

Managerial Compensation in the Financial Service Industry

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Abstract

CEO compensation in the financial sector has been a controversial topic following the financial crisis. I use a new dataset with detailed information on CEO remuneration of major international banks from 2000 to 2008 to give a comprehensive overview of compensation practices in banking throughout the world, the impact on risk and bank policy choices and the determinants. I show that remuneration had an impact on bank performance during the financial crisis. Banks which endowed their CEO with high risk taking incentives performed worse in the period after the Lehman collapse in terms of accounting performance. Banks which granted more stocks performed better. Using simultaneous equation models I show that over time bank risk has been positively correlated with CEOs' risk taking incentives. From a bank policy perspective high vega low delta CEOs rely on riskier, fee based activities and higher leverage. Moreover I investigate the interaction between corporate governance, regulation and CEO compensation. Banks from countries with strong regulation react stronger to bank risk when setting their compensation contracts, on the other hand they grant more equity based compensation. Weak boards lead banks to rely more on equity based compensation and weak compensation committees implement option contracts with characteristics that are more favorable for the CEO.

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1 Introduction

Triggered by the U.S. subprime crisis, financial institutions around the world have suffered from tremendous write downs on their assets. According to estimates of the Boston Consulting Group, the global banking industry's market capitalization dropped from \$ 9.3 trillion in October 2007 to \$ 3.1 trillion in February 2009 and since then has regained about 50% of the lost market value. A wide range of fiscal, monetary and financial policies has been implemented to cut the feedback loops between the financial sector and the real economy. Additional to central banks' effort to support liquidity in the financial industry, governments intervened heavily in the financial system. Total upfront government financing sums up to 5.8 % of GDP on average for advanced economies reaching more than 50 % of GDP when taking into account total support of the financial sector (including guarantees and central bank liquidity provisions).¹

To justify the expenditures on bailouts of those firms which are widely perceived to be responsible for the crisis, policy makers have been introducing and are planning to introduce various new financial regulations, out of which restrictions on executive compensation play a prominent role. For example the U.S. implemented the troubled assets relief program (TARP), which provides capital injections to the financial sector contingent on the compliance to limits on executive compensation. In Germany banks seeking help from the comparable SoFFin program need to limit their CEOs' remuneration to a maximum of half a million Euro per year, including bonus payments. Similar restrictions hold for banks participating in the British bank rescue package. Further regulation on bank CEOs' remuneration are discussed and range from increasing shareholder rights over stronger supervisory power to plain restrictions on the levels of CEO pay.

Ex-post we can say that banks took on too much risk during the period which led to the recent financial turmoil. Many institutions shifted their business

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¹According to IMF staff position note SPN/09/13.

model from traditional banking to more volatile investment banking, relied heavily on loan securitization or overloaded their portfolios with mortgage backed securities whose risk was not correctly understood. High leverage ratios, both on-balance sheet and off-balance sheet, aggravated the situation even further. Kashyap et al. (2008) argue that the contamination of bank balance sheets with a great range of problematic assets was caused by the failure of incentive and risk control systems within banks. Bank CEOs are in fact key decision makers who are exposed to various forms of performance based compensation and additionally aligned to shareholders' interests via bank equity. To form an opinion about an adequate regulation of their compensation contracts several questions have to be answered:

First, are the incentives provided by CEOs' compensation packages designed to increase bank risk through risky bank policy choices? Coles et al. (2006) for U.S. firms and recently DeYoung et al. (2009) for U.S. banks study the impact executive compensation packages have on risk and policy choices. Both studies find that CEO incentives do have an impact on risk taking. My work complements this strand of literature by providing for the first time international evidence over a comparatively long sample period. The dataset comprises detailed information on base salary, bonus payments, stock ownership and option holdings of top officers of 112 banks from 23 countries for the period 2000-2008. I investigate the effect managerial compensation has on bank risk by explaining market and accounting based risk measures (equity risk, idiosyncratic risk, systematic risk, distance-to-default), and measures of bank policies (non-interest income, leverage) with CEO incentives. The sensitivity of CEOs' portfolio² to changes in equity volatility (vega) is used as a measure of risk taking incentives. The sensitivity of CEOs' portfolio to stock price changes (delta) is used as a proxy for the incentive alignment between shareholders and management. Though depending on option characteristics and on the leverage of the bank, typically stock options provide higher incentives to increase volatility than stocks. Therefore CEOs with a greater exposure to options would be expected to choose riskier policies leading to an increase in bank risk, while CEOs with large stock holdings would act in a more conservative fashion.

My results show that there is a strong link between CEO incentives and bank risk taking. I find that equity volatility and idiosyncratic risk increase

²Options, stocks and restricted stocks.

in vega and decrease in delta. When looking at bank policies I find that the non-interest income to total income ratio is higher for CEOs with high vega and low delta. A high level of non-interest income is an indicator of banks' focus on fee based activities and of the securitization of loans, two activities which have been associated with high risk. Similarly the capital ratios of banks with strong risk taking incentives and lower levels of exposure to stock price movements are lower, indicating that leverage is used as mean to take on more risk. Although these effects are smaller than documented by DeYoung et al. (2009) for a larger set of US banks over a different time period I do not find that US banks drive the results.

Second, how does remuneration policy interact with bank characteristics, different regulatory regimes and corporate governance? Are compensation systems comparable throughout the world and is it necessary to introduce new, potentially distortive regulations or are there already supervisory regimes and corporate governance mechanisms in place that address the problem of excessive risk taking incentives accurately? On the one hand tough regulation may encourage shareholders to increase CEO risk taking incentives as a countermeasure. On the other hand strong supervisory authorities may be able to prevent excessive risk taking of banks which would reduce the need to launch expensive risk inducing remuneration schemes. Similarly, bank supervision may be a substitute for monitoring and could therefore decrease the necessity of tying managerial wealth to bank performance. John and Qian (2003) interpret lower pay-performance sensitivities in banks than in manufacturing firms as evidence for this hypothesis. Different to previous studies the international character of my dataset allows to assess the impact of the regulatory environment on the structure and the level of CEO remuneration. I measure regulatory power via the indices provided by Barth et al. (2001) (supervisory rights, capital requirements, private monitoring). Good corporate governance should be able to set incentives levels optimally from a shareholders perspective but possibly not from the regulators perspective. I investigate the effect of corporate governance on compensation by using detailed data on the board and its remuneration committee.

I find that the structure and level of managerial compensation in the banking sector has been converging over time. Cash compensation and bonuses have reached similar levels in most countries, long term incentive plans have been widely adapted and equity based compensation plays an increasingly important role. Nevertheless CEOs from the US rely far more on equity based compensation and long-term incentive plans than banks from any other coun-

try throughout the whole sample period. This is especially interesting in the light of new regulatory proposals that encourage exactly these types of remuneration.³ When looking at the impact of regulation on CEO compensation the findings of John and Qian (2003) cannot be supported. In my sample banks from countries with strong regulators rely more on equity based compensation than those from countries with weaker supervisory authorities. I also find evidence that banks from countries with stronger regulation are more active when adjusting their CEOs incentives to bank risk. High bank risk and risky bank policies let the board set CEO compensation in a manner that incentivizes the CEO to take on less risk. Moreover I find several board characteristics that influence pay structure. I find relatively little impact of banks' boards on the compensation structure. Although one would imagine the CEOs of large international banks to be very mobile a large portion of the variation in CEO pay can be explained by country fixed effects. Nevertheless, similar to Fahlenbrach (2008) banks with weak corporate governance structures tend to grant contracts with larger pay-for-performance components like high delta options and large bonus payments. The compensation committee does not have any impact on the level of incentive pay, bonus payments or total compensation, a finding which is especially interesting in light of good governance guidelines which propagated the implementation of such a committee. Not surprisingly most of the sample banks have implemented a compensation committee during the sample period. Looking closer at the characteristics of the option granted we see that a weaker committee, i.e. with more committee members, tends to give the CEO options with a shorter vesting period and a lower exercise price. A more active committee grants less options with lower risk taking incentives and less exposure to changes in the banks' stock price. Women on the board lead to lower levels of option based pay and to option grants that are less favorable to the CEO.

Third, did managerial compensation actually play a role in the recent financial crisis? Fahlenbrach and Stulz (2009) and Beltratti and Stulz (2009) try to explain the returns of banks during the financial crisis using bank and country specific governance measures. Fahlenbrach and Stulz (2009) find no evidence that banks with a more risk inducing remuneration policy performed worse during the financial downturn, using a sample of U.S. banks.

³See for example the FSB's "Principles for Sound Compensation Practices" or the "Revised Capital Requirements Directive" issued by the European Commission.

Beltratti and Stulz (2009) report that on an international level banks with shareholder friendly boards performed worse and those exposed to stricter capital regulation better. I contribute to this literature by extending the Fahlenbrach and Stulz (2009) approach to an international sample, taking into account regulation and legal environments. Furthermore my dataset allows to investigate the impact of the timeseries of CEO compensation on the banks' performance during the financial crisis.

Although I do not find any impact of managerial compensation on equity returns during the crisis, I can show that accounting based performance measures are strongly correlated with my incentive measures. Banks relying on option based compensation and on short term bonuses performed worse than banks whose CEOs held a large share in stocks.

The remainder of the paper is organized as follows. The next section summarizes the existing literature on managerial compensation. Section 3 presents and summarizes the data, gives a qualitative overview on remuneration practices and describes the variables used in the empirical analysis. Section 5 shows how the regulatory environment and corporate governance impact executive compensation. Section 4 shows the result of several simultaneous equation models explaining bank risk, bank policy choices and banks' board reaction to it. Section 6 deals with the impact of CEO compensation on bank performance during the financial crisis and section 7 concludes.

2 Literature

Early studies in the area of managerial compensation focus on the link between remuneration and performance for firms in the U.S.⁴ They find that pay for performance sensitivities are predominantly driven by stock options and stock ownership but - though increasing over time - remain relatively low. Murphy (1998) summarizes the literature on executive compensation in the U.S. and presents some stylized facts. Pay levels are industry dependent with lower than average remuneration in utilities and higher remuneration in financial service companies,⁵ CEO compensation is increasing in firm size

⁴See for example Murphy (1985), Jensen and Murphy (1990b) or Jensen and Murphy (1990a).

⁵See Carroll and Ciscel (1982) on the effect of regulation on managerial compensation, Houston and James (1995), Hubbard and Palia (1995) or Ang et al. (2002) for an analysis

and the option component accounts for the largest block of total compensation.

Due to limited data availability relatively few international comparisons have been carried out. Almost all of them using survey data from consulting companies.⁶ They confirm the conventional wisdom that CEO pay in the US exceeds pay in other countries and that the holding of stock options and stock ownership are much more developed in the US.

Managerial compensation in the financial sector has been investigated by several authors, mainly from an U.S. point of view. The literature starts with Barro and Barro (1990) who verify that CEO pay depends on stock performance. Hubbard and Palia (1995) examine the effect of deregulation in the U.S. banking system on the pay-performance relationship. They find a higher pay-performance sensitivity when competition increases. Burghof and Hofmann (2000) analyze 52 banks from 12 European countries for the years 1995-1997. They find weak evidence of an influence of pay-performance-sensitivities on banks' performances. John and Qian (2003) hypothesize that pay-performance sensitivities should be declining in debt ratios in order to restrain managers from risk shifting. Regulation and firm size could be substitutes for monitoring of banks' management and could therefore decrease the necessity to align managerial incentives via high pay-performance sensitivities. Consistently the authors document lower pay-performance sensitivities in the banking sector than in the manufacturing sector in a sample of U.S. banks between 1992 and 2000. Chen et al. (2006) use a sample of 68 American banks from 1992 to 2000 to test whether option based compensation induces risk taking in the banking industry. Using some rough proxies for CEO's exposure to stock options and solely market based risk measures the authors find evidence supporting their conjecture. Using a similar sample Mehran and Rosenberg (2007) find that an increase in bank CEOs' stock option holdings are associated with higher equity risk and a capital build up. Recently various authors have been looking at governance features of banks to explain the credit crisis. Fahlenbrach and Stulz (2009) and DeYoung et al. (2009) try to explain the bank performance during the financial crisis using compensation policies as an explanatory variable. Fahlenbrach and Stulz (2009) do not find any evidence that banks with high risk taking incentives performed worse during the financial downturn. DeYoung et al.

of compensation in the banking industry.

⁶E.g. Abowd and Bognanno (1995).

(2009) on the other hand report riskier policies for banks with a more risk inducing compensation structure. Cheng et al. (2010) find residual pay to be correlated various risk measures, for example with a firms sensitivities to a change in the ABX subprime index in a sample of US banks. They argue that compensation and risk taking is not related to governance variables but to ownership of institutional investors which is taken as evidence that investors with short-term preferences incentivize firms to take on more risk.

Erkens et al. (2009) and Beltratti and Stulz (2009) use an international dataset with corporate governance variables of financial firms in 2006 to explain risk taking and stock market performance in 2008 to 2009. Erkens et al. (2009) find that banks with more independent boards were more likely to raise fresh capital and disclosed greater writedowns during the crisis. Beltratti and Stulz (2009) find lower stock returns for financial institution with shareholder friendly boards. Chesney et al. (2010) show that governance features of financial firms in the US were related to writedowns in the credit crisis.

3 Data & Descriptive Statistics

3.1 Data

In order to conduct a panel data analysis of bank remuneration policies I follow two alternative approaches: First I select the world's 250 largest (by total assets) banks in 2000. This procedure guarantees a sample free of survivorship biases, which is necessary to evaluate the influence of managerial incentives on bank risk appropriately. It is however clear that many of those banks are enjoying implicit too-big-to-fail guarantees which may increase risk taking incentives. From the selected institutions I exclude banks which are not publicly held and banks which do not disclose any information on managerial compensation for at least two consecutive years. Selecting publicly traded banks allows me to calculate stock market based measures of incentives, besides that disclosure requirements are typically higher for traded companies. Second I select the top five banks by total assets in each country of the original sample in each year. This sample differs from the first mainly through a lower fraction of U.S. banks and is therefore smaller than the first sample. This sample is mainly used for the analysis of compensation in relation to the regulatory regime a bank is operating in.

The total number of remaining banks is 112. The data items (collected from annual reports, proxy statements and the Compustat Execucomp database) are:

- Personal (CEO name, tenure)
- Cash remuneration (salary, bonus payments, long term incentive plans)
- Interest in the banks shares (direct or through restricted shares⁷)
- Stock options (grant date, vesting date, exercise price, exercise date, performance criteria)

Appendix A shows all the selected banks and their disclosure policies regarding total compensation, cash bonuses, stock holdings and option holdings. In countries with mandatory disclosure rules, information on compensation policies is standardized and mostly complete. In all other countries the amount and detail of information disclosed varies considerably among the banks and over time. In general, disclosure improves over time, most frequently when a new CEO enters the bank. Information on the exact exercise date is rarely reported.⁸

For the smaller sample I complement this data on CEO compensation with the following information on corporate governance practices for each bank:

- Is the CEO member of the board of directors, and if yes is she the chairman of the board?
- General information on the board of directors (number of directors, number of independent directors, fraction of female directors, number of board meetings.)
- Information on the remuneration committee (Has a remuneration committee been implemented? Is the CEO member of the committee or does she attend its meetings? Is the CEO chairman of the committee? Number of committee meetings, number of independent directors on the committee.

⁷Restricted shares are share grants tied to performance or vesting criteria.

⁸In few cases it is possible to infer the exercise dates from the stock price at the date of exercise, otherwise the middle of the fiscal year is assumed to be the exercise date.

Stock market data comes from CRSP for US banks and Compustat for all other banks. Bank balance sheet data is taken from Bureau van Dijk's Bankscope database. The indices describing the regulatory environment are constructed using the procedure developed by Barth et al. (2001). The data is available through the Worldbank for 2001, 2003 and 2007. Information on the minimum capital requirements for each country comes from the same source. The existence of an explicit deposit insurance scheme has been documented by Demirg-Kunt et al. (2006). Macro variables come from the Worldbank database. Information on geographic segmentations for each bank from Datastream. Shareholder rights are measured via the revised anti director rights index of Djankov et al. (2008).

