of Financial Economics*, 88: 499-533.

Finkelstein, S. & D'Aveni, R.A., 1994, 'CEO duality as a double-edged sword: How boards of directors balance entrenchment avoidance and unity of command', *Academy of Management Journal*, 37: 1079-1108.

Finkelstein, S. & Hambrick, D.C., 1996, 'Top executives and their effects on organizations', *MN:West Publishing Company.*, St. Pauls.

Finkelstein, S. & Boyd, B.K., 1998, 'How much does the CEO matter? The role of managerial discretion in the setting of CEO compensation', *Academy of Management Journal*, 41: 179-199.

Flannery, M.J., 1998, 'Using market information in prudential bank supervision: A review of the U.S. empirical evidence', *Journal of Money, Credit and Banking*, 30: 279-305.

Florin, D. , Hallock K.F. & Webber, D., 2010, 'Executive pay and firm performance: Methodological considerations and future directions', *Research in Personnel and Human Resources Management*, 29: 49-86.

Frydman, C. & Jenter, D., 2010, 'CEO compensation', *Working Paper*, Rock Center for Corporate Governance at Stanford University.

Gabaix, X. & Landier, A., 2008, 'Why has CEO pay increased so much?', *Quarterly Journal of Economics*, 123: 49-100.

Gaver, J. & Gaver, K., 1993, 'Additional evidence on the association between the investment opportunity set and corporate financing, dividend, and compensation policies', *Journal of Accounting and Economics*, 16: 125-160.

Giannetti, M., 2003, 'Do better institutions mitigate agency problems? evidence from corporate finance choices', *Journal of Financial and*

Quantitative Analysis, 38: 185-212.

Gibbons, R. & Murphy, K.J., 1992, 'Optimal incentive contracts in the presence of career concerns: Theory and evidence', *Journal of Political Economy*, 100: 468-505.

Gillan, S., 2006, 'Recent developments in corporate governance: An overview', *Journal of Corporate Finance*, 12: 381-402.

Gray, S.R. & Cannella, A.A., 1997, 'The role of risk in executive compensation', *Journal of Management*, 23: 517-540.

Grinstein, Y. & Hribar, P., 2004, 'CEO compensation and incentives: Evidence from M&A bonuses', *Journal of Financial Economics*, 73: 119-143.

Grossman, S. & Hart, O., 1980, 'Takeover bids, the free rider problem, and the theory of the corporation', *Bell Journal of Economics*, 11: 42-64.

Guay, W.R., 1999, 'The sensitivity of CEO wealth to equity risk: an analysis of the magnitude and determinants', *Journal of Financial Economics*, 53: 43-72.

Guidry, F., Leone, A. J. & Rock, S., 1999, 'Earnings-based bonus plans and earnings management by business-unit managers', *Journal of Accounting and Economics*, 26: 113-142.

Han, S., Kang, T., Selter, S. & Yoo, Y. K., 2010, 'A cross-country study on the effects of national culture on earnings management', *Journal of International Business Studies*, 41: 123-141.

Hall, P.A., 1986, 'Governing the economy: The Politics of state intervention in Britain and France', *Oxford University Press*, New York.

Hall, B. & Liebman, J., 1998, 'Are CEOs really paid like bureaucrats?', *Quarterly Journal of Economics*, 103: 653-691.

Hallock, K.F., 1997, 'Reciprocally interlocking boards of directors and executive compensation', *Journal of Financial and Quantitative Analysis*, 32: 331-344.

Harjoto, M.A. & Mullineaux, D.J., 2003, 'CEO compensation and the transformation of banking', *Journal of Financial Research*, 26: 341-354.

Hartzell, J.C. & Starks, L.T., 2003, 'Institutional investors and executive compensation', *The Journal of Finance*, 58: 2352-2374.

Haugen, R. & Senbet, L., 1981, 'Resolving the agency problems of external capital through options', *Journal of Finance* , 50: 1291-1308.

Haw,I., Ho, S.M., Hu, B. & Wu. D., 2010, 'Concentrated control, institutions, and banking sector: An international study', *Journal of Banking and Finance*, 34: 485-497.

