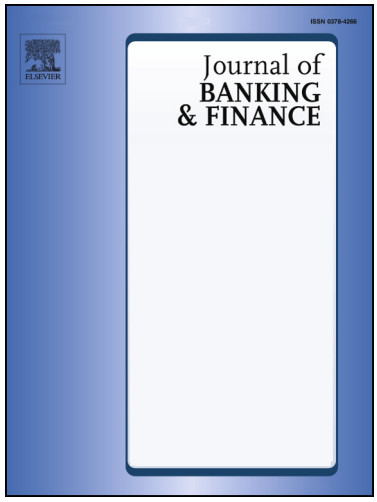

Investment Horizon, Risk, and Compensation in the Banking Industry

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Investment Horizon, Risk, and Compensation in the Banking Industry

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Investment Horizon, Risk, and Compensation in the Banking Industry

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Abstract

This paper examines the relation between the investment horizon of banks and their CEO compensation, and its consequences for risk and performance. We find that banks with short-term investment intensity pay more cash bonus, exhibit higher risk and perform more poorly than banks with longer-term investment intensity. This evidence is broadly consistent with the view that short-term means of compensation encouraged a short-term investment focus, which in turn led to both higher risk and resulted in poorer performance, culminating in the sub-prime crisis. The inverse risk-performance relation suggests pay schemes were incongruent with shareholders' interest. Moreover, pay arrangements used in banks prior to the subprime crisis exposed banks to the ex-post settling up problem (the clawback problem).

Keywords: investment horizon, compensation, risk, performance, clawback problem

"...Gamblers broke the banks" (Lionel Barber, Financial Times, 2008)

1 Introduction

The subprime crisis has brought bankers' compensation practices under close public and political scrutiny. A common argument has been that compensation encouraged risk-taking and short-term focus to the detriment of shareholders and, perhaps ironically, bankers themselves (Fahlenbrach and Stulz, 2010). Bankers seem to agree that the short-term focus in compensation is to blame, at least in part. For example, the Institute of International Finance (2009) presents survey results in which bankers admit compensation schemes encouraged high risk-taking with little regard to the ultimate success of their investments.[1] Notwithstanding these claims, research on the link between bank investment strategies and compensation is yet sparse.

We attempt to provide evidence that is relevant for this issue by investigating the link between bank CEO cash bonus, investment horizon, performance, and risk. Cash bonus is a short-term form of compensation and thus is expected to be aligned with the intensity of a bank's short-term investment horizon. However, because the outcome of short-term positions are often unpredictable in nature, they are expected to be positively related to risk. To the extent that cash compensation is paid upfront for risk-increasing positions, the bank is exposed to the possibility that it will not be able to claw back compensation, when expected cash flows fail to materialize.[2] Furthermore, if bankers invest in short-term risky assets to benefit themselves at the expense of shareholders, we would not expect to find a positive relation between short-term investment horizon and bank performance. Overall, therefore, if the abovementioned criticism is borne out by the data, we would expect higher cash bonuses to lead to higher intensity of short-term positions, with the latter in turn leading to higher risk, but not better performance. To the extent that carrying out a business strategy that focuses on short-term risky investment is subsequently rewarded, we also expect to find a feedback loop from short-term investment horizon to cash bonus.

We capture a bank's investment horizon by reference to its composition of assets on the balance sheet. Specifically, we exploit the fact that accounting rules under SFAS No. 115 Accounting for Certain Investments in Debt and Equity Securities (FASB 1993), require banks to provide balance sheet information about asset types that distinguishes between short-term, and longer-term investments.

[1] See also, for example, Buttonwood – The bonus racket (The Economist, 21 January 2009).

[2] As Leone et al. (2006) highlight, the ex-post settling up problem does not exist with equity-based compensation.

Thus, a bank's balance sheet reflects management intention with respect to the investment-horizon and the nature of the underlying asset types. In particular, short-term positions, which are typically classified as trading assets, reflect an investment strategy whose purpose is to benefit from short-term changes in market prices. Many view this as a speculative activity whose aim is to time the market (e.g., Stickney et al., 2010, p. 573). In contrast, loans, available-for-sale (AFS), and held-to-maturity (HTM) investments represent a longer-term strategy, where often the primary goal is to benefit from contractual cash flows.

Earlier literature provides mixed evidence regarding the link between the composition of bank assets and resultant risk, in particular with respect to trading assets versus loans (e.g., Morgan, 2002; Flannery et al., 2004). Moreover, this literature is silent on the link between asset composition and compensation, and is inconclusive as to whether compensation in banks motivates greater risk-taking (Houston and James, 1995; Brewer et al. 2004). More recently, DeYoung et al. (2012) provide evidence that pertains to CEO compensation, risk, and lines-of-business in US banks. Their results indicate that high wealth incentives in large banks induced risk-taking during the 1995-2006 period. They also show that these incentives led large banks to invest in private MBS securities more than commercial securities, and that private MBS securities are positively related to risk. Their evidence particularly suggests there was a shift in compensation arrangements to encourage risk-taking following the enactment of the Gramm-Leach-Bliley Financial Modernization Act of 1999 (FMA). The DeYoung et al.'s (2012) evidence is broadly consistent with recent anecdotal evidence (Bebchuk et al., 2010), and that the pre-crisis years had witnessed a dramatic shift in banking activities towards loan securitization, proprietary and speculative trading, especially in derivatives. Stout, (2011) attributes this shift to the Commodities Futures Modernization Act of 2000 (CFMA).[3]

We collect data on US banks for the period 1994-2010. We operationalize the concept of short-term investment horizon as the fraction of trading assets to the total of trading assets, AFS, HTM and loans. The larger this fraction, the greater is a bank's short-term investment intensity (or, alternatively, the shorter is its investment horizon). Using a system of simultaneous equations to control for the endogeneity in the relation between firm risk, compensation, and investment patterns, we find that past cash bonuses (as a proportion of total compensation), and current short-term investment intensity, are positively related. We additionally find evidence supporting a feedback loop from short-term

[3]It is unclear whether the evidence on the shift in compensation provided in DeYoung et al. (2012) can be safely attributed to FMA rather than CFMA. But it seems that in the late 1990s and early 2000s there were two main legal changes that may have prompted these changes.

investment intensity to cash bonuses. Moreover, short-term investment intensity exhibits positive association with the volatility of stock prices, but a negative association with current performance, especially during the crisis period of 2007-2008. Our results are strongest for the years 2001-2007 (the years FMA and CFMA were in full swing), and are robust if we eliminate banks that do not hold short horizon investments. They are also robust to a large number of covariates previously identified to be related to compensation related incentives, firm risk, and investment patterns.