3.2 Structure of CEO remuneration

CEO pay in the banking industry typically consists of four different components. The base salary is usually determined according to industry and firm size benchmarks and acts as a basis for the calculation of bonuses and stock option grants.

Short term bonuses are functions of pre-specified performance measures. Bonuses are not paid below a certain level of performance and are capped above a performance threshold. Performance measures are accounting based measures of performance but can also be discretionary measures like an outstanding performance related to M&A activities. Accounting measures have the advantage of being easily verifiable, which in turn makes it easier for managers to relate their own actions to the bonus payments. On the other hand accounting measures can be manipulated and are backward looking and short-run which might lead to myopic decision making.

Stock options give the CEO the right to buy shares of the bank at the pre-specified exercise price. Although option design varies across banks, the typical option contract has a maturity of 10 years (less frequently 5-7 years) and vests after 3 years (less frequently options become exercisable gradually over time). The exercise price is usually set at the market price around the grant date or slightly above. Frequently the exercise of an option is conditional on the achievement of a pre-specified performance criteria which is either an accounting measure, a stock price hurdle or the stock performance

relative to a peer group.⁹

Other forms of compensation include long-term incentive plans which have replaced stock option plans in some banks. Under these plans restricted shares are granted or a bonus is paid when pre-specified performance criteria are met over a horizon longer than one year (typically 3-5 years).

On top of these compensation packages CEOs typically hold shares in the bank. This stock ownership results either from the exercise of stock options and share plans, from mandatory minimum requirements on CEO shareholdings set by banks or from voluntary purchases of stocks by CEOs.

3.3 Managerial Incentives

Similar to most of the literature on managerial compensation, I construct several measures of CEO incentives based on the sensitivities of CEO wealth with respect to the bank's stock price and standard deviation. As in Jensen and Murphy (1990a) or Murphy (1998) Delta is the dollar change of CEO wealth for a one percent change in banks' market capitalization. It measures how aligned managerial incentives are with the interests of shareholders.

Vega on the other hand, as introduced by Guay (1999), is defined as the change in CEO wealth for a 0.01 change in annualized standard deviation of stock returns. Vega rewards managers for increasing equity risk and is therefore a counterweight to CEO risk aversion.

I compute delta and vega for all the components of managerial compensation as follows:

- Sensitivities for option holdings can be computed directly using the Black-Scholes option pricing model modified to account for dividend payments.
- Executive wealth varies with the value of holdings of stocks and restricted stocks. Delta is defined as the change in portfolio value for a 1% change in the banks market capitalization. As shown by Black and Scholes (1973) common stock can be seen as a call option with the total value of the firm as an underlying assets and face value of debt

⁹Performance criteria vary from easy to reach and flexible to fixed and dependent on peer group performances.

as the exercise price. Using the KMV model the value of the banks' assets and asset volatility can be computed by solving numerically a nonlinear system of two equations. I follow Guay (1999) and compute common stocks sensitivity to a one percent change in annualized standard deviation by using the Black & Scholes model.¹⁰

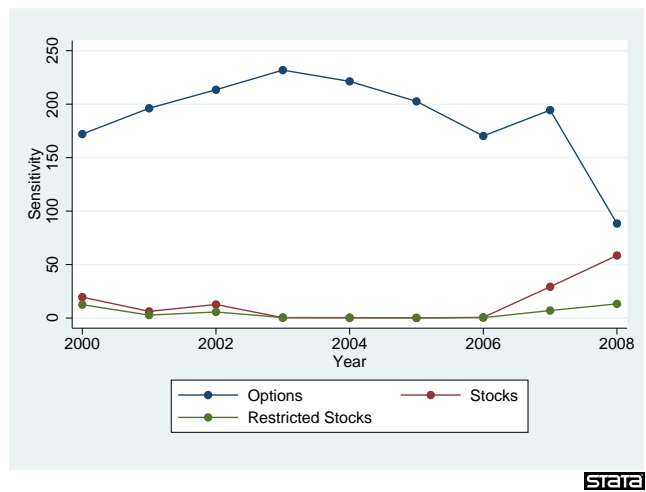
- Estimating a time-series of company specific pay-performance sensitivities for cash compensation is not feasible given that there is just one observation for each CEO per year. Proxies for risk taking incentives through cash compensation are constructed using ratio of bonus payments to total salary.

Most of the studies using panel data on executive compensation from the US, e.g. Coles et al. (2006) and DeYoung et al. (2009), compute sensitivities using the "one-year approximation" methodology proposed by Core and Guay (2002). Since before fiscal year 2006 no details on previous option grants had to be disclosed in the annual proxy statements, Core and Guay (2002) estimate the exercise price from the realizable values of exercisable and unexercisable options. This procedure leads to an understatement of the true exercise price because the number of out-of-the-money stock options is not disclosed. Moreover time to maturity of the options are not disclosed and are set between six and nine years. Core and Guay (2002) report that biases resulting from their methodology are severe when the price-to-strike ratios are low. My hand-collected sample allows me to circumvent these imprecisions and to calculate sigma and vega precisely.

Long term incentive plans (LTIP) became increasingly popular during the last five years. These LTIPs are typically composed of restricted stocks or performance stocks which vest after a pre-specified period or when achieving certain performance goals. Due to the big differences in performance criteria and vesting schedules it is not feasible to compute sensitivities of these performance stocks accurately. Like most of the literature I treat restricted stocks like normal stocks, which will most probably understate the risk taking incentives provided by them.

¹⁰The equation for equity comes from Merton's model as $E_0 = V_0 N(d_1) - Fe^{-rT} N(d_2)$. Asset volatility is characterized by $\sigma_E = \frac{V_0}{E_0} N(d_1) \sigma_V$. The relation of a change in asset volatility for a given change in equity volatility is given in the model by $\sigma_E = \frac{V_0}{E_0} N(d_1) \sigma_V$, where σ_E is the standard deviation of stock returns, V_0 is the asset value, E_0 is the value of equity and σ_V the asset volatility. d_1 is specified in the usual way.

Figure 1: The development of CEO sensitivities with respect to changes in equity volatility over time. Options, stocks and restricted stocks denote the change in CEO portfolio value with respect to a 0.01 increase in volatility. In thousand US\$.



3.4 Descriptive Statistics

Table 1 summarizes the main sample characteristics by country and by legal origin as defined in La Porta et al. (1998). The average compensation amount and structure vary considerably among the different countries with lower levels in the Scandinavian countries,¹¹ high values of stock options and managerial stock ownership in the countries with English legal origin and above average bonus payments in German legal origin countries.

Mean total compensation is about \$3.6 million out of which roughly 60% is paid as bonuses. The average CEO holds 0.32% of her employers equity through stocks. The average CEO portfolio increases by \$1.14 million for a one percent increase in shareholder value and by \$204,000 for a 0.01 increase in stock return volatility. The sensitivity of CEO option portfolios to a stock price change is highest in the English origin banks, sensitivities from stock and restricted stocks is highest in German legal origin countries and the Scandinavian countries exhibit low sensitivities through all means of compensation.

Table 2 and Figure 1 show the evolution of the different variables over time. Total compensation increased steadily from an average of \$3.24 million in 2000 to \$4.55 million in 2007 until the financial crisis melted it down below the level of 2003. Similarly sensitivities towards price changes rose until the beginning of the financial crisis when many CEOs were replaced at the same time leading to lower stock and option holdings. Moreover government interventions decreased the overall level of performance pay. For most of the years the sensitivity of stock and restricted stock portfolios to changes in volatility are low. The increase in Vega in 2007 is due to the decline in price-to-strike ratios for many banks. While a dramatic drop in prices leaves stock options out of the money with low vega and low delta, the equity options get closer to their exercise prices and risk taking incentives from stocks and restricted stocks increase.

Table 3 shows the evolution of different components of executive compensation over time and by country. CEOs from the US and Canada rely far more on equity based compensation than banks from any other country throughout the whole sample period. Nevertheless there seems to be some convergence in terms of the structure and the level of compensation. Base salaries reach similar levels in most countries during the last three-year pe-

¹¹High levels of stock ownership are mainly driven through Finnish Sampo Bank

Table 1: Summary Statistics

The data covers CEO characteristics and ranges from 2000 to 2008. All variables are expressed in 2008 thousand US dollars. Salary is the non-performance related part of CEO wage, bonus payments is typically related to achievements of short-term accounting-based performance measures. Option value is the value of CEOs' option package computed with the Black&Scholes formula adjusted for dividends. Value of stockholdings includes CEO stockholdings and restricted shares. Total Compensation consists of base salary, bonus payments, long-term incentive plans and share-based payments. N is the number of bank-year observations and banks is the number of banks in each country.

Country / Legal Origin	Salary	Bonus payments	Ownership	Option value	Value of Stockholdings	Total Compensation	# Banks	N
Australia	1.23	2.70	0.07%	5.41	13.16	4.94	6	51
Austria	2.21	2.34	0.04%	0.24	5.64	2.86	1	9
Belgium	1.03	1.23	0.00%	1.51	0.75	2.66	2	18
Canada	1.12	1.71	0.06%	23.53	15.73	5.17	6	54
Denmark	1.11	0.12	0.00%	2.31	0.40	1.13	1	8
Finland			2.09%	0.00	201.17	2.31	1	8
France	1.08	1.03	0.00%	9.39	2.56	1.97	6	44
Germany	1.16	3.56	0.03%	0.29	7.21	4.66	7	32
Hong Kong	0.87	0.74	2.02%	1.88	48.33	1.38	4	31
Ireland	1.08	1.05	0.23%	2.43	10.48	2.55	3	27
Israel	0.76	0.77	0.00%	0.03	0.00	1.58	3	22
Italy	1.74	1.24	0.04%	5.26	10.39	2.82	5	29
Malaysia	0.59		0.01%	0.12	0.74	0.16	1	9
Netherlands	1.17	0.93	0.01%	1.38	3.47	3.10	3	23
Norway	0.60	0.21	0.01%	0.03	0.30	0.75	2	17
Singapore	0.88	2.37	0.34%	1.71	47.15	2.62	3	25
South Africa	0.56	1.00	0.44%	4.54	39.34	1.63	4	35
Spain	2.82	4.01	0.02%	0.69	8.42	6.09	4	28
Sweden	0.87	0.38	0.06%	1.12	1.17	1.21	5	44
Switzerland	1.28	0.64	0.07%	5.14	30.79	8.06	2	3
Thailand			0.01%	0.00	0.59	0.24	1	1
UK	1.56	1.71	0.04%	3.04	7.33	4.04	12	82
USA	1.00	3.33	0.59%	39.51	113.26	4.98	30	239
legal_origin								
English	1.08	2.43	0.42%	20.08	58.22	4.03	16	576
French	1.52	1.60	0.02%	4.53	5.23	3.23	4	142
German	1.31	3.18	0.03%	0.61	8.49	4.52	5	44
Scandinavian	0.82	0.32	0.26%	0.88	21.68	1.21	4	77
Total	1.14	2.17	0.32%	14.67	43.29	3.66	12	839

Table 2: Managerial compensation over time

Total Compensation is expressed in million 2008 US dollars and consists of base salary, bonus payments, long-term incentive plans and share-based payments. Bonus denotes the fraction of bonus payments to total compensation. Ownership is the percentage of shares of the company held by the CEO through stocks or restricted shares. Delta is the sensitivity of CEOs' option portfolio to a \$ 1000 change in shareholder value. Vega is the total change in CEO wealth with respect to a 0.01 change in Volatility. Delta and Vega are expressed in thousand 2008 US dollars.

	total comp	bycomp bonus	ownership	delta option	delta stock	delta restricted	vega option	vega stock	vega restricted	
2000	3.28	45.02%	0.62%	350.35	708.89	79.30	172.06	19.54	12.48	77
2001	2.56	43.44%	0.61%	285.16	908.93	82.68	196.17	6.24	2.75	85
2002	2.63	43.05%	0.34%	235.51	546.88	74.46	213.49	12.70	5.69	92
2003	3.51	46.26%	0.32%	321.96	662.41	80.39	231.86	0.30	0.48	96
2004	4.23	49.85%	0.30%	350.10	735.09	100.14	221.34	0.13	0.41	100
2005	4.47	50.45%	0.28%	343.78	825.71	118.98	202.64	0.09	0.15	101
2006	4.59	42.57%	0.16%	427.59	672.09	114.49	170.27	0.67	0.37	100
2007	4.59	36.70%	0.21%	265.53	821.77	108.80	194.44	29.25	7.00	100
2008	2.62	18.42%	0.14%	128.24	327.58	44.92	88.38	58.51	13.25	88
Total	3.66	41.81%	0.32%	302.32	692.88	91.12	189.19	13.70	4.36	839

riod. Longterm incentive plans became a standard component over time in most countries as can be seen from the payouts of longterm bonuses and by looking at the occurrence of restricted stocks. Vesting criteria are used predominantly by banks from Australia and the UK. Table 3 also shows how disclosure improved over time, while information on various components of compensation is not available for the early sample years most of the banks fully disclose their CEO's remuneration package by the end of the sample period.

Table 4 and Table 5 show the board characteristics for each country and over time. There is little time variation in the sample period. The percentage of women on the board of directors increases from 10% in 2000 to 18% in 2008 and the CEO is more likely to attend compensation committee meetings in the earlier sample years. The number of board meetings stays stable until 2008 when boards met more frequently, supposedly to manage challenges posed by the financial crisis. The percentage of CEOs that are also board members decreases over time. More interesting are the cross-sectional differences in the sample. The average number of board members varies from 8 in Finland to 19 in Germany and Spain. The frequency of board meetings varies from 7 to 47, implying possibly large differences in monitoring activities of boards. Boards are dominated by men all over the world, with higher numbers especially in the Scandinavian and German speaking countries. Most banks have established a committee that deals specifically with managerial compensation. These committees meet between one and ten times per year, have mainly independent members and mostly meet without the presence of the CEO.

Table 6 gives a detailed overview on option characteristics. Over time the number of options granted with vesting criteria increases. Most options are granted with ten years to maturity, but maturities smaller than that are not uncommon either. Options vest on average three years after the grantdate although staggered options where a part of the package vests earlier are not uncommon either.

Table 7 gives summary statistics on the variables used in the multivariate analysis.

Looking at the development of remuneration policies and board charac-

Table 3: Managerial compensation over time and by country

Bonus and Salary denote the average cash payments. Option value is the average Black&Scholes value of a CEO's option portfolio. Longterm is the amount of long term incentive payments made. All values are expressed in 2008 million US dollars. Options are the number of underlying shares divided by the number of shares outstanding. Vesting criteria is the percentage of options whose exercise depends on special vesting criteria. Stocks and Restricted are the percentage ownership through stocks and restricted stocks.