Healy, P.M., 1985, 'The effect of bonus schemes on accounting decisions', *Journal of Accounting and Economics*, 7: 85-107.

Hermalin, B.E. & Weisbach, M.S., 2003, 'Board of directors as an endogenously-determined institution: a survey of economic literature', *Economic Policy Review*, 9: 7-26.

Hillier, D., Pindado, J., de Queiroz, V. & de la Torre, C., 2011, 'The impact of country-level corporate governance on research and development', *Journal of International Business Studies*, 42: 76-98.

Himmelberg, C., Hubbard, G. & Palia, D., 1999, 'Understanding the determinants of managerial ownership and the link between ownership and performance', *Journal of Financial Economics*, 52: 353-384.

Hirshleifer, D. & Thakor, A., 1992, 'Managerial conservatism, project choice, and debt', *Review of Financial Studies*, 5: 437-470.

Holderness, C.G., 2003, 'A survey of blockholders and corporate control', *Economic Policy Review*, Federal Reserve Bank of New York, 9: 51-63.

Holmstrom, B., 1979, 'Moral hazard and observability', *Bell Journal of Economics*, 10: 74-91.

Holmstrom, B. & Milgrom, P., 1987, 'Aggregation and linearity in the provision of intertemporal incentives', *Econometrica*, 55: 303-328.

Holmstrom, B. & Tirole, J., 1993, 'Market liquidity and performance

monitoring', *Journal of Political Economy*, 101: 678-709.

Holmstrom, B., 2005, 'Pay without performance and the managerial power hypothesis: A comment', *Journal of Corporation Law*, 30: 703-713.

Houston, J.F. & James, C., 1995, 'CEO compensation and bank risk Is compensation in banking structured to promote risk taking?', *Journal of Monetary Economics*, 36: 405-431.

Hüttenbrink, A., Rapp, M.S. & Wolff, M., 2011a, 'Does institutional environment matter in executive compensation? A multinational analysis', *Working Paper*, SSRN Library.

Hüttenbrink, A., Rapp, M.S. & Wolff, M., 2011b, 'Höhe und Struktur der Vorstandsvergütung in börsennotierten Unternehmen - Ein unter Corporate-Governance-Aspekten durchgeführter europäischer Vergleich', *Zeitschrift für Corporate Governance*, 4: 165-171.

Hüttenbrink, A., Kaserer, C. & Rapp, M.S., 2012a, 'Will regulators prevent the next financial crisis? New evidence on the interaction of regulation, compensation and risk taking in banks', *Working Paper*, SSRN Library.

Hüttenbrink, A., Kaserer, C. & Rapp, M.S., 2012b, 'Vorstandsvergütung und geschäftspolitische Risiken bei Banken', *Journal of Banking Law and Banking*, Forthcoming.

Jensen, M. & Meckling, W., 1976, 'Theory of the firm: Managerial behaviour, agency costs and ownership structure', *Journal of Financial Economics*, 3: 305-360.

Jensen, M. & Murphy, K. J., 1990 , 'Performance pay and top-management incentives', *Journal of Political Economy*, 98: 225-264.

Jensen, M., 1993, 'The modern industrial revolution, exit, and the failure of internal control systems', *Journal of Finance*, 48: 831-880.

Jensen, M. & Smith, C.W., 2000, 'Stockholder, manager, and creditor interests: applications of agency theory', *Theory of the Firm: Gover-*

nance, Residual Claims, and Organizational Forms, Harvard University Press.

Jensen, M., 2001, 'Value maximisation, stakeholder theory, and the corporate objective function', *European Financial Management*, 7: 297-317.

Jensen, M., 2003, 'A theory of the firm: governance, residual claims, and organizational forms', *Harvard University Press*.

John, K. & Senbet, L.W., 1998, 'Corporate governance and board effectiveness', *Journal of Banking and Finance*, 22: 371-403.

John, K., Saunders, A. & Senbet, L.W., 2000, 'A theory of bank regulation and management compensation', *Review of Financial Studies*, 13: 95-125.