In additional analyses we find that the source of risk/return caused by short-term investments is mainly due to investments in debt and foreign securities, and treasuries. In contrast, longer term investments such as AFS, HTM, and loans are negatively related to risk, and unrelated to profitability. In robustness tests we also explore whether investment mix is positively related to equity-based compensation, where we find that short-term investment intensity is negatively related to the proportion of equity pay. That short-term investment horizon is positively (negatively) related to cash (equity) compensation further underlines the severity of the clawback problem.

In summary, the evidence presented here is consistent with the notion that compensation in banks encouraged short-term speculative investments while creating the potential for the ex-post settling up problem. These investments resulted in greater risk, without delivering better performance. This seems consistent with short-term risk-seeking strategies and compensation-based incentives for CEOs to shift away from long-term less risky investments. It is also consistent with banks shifting attention away from traditional loans to more lucrative forms of investment, which resulted in the financial crisis of 2007-2008 (Bernanke, 2010).

In assessing these conclusions it is worthwhile to note that in a recent paper Fahlenbrach and Stulz (2010) argue that if CEOs anticipated the losses in the recent crisis, they likely reduced their equity stakes to avoid forthcoming losses. Contrary to case-based evidence provided by Bebchuk et al. (2010), and evidence reported by DeYoung et al. (2012), they find little evidence of such pre-emptive strategy in their sample. The inference from Fahlenbrach and Stulz (2010) is consistent with the view that CEOs' pay incentives were not corrupting their risk-taking behavior. Rather, it was their misjudgement of market conditions. In contrast, our findings suggest that, notwithstanding their equity stakes, linking short-term positions to upfront cash payments likely cushioned CEOs' exposure to the subsequent loss events.

We contribute to the literature in a number of ways. Together with DeYoung et al. (2012), our paper is among the first to link strategic business policy decision with compensation, risk and

performance. Our focus is on the link between investment horizons and compensation horizons, with a particular interest in short-termism in banks. We are motivated by the financial crisis and whether short-term compensation horizons contributed to the financial crisis. On a broader level, we contribute to the literature on accounting disclosures for financial instruments (e.g., Barth, 1994; Nelson, 1996). In particular, recently Riedl and Serafeim (2011) show that the properties of inputs used to measure investments under SFAS 157 Fair Value Measurements (FASB 2006) influence a firm's beta. Specifically, they find that more opaque inputs are positively related to higher betas. We add to this literature by showing that SFAS 115 classification of financial assets into short- to long-term holdings is associated with risk and performance.

The paper is organized as follows. Section 2 provides the necessary institutional background. It also develops our research questions in light of prior literature relevant to our study. In Section 3 we describe the data and sample composition as well as the research design. The empirical findings are reported in Section 4; in Section 5 we perform some additional sensitivity and robustness analyses. Section 6 concludes.

2 Relevant Background and Literature

2.1 Structural Change in the US Banking Industry and the Origins of the Credit Crisis

A major structural shift in US banking activities took place during the 1990s. It involved relaxation and erosion of regulatory restrictions that allowed commercial banks to increasingly engage in a range of new fee earning activities. These included underwriting of municipal bonds, commercial paper and mortgage-backed and asset-backed securities underwriting, sale of insurance products, discount brokering, and managing and advising open- and close-ended mutual funds. Importantly, they were also able to engage in other investment banking activities, such as proprietary trading, via so called Section 20 subsidiaries. These changes were cemented by the passage of the Financial Modernization Act (FMA) of 1999, effectively abolishing the Glass-Steagall separation between commercial and investment banking.[4] In 2000 Congress passed the Commodities Futures Modernization Act (CFMA), which allowed for the first time large scale speculation in derivatives (Stout, 2011). In subsequent years – which are covered in our sample period - commercial banks increasingly securitized their exposures,

[4]See Gibson, Dunn and Crutcher LLP (1999) for a summary of the provisions of this act.

packaging them into agency and private label MBS and ABS securities with a correspondingly rapid increase of broker-dealer balance sheets.[5] Such balance sheets feature trading assets, inclusive of derivatives, that are held for the short-term, in addition to longer term, more traditional investments such as loans. Even banks that securitize their loan books typically maintain a residual stake that is treated as trading assets (Dechow et al., 2010).

These structural changes thus involved both a shift of activities out of the traditional insured deposit-taking institutions into intermediation and a shift of activities within the commercial banking sector from a traditional interest margin business into fee-based and trading activities. These bank activities, especially the time horizon and nature of investments, and their relations with compensation, performance, and risk, are the focus of our research.

2.2 Development of the Research Questions

The composition of a bank's assets is of great interest to regulators, investors and rating agencies. For example, Morgan (2002, p. 875) argues that "trading assets, in particular, seem to confound the raters, as do loans." Building on prior literature (e.g., Myers and Rajan, 1998; Jensen and Meckling, 1976) Morgan further posits that the uncertainty over bank's assets may create incentives for risk shifting and asset substitution especially for highly leveraged banks. This is because the risks of trading assets and loans are hard for outsiders to observe but the assets themselves are easy to change. Using disagreement in bond ratings as a proxy for risk, Morgan (2002) finds that asset composition matters for risk: relatively more loans and more trading assets increase raters' disagreement. A similar conclusion is reached by Morgan and Stiroh (2001).