Country	Bonus	Salary	Option Value	Longterm	Options	Vesting criteria	Stocks	Restricted	# Banks	N
<i>2000 - 2002</i>										
Australia	1.14	0.82	5.01	0.00	0.1616%	56.93%	0.0571%	0.0002%	6	16
Austria			0.18	0.00	0.0797%	50.00%			1	3
Belgium	0.54	0.85	1.46	367,896.97	0.0376%	0.0000%	0.0020%	0.0000%	2	6
Canada	1.65	0.82	18.13	68,738.40	0.4342%	13.00%	0.0258%	0.0000%	6	18
Denmark			0.47		0.0124%	0.00%	0.0007%	0.0000%	1	2
Finland			0.00		0.0000%		2.1162%	0.0000%	1	2
France	0.99	0.78	9.27	16,362.88	0.1102%	21.93%	0.0074%	0.0002%	6	13
Germany	2.34		2.34		0.0175%	0.00%			7	1
Hong-Kong	0.23		0.23		0.0487%	0.00%	7.6263%	0.0000%	4	8
Ireland	0.50	0.66	1.47	221,898.05	0.1882%	0.00%	0.4531%	0.0011%	3	9
Israel	0.62	1.05	2.63	0.00	0.0000%				3	4
Italy			0.14		0.1568%	32.37%	0.0011%	0.0000%	5	8
Malaysia			0.14		0.0062%	0.00%	0.0017%	0.0000%	1	3
Netherlands	0.44	0.87	2.18		0.0142%	0.00%	0.0005%	0.0093%	3	6
Norway	0.02	0.44	0.07	0.00	0.0419%	25.00%	0.0030%	0.0000%	1	5
Singapore	1.27	0.38	1.83		0.0702%	0.00%	0.5235%	0.0000%	3	8
South-Africa	0.49	0.38	2.77		0.1563%	3.31%	0.5877%	0.0147%	4	11
Spain	4.09	3.10	0.03		0.0005%	0.00%	0.0560%	0.0071%	4	5
Sweden	0.11	0.71	0.61	0.00	0.0296%	0.00%	0.0756%	0.0000%	5	14
UK	0.88	1.15	3.03	247,814.36	0.0412%	33.02%	0.0064%	0.0213%	12	29
USA	3.57	1.03	44.59	877,008.71	0.4614%	2.20%	0.6180%	0.1617%	30	83
<i>2003 - 2005</i>										
Australia	3.01	1.23	5.71	109,844.39	0.1611%	61.45%	0.0588%	0.0094%	6	18
Austria	1.61	2.15	0.44	1,001,385.17	0.0301%	0.00%	0.0758%	0.0000%	1	3
Belgium	1.32	1.10	2.00	416,784.44	0.0398%	7.60%	0.0035%	0.0019%	2	6
Canada	1.88	1.17	22.57	442,003.96	0.2949%	0.00%	0.0207%	0.0000%	6	18
Denmark	0.14	0.87	2.09		0.0443%	0.00%			1	3
Finland			0.00		0.0000%		2.0917%	0.0000%	1	3
France	1.19	0.94	7.61	108,985.31	0.2659%	23.79%	0.0083%	0.0000%	6	16
Germany	4.89	1.18	0.63	0.00	0.0083%	0.00%	0.0204%	0.0134%	7	11
Hong-Kong	0.73	0.84	1.27		0.0829%	0.00%	0.8376%	0.0151%	4	12
Ireland	1.12	1.09	2.16	231,676.71	0.0744%	23.25%	0.2407%	0.0081%	3	9
Israel	1.05	0.63	0.00		0.0000%				3	9
Italy	1.13	1.82	9.52	0.00	0.1983%	24.51%	0.0165%	0.0000%	5	11
Malaysia			0.03		0.0069%	0.00%	0.0083%	0.0000%	1	3
Netherlands	0.82	1.20	0.82	568,612.69	0.0182%	0.00%	0.0010%	0.0112%	3	9
Norway	0.24	0.65	0.03	0.00	0.0339%	11.11%	0.0055%	0.0000%	2	6
Singapore	2.50	0.99	1.17		0.0528%	0.00%	0.3591%	0.0000%	3	9
South-Africa	1.09	0.61	4.69		0.1274%	8.05%	0.7461%	0.0122%	4	12
Spain	4.27	3.16	0.36		0.0051%	0.00%	0.0020%	0.0111%	4	11
Sweden	0.44	0.89	1.37	0.00	0.0412%	0.46%	0.0982%	0.0000%	5	15
UK	2.03	1.66	3.26	1,178,869.81	0.0837%	58.50%	0.0114%	0.0407%	12	29
USA	4.23	1.00	35.36	742,314.50	0.4589%	1.56%	0.5805%	0.0962%	30	84
<i>2006 - 2008</i>										
Australia	3.76	1.58	5.47	0.00	0.0999%	65.23%	0.0704%	0.0157%	6	17
Austria	2.82	2.25	0.11		0.0019%	0.00%	0.0501%	0.0000%	1	3
Belgium	1.71	1.11	1.07	849,000.20	0.0211%	0.00%	0.0000%	0.0033%	2	6
Canada	1.59	1.37	29.90	1,196,656.68	0.2370%	5.32%	0.0216%	0.0482%	6	18
Denmark	0.12	1.19	3.74		0.0691%	0.00%			1	3
Finland			0.00		0.0000%		2.0673%	0.0000%	1	3
France	0.91	1.42	11.39	142,985.23	0.0506%	24.51%	0.0102%	0.0000%	6	15
Germany	2.84	1.15	0.00	151,179.57	0.0004%	0.00%	0.0378%	0.0366%	7	20
Hong-Kong	0.75	0.90	3.74		0.1063%	0.00%	0.8623%	0.0552%	4	11
Ireland	1.53	1.43	3.67	448,249.05	0.0626%	38.28%	0.0521%	0.0245%	3	9
Israel	0.60	0.81	0.07		0.0596%	40.00%	0.0013%	0.0000%	3	9
Italy	1.81	2.19	2.67	0.00	0.0250%	0.00%	0.1595%	0.0000%	5	10
Malaysia			0.19		0.0182%	0.00%	0.0138%	0.0000%	1	3
Netherlands	1.41	1.37	1.41	355,752.83	0.0108%	0.00%	0.0018%	0.0100%	3	8
Norway	0.30	0.70	0.00	0.00	0.0000%		0.0084%	0.0000%	2	6
Singapore	2.66	0.96	2.21		0.0529%	0.00%	0.1952%	0.0000%	3	8
South-Africa	1.33	0.66	6.02	2,589,621.50	0.0978%	14.59%	0.0028%	0.0117%	4	12
Spain	3.82	2.57	1.26	4,397,848.85	0.0060%	0.00%	0.0028%	0.0127%	4	12
Sweden	0.57	1.00	1.34	0.00	0.0203%	18.14%	0.0377%	0.0001%	5	15
Switzerland	0.64	1.28	5.14		0.0358%	0.00%	0.0200%	0.0686%	2	3
Thailand			0.00		0.0000%		0.0076%	0.0000%	1	1
UK	2.34	1.94	2.78	1,494,540.79	0.0248%	86.32%	0.0109%	0.0310%	12	24
USA	1.99	0.96	38.51	2,898,271.63	0.3782%	2.35%	0.2883%	0.0395%	30	72

Table 4: Board characteristics for the top five banks of each country if available from 2000 to 2008. CEO on board is the percentage of banks in which the CEO is part of the board. Independence is the percentage of independent board members as reported by the bank. Women on board gives the percentage of female board members. Compensation committee is the percentage of banks which have a compensation committee. CEO on committee is the percentage of banks in which the CEO attends compensation committee meetings or is member of the compensation committee. Committee independence is the percentage of independent board members in the compensation committee as reported by the bank.

Country	# Board members	# Board meetings	CEO on board	Independence	Women on board	Compensation committee	Committee meetings	CEO on committee	Committee independence	N
Australia	10	11	98%	83%	17%	100%	6	20%	98%	41
Austria	17	7	0%		23%	44%	1	0%		9
Belgium	17	8	100%	43%	8%	100%	3	19%	63%	16
Canada	17	13	100%	88%	20%	100%	6	29%	100%	42
Denmark	18	14	0%	100%		50%	2	0%		8
Finland	8	13	100%	59%	9%	75%	5	0%	94%	8
France	18	8	46%	37%	6%	100%	4	0%	62%	35
Germany	19	7	0%		20%	23%	4	0%		13
Hong.Kong	15	7	100%	42%	5%	92%	3	0%	76%	25
Ireland	14	10	100%	68%	9%	100%	5	0%	100%	26
Israel	15	31	0%		15%	32%	6	0%		22
Italy	18	16	71%	57%	4%	59%	2	0%	47%	17
Malaysia	11	17	100%	49%	6%	100%	10	11%	56%	9
Netherlands	11	9	0%	93%	8%	95%	4	5%	100%	22
Norway	10	19	0%	81%	36%	56%	5	0%	100%	16
Singapore	12	8	100%	68%	5%	100%	3	54%	68%	24
South.Africa	18	7	94%	59%	10%	100%	4	55%	69%	33
Spain	19	11	75%	48%	11%	71%	7	0%	87%	28
Sweden	12	15	85%	58%	29%	93%	5	12%	75%	41
Switzerland	10	47	0%	90%	20%	100%	7	0%	100%	3
Thailand	19	12	100%	37%	5%	100%	6	0%	33%	1
UK	17	11	100%	52%	11%	100%	6	0%	92%	42
USA	14	12	95%	85%	17%	100%	7	0%	100%	40
Total	15	12	74%	64%	14%	88%	5	12%	84%	521

Table 5: Board characteristics for the top five banks of each country if available from 2000 to 2008 by year. CEO on board is the percentage of banks in which the CEO is part of the board. Independence is the percentage of independent board members as reported by the bank. Women on board gives the percentage of female board members. Compensation committee is the percentage of banks which have a compensation committee. CEO on committee is the percentage of banks in which the CEO attends compensation committee meetings or is member of the compensation committee. Committee independence is the percentage of independent board members in the compensation committee as reported by the bank.

Year	# members	Board # meetings	Board CEO board	on board	Independence	Women on board	on board	Compensation committee	Committee meetings	CEO committee	on committee	Committee independ- ence	N
2000	15	12	81%	54%	54%	10%	90%	5	5	10%	91%	31	
2001	15	11	82%	60%	60%	11%	78%	5	5	16%	78%	50	
2002	15	12	81%	62%	62%	11%	83%	5	5	17%	81%	54	
2003	15	11	77%	64%	64%	12%	84%	5	5	18%	83%	61	
2004	15	11	77%	64%	64%	14%	86%	5	5	12%	86%	65	
2005	14	11	72%	64%	64%	16%	89%	5	5	11%	84%	65	
2006	15	12	71%	67%	67%	16%	89%	6	6	11%	85%	66	
2007	15	12	69%	65%	65%	15%	93%	5	5	7%	84%	67	
2008	15	15	63%	67%	67%	18%	95%	6	6	5%	85%	62	
Total	15	12	74%	64%	64%	14%	88%	5	5	12%	84%	521	

Table 6: Summary Statistics on Option characteristics. Criteria granted shows the ratio of total option grants with performance criteria attached to the total number of option grants. Maturity granted shows the years to maturity of an option grant. Vesting granted is the vesting period. Moneyiness granted is the ratio of strike price to stock price.

fiscalyear	Mean				N
	granted crite- ria	granted ma- turity	ma- ing	vest- eyness	
1992	0.00	10	2	0.95	9
1993	0.07	9	2	0.94	19
1994	0.00	10	3	1.02	28
1995	0.05	9	2	1.01	31
1996	0.03	9	2	1.03	37
1997	0.14	9	3	1.03	45
1998	0.14	9	2	1.05	57
1999	0.14	9	2	1.01	71
2000	0.12	8	3	1.00	77
2001	0.16	8	2	1.01	85
2002	0.11	9	2	1.01	92
2003	0.20	9	3	1.04	96
2004	0.15	8	2	1.00	100
2005	0.21	8	2	0.97	101
2006	0.18	8	3	0.97	100
2007	0.13	8	3	1.00	100
2008	0.16	9	3	0.98	88
2009	0.00	3	3	1.53	71
Total	0.14	9	2	1.00	1,213

Table 7: Summary statistics

This table provides summary statistics for the risk measures and control variables used in the analysis. The sample spans 112 banks over the years 2000-2008.

Variable	Mean	Std. Dev.	N
Total risk	0.343	0.277	899
Idiosyncratic risk	0.018	0.012	895
Distance to default	2.551	10.365	714
Non-interest income / net income	1.704	10.958	862
Total capital ratio	0.048	0.445	892
T1 ratio	0.09	0.03	782
Total assets (\$000s)	375,194,245	519,604,602	892
Market-to-book	1.949	1.691	886
Tenure	5.73	5.044	910

teristics in the financial sector during the last ten years is especially relevant in the light of recent proposals by international supervisory bodies on how to regulate corporate governance practices in banks. The financial Stability Board (FSB) issued in 2009 the "Principles for Sound Compensation Practices" and the "Principles for Sound Compensation Practices: Implementation Standards" (the Principals and Standards), which address reforms of remuneration structure, corporate governance, supervision and disclosure. In line with these proposals the European Commission issued the revised Capital Requirements Directive (CRD III) and the European Banking Authority (EBA) its guidelines on sound remuneration policies in the financial sector. All these regulatory reforms, which are now successively implemented into local legislation, are similar in essence and I will briefly describe them and then compare them to the compensation and governance structures already in place. First, financial institutions are required to implement a corporate governance system that is able to monitor compensation policies in line with prudent risk taking. For large financial institutions such corporate governance systems include a remuneration committee that consists of independent and qualified members, able to link compensation practices with overall bank risk, capital and liquidity. Second, the regulatory reforms emphasize the importance of long-term compensation packages that are linked to performance and risk. Malus and clawback clauses are tools to adjust variable compensation to long run risks. While required to be consistent with prudent risk taking incentives, a substantial proportion of compensation packages has to be paid in equity-based instruments. However, no recommendations on the explicit characteristics of option packages are made. Third, more extensive disclosure rules will be implemented and regulators will have more possibilities to intervene when compensation practices are not in line with regulatory standards.

As pointed out in the previous paragraph table 3 shows that especially in the US equity based compensation and long-term compensation have been in place during the whole sample period, while banks in other countries have just been slowly implementing these components and have not reached the levels of American banks. Tables 3 and 5 draw a similar picture for corporate governance mechanisms. US banks did comply with most measures of good corporate governance required by the new regulations. Boards are of moderate size with mainly independent members, all banks had a compensation committee implemented which consisted of independent members only and met frequently. Given the performance of the US banking system during the

financial crisis all this casts some doubt whether the abovementioned regulatory reforms will be sufficient to guarantee a sound and stable banking system. Especially the lack of precise requirements on the characteristics of stock options could be potentially harmful as I will explore in the next two sections.

4 The effect of managerial incentives on bank risk and bank policy variables

Agency conflicts between managers and shareholders are typically mitigated by tying managers' wealth to firm performance using bonus programs and stock option schemes. On the one hand high sensitivities of compensation packages with respect to equity returns guarantee a better alignment of shareholders' interests with managerial incentives. On the other hand high pay-performance sensitivities increase managers' exposure to equity risk. Managerial wealth in the form of stocks, options, bonus payments and human capital is linked to firm performance and is in general not diversifiable such that managers are exposed to more risk than diversified shareholders. The resulting agency conflict can induce managers to forgo profitable investment projects as has been shown for example by Smith and Stulz (1985).

As a consequence securities whose value is increasing in equity volatility like options or bonus programs are used to induce managerial risk taking. Guay (1999) uses the vega of managers' stock option portfolios as a measure of convexity and finds that it is positively correlated with stock return volatility. Coles et al. (2006) argue that shareholders set their CEO's delta and vega such that shareholder value is maximized. They find that higher vega leads to riskier policy choices¹² while an increase in delta leads to the implementation of more conservative corporate policies. Therefore I expect that banks implement riskier strategies when CEO incentives are aligned through high vega.

The effect of delta on risk shifting behavior is not clear. On the one hand managers are exposed to more risk the higher delta, on the other hand alignment to shareholders' incentives could lead to the acceptance of high risk but positive net present value projects which would increase firm risk.