John, K. & Qian, Y., 2003, 'Incentive features in CEO compensation in the banking industry', *Economic Policy Review*, 9: 109-121.

John, K., Litov, L. & Yeung, B., 2008, 'Corporate governance and risk-taking', *Journal of Finance*, 63: 1679-1728.

Johnson, S., LaPorta, R., Lopez-de-Silanes, F. & Shleifer, A., 2000, 'Tunneling', *American Economic Review*, 90: 22-27.

Judge, George G., Hill, R.C., Griffiths, W.E., Lutkepohl, H. & Lee, T.C., 1988, 'Introduction to the theory and practice of econometrics', *John Wiley and Sons*.

Kane, E.J., 1985, 'The gathering crisis in federal deposit insurance', *MIT Press Books*.

Kaplan, S.N., 2008, 'Are US CEOs overpaid?', *Academy of Management Perspectives*, 22: 5-20.

Kaufmann, D., Kraay, A. & Mastruzzi, M., 2009, 'Governance matters VIII: Aggregate and individual governance indicators, 1996-2008', *Policy Research Working Paper No. 4654*, World Bank.

Keeley, M.C., 1990, 'Deposit insurance, risk, and market power in banking', *American Economic Review*, 5: 1183-1200.

Khan, R., Dharwadkar, R. & Brandes, P., 2005, 'Institutional ownership and CEO compensation: a longitudinal examination', *Journal of Business Research*, 58: 1078-1088.

Klomp, J. & de Haan, J., 2011, 'Banking risk and regulation: Does one size fit all?', *Journal of Banking and Finance*, Forthcoming.

Koehn, M. & Santomero, A., 2001, 'Regulation of bank capital and portfolio risk', *Journal of Finance*, 35: 1235-1244.

Kole, S., 1997, 'The complexity of compensation contracts', *Journal of Financial Economics*, 43: 79-104.

Kraft, K. & Niederprum, A., 1999, 'Determinants of management compensation with risk-averse agents and dispersed ownership of the firm', *Journal of Economic Behavior and Organization*, 40: 17-27.

Kuhnen, C. & Zwiebel, J., 2008, 'Executive pay, hidden compensation and managerial entrenchment', *Working Paper*, Rock Center for Corporate Governance at Stanford University.

Kwan, S.H. & Ladermann, E.S., 1999, 'On the portfolio effects of financial convergence - A review of the literature', *Federal Reserve Bank of San Francisco*, 2: 18-31.

Lambert, R. & Larcker, D., 2001, 'Options, Restricted Stock, and Incentives', *Working Paper*, University of Pennsylvania.

La Porta, R., Lopez-de-Silanes, F. & Shleifer, A., 1997, 'Legal determinants of external finance', *Journal of Finance*, 52: 1131-1150.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. & Vishny, R., 1998, 'Law and finance', *Journal of Political Economy*, 106: 1113-1155.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. & Vishny, R., 1999, 'Corporate ownership around the world', *The Journal of Finance*, 54: 471-517.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. & Vishny, R., 2000a, 'Investor protection and corporate governance', *Journal of Financial Economics*, 58: 3-27.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. & Vishny, R., 2000b, 'Agency problems and dividend policies around the world', *Journal of Finance*, 55: 1-33.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. & Vishny, R., 2002, 'Investor protection and corporate valuation', *Journal of Finance*, 53: 1147-1170.

La Porta, R., Lopez-de-Silanes, F. & Shleifer, A., 2006, 'What works in securities laws?', *Journal of Finance*, 61: 1-32.

Laeven, L. & Levine, R., 2009, 'Bank governance, regulation and risk taking', *Journal of Financial Economics*, 93: 259-275.

Lambert, R. & Larcker, D., 1987, 'An analysis of the use of accounting and market measures of performance in executive compensation contracts', *Journal of Accounting Research*, 25: 85-125.

Leone, A.J., Wu, J.S. & Zimmerman, J.L., 2006, 'Asymmetric sensitivity of CEO cash compensation to stock returns', *Journal of Accounting and Economics*, 42: 167-192.