Flannery et al. (2004) relate return volatility, bid-ask spreads and financial analysts' earnings forecast to elements of the balance sheet. They argue that if a different asset mix reflects differences in underlying valuation properties, then this should be associated with measures of risk in a predictable way. For example, if loans are more difficult to value and entail more risk, higher loan concentration should be associated with higher bid-ask spreads, return volatility and forecast errors. However, Flannery et al. (2004) provide rather mixed evidence on this relation.

Importantly, these studies are silent on the link between compensation and asset mix (and resultant effect on risk and performance). Nevertheless, this prior literature (e.g., Morgan, 2002; Hentschel and

[5] Adrian and Song (2009) document the increase in broker dealer balance sheets and discuss its importance in monetary policy transmission.

Smith, 1996) notes that bankers have incentives to take excessive risk because of the asymmetry in compensation, where they profit from the upside potential via bonuses but face only a limited liability with losses. This problem is compounded because markets cannot "discipline" managers because they find it hard to follow "slippery" short-term positions (Myers and Rajan, 1998) and properly conduct valuations. But short-term positions are not the only source of risk. Assets such as loans are illiquid and hence less slippery than trading assets, though they are also problematic from a compensation perspective in that they lack transparency, are hard to quantify, may carry unobserved risk, and are difficult to manage (Greenspan, 1996, pp. 1–2; Hentschel and Smith, 1996; Morgan, 2002).

Risk-taking by banks is examined in Houston and James (1995). Motivated by the Savings and Loans crisis in the 1980s, they compare compensation in banks to other industries. Based on this analysis they conclude that compensation plans in banks do not promote risk-taking. John et al. (2000) develop a model that illustrates regulatory restrictions on risk-taking in banks may only have limited effectiveness.

Three more recent studies examine the impact of the structural and regulatory changes in banking on executive compensation. Becher et al. (2005) investigate the impact of diversification of bank activities on the equity and cash components of bank director remuneration. Using a matched sample of banks and non-banks they show that, whereas in the early 1990s bank directors received a relatively low share of compensation in the form of equity than directors of non-banks, by the late 1990s the cash to equity share of compensation was very similar in banks and non-banks. They interpret this change as taking place in order to offset the greater potential for conflict of objectives between management and shareholders with increasing freedom of bank activities (a point also emphasized by Houston and James, 1995). Brewer et al. (2004) also examine the determinants of the choice between equity and cash components of bank chief executive compensation, finding that the equity share of compensation increases as bank activities are tilted towards fee-based and riskier activities, but is unaffected by leverage. Neither of these two studies employs measures of asset mix, or distinguishes between components of the balance sheet. DeYoung et al. (2012) take this literature a step forward by linking bank CEOs' wealth incentives – proxied by stock option deltas and vegas – with choice of lines of business, and measures of risk. DeYoung et al. (2012) specifically explore whether wealth incentives are associated with less "traditional" lines of business, inclusive of non-interest sources of income and mortgage-based securities (MBS), and if these result in more risk. Their findings suggest that relaxing regulation around 2000 changed CEOs incentives in large banks, which in turn led to

new, and more risky, lines of business.

Prior literature, however, does not look at investment horizon and its relation to compensation horizon. An exception is Bolton et al. (2006) who analyze a two-period model in which some investors over-value a firm's stock in the short run and managers are compensated in both periods. This model predicts that optimal compensation contracts may incentivize speculation by shortening the compensation horizon.[6] They also show that managers become more short-termist in speculative markets than in non-speculative markets. In doing so, managers make a long-run value-destroying investment decision, because it boosts short-term performance and compensation.[7] Their model thus predicts a positive link between short-term (speculative) investment and cash compensation. Yet, equity compensation has also been linked to risk-taking (Prendergast, 2002; Rajgopal and Shevlin, 2002; Coles et al., 2006 and Tong, 2010). However, owing to the vesting conditions that mature over time, equity compensation is expected to be related to risk that is resolved in the longer-term, and thus related to longer-lived investments.

It is, however, an open question how much risk is borne by the manager. Misalignment of exposure to risk between shareholders and managers can create the ex-post settling up (or, the clawback) problem, which received much attention in the recent banking crisis. This problem applies to both forms of compensation (cash and equity), albeit to a different extent. Equity-based compensation, by construction, helps to mitigate the clawback problem in the presence of unresolved risk (Leone et al., 2006). Yet, it may not solve it fully. This is because the longer the investment horizon, the greater the likelihood managers are able to exercise their option, or sell their shares, before the outcome of their business strategy is fully known. Specifically, if at the selling point the price of these shares and options does not reflect ultimate bad outcomes, managers would benefit at the expense of shareholders (see Bolton et al. (2005) for anecdotal evidence). On the other hand, rewarding managers for taking short-term speculative positions through cash bonus creates possibly a more severe clawback problem, given that more cash compensation would encourage even more short-term speculation (Bolton et al., 2006). This, in turn, will reinforce the compensation strategy, thus increasingly exposing the bank to the clawback problem. Given the discussion above, we therefore ask:

[6] In the model, shortening of the payment horizon occurs when the manager is paid more in the first period. While this model strictly speaks about equity-based compensation, we believe it is general enough to encompass other forms of short-term compensation, such as cash. The crucial feature of the Bolton et al. (2006) model is that there is a compensation-relevant signal in the first period (which we regard as short-term) about the long-term performance of the speculative investment. Financial statements are an important source of such signals.

[7] See Bolton et al (2005) for a discussion of related evidence.

(1) What is the relation between investment horizon and CEO cash bonus?

(2) Is short-term investment intensity positively associated with risk?