¹²Measured through R&D expenditures, leverage and capital expenditures

Endogeneity is clearly an issue when analyzing the relationship between incentives and risk measures. The principal agent model predicts that managerial compensation structure is dependent on firm risk. Managers of risky firms would want higher fixed salaries and less performance related pay. Shareholders of high risk firms may prefer to reduce firm risk by implementing low vega contracts. I use the following system of equations to address this point. In the model executive compensation and equity risk are jointly determined depending on bank characteristics.

$$\begin{aligned} \text{bank risk}_t &= f(\text{vega}_t, \text{Delta}_t, \text{bank characteristics}_{t-1}, \text{GDP growth}_t, \text{fixed effects}) \\ \text{vega}_t &= f(\text{bankrisk}_t, \text{delta}_t, \text{bank characteristics}_{t-1}, \text{salary}_t, \text{fixed effects}) \\ \text{delta}_t &= f(\text{bankrisk}_t, \text{vega}_t, \text{bank characteristics}_{t-1}, \text{tenure}_t, \text{fixed effects}) \end{aligned}$$

To test the hypotheses several market and accounting based measures of bank risk and bank policy are employed. The first variable is the annualized standard deviation of equity returns measured over a 120 trading day window. To control for market wide effects I use an industry CAPM model with the *STOXX Global 1800 Banks* index as market index. The resulting Beta is used as a proxy for systematic risk and the standard errors of the regression are used as proxies for the idiosyncratic component of risk. The fourth measure of bank risk employed is the distance-to-default, defined as the number of standard deviations the value of assets is away from default. As default point I use the face value of debt and I assume a one year maturity. An advantage of the distance-to-default over the before mentioned risk measures is, that it includes information on asset volatility, the market value of assets and on leverage. Gropp et al. (2002) argue that a distance-to-default measure is in fact a leading indicator of bank fragility. The same model is employed when looking at bank policy variables. Three variables are used: The ratio of equity to total assets represents the leverage decision of bank managers. Although tied by regulation banks do have some discretion when setting their capital structure. A similar measure is the Tier 1 ratio, which also takes into account the riskiness of assets. DeYoung and Roland (2001) and Stiroh (2006) find that fee based activities are associated with higher risk than traditional lending activities. Stiroh (2006) links various components of non-interest income (revenues from investment banking,

loan sales, other non-interest income, sale of assets and net securitization) with risk. The last proxy for risky policy choices is therefore total net fee-based income scaled by net income.

The control variables and their hypothesized effect on bank risk are: (1) The market-to-book ratio proxies for investment opportunities. It may also account for a bank's franchise. (2) The capital ratio is defined as total equity divided by total assets. High capital ratios are expected to lead to lower risk. (3) The log of total assets. Large banks are more diversified than small banks but may take on higher risks because of implicit "too big to fail" guarantees. The system of equations is exactly identified through one control variable unique to each equation. GDP-growth in the first equation is the exposure of each bank to country risk. I use information on geographical segmentation from Datastream to construct a bank specific measure of exposure to GDP-growth. The effect of country risk on bank risk and bank policies is not clear. On the one hand strong economic conditions might reduce risk in general, on the other hand they might allow for the implementation of riskier policies. The Vega equation includes the logarithm of fixed salary. High cash compensation allows the CEO to diversify her portfolio and therefore reduce risk aversion Guay (1999). High fixed salaries can also indicate CEO entrenchment which could lead to low risk taking incentives of CEOs (Berger et al. (1997)). The Delta equation includes CEO tenure as a control variable. Prior studies have found that CEO reaching retirement tend to have high-delta contracts (Core and Guay (1999)).

In addition to the above mentioned variables each equation contains country fixed effects, year fixed effects and dummies for different bank types. The risk and incentive variables are winsorized at the 1% level.

4.1 Empirical results

I first report results of 2SLS regressions of bank risk measures on CEO incentives and control variables for the period 2000 to 2006. I focus on the pre-crisis part of the sample to get an idea of how bank risk reacts to incentives in normal times.

4.1.1 Compensation and bank risk

Table 8 and Table 9 show the results of the estimations of the simultaneous equation models. In each specification the jointly determined variables are the measure of risk, vega and delta. Vega and Delta are expressed in logarithms of the mean value during one year.¹³ Both variables are computed using options stocks and restricted stocks, excluding restricted stocks leads to a less significant coefficient for delta which could imply that treating restricted stocks like normal stocks correctly reflects the incentive structure of CEO compensation contracts. Bank risk and CEO incentives are thought to be chosen simultaneously, depending on bank characteristics. Panel A in Table 8 shows the results for the model with the standard deviation of equity as proxy for bank risk, the specification in Panel B uses idiosyncratic risk as a proxy for risk. Table 9 contains two systems' specifications. Panel A shows the specification with systematic risk, in Panel B the distance-to-default is the measure of bank risk.

I find that high vega contracts lead to higher volatilities, higher idiosyncratic and systematic risk and lower values for the distance-to-default. The coefficients for the distance to default are however not significant. The effect of delta on bank risk goes in the opposite direction. These findings are in line with the hypotheses formulated above and with the findings in the literature on US firms (Coles et al. (2006)) and on US banks (DeYoung et al. (2009)). It partially contradicts the findings of Fahlenbrach and Stulz (2009) who do not find any impact of compensation on risk taking during the financial crisis. Option based compensation leading to high vega contracts induces managers to increase bank risk whereas stock holdings make CEOs more vulnerable to stock price decreases and therefore reduce their incentive to increase risk. One has however to remember that in times of crisis when the equity option goes from deep in the money to at the money risk taking incentives from stocks increase while option vega most likely declines.

The effects of incentive measures on bank risk are smaller than those documented in the literature on US banks (DeYoung et al. (2009)), which could be due to differences in the sample or because the effect is significant but smaller for non-US banks. A 10% increase in vega leads to a 0.4% increase in risk while a 10% increase in delta reduces risk by 0.85%. Similarly Idiosyncratic risk increases by 0.32% for a 10% change in vega and decreases by 0.51% for a 10% increase in delta. Coefficients for systematic risk are higher

¹³Using end of year values does not change any of the results

Table 8: Simultaneous equation model of bank risk and CEO incentives for the period 2000 to 2006. Bank risk is represented by the standard deviation of daily stock returns (Panel A) and idiosyncratic risk (Panel B) derived from an industry CAPM model. CEO incentives are the sensitivity of CEOs' stock, option and restricted stock portfolio to a one percent change in stock price (delta) and to a 0.01 increase in volatility (vega). All equations contain year and country dummies.

	Panel A: Sigma			Panel B: Idiosyncratic risk		
	lnsigma	vega	delta	lnidiosyn	vega	delta
total risk		-87.555 (270.05)	4.334 (5.95)			
idiosyncratic risk					-119.288 (388.42)	168.086 (163.58)
ln(total vega)	0.014*** (0.01)		0.049 (0.09)	0.001** (0.00)		0.008 (0.12)
ln(total delta)	-0.029** (0.01)	20.202 (37.73)		-0.001* (0.00)	0.684 (0.43)	
GDP growth	0.184*** (0.06)			0.008*** (0.00)		
ln(mtb) _{t-1}	0.014*** (0.00)	-4.271 (7.53)	0.211*** (0.07)	0.001*** (0.00)	-0.059 (0.24)	0.165* (0.09)
lna _{t-1}	0.001 (0.01)	-8.479 (17.37)	0.420*** (0.09)	-0.001* (0.00)	-0.093 (0.46)	0.531*** (0.17)
capital ratio _{t-1}	-0.291 (0.27)	-21.991 (91.62)	1.089 (3.50)	-0.015 (0.01)	-18.695 (17.53)	2.544 (4.09)
ln(tenure)		-9.072 (18.54)	0.449*** (0.10)			0.463*** (0.10)
ln(salary)					3.215** (1.38)	
Constant	0.384*** (0.13)	44.085 (134.79)	-2.182 (2.91)	0.031*** (0.01)	-37.235*** (13.53)	-3.964 (5.32)
N	385	385	385	384	384	384
Kleibergen-Paap	8.08***	0.23	6.08**	8.71***	10.20***	5.80**

and therefore indicate that managers alter bank risk to a larger extent by increasing the banks' beta, in line with the theoretical predictions of Landier et al. (2010). A 10% increase in vega leads to 1% higher systematic risk and a 10% increase in delta to a 1.7% decrease in systematic risk. It is not just equity risk that is influenced by managerial incentives but also the overall risk of default. A 10% increase in vega reduces the bank's distance to default by 1.9% and a 10% increase in delta to an increase by 4.8% .

Equations two and three of each panel show how compensation is set. Coefficients on the risk measure in the delta and vega equations have the expected sign, with high risk inducing higher delta and lower vega contracts, but are not or just marginally significant. The Kleibergen-Paap rk LM statistic is in all but two equations significantly different from zero and the null-hypothesis of under-identification can be rejected.

Table 9: Simultaneous equation model of bank risk and CEO incentives for the period 2000 to 2006. Bank risk is represented by systematic risk (Panel A) and the distance-to-default (Panel B). CEO incentives are the sensitivity of CEOs' stock, option and restricted stock portfolio to a one percent change in stock price (delta) and to a 0.01 increase in volatility (vega). All equations contain year and country dummies.

	Panel A: Systematic risk			Panel B: Distance-to-default		
	beta	vega	delta	distance	vega	delta
systematic risk		-0.996 (3.18)	0.906 (1.26)			
distance to default					3.201 (6.13)	0.310 (0.38)
ln(total vega)	0.091*** (0.03)		0.032 (0.12)	-0.162*** (0.06)		0.146*** (0.05)
ln(total delta)	-0.144** (0.06)	0.668 (0.46)		0.418** (0.17)	-0.037 (1.81)	
GDP growth	0.905*** (0.35)			4.692 (2.87)		
ln(mtb) _{t-1}	0.043** (0.02)	-0.096 (0.18)	0.228*** (0.04)	0.092 (0.07)	-0.411 (0.67)	0.178** (0.08)
lna _{t-1}	0.042 (0.03)	0.011 (0.31)	0.386*** (0.06)	0.126 (0.08)	-0.485 (0.89)	0.282*** (0.10)
capital ratio _{t-1}	0.099 (1.34)	-17.081 (13.40)	-0.119 (2.67)	28.924*** (3.71)	-117.089 (192.33)	-9.127 (11.51)
ln(salary)		3.261** (1.44)			4.351 (2.99)	
ln(tenure)			0.447*** (0.10)			0.343*** (0.08)
Constant	0.173 (0.60)	-41.392** (16.59)	1.256 (1.20)	-6.620*** (1.93)	-41.842** (18.05)	1.646 (2.41)
N	384	384	384	385	385	385
Kleibergen-Paap	8.76***	7.62***	4.80**	8.65***	1.05	3.71*

4.1.2 CEO incentives and bank policy

In this sub-section I will focus on the channels through which banks increase risk. 10 shows the results of three simultaneous equation models with fee-based income, tier 1 ratio and total capital ratio as bank policy variables. Bank policies, vega and delta are thought to be chosen simultaneously taking into account lagged bank characteristics. The results show that banks with high vega and low delta CEOs obtain a higher proportion of total income from fee-based activities, which are presumably riskier than the traditional lending business. Similarly high delta contracts are associated with higher capital ratios whereas the effect of vega goes in the opposite direction. There is no effect of CEO incentives on Tier 1 capital, most likely because compliance to capital regulation prevents banks from lowering Tier 1 ratios to increase risk.

At the means of the data a 10% increase in vega leads to a 0.2% lower capital ratio while a 10% increase in delta yields a 0.76% higher ratio. Similarly a 10% in vega increases fee based income by 0.85% and an increase in delta by the same amount reduces it by 7%.

As in the bank risk equations in the previous subsection none of the bank policy variables has a significant impact on the compensation contracts of the CEO.

4.1.3 Regulation

DeYoung et al. (2009) argue that after deregulation in the United States bank business policies became more sensitive to CEO risk taking incentives, that boards of high risk banks decreased the risk taking incentives of their CEOs and that incentives were used to encourage CEOs to exploit new growth opportunities. My international dataset allows me to check more directly the impact of regulation on compensation and on the way it influences risk and policy variables.

I construct a measure of regulator power from the Worldbank indices on official supervisory power, supervisory independence and Capital. The variable Regulation is constructed as the sum of the three indices standardized for each year. The results in Table 11 show that when regulation is strong bank boards seem to react more to bank risk when setting the compensation of the CEO. A result that can be directly related to the recent regulatory proposals on by the European Commission "prompt remedial actions", as described in the previous section. It seems that strong regulators do have the ability to change the way banks set their compensation structure. Bank boards may either adjust the incentive structure ex-ante in order to avoid regulatory interventions or regulators might directly impact the compensation structure if deemed inappropriately high. Although these findings show the potential effect regulation can have on CEO incentives it is noteworthy that among the countries with high values on the compound regulatory strength index are the United States. In line with the descriptive findings of the previous section, this casts some doubt on the sufficiency of the proposed changes in regulation.

5 Determinants of managerial compensation and bank regulation

After having reached the conclusion that the structure and the extent of CEO compensation has an impact on bank risk and after identifying chan-

Table 10: Simultaneous equation model of bank policies and CEO incentives for the period 2000 to 2006. Bank policies are represented by the ratio of fee-based income to total income (Panel A), the Tier 1 ratio (Panel B) and the total capital ratio (Panel C). CEO incentives are the sensitivity of CEOs' stock, option and restricted stock portfolio to a one percent change in stock price (delta) and to a 0.01 increase in volatility (sigma). All equations contain year and country dummies.

	Panel A: Fee-based income		Panel B: Tier 1		Panel C: Total Capital		
	vega	delta	Total Capital	vega	Tier 1 Capital	vega	delta
non-interest	-0.026 (0.21)	0.034 (0.09)					
capital ratio							
ln(total vega)	0.144** (0.07)	0.114** (0.05)	-0.001* (0.00)	-71.178 (64.84)	0.157 (0.19)	0.105 (0.11)	
ln(total delta)	-1.199*** (0.46)	0.583 (0.54)	0.004* (0.00)	0.764 (0.48)	-0.142 (0.31)	0.657 (1.01)	
ln(mtb) _{t-1}	0.418*** (0.11)	-0.006 (0.18)	0.002 (0.00)	0.073 (0.24)	0.753*** (0.25)	-1.993 (3.23)	0.056 (0.54)
lnra _{t-1}	0.429** (0.19)	-0.125 (0.27)	-0.004*** (0.00)	-0.299 (0.30)	-0.449 (0.44)	0.930 (1.68)	0.565 (0.36)
capital ratio _{t-1}	-27.119 (22.73)	-1.099 (2.81)					
T1 ratio							
salary	0.000*** (0.00)			0.000*** (0.00)		2.473 (3.98)	0.312 (0.71)
tenure		0.093*** (0.01)				0.000* (0.00)	0.095*** (0.02)
GDP growth	12.41 (9.35)		-0.060 (0.04)		3.298 (5.27)		
Constant	-0.608 (3.27)	3.931 (5.70)	0.101*** (0.03)	8.216 (7.33)	18.489** (8.18)	-41.072 (67.80)	-5.312 (12.90)
N	369	369	385	383	334	334	334
Kleibergen-Paap	9.08***	1.75	8.84***	6.02**	7.56***	2.53	0.38

Table 11: Simultaneous equation model of bank policies and CEO incentives for the period 2000 to 2006 with Regulation interaction terms. Bank policies are represented by total risk (Panel A), idiosyncratic risk (Panel B) and the ratio of non-interest income to total income (Panel C). CEO incentives are the sensitivity of CEOs' stock, option and restricted stock portfolio to a one percent change in stock price (delta) and to a 0.01 increase in volatility (sigma). All equations contain year and country dummies.