Leuz, C., Nanda, D. & Wysocki, P.D., 2003, 'Earnings management and investor protection: an international comparison', *Journal of Financial Economics*, 69: 505-527.

Levy, H., 1982, 'Economic valuation of voting power of common stock', *Journal of Finance*, 38: 79-93.

Lewellen, W. & Huntsman, B., 1970, 'Managerial pay and corporate performance', *American Economic Review*, 60: 710-720.

Lewellen, K., 2006, 'Does option compensation increase managerial risk appetite?', *Journal of Financial Economics*, 82: 551-589.

Licht, A., 2003, 'Cross-listing and corporate governance: bonding or avoiding?', *Chicago Journal of International Law*, 4: 141-163.

Lintner, J., 1965, 'The valuation of risk assets and selection of risky investments in stock portfolios and capital budgets', *Review of Economics and Statistics*, 47: 13-37.

Lorsch, J.W. & Maciver, E., 1989, 'Pawns or potentates: The reality of America's corporate boards', *Journal of Law and Economics*, 46: 569-597.

Low, A., 2009, 'Managerial risk taking behavior and equity-based compensation', *Journal of Financial Economics*, 92: 470-490.

March, J.G. & Shapira, Z., 1987, 'Managerial perspectives on risk and risk taking', *Management Science*, 33: 1404-1418.

Markowitz, H., 1952, 'Portfolio selection', *Journal of Finance*, 7: 77-91.

Masson, R., 1971, 'Executive motivations, earnings, and consequent equity performance', *Journal of Political Economy*, 79: 1278-1292.

Maug, E., 1998, 'Large shareholders as monitors: Is there a trade-off between liquidity and control?', *Journal of Finance*, 53: 65-98.

May, D., 1995, 'Do managerial motives influence firm risk reduction strategies?', *Journal of Finance*, 50: 1291-1308.

Mehran, H., 1995, 'Executive compensation, ownership, and firm performance', *Journal of Financial Economics*, 38: 163-184.

Mehran, H. & Rosenberg, J., 2008, 'The effect of CEO stock options on bank investment choice, borrowing, and capital', *Working Paper*, Federal Reserve Bank of New York.

Mehran, H., Morrison, A. & Shapiro, J., 2011, 'Corporate governance and banks: What have we learned from the financial crisis?', *Working Paper*, Federal Reserve Bank of New York.

Merton, R.C., 1973, 'Theory of rational option pricing', *Bell Journal of Economics and Management Science*, 4: 141-183.

Merton, R.C., 1977, 'Analytic derivation of the cost of deposit insurance and loan guarantees', *Journal of Banking and Finance*, 1: 3-11.

Miller, J.S., Wiseman, R.M. & Gomez-Mejia, L.R., 2002, 'The fit between CEO compensation design and firm risk', *Academy of Management Journal*, 45: 745-756.

Mishkin, F., 1999, 'Financial consolidation: Dangers and opportunities', *Journal of Banking and Finance*, 23: 675-691.

Monks, R.A. & Minnow, N., 2008, 'Corporate governance', *John Wiley and Sons*, Chichester.

Morck, R.K., Wolfenzon, D. & Yeung, B., 2005, 'Corporate governance, economic entrenchment, and growth', *Journal of Economic Literature*, 43: 657-722.

Murphy, K.J., 1985, 'Corporate performance and managerial remuneration: An empirical analysis', *Journal of Accounting and Economics*, 7: 11-42.

Murphy, K.J., 1999, 'Executive compensation', *Handbook of Labor Economics, vol. 3b*, North Holland, Amsterdam.

Murphy, K.J, 2002, 'Explaining executive compensation: managerial power vs. perceived cost of stock options', *University of Chicago Law Review*, 69: 847-869.

Muslu, V., 2010, 'Executive directors, pay disclosures, and incentive compensation in large european companies', *Journal of Accounting, Auditing and Finance*, 25: 331-344.

Myers, S.C., 1977, 'Determinants of corporate borrowing', *Journal of Financial Economics*, 5: 147-175.