(3) Is short-term investment intensity positively related to performance?

3 Sample Selection, Variables and Research Design

3.1 Sample Selection

We collect balance sheet and income statement data for our financial institutions from the Fed Form Y9-C Regulatory Filing bank holding company data. Given that we examine market risk as manifested by stock price volatility, and are interested in managerial conflict of interest arising from compensation structures, we focus our analysis on public banks. We collect share price data from CRSP, while compensation data is collected from ExecuComp.

Data collection starts in 1994, the first year Execucomp has sizeable data, and ends in 2010, the last year of data available to us. The intersection of ExecuComp with the Fed data yields 1,203 useable firm-year observations with the necessary data, composed of 141 unique bank holding companies and independent commercial banks. To mitigate the influence of outliers, all variables are winsorized at 1% at each end. All of the sample is composed of commercial banks, except four which are non-Federally chartered savings institutions (a total of 29 firm-year observations).

3.2 Variables and Research Design

Compensation, performance, and risk are a by-product of firm-level endogenous choices, including past investment and compensation decisions. Therefore, all our statistical tests employ a system of equations to control for this endogeneity (following DeYoung et al., 2012; Rajgopal and Shevlin, 2002).

To provide some initial evidence on the relation between the strategic investment decision – the investment horizon – and cash compensation, we estimate a simple system of simultaneous equations where we treat the investment horizon as the endogenous variable. Specifically, in the first stage we estimate the determinants of short-term investment intensity ($ShortTerm$), while in the second stage we examine whether cash bonus ($Bonus$) is related to $ShortTerm$ and other variables. $ShortTerm$ is calculated as the end-of-year t balance of trading assets (TS) for bank i divided by the sum of TS, AFS (available-for-sale), loans, and HTM (held-to-maturity) securities. This variable efficiently summarizes the economic importance of short-term investments vis-a-vis longer term ones in a bank's

balance sheet, and so eases the interpretation of the results. *Bonus* is the annual bonus awarded to the CEO by bank i in year t, normalized by the total compensation (thus capturing the magnitude of short-term cash bonuses relative to that of longer term equity pay).

In estimating *ShortTerm* the explanatory variables we use are lagged cash compensation (i.e., *Bonus*), and lagged firm size (i.e., *LogAssets*), which is the (lagged) log of total assets at year-end. We also use lagged leverage (*Leverage*), which is the (lagged) long-term debt divided by (lagged) total assets. *Bonus* and the other independent variables are lagged, since past compensation patterns could motivate current investment choices; larger firms are more likely to engage in short-term investments and high leverage can reduce cash available for compensation.

In the second stage equation – the bonus equation - we express bonus as a function of current investment strategy (*ShortTerm*) as well as other factors that influence the structure of executive compensation contracts. We follow methodology that is standard in the literature (Barro and Barro, 1990; Conyon et al., 2011; Core et al., 1999), which has found that larger firms require more talented and highly paid managers. Hence we include current *LogAssets*. In line with this literature, we also control for firm performance (*ROA*), calculated as net income in year t divided by the total assets at the end of year t. In both stages we also utilize year fixed effects to control for changes in compensation patterns throughout the sample period, and also to control for time-varying exogenous factors that affect compensation (such as market upturns and downturns and changes in interest rates). Our aim is to present a parsimonious model that depicts the theoretical relations among our main variables of interest. Moreover, we do not include outcome/intermediary variables in our compensation regressions which could be a function of investment choice (i.e. *ShortTerm*), which we attempt to examine. Nevertheless, in ensuing robustness tests we present more comprehensive models, with extensive controls, with similar results. For brevity, we call this system the bonus system, as follows:

$$ShortTerm_{i,t} = \alpha_0 + \alpha_1 Bonus_{i,t-1} + \alpha_2 LogAssets_{i,t-1} + \alpha_3 Leverage_{i,t-1} + Year \quad (1)$$

$$Bonus_{i,t} = \beta_0 + \beta_1 ShortTerm_{i,t} + \beta_2 ROA_{i,t} + \beta_3 LogAssets_{i,t} + Year \quad (2)$$

Consistent with DeYoung et al. (2012) we assume that past compensation incentives take time to become effective, and so influence CEO's current trading strategy. Hence, to the extent that a

past higher cash bonus motivates CEO's to shorten the investment horizon, α_1 in (1) is expected to be positive. However, since cash bonus also acts as a reward system, whereby the reward follows execution of strategy, we expect β_1 in (2) to be positive to the extent that last year's incentives to focus on short-term trading intensity is rewarded with more cash bonus (the feedback effect).

In the main analysis we examine the relation between investment mix, as the endogenous strategy decision variable - and both firm risk and performance. Specifically, we employ a system of three equations, in two different specifications. The first links together compensation, firm risk, and investment risk (for brevity, we call it the risk system). The second links together compensation, performance, and investment (for brevity, we call it the performance system). Both systems follow DeYoung et al.'s (2012) approach in which compensation affects strategic decisions (i.e., the choice of the investment mix) with delay; and past investment mix affects current compensation (i.e., a delayed feedback effect). It is assumed that the investment mix affects firm performance and risk in the current period. The risk system is as follows:

$$Bonus_{i,t} = \alpha_0 + \alpha_1 ShortTerm_{i,t-1} + \alpha_2 ROA_{i,t-1} + \alpha_3 LogAssets_{i,t-1} + Year \tag{3}$$

$$ShortTerm_{i,t} = \beta_0 + \beta_1 Bonus_{i,t-1} + \beta_2 LogAssets_{i,t-1} + \beta_3 Leverage_{i,t-1} + Year \tag{4}$$

$$Risk_{i,t} = \theta_0 + \theta_1 ShortTerm_{i,t} + \theta_2 LogAssets_{i,t} + Year \tag{5}$$