	Panel A: Total risk		Panel B: Idiosyncratic risk		Panel C: Non-interest income	
	total risk	delta	Idiosyncratic risk	delta	Non-interest vega	delta
sigma	-4.812 (17.63)	2.203 (5.23)				
idiosyn			120.059 (366.40)	17.479 (120.14)		
feebased					0.866 (1.29)	0.225 (1.15)
ln(total vega)	0.017** (0.01)	0.006 (0.14)	0.001* (0.00)	0.115 (0.10)	0.059 (0.51)	-0.088 (0.93)
ln(total delta)	-0.032** (0.02)	1.172 (0.83)	-0.001* (0.00)	0.325 (0.46)	-0.895* (0.51)	3.825* (2.01)
regXsigma	-1.645** (0.83)	0.205 (0.22)				
regXidiosyn			-145.240* (78.56)	23.432 (19.89)		
regXfee					1.025 (1.20)	-0.342 (1.29)
regXvega	-0.001 (0.00)	0.016 (0.03)	-0.000 (0.00)	-0.044 (0.03)	0.106 (0.31)	0.015 (0.10)
regXdelta	-0.000 (0.01)	-0.634 (0.58)	0.000 (0.00)	0.119* (0.07)	-0.049 (0.21)	-0.122 (0.11)
regvar	0.021 (0.09)	5.738 (6.50)				
N	385	385	384	384	369	369
Kleibergen-Paap	6.94***	6.53***	1.95	8.76***	1.51	4.12**
		4.66**		6.77**		0.10

nels through which banks increase risk. In the previous section we have seen that banks from countries with powerful regulators are more sensitive to risk when setting compensation. It is of great importance - not only from an academic but also from a policymakers' point of view - to assess the impact of regulation and corporate governance mechanisms on how the banks sets its compensation and therefore ultimately on how much risk a bank is taking.

5.1 Regulation and Compensation

Strong regulatory authorities may reduce banks' incentive to implement high vega contracts, since expensive risk inducing contracts are less valuable for shareholders if supervisors do not allow banks to increase the riskiness of their business model. At the same time a powerful regulatory system is likely to reduce the demand for incentive alignment of CEOs because monitoring through the regulator would reduce the need to align incentives. Less stock based compensation would be the consequence. John and Qian (2003) interpret lower pay-performance sensitivities in banks than in manufacturing firms as evidence for this hypothesis. On the opposite one might argue that tough regulation incentivises shareholders to give higher risk taking incentives to the CEO as a countermeasure. Similarly strong regulation may be perceived as a guarantee against a systemic instability leading to less caution when incentivising CEOs. Strong shareholder rights should make it easier to align CEOs to the incentives and to the risk appetite of shareholders.

To understand the effect of regulation on managerial incentives I regress several characteristics of CEO compensation contracts on indices representing the supervisory environment. The indices are taken from Djankov et al. (2008) and Barth et al. (2001). Barth et al. (2001) conduct three cross-country surveys of how banks are regulated and supervised. The surveys have been completed in 2001, 2003 and 2007 respectively and I construct the following indices of regulatory power as described in Barth et al. (2004): *official* is an index of supervisory power, it measures the degree to which supervisory authorities may intervene in the banking system. *restrict* is an index of regulatory restrictions on bank activities, *independence* measures to which degree supervisory authorities are independent from the government and legally protected from the banking system. *capital* is an index capturing the stringency of the regulatory capital restrictions. It does not reflect the

actual level of minimum capital requirements but the approach of the regulatory or supervisory authorities towards assessing and verifying the funds used as regulatory capital. *Capital Requirement* is the regulatory minimum requirement. In most countries for most of the years it is set at 8% but about 10% of the countries in the sample have requirements between 8% and 12%. Additionally the existence of an explicit deposit insurance scheme has been documented by Demirg-Kunt et al. (2006) and is included as a dummy variable. *private monitoring* is an index which measures the extent of private monitoring, i.e. not by the regulatory authority, for each country. It measures for example the quality of disclosure requirements, director liability and audit requirements. The existence of an explicit deposit insurance scheme reduces the private monitoring index. *rights* measures shareholder protection with the revised anti-director rights index for each country as described in Djankov et al. (2008).

5.2 Corporate Governance and Compensation

Several studies have examined the impact of corporate governance on executive compensation, Core et al. (1999) for example find that less effective governance leads to higher executive compensation. Fahlenbrach (2008) argues that poor corporate governance is counterbalanced by compensation contracts that help better align CEOs' incentives. I use detailed information on the board of directors in general and on the compensation committee in specific to examine the impact of corporate governance on CEO compensation in the financial service industry.

The way corporate governance influences managerial compensation is not clear from a theoretical point of view. The so called substitution hypothesis predicts that firms with weaker governance structures would implement compensation contracts with high pay-for-performance sensitivities as substitutes for poor monitoring by the board of directors. At the same time the level of compensation might be higher to compensate the risk averse CEO for large bank-specific risk.

The entrenchment hypothesis propagated by Bebchuk and Fried (2004) argue that weaker governance allows the CEO to extract rents through higher total compensation and lower pay-for-performance sensitivities.

Finally the complementarity hypothesis predicts that better governance leads to higher incentive pay, a board that understands the value of incentive pay

to the firm's shareholders is more likely to implement such contracts. Hartzell and Starks (2003) for example find that institutional investors push for more equity based compensation.

To measure the quality of corporate governance on the board level I include the following variables: (1) Board size and the size of the compensation committee. Core and Guay (1999) for example argue that it is easier for the CEO to capture the board and that individual board members are less likely to be held accountable, implying less effective monitoring. (2) The fraction of independent directors both on the board and on the compensation committee. The empirical evidence is mixed. Yermack (1996) finds no evidence that a high fraction of outside directors is associated with CEO compensation, Mehran (1995) on the other hand can show that equity based compensation is higher for firms with more independent directors. (3) The number of board meetings and the number of compensation committee meetings. More frequent meetings may point towards a more active board that is better able to monitor the management. (4) Female is the ratio of female board members. Among others Barber and Odean (2001) document that women exhibit a smaller tendency to overconfidence and are more risk averse than men. A strong female presence on the board might therefore have an impact on the way executive compensation is structured.

The entrenchment hypothesis is tested by looking at variables that specifically relate to the CEOs' ability to capture the board. (5) The CEO being also chairman of the board. Among others Core and Guay (1999) argue that CEO chair duality can cause agency problems. (6) The same argument is applicable to the CEO being part of the compensation committee. (7) CEO tenure is another proxy for entrenchment. After many years in the bank it is more likely that the CEO was able to form a board that is more loyal to him. Evidence for this hypothesis has been provided by for example by Baker and Gompers (2002).

The control variables are drawn from the large body of literature that addresses the determinants of managerial compensation.¹⁴ Bank size for opaqueness and firm complexity. Opaque banks may have a higher need for aligning CEOs' incentives because of high monitoring costs. The market-to-book ratio is connected to banks' investment opportunity set. Bank with

¹⁴In particular Guay (1999).

more investment opportunities are more likely to provide managers with risk taking incentives to reduce costs from forgone high risk investment projects.¹⁵ *Tenure* and *salary* represent both CEOs' possibility to diversify their wealth and managerial entrenchment. Diversified CEOs are less exposed to firm specific risk and therefore less averse to an increase of risk. Moreover banks will most likely adjust gradually to their CEOs target incentive levels. *cooperative* & *savings, investment, mortgage* are dummy variables for banks with a specialization different from a commercial bank or bank holding company, as reported by Bankscope.

5.3 Empirical Results

The following two subsections show the impact of regulation and of corporate governance on compensation variables. Corporate governance variables are available for a subset of the original sample, specifically for a sample that includes only the five largest banks from each country. Regulatory variables on the other hand are available for the whole sample. All the regressions explaining the compensation structure contain year dummies and bank type dummies. Since most of the regulatory indices vary very little over time I show results with and without country dummies. As suggested by Petersen (2009) standard errors are clustered at the bank level to account for correlation across firms.¹⁶

5.3.1 Regulation

Table 12 shows how CEO incentives, measured as the logarithm of the sensitivity of CEOs' stock, option and restricted stock portfolio to a one percent to a 0.01 increase in volatility (vega) and to a change in stock price (delta), are related to the regulatory environment a bank is operating in. The first two columns show regressions with year fixed effects only. Coefficients for

¹⁵E.g. Coles et al. (2006) find that firms with high R&D expenses implement high vega contracts. Hubbard and Palia (1995) report high delta contracts in deregulated banking markets.

¹⁶I follow mainly the approach of Fahlenbrach (2008) and estimate CEO compensation components as a function of firm characteristics, regulation, governance and fixed effects. An alternative would be to use a simultaneous equation approach as in the previous section. I refrain from this because GDP growth seems to be a weak instrument when including the financial crisis period.

Official supervisory power, independence of the regulator and the minimum capital ratio are all positive and significant, which points in the direction that stronger regulation leads banks to grant more incentive based pay. One concern is that unobservable country and firm specific factors are not properly captured by the control variables. Estimating country fixed effect models and firm fixed effect models could possibly solve this problem. The coefficient of these regressions however have to be looked at with caution since the time variation of the regulatory indices, although updated three times during the sample period is rather small. Columns three and four show a significantly positive coefficient for official supervisory power and a marginally significant coefficient for independence of the regulatory authority on the CEOs' vega. Including country fixed effects also increases the r-squared of the regression implying that compensation is largely set relative to country peers. Columns five and six show the same regressions using bank fixed effects. The coefficients for Official supervisory power and independence on vega stay significant and positive. All in all I interpret this as evidence for the hypothesis that banks reaction to strong regulation is to increase the risk taking incentives of there CEOs to counteract the stricter regulatory environment. It contradicts the findings of John and Qian (2003), who state that regulation and CEO incentives are substitutes.

5.3.2 Corporate Governance

Table 13 and Table 14 show regressions of compensation components on corporate governance variables. The limited sample size and little time variation in the corporate governance variables does not allow for a bank fixed effect regression, I include however country fixed effects and type dummies that capture the different business models of the sample banks. Table 13 includes only board specific governance variables and Table 14 also committee specific variables. I report them differently because not all banks do have a special compensation committee. The main findings are that board characteristics seem to matter relatively little for the structure of CEO compensation. neither the board composition nor the composition of the compensation committee has an impact on the level of vega. The compensation committee in particular does not seem to have an impact on any of the compensation variables casting doubt on whether these committees do fulfill there duties when setting CEO contracts. One interpretation could be that CEO pay is mostly set by consulting agencies which are active in almost all of the banks

Table 12: Regression of CEO incentives on variables capturing the regulatory environment and controls. $\ln(\text{vega})$ is the logarithm of the sensitivity of CEOs' stock, option and restricted stock portfolio to a one percent to a 0.01 increase in volatility. $\ln(\text{delta})$ is the logarithm of the sensitivity of CEOs' stock, option and restricted stock portfolio to a change in stock price. Official supervisory power measures the power of a country's regulator, Capital measures the regulatory approach towards bank capital, Independence the independence of the supervisor from litigations, private monitoring the extent to which banks are monitored by market participants other than the regulator, Restrict measures bank activity restrictions, Deposit Insurance the existence of an explicit deposit insurance scheme, minimum Capital ratio is the regulatory capital requirement, Shareholder rights is the Index of Djankov et al. (2008). Standard errors are clustered at the bank level.

Variable	$\ln(\text{Vega})$	$\ln(\text{Delta})$	$\ln(\text{Vega})$	$\ln(\text{Delta})$	$\ln(\text{Vega})$	$\ln(\text{Delta})$
$\ln(\text{CEO tenure})$	0.055 (0.05)	0.116*** (0.02)	0.019 (0.05)	0.088*** (0.02)	0.023 (0.09)	0.077*** (0.01)
market-to-book	-0.299 (0.41)	0.191 (0.16)	-0.318 (0.29)	0.198** (0.10)	-0.710* (0.40)	0.196*** (0.07)
$\ln(\text{Salary})$	1.993 (1.32)	0.169 (0.41)	3.740** (1.80)	0.621 (0.46)	2.329 (1.69)	0.518* (0.31)
$\ln(\text{total assets})$	0.644** (0.30)	0.624*** (0.10)	0.492** (0.23)	0.572*** (0.09)	-2.049 (2.18)	0.479** (0.21)
Equity volatility	-6.089* (3.60)	-1.134** (0.53)	-5.568 (3.45)	-0.903* (0.54)	-8.252* (4.29)	-1.550*** (0.49)
Official supervisory power	0.401* (0.24)	0.151** (0.07)	0.524* (0.28)	0.004 (0.03)	0.521* (0.26)	0.014 (0.03)
Capital	-0.855 (0.55)	-0.288* (0.16)	0.211 (0.34)	-0.039 (0.06)	-0.148 (0.39)	0.002 (0.05)
Independence	2.241** (1.07)	0.391* (0.20)	1.879 (1.18)	0.095 (0.13)	2.437* (1.30)	0.175 (0.13)
private monitoring	-0.088 (0.90)	0.367 (0.26)	-1.245 (0.86)	-0.090 (0.07)	-0.257 (0.81)	0.056 (0.10)
Restrict	0.235 (0.27)	0.199* (0.10)	-0.735*** (0.25)	-0.092* (0.05)	-0.236 (0.27)	-0.053 (0.06)
Deposit insurance	0.751 (1.55)	0.987 (0.61)				
Minimum capital ratio	3.894** (1.65)	1.499** (0.59)	1.571 (1.15)	0.448 (0.40)	0.181 (0.87)	-0.155 (0.17)
Shareholder rights	-0.700 (1.39)	-0.225 (0.37)				
BHC	-0.876 (0.97)	1.023*** (0.28)	-0.227 (0.91)	1.354*** (0.26)		
Commercial bank	-1.409 (1.60)	0.986* (0.51)	2.202 (2.05)	2.164*** (0.51)		
Investment bank	1.044 (1.64)	2.288*** (0.64)	4.154 (2.62)	3.709*** (0.66)		
Mortgage bank	0.452 (3.89)	1.234 (0.81)	2.153 (3.96)	1.916** (0.74)		
Savings Bank	-14.181*** (1.57)	-3.245*** (0.67)	-11.025*** (1.79)	-1.197** (0.50)		
Constant	-63.554** (28.71)	-24.784** (9.47)	-59.869* (31.12)	-15.837** (7.73)	24.507 (48.34)	-8.317 (6.82)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	No	No
Bank FE	No	No	No	No	Yes	Yes
R^2	0.274	0.599	0.414	0.806	0.589	0.944
N	508	514	508	514	508	514

in the sample.

Consistent with the findings of Fahlenbrach (2008) for US companies there is a negative effect of board size on CEO incentive alignment through high delta contracts. This is consistent with both the entrenchment hypothesis and the complementarity hypothesis. If large boards are a proxy for weak governance than this could either allow the CEO to reduce incentive alignment or stronger governance would be needed to implement contracts with higher pay-for-performance sensitivities. The coefficients for the CEO being also chairman of the board and tenure are both significant and positive as in Fahlenbrach (2008). This is consistent with the substitution hypothesis, weaker governance is associated with higher pay-for-performance sensitivities. Consistent with this hypothesis is the negative sign on the coefficient for board meetings. More active boards are better able to monitor the CEO and alignment of CEO incentives to shareholders' incentives is less important. All in all I follow Fahlenbrach (2008) in his interpretation and conclude that the substitution effect is probably what drives CEO incentives. The results in column three, where the ratio of bonus payments to total compensation is regressed on the same variables, go in the same direction. Weaker governance is associated with higher bonus payments and therefore better incentive alignment.

Total compensation, the independent variable in the last column is increasing with board independence and CEO tenure. The positive sign on tenure could be an indicator for entrenchment while the fact that more independent board grant higher total compensation would contradict this hypothesis. The positive sign on board independence is however again consistent with Fahlenbrach (2008) who interprets it as evidence that good corporate governance led to better performance and therefore higher payouts of incentive based pay. The positive impact of board independence on bonus payments corroborates this hypothesis.

Next I look at the decision to grant options and on the characteristics of those option grants. Although the compensation committee did not seem to play an active role when setting overall CEO incentives and compensation I would expect it to be more important when deciding whether to grant options and on the characteristics of these options.