Noe, T., Rebello, M.J. & Wall, L.D., 1996, 'Managerial rents and regulatory intervention in troubled banks', *Journal of Banking and Finance*, 20: 331-350.

Noe, T., 2002, 'Investor activism and financial market structure', *Review of Financial Studies*, 15: 289-319.

North, D.C., 1990, 'Institutions, institutional change, and economic performance', *Cambridge University Press*, Cambridge.

Obama, B., 2010, 'Remarks by the President on financial reform.', *Office of the Press Secretary*, 21 January 2010.

Otten, J.A., 2002, 'Origins of executive pay and corporate governance

reform codes. An institutional approach to corporate governance', *PhD-thesis, Utrecht School of Economics*, Utrecht.

Pagano, M. & Volpin, P.F., 2005, ' The Political Economy of Corporate Governance', *American Economic Review*, 95: 1005-1030.

Pathan, S., 2009, 'Strong Boards, CEO Power and Bank risk-taking', *Journal of Banking and Finance*, 33: 1340-1350.

Perry, T. & Zenner, M., 2000, 'CEO compensation in the 1990s: shareholder alignment or shareholder expropriation?', *Wake Forest Law Review*, 35: 123-152.

Perry, T. & Zenner, M., 2001, 'Pay for performance? Government regulation and the structure of compensation contracts', *Journal of Financial Economics*, 62: 453-488.

Petersen, M. A., 2009, 'Estimating standard errors in finance panel data sets: Comparing approaches', *Review of Financial Studies*, 22: 435-448.

Pinkowitz, L., Stulz, R. & Williamson, R., 2006, 'Does the contribution of corporate cash holdings and dividends to firm value depend on governance? A cross-country analysis', *Journal of Finance*, 61: 2725-2751.

Rajan, R. & Zingales, L., 1995, 'What do we know about capital structure? Some evidence from international data', *Journal of Finance*, 50: 1421-1460.

Rajan, R. & Zingales, Z., 1998, 'Financial dependence and growth', *American Economic Review*, 88: 559-586.

Rapp, M.S., Schaller, P. & Wolff, M., 2009, 'Stock-based incentives: design and implications for firm performance, *Working Paper*, SSRN Library.

Rapp, M.S. & Wolff, M., 2010, 'Determinanten der Vorstandsvergütung - Eine empirische Untersuchung der deutschen Prime-Standard Unternehmen', *Zeitschrift für Betriebswirtschaft*, 80: 1075-1112.

Rapp, M. & Trinchera, O., 2012, 'Regulation and the anatomy of own-

ership structures in European listed firms', *Working Paper*, Technische Universtität München.

Rediker, K.J. & Seth, A., 1995, 'Boards of directors and substitution effects of alternative governance mechanisms', *Strategic Management Journal*, 16: 85-99.

Reynolds, T. & Flores, A., 1989, 'Foreign law: Current sources of basic legislation in jurisdictions of the world', *Rothman and Co.*, Littleton.

Rochet, J.C., 1992, 'Capital requirements and the behaviour of commercial banks', *European Economic Review*, 36: 1137-1170.

Rosen, S., 1985, 'Implicit contracts: A survey', *Journal of Economic Literature*, 23: 1144-1175.

Ross, S.A., 1973, 'The Economic Theory of Agency: The Principal's Problem', *The American Economic Review*, 63: 134-139.

Ross, S.A., 2004, 'Compensation, incentives, and the duality of risk aversion and riskiness', *Journal of Finance*, 59: 207-225.

Roy, A.D., 1952, 'Safety first and the holding of assets', *Econometrica*, 20: 431-449.

Sautner, Z. & Weber, M., 2008, 'Corporate governance and the design of stock option programs' *Working Paper*, SSRN Library.

Sharpe, W.F., 1964, 'Capital asset prices: A theory of market equilibrium under conditions of risk', *Journal of Finance*, 19: 425-442.

Shivdasani, A. & Yermack, D., 1999, 'CEO involvement in the selection of new board members: An empirical analysis', *Journal of Finance*, 54: 1829-1853.

Shleifer, A. & Vishny, R., 1986, 'Large shareholders and corporate control', *Journal of Political Economy*, 95: 461-488.