Here *Risk* is stock price volatility (systematic plus idiosyncratic) calculated according to Shin and Stulz (2000). If short-term investment increases risk, we expect θ_1 in equation (5) to be positively related to *Risk*. We employ a three-stage least-squares estimation strategy (3SLS), which treats *ShortTerm* as the endogenous variable.[8] In this system compensation decisions motivate a CEO to adopt an investment strategy (equation (4)); the investment mix, in turn, affects the bank's risk (equation (5)); and finally last year's investment mix affects current year's compensation (equation (3)). Although our main interest is to test the relation between *ShortTerm* and *Risk*, note the

[8] 3SLS estimates all of the coefficients in a model simultaneously, while allowing for a correlation between the error terms across equations. In essence, a 3SLS requires three steps: first-stage regressions to get predicted values for the endogenous regressors; a two-stage least-squares step to get residuals to estimate the cross-equation correlation matrix; and the final estimation step (see Zellner and Theil, 1962). Alternatively, if we utilize a two-stage estimation methodology, results and inferences remain unchanged.

inclusion of equation (3), the feedback from investment to pay, where we use lagged investment mix. The system features equation (3) even though Bonus does not enter equation (5). This is because if we ignore equation (3), or estimate it separately, when it is in fact a relevant equation, we end up with inefficient estimates in all equations. Econometrically, we allow for a common shock in the error terms of the three equations.[9] The performance system is structured in a similar way, as follows:

$$Bonus_{i,t} = \alpha_0 + \alpha_1 ShortTerm_{i,t-1} + \alpha_2 ROA_{i,t-1} + \alpha_3 LogAssets_{i,t-1} + Year \quad (6)$$

$$ShortTerm_{i,t} = \beta_0 + \beta_1 Bonus_{i,t-1} + \beta_2 LogAssets_{i,t-1} + \beta_3 Leverage_{i,t-1} + Year \quad (7)$$

$$ROA_{i,t} = \theta_0 + \theta_1 ShortTerm_{i,t} + \theta_2 LogAssets_{i,t} + Year \quad (8)$$

Here we expect θ_1 in equation (8) to be negative, or insignificant, to the extent that investment decisions taken by CEOs were not made with the objective of improving bank performance.

We estimate all regression systems (the bonus, risk and performance) employing three samples. The first is the full sample of firm-years (1994-2010). The second involves the subset of firms that report short-term investments in their balance sheets in the entire sample period (about 58% of the firm-years). The third includes the same banks as in the second sample but only in the crucial pre-crisis period of 2001-2007, when short-term investing patterns were implicated for banks' behavior.

4 Descriptive Statistics and Results

4.1 Descriptives

Table 1 presents the descriptive statistics. Median (mean) bonus for sample firms is about $255,000 ($0.71 million), and 34% of our sample firms do not award any bonus in any given year, explaining the large difference between the mean and median for this variable. At the higher end of the distribution, bonuses regularly exceed $2 million, with a maximum of $10 million. As a proportion of total pay, we note that bonuses comprise on average 15.5% of total pay each year. In unreported results we find that if we exclude the guaranteed cash salary, annual bonuses amount to roughly 30-40% of yearly

[9] Results are qualitatively similar if we include *Bonus* as an independent regressor in equation 5, and in equation 8 (below).

incentive pay.

Investments classified as short-term securities ($ShortTerm$) are cross-sectionally small (mean = 1.8%), consistent with Morgan (2002). Not all banks have this type of assets. In unreported results, 58% of banks have such investments, in contrast to available-for-sale (AFS) securities that are held by all of the banks in our sample. However, we find that at the higher end of the distribution, this type of investment accounts for 5-10% (up to a maximum of 25%) of the total assets of a firm. Moreover, although mean trading securities (as a percentage of total assets) is relatively small, in untabulated analysis we observe that it constitutes, on average, about 52% of firm equity for our sample firms. Hence, gains or losses on trading securities can significantly affect profitability measures such as ROA. In particular, volatility in the valuation of short-term investments has the capacity to quickly erode capital.

Assets classified as AFS are on average 18% of total assets. In contrast, loans - the more traditional investment category that is normally held for a long period - comprises the bulk of the balance sheet of our financial institutions, as is suggested by a mean of 63%. Firms are on average profitable, where mean ROA is about 1%. *Risk* has a mean of 0.743, with a range of 0.186-0.617 in the 25th-75th of the distribution, indicating a large spread in the riskiness of our sample banks. *Leverage*, calculated as long-term debt divided by total assets, has a mean of about 92.5%, indicating that, as expected, our sample banks are heavily levered. Total assets has a mean of \$64billion (median = \$14billion), reflecting the size of the relatively large bank holding companies. The standard deviation of total assets is about \$183 billion indicating that there is broad representation and variability in terms of bank size.

(Insert Table 1 about here)

4.2 Correlations

Table 2 presents the pair-wise correlation analysis among the main variables. It indicates that *Bonus* is not correlated with either $ShortTerm$ and $Trading$. In contrast, *Bonus* is negatively related to loans and firm risk, but positively related to ROA. Larger firms invest more in trading assets, but report less available-for-sale securities and loans. At this univariate level, results do not support the notion that short-term oriented bank investment patterns attracted higher compensation and lowered performance. Furthermore, we observe a negative relation between short-term investment horizon and risk. We next turn our attention to our multivariate analysis.

(Insert Table 2 about here)

4.3 Results

4.3.1 Bank Investment Mix and Compensation

We start by providing initial evidence for the bonus system by examining the relation between investment mix - the endogenous strategy variable - and CEO compensation (i.e. estimating equations 1-2). Recall that the main variable of interest is short-term investment intensity ($ShortTerm$). Table 3 reports the results of our estimation, presented for the three samples (full sample (Columns 1-2), firms reporting short-term assets (Columns 3-4), and finally, firms holding short-term assets over the period 2001-2007 (Columns 5-6)).