Table 15 shows the corresponding regression analysis. Columns one to six are standard OLS regressions of the compensation components on con-

Table 13: Regression of CEO incentives on variables capturing the strength of corporate governance mechanisms and controls. $\ln(\text{vega})$ is the logarithm of the sensitivity of CEOs' stock, option and restricted stock portfolio to a one percent to a 0.01 increase in volatility. $\ln(\text{delta})$ is the logarithm of the sensitivity of CEOs' stock, option and restricted stock portfolio to a change in stock price. bonus ratio is the ratio of bonus payments to total compensation. $\ln(\text{total compensation})$ is the logarithm of total compensation. # Board members is the number of directors on the board. Board independence is the ratio of independent board members. Female is the ratio of women on the board. Board meetings is the number of board meetings per year. CEO chairman is a dummy variable that takes value equal to one if the CEO and the chairman of the board are the same person and zero otherwise. Standard errors are clustered at the bank level.

Variable	$\ln(\text{Vega})$	$\ln(\text{Delta})$	bonus ratio	$\ln(\text{total compensation})$
$\ln(\text{CEO tenure})$	-0.048 (0.17)	0.087*** (0.02)	0.007* (0.00)	0.032*** (0.01)
market-to-book	-0.783*** (0.22)	0.123** (0.05)	-0.013** (0.01)	-0.018 (0.03)
$\ln(\text{Salary})$	1.004 (1.62)	0.607** (0.28)	0.005 (0.04)	
$\ln(\text{total assets})$	0.168 (0.79)	0.226 (0.28)	0.001 (0.02)	0.329*** (0.05)
Volatility	-9.931 (7.25)	-0.743** (0.36)	-0.272*** (0.08)	-1.014*** (0.36)
# Board members	-0.413 (0.27)	-0.072* (0.04)	0.001 (0.00)	0.012 (0.01)
Board independence	-4.111 (5.90)	1.227 (0.82)	0.165* (0.09)	1.010*** (0.34)
Female	-19.974 (13.12)	-0.780 (0.86)	-0.458* (0.23)	-0.603 (0.84)
Board meetings	-0.115 (0.19)	-0.034* (0.02)	-0.007** (0.00)	-0.007 (0.01)
CEO chairman	-1.418 (1.29)	0.335* (0.19)	0.097** (0.04)	0.083 (0.16)
BHC	-1.955 (1.32)	0.642*** (0.22)	0.291*** (0.05)	-0.242 (0.15)
Commercial bank	0.469 (2.25)	2.735*** (0.44)	0.144*** (0.04)	-0.158 (0.14)
Investment bank	-0.092 (3.64)	2.543** (1.08)	0.764*** (0.10)	1.278*** (0.36)
Savings Bank	-7.501 (4.94)	-0.734 (0.58)	0.115 (0.10)	-0.533 (0.35)
L.return			0.083 (0.06)	0.367* (0.19)
Constant	6.856 (28.95)	-5.020 (6.57)	0.297 (0.53)	5.674*** (1.43)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
R^2	0.595	0.887	0.412	0.436
N	216	220	307	317

Table 14: Regression of CEO incentives on variables capturing the strength of corporate governance mechanisms and controls. $\ln(\text{vega})$ is the logarithm of the sensitivity of CEOs' stock, option and restricted stock portfolio to a one percent to a 0.01 increase in volatility. $\ln(\text{delta})$ is the logarithm of the sensitivity of CEOs' stock, option and restricted stock portfolio to a change in stock price. bonus ratio is the ratio of bonus payments to total compensation. $\ln(\text{total compensation})$ is the logarithm of total compensation. $\#$ Board members is the number of directors on the board. Board independence is the ratio of independent board members. Female is the ratio of women on the board. Board meetings is the number of board meetings per year. CEO chairman is a dummy variable that takes value equal to one if the CEO and the chairman of the board are the same person and zero otherwise. Committee meetings is the number of compensation committee meetings per year. Committee members is the number of directors on the compensation committee. CEO committee member is a dummy that takes value one if the CEO is member of the compensation committee and zero otherwise. Committee independence is the ratio of independent directors on the Committee. Standard errors are clustered at the bank level.

Variable	$\ln(\text{Vega})$	$\ln(\text{Delta})$	bonus ratio	$\ln(\text{total compensation})$
$\ln(\text{CEO tenure})$	0.185 (0.19)	0.094*** (0.03)	0.005 (0.00)	0.032*** (0.01)
market-to-book	-0.964*** (0.28)	0.093* (0.05)	-0.011* (0.01)	-0.016 (0.03)
$\ln(\text{Salary})$	0.422 (1.61)	0.438 (0.30)	-0.008 (0.04)	
$\ln(\text{total assets})$	-0.993 (0.81)	0.213 (0.31)	0.012 (0.02)	0.319*** (0.06)
Volatility	-11.200 (7.75)	-0.790** (0.35)	-0.276*** (0.08)	-1.009*** (0.36)
$\#$ Board members	-0.459 (0.29)	-0.084** (0.04)	-0.003 (0.01)	0.002 (0.02)
Board independence	-6.265 (5.32)	1.312 (0.90)	0.068 (0.13)	0.618 (0.39)
Female	-18.577 (14.63)	0.107 (0.89)	-0.464* (0.23)	-0.650 (0.85)
Board meetings	-0.161 (0.25)	-0.035* (0.02)	-0.007** (0.00)	-0.008 (0.01)
CEO chairman	-1.978 (1.45)	0.373* (0.20)	0.105** (0.04)	0.057 (0.19)
Committee meetings	-0.000 (0.29)	-0.033 (0.03)	0.001 (0.01)	0.013 (0.03)
Committee members	0.624 (0.39)	0.080 (0.05)	0.009 (0.02)	0.043 (0.07)
CEO committee member	-0.698 (0.91)	-0.269 (0.25)	0.037 (0.06)	-0.134 (0.14)
committee independence	6.479 (5.99)	0.603 (0.55)	0.003 (0.10)	0.331 (0.31)
BHC	-2.575 (1.58)	0.560** (0.22)	0.273*** (0.06)	-0.255 (0.16)
Commercial bank	-1.982 (2.71)	2.680*** (0.52)	0.142*** (0.05)	-0.123 (0.16)
Investment bank	-6.817 (4.40)	2.279* (1.20)	0.794*** (0.11)	1.258*** (0.35)
Savings Bank	-10.473* (6.08)	-1.196** (0.52)	0.092 (0.10)	-0.513 (0.37)
L.return			0.097 (0.08)	0.344 (0.24)
Constant	40.878 (29.75)	-2.683 (7.38)	0.227 (0.54)	5.865*** (1.49)
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
R^2	0.620	0.886	0.414	0.442
N	196	200	284	293

Table 15: Regression of CEO incentives on variables capturing the strength of corporate governance mechanisms and controls. $\ln(\text{vega})$ granted is the logarithm of the sensitivity of a CEO's option grant to a one percent increase in volatility. $\ln(\text{delta})$ granted is the logarithm of the sensitivity of CEO's option grant to a change in stock price. Criteria is the percentage of option granted with vesting criteria attached in each year for each CEO. Moneyess is the average moneyess of the option granted to each CEO in one year. Vesting period is the average vesting period of the options granted. BS value is the Black & Scholes value of the options granted. Option and Rights depict logit regressions with a dummy taking value one if granted or rights are granted and value zero otherwise as the dependent variable. # Board members is the number of directors on the board. Board independence is the ratio of independent board members. Female is the ratio of women on the board. Board meetings is the number of board meetings per year. CEO chairman is a dummy variable that takes value equal to one if the CEO and the chairman of the board are the same person and zero otherwise. Committee meetings is the number of compensation committee meetings per year. Committee members is the number of directors on the compensation committee. CEO committee member is dummy that takes value one if the CEO is member of the compensation committee and zero otherwise. Committee independence is the ratio of independent directors on the Committee. Standard errors are clustered at the bank level.

Variable	$\ln(\text{Vega})$ granted	$\ln(\text{Delta})$ granted	Criteria	Moneyess	Vesting period	fixed compensation	Option	Rights
$\ln(\text{CEO tenure})$	0.165 (0.16)	-0.003 (0.04)	-0.012 (0.02)	0.018 (0.02)	-0.014 (0.03)	-0.028 (0.05)	-0.036 (0.06)	-0.109 (0.09)
market-to-book	-0.096 (0.35)	0.019 (0.37)	-0.021 (0.08)	-0.009 (0.03)	-0.198 (0.17)	-0.019 (0.40)	-0.250* (0.15)	0.061 (0.18)
$\ln(\text{Salary})$	0.186 (0.32)	0.286 (0.31)						
$\ln(\text{total assets})$	-0.348 (0.46)	-0.270 (0.36)	0.219 (0.18)	0.082* (0.04)	-0.121 (0.41)	-0.411 (0.47)	0.073 (0.66)	-0.748 (0.70)
Volatility	-0.192 (0.75)	0.144 (0.64)	0.123 (0.19)	-0.074 (0.09)	0.161 (0.47)	0.426 (0.68)	0.041 (0.93)	-0.926 (1.54)
# Board members	-0.043 (0.07)	-0.031 (0.06)	0.011 (0.02)	-0.003 (0.01)	0.057 (0.03)	-0.047 (0.10)	-0.118 (0.10)	0.147 (0.13)
Board independence	0.609 (1.99)	1.554 (1.08)	0.055 (0.40)	-0.136 (0.14)	1.808** (0.89)	1.600 (1.18)	-2.165 (2.17)	4.918* (2.59)
Female	-2.798 (2.16)	-4.690** (2.07)	1.048* (0.58)	0.232 (0.21)	2.305** (0.99)	-4.331* (2.34)	1.998 (3.57)	1.293 (4.98)
Board meetings	0.019 (0.05)	-0.018 (0.04)	0.011 (0.01)	0.007 (0.01)	-0.027 (0.02)	-0.012 (0.04)	-0.045 (0.05)	0.001 (0.07)
CEO chairman	-0.866 (0.86)	0.038 (0.39)	0.054 (0.15)	-0.079 (0.10)	-0.610* (0.36)	0.307 (0.42)	-0.304 (1.06)	3.379* (1.73)
Committee meetings	-0.167** (0.08)	-0.110** (0.05)	0.021 (0.02)	-0.006 (0.01)	-0.023 (0.04)	-0.105* (0.05)	-0.207** (0.11)	0.022 (0.14)
Committee members	0.094 (0.11)	0.027 (0.10)	-0.007 (0.04)	0.027** (0.01)	-0.255*** (0.08)	0.015 (0.11)	0.309* (0.17)	-0.283 (0.33)
CEO committee member	-0.496 (0.40)	-0.563 (0.34)	0.154 (0.13)	0.040 (0.03)	0.126 (0.17)	-0.610 (0.39)	0.524 (0.67)	1.564 (1.13)
committee independence	0.979 (1.04)	1.527* (0.80)	-0.488 (0.32)	-0.071 (0.12)	-0.804 (0.57)	1.490* (0.84)	-1.951 (1.80)	1.898 (3.55)
BHC	-1.191* (0.66)	-1.088* (0.62)	0.147 (0.20)	0.003 (0.07)	-0.295 (0.51)	-0.968 (0.63)	2.709*** (0.62)	4.014*** (1.15)
Commercial bank	0.129 (0.90)	0.682 (0.67)	0.124 (0.22)	-0.150 (0.10)	-0.364 (0.46)	1.058 (0.65)	3.766*** (1.15)	6.534** (2.92)
Cooperative bank	1.054 (1.02)	1.054 (0.83)	-0.709** (0.34)	-0.087 (0.11)	-0.328 (0.60)	1.789** (0.84)	-0.437 (1.59)	
Investment bank	-0.465 (1.99)	-3.693** (1.69)	0.515 (0.88)	0.916*** (0.22)	-2.999* (1.76)	-4.483** (2.05)	2.988 (3.13)	
salary			0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000** (0.00)	0.000** (0.00)
L-return			-0.099 (0.14)	0.010 (0.07)	0.073 (0.30)	0.641 (0.62)	-0.823 (0.92)	-0.896 (1.31)
Constant	17.310 (14.05)	12.357 (9.93)	-4.619 (4.85)	-0.937 (1.23)	6.101 (10.78)	22.200* (12.99)	-1.862 (16.20)	5.280 (16.58)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.594	0.689	0.645	0.404	0.726	0.673	243	238
N	153	153	153	153	153	153		

trols. The last two columns depict logit regressions with a dummy taking value one if options or rights are granted and value zero otherwise as the dependent variable. In line with the substitution hypothesis a more active compensation committee seems to grant less options with lower vega and lower deltas. More independent committees are more likely to grant options with higher deltas. This is in line with the idea that it needs good corporate governance to implement contracts that align CEO incentives through options. The option characteristics, the attachment of vesting criteria, the moneyness of the option at grant date and the vesting period are regressed on the governance variables in columns three to five. Large compensation committees grant more options which are more in the money at grant date and with smaller vesting periods, which would imply that weaker governance could lead to option characteristics which are more favorable to the CEO. Women on the board seem to be responsible for less option grants with lower values, smaller sensitivities to stock price movement, more vesting criteria and longer vesting periods. All in line with the evidence that women are more risk averse and less overconfident than men.

6 Managerial compensation and the financial crisis

Beltratti and Stulz (2009) try to explain bank returns after the Lehman collapse by looking at bank-level governance, country level regulation and bank balance sheets. On the bank-governance side they find that banks with shareholder friendly boards performed worse during the crisis, but they cannot identify an effect of compensation policy proxies on bank returns. Fahlenbrach and Stulz (2009) use US-data on CEO compensation to identify the effect of stock and option based CEO compensation on banks' performance during the recent financial crisis. They find not only that high risk taking incentives and strong alignment with shareholders' interests had no impact on a bank's performance during the crisis, but also that CEOs' portfolio values declined considerably. There seems to be no evidence of CEOs foreseeing the financial downturn and reducing their exposure to stocks.

In general we would expect banks to perform better in a stricter regulatory environment, with CEOs well aligned to bank performance and with little risk taking incentives. A compensation structure rewarding long-term

performance rather than short term profits would be considered favorable.

I follow the approach of Fahlenbrach and Stulz (2009) and try to explain stock market returns and accounting measures of performance (ROA and ROE) during the financial crisis in my international sample. Different to Fahlenbrach and Stulz (2009) I use four different measures of risk taking incentives. The option vega, vega from stocks and options and vega from stocks, options and restricted stocks. To take into account that most likely risky bank policies have not been implemented just before the crisis but that exposure to risk has been implemented over several years I take not only the level of vega in 2006 but also the average vega over the years 2001 to 2006 into account. Additionally the ratio of cash bonus to salary is taken as a proxy for short term risk taking incentives. Bonus payments are typically based on accounting measures and related to the previous fiscal year, which makes this a backward looking measure. However it is interesting to include because different to options, short term bonus programs may give incentives to increase short-term profits while reducing long-term returns.

Control variables are chosen to represent the regulatory environment (Rights, Official, Capital, Independence, Private Monitoring) and bank characteristics (Size, Market-to-book ratio, Capital ratio). Banks with high levels of capital are thought to be less dependent on outside financing when markets freeze up. Lagged returns are included to control for the possibility that banks engaged in risky strategies with large tail risks that paid high returns just before the crisis but performed much worse during the crisis.

In line with the findings of Fahlenbrach and Stulz (2009) the results in Table 16 show that CEO risk taking incentives had little effect on the equity returns of banks during July 2007 and December 2008 in an international sample. The regressions in Table 16 use delta and vega from options, column one and four, from options and stocks, columns two and five and from stocks, options and restricted stocks, columns three and six. The first three regressions models use incentive variables from the year 2006 while in columns four to six the average incentives over the years 2001 to 2006 are used. For most of the specifications neither high vega contracts, nor low delta contracts, nor high bonuses had a negative influence on returns. The signs of the coefficients point however in the predicted direction. One concern is that market participants overreacted during the height of the financial crisis and did not value all banks correctly. I try to address this concern in Table 17 by showing that the results also hold for a longer sample period, July 2007 till April 2009, in which markets arguably calmed down and mispricing should have

Table 16: Regression of the stock market returns between July 2007 and December 2008 on bank characteristics, indices representing the legal and regulatory environment and on variables describing CEO incentives. The only bank-year considered is 2006. Means are the averages over the period 2001-2006. Rights the anti-director rights index, official is an index of supervisory power, restrict is an index of regulatory restrictions on bank activities, independence measures to which degree supervisory authorities are independent from the government and legally protected from the banking system, capital is an index of regulatory capital restrictions, private monitoring is an index of the extent to which supervisory agencies encourage private monitoring.