Shleifer, A. & Vishny, R., 1997, 'The limits of arbitrage', *Journal of Finance*, 52: 35-55.

Sloan, R.G., 1996, 'Do stock prices fully reflect information in accruals

and cash flows about future earnings?', *Accounting Review*, 71: 289-315.

Smith, A., 1776, 'An inquiry into the nature and causes of the wealth of nations', *Clarendon Press (1996, Vol. 2)*, London.

Smith, C.W. & Stulz, R.M., 1985, 'The determinants of firm's hedging policies', *The Journal of Financial and Quantitative Analysis*, 20: 391-405.

Smith, C. & Watts, R., 1992, 'The investment opportunity set and corporate financing, dividend and compensation policies', *Journal of Financial Economics*, 3: 263-292.

Spamann, H., 2010, 'The "Antidirector Rights Index" revisited', *Review of Financial Studies*, 23: 467-486.

Spence, M. & Zeckhauser, R., 1971, 'Insurance, information, and individual action', *The American Economic Review*, 61: 380-387.

Stulz, R.M., 2005, 'Do managerial motives influence firm risk reduction strategies?', *Journal of Finance*, 60: 1595-1638.

Suntheim, F., 2011, 'Managerial compensation in the financial service industry', *Working Paper*, SSRN Library.

Szewczyk, S.H. & Tsetsekos, G.P., 1992, 'State intervention in the market for corporate control: The case of Pennsylvania Senate Bill 1310', *Journal of Financial Economics*, 31: 3-23.

Thompson, S., 2011, 'Simple formulas for standard errors that cluster by both firm and time', *Review of Financial Studies*, 99: 1-10.

Tirole, J., 1986, 'Hierarchies and bureacracies: On the role of collusion in organizations', *Journal of Law, Economics, and Organization*, 2: 181-214.

Tirole, J., 2001, 'Corporate governance', *Econometrica*, 69: 1-35.

Vallascas, F. & Hagendorff, J., 2012, 'CEO bonus pay and bank default risk: Evidence from europe and the us', *Working Paper*, SSRN Library.

Walker, D.I., 2004, 'Is equity compensation tax advantaged?', *Boston*

University Law Review, 84: 695-755.

Walker, D.I., 2010, 'The law and economics of executive compensation: theory and evidence', *Working Paper*, Boston University School of Law.

Walsh, J.P., 2008, 'CEO compensation and the responsibilities of the business scholar to society', *Academy of Management Perspectives*, 22: 26-33.

Weisbach, M.S., 1988, 'Outside Directors and CEO Turnover', *Journal of Financial Economics*, 20: 431-460.

Weisbach, M.S., 2006, 'Optimal executive compensation vs. managerial power: A review of Lucian Bebchuk and Jesse Fried's "Pay without performance: The unfulfilled promise of executive compensation"', *NBER Working Paper No. 12798*, SSRN Library.

Williams, J., 1987, 'Perquisites, risk, and capital structure', *Journal of Finance*, 42: 29-48.

Yermack, D., 1995, 'Do corporations award CEO stock options effectively?', *Journal of Financial Economics*, 39: 237-269.

Yermack, D., 1996, 'Higher market valuation of companies with a small board of directors', *Journal of Financial Economics*, 40: 185-211.

Yermack, D., 1997, 'Good timing: CEO stock option awards and company news announcements', *Journal of Finance*, 52: 449-476.

Zajac, E.J. & Westphal, J.D., 1994, 'The costs and benefits of managerial incentives and monitoring in large US corporations: when is more not better?', *Strategic Management Journal*, 15: 121-142.

Zhou, X., 2001, 'Understanding the determinants of managerial ownership and the link between ownership and performance: Comment', *Journal of Financial Economics*, 62: 559-571.

Zingales, L., 1994, 'The value of the voting right: a study of the Milan Stock Exchange', *Review of Financial Studies*, 7: 125-148.

Zingales, L., 1998, 'Corporate Governance', *The New Palgrave Dictionary of Economics and the Law*, London, 497-502.