(Insert Table 3 about here)

In the regression predicting $ShortTerm$ (Column 2, Table 3), we see that the coefficient on lagged $Bonus$ is positive and highly significant, indicating that past compensation patterns influence current investment strategies. The coefficient on lagged firm size ($LogAssets$) is positive and significant, indicating that short-term investment strategies intensify with bank size. Using $ShortTerm$ in the bonus equation (Column 1, Table 3), we see that it is positively related to cash compensation, confirming that short-term investments were rewarded with higher cash pay. We also find that firm profitability, ROA, is positively related to executive bonuses (although marginally so in the first set of regressions). This is expected to the extent that bonuses are proportional to accounting performance, and firms with poor current accounting performance award more equity pay as a proportion of total compensation. Firm size ($LogAssets$), is negatively related to cash compensation, indicating that larger firms award less bonuses.

Next, we repeat the same analysis (estimating equations 1 and 2), for the subsample of firms that report non-zero values of short-term investments (Columns 3 and 4, Table 3), and for these same firms over the pre-crisis period of 2001-2007 (Columns 5 and 6, Table 3). Our results are qualitatively similar, except for the pre-crisis sample where firm size does not explain $Bonus$ (see Column 5). Nevertheless, $ShortTerm$ is always positively related to $Bonus$, indicating that increases in short-term investments were rewarded by higher bonuses, both in firms that exclusively have such investments, and also for the truncated 2001-2007 pre-crisis period. These findings complement the full sample results found in Columns 1 and 2, and confirm anecdotal evidence that compensation plans may have encouraged a shift from a long-term focus to a shorter one. Given that bonuses are measured as a percentage of

yearly total compensation of which equity pay is a large component, a corollary of our findings is that long-term investments are awarded more equity pay (revisited in Section 5 below).

The model appears to be well specified, and the economic effects are strong. The R^2s are largest in the pre-crisis period (Columns 5 and 6). The economic effects we obtain are strong and indicate the following: a one standard deviation increase in *ShortTerm* leads to a doubling of the cash bonus ratio.[10]

4.3.2 Bank Investment Mix and Risk

We next turn to examine whether there is a positive relation between risk and investment mix in our data per the risk system of equations 3-5. Again, we employ the three samples (full sample (Columns 1-3), subset for firms holding short-term assets (Columns 4-6), and finally, firms holding short-term assets over the period 2001-2007 (Columns 7-9)). Results are presented in Table 4.

(Insert Table 4 about here)

In all samples, in the regression predicting *ShortTerm* (Columns 3, 6, and 9), we see that lagged bonus (*L.Bonus*) is positively and significantly related to short-term investments. That is, bonus schemes motivate short-term investment focus in our sample banks. Similarly, in all samples the coefficient on firm size (*L.LogAssets*) is positive and significant, indicating that larger firms are more likely to undertake short-term investments (as also confirmed by the analysis conducted in Table 4). We also find consistent evidence for the feedback effect. Specifically, the coefficient on *L.ShortTerm* is positive and significant in the bonus regressions (Columns 2, 5, and 8). That is, adopting short-term investment strategy leads to higher cash bonus. With respect to risk (Columns, 1, 4, and 7), the table shows that *ShortTerm* is unrelated to *Risk* in the full sample, and in the sample of banks reporting trading assets during 1994-2010 (Columns 1 and 4). However, consistent with the effect of regulation such as FMA and CFMA in the early 2000, the coefficient on *ShortTerm* is positive and significant in the pre-crisis period of 2001-2007 in banks reporting trading assets (Column 7)

These results suggest that (a) the volatility effects of short-term investments were magnified in the immediate pre-crisis period, (b), the compensation side effects of risky trading securities were evident pre-crisis, and (c) the shift in short-term investment strategy towards riskier investments may have been caused by regulatory effects. On the whole, these findings suggest that banks adopting

[10]In Column 1: coefficient (*ShortTerm*)*Standard Deviation (*ShortTerm*) = 3.5*0.055 = 0.193 increase in the Bonus ratio. Measured at the mean of Bonus, which is 0.15, this leads to more than doubling of the cash payment

a short-term investment focus were perceived to be riskier by market participants, as compared to banks following traditional business models. This greater riskiness is consistent with the perception of a contagion effect that was precipitated by the demise of banks which emphasized proprietary trading and risk-taking.

4.3.3 Bank Investment Mix and Firm Performance

The findings in Section 4.3.1 suggest the presence of compensation related incentives for bank CEOs to choose a short-term risky investment mix. Moreover, the findings reported in Section 4.3.2 indicate that short-term investments made banks more risky. The risk-return paradigm thus raises a further question whether these incentives have generated the desired results, such as better firm performance. To provide some evidence for this issue we now turn to estimate the performance system of equations (6)-(8). Specifically, we examine the relation between short-term investment intensity and firm profitability as measured by ROA, as this is the main accounting measure of performance in banks. Results are again reported for our three samples, in Table 5 (full sample (Columns 1-3), subset for firms reporting short-term assets (Columns 4-6), and finally, firms holding short-term assets over the period 2001-2007 (Columns 7-9)).

(Insert Table 5 about here)

Table 5 confirms that lagged bonus is positively related to $ShortTerm$ (Columns, 3, 6 and 9) and the feedback effect from lagged $ShortTerm$ to cash compensation (Columns 2, 5 and 8). More importantly, the table shows that the relation between $ShortTerm$ and ROA is either negative or it is insignicant (Columns 1, 4 and 7). That is, we do not find any evidence that short-term investment strategy is a performance enhancing activity. In particular we find a negative relation between short-term investment intensity and accounting profits in the full sample (Column 1), and for the sub-sample of firms that exclusively report trading assets during the pre-crisis period (Column 7).

Considered against the background of the previous findings, these results suggest that short-term trading activity increased executive cash bonuses, while simultaneously increasing risk, and decreasing accounting performance. Therefore, this evidence highlights the tension between compensation and performance: lack of performance does not preclude compensation, and bad performance is not penalized.