Variable	Return July 2007 - December 2008					
delta option	0.013 (0.09)					
vega option	-0.132 (0.20)					
delta option & stock		-0.004 (0.03)				
vega option & stock		-0.075 (0.11)				
delta option & stock & rights			0.001 (0.02)			
vega option & stock & rights			-0.050 (0.09)			
mean(delta option)				0.347** (0.14)		
mean(vega option)				-0.351 (0.23)		
mean(delta option & stock)					0.038 (0.03)	
mean(vega option & stock)					0.132 (0.17)	
mean(delta option & stock & right)						0.035 (0.02)
mean(vega option & stock & right)						0.259** (0.10)
bonus ratio	-0.001 (0.00)	-0.007 (0.00)	-0.007 (0.00)			
mean(bonus ratio)				-0.005 (0.00)	-0.006 (0.00)	-0.004 (0.00)
return 2005	-0.030 (0.28)	0.014 (0.31)	0.069 (0.27)	0.064 (0.24)	0.170 (0.33)	0.420* (0.20)
roaa	11.946 (9.84)	9.555 (10.79)	-9.953 (17.52)	2.529 (13.65)	-0.674 (16.52)	-15.935*** (4.44)
capital ratio	4.557** (1.70)	5.182** (2.06)	8.264** (3.43)	4.488** (1.97)	5.300* (2.64)	8.013*** (1.88)
mtb	0.016** (0.01)	0.017** (0.01)	0.085 (0.06)	0.011*** (0.00)	0.011*** (0.00)	0.015** (0.01)
ln(ta)	0.010 (0.02)	0.000 (0.03)	0.003 (0.03)	0.001 (0.03)	-0.002 (0.04)	-0.010 (0.03)
Rights	0.004 (0.04)	-0.022 (0.04)	-0.028 (0.04)	0.073** (0.03)	0.083* (0.04)	0.078* (0.04)
Official	-0.036** (0.02)	-0.044* (0.02)	-0.055** (0.02)	-0.024* (0.01)	-0.032 (0.02)	-0.033 (0.02)
Restrict	-0.007 (0.01)	-0.022* (0.01)	-0.032 (0.02)	0.009 (0.01)	0.005 (0.01)	-0.004 (0.02)
Capital	0.021 (0.02)	0.034* (0.02)	0.069** (0.03)	0.019 (0.02)	0.023 (0.02)	0.053** (0.02)
Independence	0.094 (0.06)	0.126* (0.07)	0.264* (0.13)	0.046 (0.05)	0.070 (0.07)	0.166* (0.09)
private monitoring	0.157** (0.06)	0.179** (0.06)	0.138** (0.06)	0.089* (0.05)	0.082 (0.06)	0.050 (0.06)
Constant	-2.192*** (0.74)	-1.922** (0.88)	-2.110* (1.13)	-1.859** (0.74)	-1.752 (1.03)	-1.658 (1.00)
R^2	0.370	0.335	0.355	0.485	0.448	0.587
N	86	74	64	74	66	57

Table 17: Regression of the stock market returns between July 2007 and March 2009 on bank characteristics, indices representing the legal and regulatory environment and on variables describing CEO incentives. The only bank-year considered is 2006. Means are the averages over the period 2001-2006. Deposit is ratio the ratio of deposits to total assets. Rights the anti-director rights index, official is an index of supervisory power, restrict is an index of regulatory restrictions on bank activities, independence measures to which degree supervisory authorities are independent from the government and legally protected from the banking system, capital is an index of regulatory capital restrictions, private monitoring is an index of the extent to which supervisory agencies encourage private monitoring.

Variable	Return July 2007 - April 2009					
delta option	0.014 (0.10)					
vega option	-0.220 (0.20)					
delta option & stock		-0.016 (0.03)				
vega option & stock		-0.129 (0.10)				
delta option & stock & rights			-0.018 (0.02)			
vega option & stock & rights			-0.151 (0.10)			
mean(delta option)				0.368** (0.13)		
mean(vega option)				-0.394 (0.24)		
mean(delta option & stock)					0.046 (0.04)	
mean(vega option & stock)					0.142 (0.16)	
mean(delta option & stock & right)						0.057 (0.03)
mean(vega option & stock & right)						0.238** (0.11)
bonus ratio	-0.001 (0.00)	-0.007 (0.01)	-0.007 (0.00)			
mean(bonus ratio)				-0.001 (0.01)	-0.003 (0.01)	-0.001 (0.01)
return 2005	-0.021 (0.32)	0.071 (0.36)	0.313 (0.29)	0.120 (0.25)	0.287 (0.34)	0.468* (0.23)
capital ratio	2.455 (1.84)	2.054 (2.26)	7.322* (3.69)	2.395 (1.65)	2.639 (2.60)	5.014 (3.12)
roaa	9.187 (9.81)	6.152 (9.80)	-21.342 (18.71)	-4.535 (10.64)	-9.247 (12.56)	-22.273*** (4.44)
mtb	0.014 (0.01)	0.015 (0.01)	0.116** (0.05)	0.014*** (0.00)	0.013*** (0.00)	0.019** (0.01)
ln(ta)	0.002 (0.02)	-0.013 (0.03)	0.015 (0.03)	-0.012 (0.03)	-0.023 (0.04)	-0.034 (0.04)
Rights	0.018 (0.04)	-0.001 (0.05)	0.032 (0.06)	0.100*** (0.03)	0.124** (0.05)	0.114** (0.05)
Official	-0.034* (0.02)	-0.034 (0.03)	-0.036 (0.03)	-0.017 (0.02)	-0.020 (0.02)	-0.022 (0.03)
Restrict	0.019 (0.02)	0.014 (0.02)	0.039 (0.03)	0.017 (0.01)	0.018 (0.01)	0.001 (0.02)
Capital	-0.008 (0.02)	-0.001 (0.03)	-0.013 (0.03)	0.013 (0.02)	0.011 (0.02)	0.042 (0.03)
Independence	0.028 (0.06)	0.015 (0.08)	-0.022 (0.11)	0.047 (0.05)	0.040 (0.08)	0.154 (0.11)
private monitoring	0.179** (0.07)	0.196** (0.07)	0.180** (0.07)	0.078 (0.06)	0.068 (0.07)	0.037 (0.08)
Constant	-2.043** (0.74)	-1.597* (0.86)	-2.703** (1.14)	-1.543 (0.93)	-1.234 (1.13)	-1.008 (1.17)
R^2	0.280	0.260	0.307	0.380	0.355	0.470
N	87	75	65	74	66	57

Table 18: Regression of the return on assets between the 3rd quarter 2007 and the 4th quarter 2008 on bank characteristics, indices representing the legal and regulatory environment and on variables describing CEO incentives. The only bank-year considered is 2006. Means are the averages over the period 2001-2006. Rights the anti-director rights index, official is an index of supervisory power, restrict is an index of regulatory restrictions on bank activities, independence measures to which degree supervisory authorities are independent from the government and legally protected from the banking system, capital is an index of regulatory capital restrictions, private monitoring is an index of the extent to which supervisory agencies encourage private monitoring.

Variable	Return on Assets 3rd quarter 2007 - 4th quarter 2008					
delta option	0.057*** (0.00)					
vega option	-0.100*** (0.01)					
delta option & stock		0.018*** (0.00)				
vega option & stock		-0.040*** (0.01)				
delta option & stock & rights			0.017*** (0.00)			
vega option & stock & rights			-0.034*** (0.01)			
mean(delta option)				0.049** (0.02)		
mean(vega option)				-0.058** (0.03)		
mean(delta option & stock)					0.003 (0.00)	
mean(vega option & stock)					0.004 (0.01)	
mean(delta option & stock & right)						0.003 (0.00)
mean(vega option & stock & right)						0.008 (0.01)
bonus ratio	-0.000*** (0.00)	-0.001 (0.00)	-0.001 (0.00)			
mean(bonus ratio)				-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)
return 2005	0.021 (0.03)	0.066* (0.03)	0.052* (0.02)	0.038* (0.02)	0.061* (0.03)	0.065** (0.02)
capital ratio	0.014 (0.09)	-0.056 (0.08)	0.020 (0.08)	0.284*** (0.08)	0.282*** (0.10)	0.290** (0.10)
mtb	0.002** (0.00)	0.001* (0.00)	0.003 (0.00)	0.002 (0.00)	0.001 (0.00)	0.002 (0.00)
ln(ta)	-0.001 (0.00)	-0.000 (0.01)	-0.002 (0.01)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)
Rights	0.004** (0.00)	0.007 (0.01)	0.004 (0.01)	0.007*** (0.00)	0.008** (0.00)	0.007** (0.00)
Official	0.002 (0.00)	0.002* (0.00)	0.001 (0.00)	0.001 (0.00)	0.002 (0.00)	0.002 (0.00)
Restrict	-0.000 (0.00)	-0.000 (0.00)	-0.004* (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.002 (0.00)
Capital	0.001 (0.00)	0.000 (0.00)	0.005** (0.00)	0.002 (0.00)	0.001 (0.00)	0.004** (0.00)
Independence	0.001 (0.00)	0.003 (0.01)	0.025*** (0.01)	0.004* (0.00)	0.004 (0.00)	0.014*** (0.00)
private monitoring	0.004 (0.00)	-0.002 (0.00)	-0.006* (0.00)	-0.002 (0.00)	-0.007** (0.00)	-0.010*** (0.00)
Constant	-0.029 (0.07)	-0.036 (0.15)	0.002 (0.15)	-0.106 (0.08)	-0.096 (0.12)	-0.091 (0.13)
R^2	0.625	0.575	0.679	0.489	0.414	0.490
N	78	67	57	68	61	52

Table 19: Regression of the return on equity between the 3rd quarter 2007 and the 4th quarter 2008 on bank characteristics, indices representing the legal and regulatory environment and on variables describing CEO incentives. The only bank-year considered is 2006. Means are the averages over the period 2001-2006. Rights the anti-director rights index, official is an index of supervisory power, restrict is an index of regulatory restrictions on bank activities, independence measures to which degree supervisory authorities are independent from the government and legally protected from the banking system, capital is an index of regulatory capital restrictions, private monitoring is an index of the extent to which supervisory agencies encourage private monitoring.

Variable	Return on Equity 3rd quarter 2007 - 4th quarter 2008					
delta option	1.696***					
	(0.35)					
vega option	-3.053***					
	(0.69)					
delta option & stock		0.522***				
		(0.19)				
vega option & stock		-1.181**				
		(0.46)				
delta option & stock & rights			0.489***			
			(0.10)			
vega option & stock & rights			-0.968***			
			(0.33)			
mean(delta option)				1.042**		
				(0.50)		
mean(vega option)				-1.360*		
				(0.74)		
mean(delta option & stock)					0.084	
					(0.06)	
mean(vega option & stock)					-0.136	
					(0.25)	
mean(delta option & stock & right)						0.084
						(0.07)
mean(vega option & stock & right)						-0.075
						(0.26)
bonus ratio	-0.013***	-0.036*	-0.032*			
	(0.00)	(0.02)	(0.02)			
mean(bonus ratio)				-0.007	-0.006	-0.004
				(0.01)	(0.01)	(0.01)
return 2005	-0.452	1.067**	0.775	0.405	0.841	0.943
	(0.60)	(0.49)	(0.50)	(0.42)	(0.56)	(0.61)
capital ratio	-3.852	-3.373	-1.449	5.078	6.114	6.532
	(3.88)	(5.52)	(4.96)	(3.39)	(4.99)	(5.55)
mtb	0.027*	0.011	-0.031	0.026**	0.022	0.029*
	(0.01)	(0.01)	(0.07)	(0.01)	(0.01)	(0.01)
ln(ta)	-0.058	0.017	-0.048	0.065	0.092	0.085
	(0.07)	(0.07)	(0.07)	(0.06)	(0.08)	(0.07)
Rights	0.010	0.195	0.161	0.197*	0.211	0.216
	(0.13)	(0.15)	(0.16)	(0.11)	(0.13)	(0.16)
Official	0.010	0.041	0.016	0.008	0.020	0.032
	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)
Restrict	0.004	0.009	-0.076	0.022	0.011	-0.020
	(0.03)	(0.05)	(0.06)	(0.03)	(0.04)	(0.06)
Capital	0.010	-0.017	0.081	0.021	0.014	0.053
	(0.04)	(0.05)	(0.07)	(0.03)	(0.04)	(0.05)
Independence	-0.005	0.153	0.589**	0.090	0.158	0.322
	(0.08)	(0.16)	(0.26)	(0.06)	(0.12)	(0.21)
private monitoring	0.214	-0.040	-0.086	-0.042	-0.162	-0.221*
	(0.15)	(0.12)	(0.10)	(0.13)	(0.11)	(0.12)
Constant	0.116	-1.605	0.122	-3.096	-3.251	-3.180
	(2.03)	(2.43)	(2.36)	(2.01)	(2.55)	(2.38)
R^2	0.591	0.580	0.713	0.385	0.323	0.395
N	78	67	57	68	61	52

been less severe.

Banks with higher capital ratios and higher market-to-book ratios performed better. when looking at the regulatory variables it seems that banks from countries with strong regulation performed worse while stricter capital requirements and better private monitoring had a positive effect.

Table 18 and Table 19 show a different picture. Accounting performance seems to depend strongly on the incentives provided to the CEO. In Table 18 the dependent variable is the return on assets calculated from quarter three of 2007 till the fourth quarter of 2008 as net income over total assets.¹⁷ In Table 19 the same exercise is done for return on equity. The incentive variables are specified as before, differentiating between option, stock and restricted stock based compensation and between the incentives in 2006 and in the five years before the crisis. For almost all the specifications return on equity and return on assets have been higher for banks with CEOs with high delta contracts in 2006. Moreover high vega banks performed worse, albeit coefficients are less significant.

An explanation for these results might be that stock markets overreacted and undervalued banks which were in fact healthier than their competitors. If that was the case the mispricing did however not vanish till the April 2009 as we have seen in Table 17. Alternatively a contagion story could explain the results. Banks with different accounting performance were discounted equally by the market which incorporated the possibility of a spillover from weak banks to otherwise healthy banks. Such a discount would not necessarily be unwound over time which would be consistent with the results in Table Table 17. In many specifications banks performed worse if the CEOs received large bonuses just before the financial crisis. Bonus payments in the five year periods before the financial crisis however did not influence performance. This could be evidence in favor of myopic behavior before the onset of the crisis. Strategies that payed off in the very short run could have increased accounting performance, and therefore bonuses, just before the crisis. At the same time those strategies could have been profitable only in the short run, but value destroying in the long run.

¹⁷Not all the banks disclose quarterly financial statements and not all of the banks end their fiscal year in December which is why the sample size decreases compared to the regressions including equity returns.

Table 20: CEO wealth and CEO options characteristics after 2006. Stockholding is the dollar value of CEO stockholdings, Restricted is the dollar value of all restricted stocks, Option is the Black-Scholes value of option holdings. In-the-money denotes the percentage of options in-the-money, vested the percentage of options vested and vested & in-the-money the percentage of options both in-the-money and vested.