5 Additional Analyses, and Robustness tests

5.1 The Structure of Short-Term Investments

The results in Sections 4.3.1-4.3.3 provide intriguing evidence on the interplay between compensation, risk, and performance in relation to firm investment patterns. This section attempts to further analyze this relation, by examining not only the horizon of investment assets, but also its composition, in order to gain further insights on the exact nature of the relation. We obtain from the Fed data the composition of trading assets, splitting it into five major categories: trading assets composed of U.S. treasury securities ($Treasury$), trading securities issued outside the U.S. ($Foreign$), mortgage backed securities issued by Fannie Mae, Ginnie Mae, and Freddie Mac ($FederalLender$), and other debt securities ($Debt$) held for trading. Finally, we create a residual category that comprises of all trading securities not in the above classifications ($Other$), which captures equity investments, other mortgage backed securities not included in $FederalLender$, and all other investments held for the short-term. Next we attempt to examine the effect of each sub-group on compensation, risk, and firm performance.

We re-estimate equations (1)-(8), but now we replace $ShortTerm$ with each short-term asset category in turn. Additionally, we now explicitly control for longer term investments such loans, AFS, and HTM securities. Although all analyses are conducted in a system of equations, in the interest of space we tabulate results only for equations (2), (5) and (8), the equations that relate short-term securities to compensation, risk, and performance, respectively. Additionally, we present results only for the 2001-2007 sub-period, where the risk and performance effects of short-term investments took center stage. Results are reported in Panels A, B, and C of Table 6.

(Insert Table 6 about here)

Panel A, Column 1 presents results for $Treasury$, where we see that it is positively and significantly related to executive bonuses. Next, we see that $Foreign$ is positively and significantly related to bonuses (Column 2), but the same does not hold for $FederalLender$ (Column 3). However, in Column 4 we see that $Debt$ is positively related to $Bonus$, and in Column 5 that $Other$ trading securities are strongly and positively related to executive bonuses. With respect to the control variables, the evidence in this panel suggests that HTM and $Loans$ are positively related to current bonus.

In panel B of Table 6, we report the results for equation (5) – estimated in the risk system of equations - where firm risk ($Risk$) is the dependent variable. Column 1 presents results on $Treasury$, where we find that it is positively and significantly related to firm risk. Next, we see that $Foreign$ is

insignificantly related to firm risk (Column 2), as is the case for $FederalLender$ (Column 3). However, in Columns 4 and 5 we see that $Debt$ and $Other$ are positively related to $Risk$. As for the control variables, Panel B indicates that holding more AFS and loans reduces risk. That is, this panel indicates the contrast between short-term debt investments and long-term debt investments with respect to risk.

Next, in Panel C of Table 7, we report the results for equation (8) – estimated in the performance system of equations - where $ShortTerm$ is replaced with each short-term category in turn. Recall the dependent variable here is firm performance (ROA). We find that the negative relation documented in Table 5 between $ShortTerm$ and ROA is explained by four types of investments: treasury securities ($Treasury$, Column 1), foreign securities ($Foreign$, Column 2), and debt and other securities ($Debt$, in Column 4, and $Other$, in Column 5). In contrast, we do not find any relation between $FederalLender$ and ROA. With respect to the control variables, we do not find a significant relation between these and bank profitability.

Thus, results in Table 6 provide complementary evidence regarding the source of compensation, risk/return caused by short-term investments. With the exception of $FederalLender$ all other short-term investmenst are involved with more risk and poorer performance while being positively related to current cash bonus. In unreported tests, we see that trading securities which are issued by US states, are unrelated to compensation, risk, and performance. In contrast, longer term investments such as AFS and loans are negatively related to risk, and unrelated to profitability. Moreover, it is interesting to see that debt instruments that are held for short-term ($Debt$) are positively related to risk, while debt that is held for the long-term ($Loans$) are negatively related to risk. This is consistent with poor investment decisions (and sloppy credit checks) in debt instruments held for trading, given their short investment horizon. Finally, our findings on HTM are inconsistent with the prediction that long-term horizon investments will be associated with less cash compensation (Panel A, Table 7), but could be explained if the contractual cash flows through interest receipts, and associated earnings, result into a positive shift in bonuses (although we do not observe any effects on ROA in Panel C).

5.2 Robustness and Additional Tests

Our initial estimiation strategy was to provide for a simple statistical model that highlights our main interest in the relations between bonus, risk and performance. In the interest of parsimony, variables not directly related to the main relations of interest were not utilized. In this section, we provide robustness tests to reinforce our previous findings by presenting more comprhensive models

that control for potentially correlated, but omitted variables. Results for these "fuller" models are presented in Table 7, and leave our inferences unchanged.

(Insert Table 7 about here)

In Table 7, we re-estimate equations (1)-(8) with the additional control variables: the number of shares owned by the CEO (*Shares*) normalized by total shares outstanding, since CEO share ownership has been shown to affect investment patterns (Knopf et al., (2002); the logarithm of the dollar value of stock options (*LogOptions*) owned by the CEO, since option pay has been shown to influence CEO behavior (Jensen and Murphy, 1990; Grant et al., 2009); the length of the CEO's tenure (*Tenure*), to control for the effect of CEO entrenchment (Bebchuk and Cohen, 2005); prior year share price performance (*Return*), and growth opportunities as proxied by the market-to-book ratio (*MB*), as they have both been shown to influence executive compensation (Core et al., 1999). We also control for firm leverage (*Leverage*), and stock price volatility (*Risk*), to control for the effect of risk on compensation and investment decisions (see Aggarwal and Samwick, 1999). Finally, we control for industrial membership by having a dummy variable if a firm is a commercial bank (*CommercialBank*).