Date	Stockholding	Restricted	Option	In-the-money	Vested	Vested & in-the-money	Options held	N
2006	38,247,656	10,769,000	16,752,301	94%	58%	53%	1,285,955	101
2007	47,460,514	10,519,361	13,080,124	72%	61%	47%	1,144,970	101
2008	17,436,215	3,954,155	9,261,759	51%	66%	44%	1,144,119	88
CEOs that stayed throughout the whole period								
2006	33,392,676	9,103,909	11,776,307	96%	55%	51%	1,092,480	61
2007	32,545,937	10,229,773	11,978,643	72%	59%	46%	1,114,761	61
2008	18,258,510	4,266,423	8,197,279	55%	69%	45%	1,221,738	61

Table 20 depicts the development of CEO wealth during the years 2006-2008. While portfolio values were still increasing until 2007 they fell dramatically in 2008. To disentangle wealth loss from a drop in portfolio value because of a change in the position of the CEO I report also the portfolio values of CEO who stayed with their bank until 2009. Out of 101 CEOs in 2006 39 left their company during the period 2006-2009. The portfolio values of those staying dropped on average by around \$ 23 million between 2006 and 2008 while the number of options outstanding even increased through new grants. Clearly CEOs did either not foresee the events or if they did they did not react to this insider information by selling their assets. One potential reason might be overconfidence as described in Malmendier and Tate (2005). A more detailed analysis of CEOs' exercise behavior is however left for future research.

7 Conclusion

This paper uses a new unique dataset to address the topic of managerial compensation in the financial sector throughout the world. For the first time detailed data on CEO compensation in an international sample and detailed characteristics of the board and compensation committees of these boards can be used to assess the risk taking incentives of bank CEOs and their interaction with corporate governance and regulation.

First I describe the development of structure and level of executive compensation. The main findings are that cash compensation and bonuses have reached similar levels in most countries, long term incentive plans have been widely adapted and equity based compensation plays an increasingly important role. With very few exceptions CEOs from the US rely far more

on equity based compensation than those of banks from any other country throughout the whole sample period. Also long-term bonus payments have been first adapted in the US.

After describing the main features of the dataset I try to explain bank risk taking with the structure of a CEO's compensation contract. The measure of CEO incentives are delta, the sensitivity of the CEOs portfolio to changes in stock prices and vega, the sensitivity of the portfolio to changes in stock price volatility. Delta is associated with less risk taking incentives and better alignment of CEO wealth to company performance. A CEO with high delta contracts is more exposed to the performance of her bank and therefore tries to reduce risk, given that she is risk averse. High vega contracts on the other hand have the opposite effect, a CEO with such a contract profits from an increase in the volatility and has therefore an incentive to increase risk.

My results show that there is a link between CEO incentives and bank risk taking. Using simultaneous equation models I find that equity volatility, idiosyncratic risk and systematic risk increase in vega and decreases in delta. Similarly the distance-to-Default increases in delta and decreases in vega. When looking at bank policies I find that the non-interest income to total income ratio is higher for CEOs with high vega and low delta. This is consistent with the view that high non-interest income, is associated with riskier bank policies, e.g. more fee-based operations like investment banking or higher levels of securitization. Banks with higher delta choose higher capital levels but leave the Tier 1 ratio unchanged, which I interpret as evidence that leverage is another channel through which bank risk can be introduced, however limited by regulatory requirements.

Although coefficients are smaller than in studies on US banks I do not find that the US banks drive the results. It seems that the difference is more likely result of a smaller sample of mostly large US banks. I do not find that regulation has a direct impact on the effectiveness of the transmission of risk taking incentives into higher bank risk, but that banks in highly regulated countries are more active when rebalancing their CEO incentives depending on the level of bank risk.

In general the boards or compensation committees of bank do not seem to react strongly to bank risk when setting the compensation structure.

Having shown that compensation does effect bank risk and bank policies I look at the determinants of compensation components in detail. Although country effects do explain a large part of the variation in compensation, reg-

ulatory variables and corporate governance variables have some explanatory power too. As in Fahlenbrach (2008) I find that banks with weak corporate governance structures tend grant contracts with larger pay-for-performance components like high delta options and large bonus payments, suggesting that strong corporate governance and high levels of pay-for-performance are substitutes.

The compensation committee does not have any impact on the level of incentive pay, bonus payments or total compensation. It seems however to be of importance when looking at the characteristics of the options granted. A weaker committee, i.e. with more committee members, tends to give the CEO options with a shorter vesting period and a lower exercise price. A more active committee grants less options with lower risk taking incentives and less exposure to changes in the banks' stock price. Women on the board lead to lower levels of option based pay and to option grants that are less favorable to the CEO.

Using several Worldbank indices to capture the strength and quality of regulation in each country and the change of it over time I find that stronger regulation or external monitoring does not substitute for equity incentives. On the contrary stronger regulation leads banks to grant more performance based pay, probably to counterbalance stricter supervisory restriction.

I then look at banks performance during the financial crisis. Although I do not find any impact of managerial compensation on equity returns during the financial crisis I can show that accounting based performance measures are correlated with my incentive measures. Banks relying on option based compensation performed worse than banks whose CEOs held a large amount of stocks. High bonus payments in the year before the financial crisis led to worse performance during the crisis. These results could be explained by an contagion story in which banks that are healthy in terms of accounting performance are discounted by the market because of their exposure to weaker banks.

Especially in the light of the recent proposals on regulating CEO compensation in banking several important policy recommendations can be made. First, equity-based pay and a large fraction of long-term compensation components were predominantly used in the US, especially in the beginning of the sample period. Regulation that emphasizes these components will necessarily push compensation policies towards more US based system. Second,

the specific characteristics of equity based remuneration components matter for CEO risk taking incentives and should therefore be taken into account by regulators when assessing a bank's incentive structure. Third, strong supervisors are able to influence the way banks set their compensation structure. Bank boards are more active in balancing risk and incentives when regulation is strong but may also counteract strong supervision by setting higher risk taking incentives. Fourth, good corporate governance standards have been widely adopted and were, especially in the US, in place during the whole sample period without restricting CEO pay considerably. Focusing on easily measurable variables like board independence, the existence of a remuneration committee or board size does not seem to be a useful way to measure the boards ability to align incentives with a bank's risk bearing capabilities. The FSB's suggestion to employ board members with expertise in risk management and compensation seems to go in the right direction.

A Sample banks

Table 21: Columns two to five show the period when information was disclosed on total compensation, cash bonuses, stock holdings and option holdings respectively.

Bank name	Total compensation	Bonus	Stock holdings	Option holdings
Aareal Bank Ag	2005-2008	2005-2008	NA	2005-2008
Abbey National Plc	1998-2004	1998-2004	1998-2004	1998-2004
ABN Amro Holding NV	2000-2007	2000-2007	2002-2006	1998-2007
Absa Group Ltd	2002-2008	2002-2008	2000-2008	2005-2008
Alliance & Leicester Plc	2002-2007	2002-2007	2002-2007	2000-2007
Allied Irish Banks plc	1999-2008	1999-2008	1997-2008	1997-2008
Anglo Irish Bank Corporation	2001-2008	2001-2008	2000-2008	2000-2008
American Express Company	1997-2008	1997-2008	1997-2008	1997-2008
Amsouth Bancorporation	2000-2005	2000-2005	2000-2005	2000-2005
Australia and New Zealand Banking Group	1998-2008	1998-2008	1998-2008	1998-2008
Banco Espaol de Crdito	2005-2008	2005-2008	NA	2004-2008
Banca Intesa	2001-2006	2001-2006	2002-2006	2001-2006
Banca Nazionale del Lavoro SpA	1998-2005	1998-2005	NA	1998-2005
Banco Popular Espanol	2005-2008	2005-2008	2000-2008	2000-2008
Banco Bilbao Vizcaya Argentaria SA	2003-2008	2002-2008	2002-2008	NA
Banco Santander SA	2002-2008	2002-2008	2001-2008	2000-2008
Bangkok Bank Pcl	2005-2008	NA	2005-2008	2005-2008
Bank Hapoalim BM	2003-2008	2003-2008	2008	NA
Bank Leumi Le Israel BM	2001-2008	2008	NA	2001-2008
Bank of America Corporation	1997-2008	1997-2008	1997-2008	1997-2008
Bank of China (Hong Kong) Limited	2004-2008	2004-2008	2007-2008	2000-2008
Bank of Ireland	2001-2008	2001-2008	1997-2008	1997-2008
Bank of Nova Scotia	1997-2008	1997-2008	1997-2008	1997-2008
Bank of Scotland Plc	1997-2001	1997-2001	1997-2001	1997-2001
Bank of Montreal	1997-2008	1997-2008	1997-2008	1997-2008
Barclays Plc	1997-2008	1997-2008	1997-2008	1997-2008
BB&T Corporation	1997-2008	1997-2008	1997-2008	1997-2008
Bear Stearns Companies Inc.	2000-2007	2000-2007	2000-2007	2000-2007
BNP Paribas	1999-2008	1999-2008	1999-2008	1997-2008
Bradford & Bingley Plc	2000-2007	2000-2007	2000-2007	2000-2007
Canadian Imperial Bank of Commerce	1997-2008	1997-2008	1999-2008	1997-2008
Carnegie Investment Bank AB	2002-2008	2002-2008	2001-2008	2002-2008
Charter One Financial Inc.	2000-2003	2000-2003	2000-2003	2000-2003
Citigroup Inc	2000-2008	2000-2008	2000-2008	2000-2008
Comerica Inc	1997-2008	1997-2008	1997-2008	1997-2008
Commerzbank AG	2004-2008	2004-2008	NA	NA
Commonwealth Bank of Australia	1997-2008	1997-2008	1997-2008	1997-2008
Credit Agricole S.A.	2003-2008	2004-2008	2005-2008	2003-2008
Credit Industriel et Commercial	2005-2006	2005-2006	NA	2001-2006
Credit Lyonnais	1999-2003	1999-2003	NA	1999-2003
Credit Suisse Group AG	2007-2008	2007-2008	2007-2008	2000-2008
DBS Group Holding Ltd	2002-2007	2002-2007	2000-2007	1999-2007
Danske Bank A/S	2005-2008	2005-2008	NA	2001-2008
Deutsche Bank AG	2003-2008	2003-2008	2003-2008	2001-2008
Deutsche Postbank AG	2004-2008	2004-2008	NA	2004-2008
Dexia	2000-2008	2000-2008	2000-2008	2000-2008
DnB Nor ASA	1999-2008	1999-2008	1999-2008	1999-2008
Erste Group Bank AG	2004-2008	2004-2008	2003-2008	1999-2008
Federal National Mortgage Association	1997-2008	1997-2008	1997-2008	1997-2008
Fifth Third Bancorp	1997-2008	1997-2008	1997-2008	1997-2008
First Rand Group	2001-2008	2001-2008	2001-2008	2001-2008
Fortis	2001-2008	2001-2008	2001-2008	1997-2008
Goldman Sachs Group Inc	1999-2008	1999-2008	1999-2008	1999-2008
Gruppo Monte dei Paschi di Siena	2007-2008	2007-2008	NA	2006-2008
HBOS Plc	2001-2008	2001-2008	2001-2008	2001-2008
HSCB Holdings Plc	1997-2008	1997-2008	1997-2008	1997-2008
Halifax Group Plc	1997-2000	1997-2000	1997-2000	NA
Hang Seng Bank Ltd.	2002-2008	2002-2008	2002-2008	2002-2008
Huntington Bancshares Inc	1997-2008	1997-2008	1997-2008	1997-2008
Hypo Real Estate Holding AG	2003-2008	2003-2008	NA	2003-2008
IKB Deutsche Industriebank	2005-2008	2005-2008	NA	2005-2008
ING Groep NV	2000-2008	2000-2008	2005-2008	1998-2008
Intesa Sanpaolo	2007-2008	2007-2008	2007-2008	2007-2008
Irish Life & Permanent plc	2000-2008	2000-2008	2000-2008	2000-2008
Israel Discount Bank Ltd	2001-2008	2008	NA	2001-2008
JP Morgan Chase & Co	1997-2008	1997-2008	1997-2008	1997-2008
KeyCorp	1997-2008	1997-2008	1997-2008	1997-2008
LBB Holding AG	2006-2008	2006-2008	NA	2006-2008
Lehman Brothers Holdings Inc	1997-2007	1997-2007	1997-2007	1997-2007

Lloyds Banking Group Plc	1997-2008	1997-2008	1997-2008	1997-2008
M&T Bank Corp.	2000-2006	2000-2006	2000-2006	2000-2006
Macquarie Group Limited	2000-2008	2000-2008	2000-2008	2000-2008
Malayan Banking BHD	2008	NA	2000-2008	2000-2008
Mediobanca Spa	2003-2008	2003-2008	2003-2008	2003-2008
Mellon Financial Corp.	2000-2006	2000-2006	2000-2006	2000-2006
Morgan Stanley	1997-2008	1997-2008	1997-2008	1997-2008
National Australia Bank Limited	1998-2008	1998-2008	1997-2008	1997-2008
National Bank of Canada	2002-2008	2002-2008	2002-2008	2002-2008
National City Corp.	2000-2007	2000-2007	2000-2007	2000-2007
Natixis	2002-2008	2003-2008	NA	2002-2008
Nedbank	2000-2008	2000-2008	2000-2008	2000-2008
Nordea Bank AB	2000-2008	2000-2008	2000-2008	2000-2008
Northern Rock Plc	1997-2008	1997-2008	1997-2006	1997-2000
Northern Trust Corporation	1997-2008	1997-2008	1997-2008	1997-2008
Oversea Chinese Banking	2002-2008	2002-2008	2001-2008	2001-2008
PNC Financial Corporation	1997-2008	1997-2008	1997-2008	1997-2008
Popular Inc	2000-2008	2000-2008	2000-2008	2000-2008
Regions Financial Corporation	1997-2008	1997-2008	1997-2008	1997-2008
Royal Bank of Canada	1997-2008	1997-2008	1999-2008	1997-2008
Royal Bank of Scotland Group Plc	1997-2008	1997-2008	1997-2008	1997-2008
Sampo Bank	2001-2008	NA	NA	2001-2008
Sanpaolo IMI	2001-2006	2001-2006	2005-2006	2001-2006
Skandinaviska Enskilda Banken AB	1997-2008	1997-2008	1998-2008	1997-2008
Societe Generale	2000-2008	2000-2008	2000-2008	1997-2008
SNS Bank	2003-2008	2003-2008	NA	2003-2008
St. George Bank	2002-2007	2002-2007	2002-2007	2002-2007
Standard Bank Group Ltd.	2000-2008	2000-2008	2000-2008	2000-2008
Standard Chartered Plc	1997-2008	1997-2008	1997-2008	1997-2008
State Street Corporation	1997-2008	1997-2008	1997-2008	1997-2008
Storebrand	2000-2008	2002-2008	2000-2008	2000-2008
SunTrust Banks Inc.	1998-2008	1998-2008	1998-2008	1998-2008
Svenska Handelsbanken	1998-2007	1998-2007	1997-2008	1997-2008
Swedbank AB	2001-2008	2001-2008	2002-2008	1999-2008
The Bank of East Asia Limited	2004-2008	2004-2008	2001-2008	2000-2008
Toronto Dominion Bank	1997-2008	1997-2008	1998-2008	1997-2008
Unionbanca Corp.	2000-2007	2000-2007	2000-2007	2000-2007
United Overseas Bank Ltd.	2002-2008	2002-2008	2000-2008	2000-2008
UBS AG	2008	2008	2008	2003-2008
US Bancorp	2001-2008	2001-2008	2001-2008	2001-2008
Wachovia Corp.	2000-2007	2000-2007	2000-2007	2000-2007
Washington Mutual Inc.	1997-2007	1997-2007	1997-2007	1997-2007
Wells Fargo & Company	1997-2008	1997-2008	1997-2008	1997-2008
Westpac Banking Corporation	1997-2008	1997-2008	1997-2008	1997-2008
Wing Hang Bank Limited	2004-2008	2004-2008	2000-2008	2000-2008

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