Our regressions are for the full sample period (although inferences are unchanged if we use the 2001-2007 time period). Although we run our bonus, risk, and performance models in a system of equations, for the sake of brevity we just present the final regressions with the relations of interest. Column 1 in Table 7 reports the results for equation (2), which examines the relation between short-term investment intensity and executive bonuses. Column 2 (3) depicts equation 5 (8), which examines the relation between short-term investments and firm risk (profitability). For Columns 2 and 3 we essentially utilize the same set of additional control variables as in Column 1, but we additionally endogenize executive bonuses, to check whether there is also a direct relation between bonuses and firm risk/performance. Specifically, in equations (5) and (8) we add *Bonus* – the dependent variable in equations (3) and (6) - as an additional independent variable and estimate the system using 3SLS.

Reported results provide further confirmation of findings reported in previous tables. Specifically, *ShortTerm* is positively and significantly related to executive bonuses (Column 1, Table 7). Moreover, short-term investment intensity is still positively and significantly related to firm riskiness (Column 2), while being negatively and significantly related to firm profitability (Column 3). *Bonus* is positively related to *Risk* (Column 2) but is unrelated to *ROA* (Column 3). In another set of robustness tests (untabulated), we also control for other aspects of the income statement such as trading income,

unrealized income on AFS and HTM securities, net interest income on loans and other income. Results remain unchanged for our main results.

Our next robustness test explores the performance of different asset mix strategies during the crisis period. As pointed out earlier, many banks do not invest in short-term securities. The decision on whether to invest in such securities is likely correlated with the underlying banking business model adopted by our sample banks. Thus splitting the sample between banks that prior to the crisis reported short-term securities, and comparing them to banks that report only investments in longer-term securities and the loan book, can shed further light on the consequences of short-term investment strategies before the onset of the crisis. Accordingly, we calculate average abnormal returns of banks reporting *ShortTerm* and compare to banks with longer term inverstments.[11] We carry out t-tests for 2 time periods: the early stage of the crisis (May-Aug 2007), and a longer time period that encompassed the full crisis period (May 2007-Nov 2008). Table 8 presents the results.[12]

(Insert Table 8 about here)

We report the returns of firms that have no short-term investment assets (Column 1) and for those that do (Column 2). For the initial phase of the crisis, we see that there is a statistically significant 7% differential in abnormal returns across the two subgroups ($p < 0.05$), where banks with short-term investments underperformed. When the full crisis period is considered (May 2007 – Nov 2008), we see that firms with no investment assets recovered initial stock price losses incurred during the Lehman collapse, however, firms with investment assets continued their steep and downward spiral. As such, banks with short-term investment assets underperformed their more longer horizon oriented peers by a cumulative 51% (this difference being highly significant). These tests complement results obtained in Table 5, but highlight the fact that firms with investment assets, and particularly trading assets, performed very poorly during the crisis. This further reinforces the common notion that risk-taking while being rewarded with cash bonuses, resulted in fast deteriorating performance during the crisis years.

We also conduct a number of untabulated sensitivity analyses, in order to further establish the robustness of our main findings. First, and as a confirmatory test, rather than calculating CEO bonuses

[11] Abnormal returns are calculated using the market model employing 30 monthly returns for the period ending 30 April 2007.

[12] We also employ a multivariate model similar to the analysis in Table 6 where the dependent variable is abnormal returns during the crisis period. However, these analyses do not yield statistically significant results possibly because multivariate analysis with less than a hundred observations and a multitude of controls masks the returns difference between banks who invest short-term and banks that invest long-term.

as the proportion of cash bonuses normalized by total yearly pay, we use the logarithm of the dollar value of cash bonuses awarded (consistent with Banker et al., 2009). In another robustness test we normalize CEO cash bonus by total assets. In both of these alternate specifications our results remain unchanged. Moreover, this evidence indicates that short-term investments were not only awarded more bonuses as a proportion of total compensation, but there was also a positive shift in the dollar value of bonuses received.

Next, we try other permutations of our compensation variable, where we re-run the same system of equations while having the proportion of equity compensation, rather than bonuses, as a dependent variable. Given that we measure bonuses as being the proportion of bonuses with respect to total compensation awarded, and given that it is positively related to short-term investments, it is natural to expect that bonuses substitute equity pay when it relates to short-term investment horizon. We find that this is the case: short-term investment intensity is negatively related to the proportion of equity pay, hence, exasperating the clawback problem. A corollary of the above findings is that long-term investments are awarded less bonus pay and consequently more equity pay, hence mitigating agency problems resulting due to horizon mismatches between shareholders and managers. This relation is expected, given that risk resolution for loans and other longer term investments is spread over longer periods, we would expect longer-term investment horizon to be linked with equity-based compensation.

We also carry out further analyses regarding our choice of compensation variable. To see if compensation is paid for firm-specific performance rather than for common factors (or, for luck, as in Garvey and Milbourn, 2006), we de-mean bonuses by subtracting from each firm's bonus, in a given year, the sample mean for the specific year. Results remain intact, suggesting our analyses also capture firm specific factors, and not overall compensation trends. In a further test, instead of using CEO bonus as the dependent variable, we aggregate the bonuses of the top 5 executives, and find similar results. Finally, we utilize CEO option deltas, and vegas, as additional control variables, which we estimate using the methodology of Core and Guay (2002). This also brings our methodolgy more in line to those of DeYoung et al. (2012). Our results remain intact and inferences remain unchanged.

Next, we further examine the relation between investment patterns and firm risk. In untabulated results we break down firm risk into two components, idiosyncratic and systematic risk, where we see that each component is individually, and significantly, positively related to short-term investment. These findings suggest that banks adopting a short-term investment focus were contributing to the overall riskiness of the banking system, in addition to increasing their unique risks given their short-

term oriented, and arguably uncertain in nature, business models. The sensitivity to macro factors is consistent with the perception of a contagion effect that was precipitated by the demise of some of the largest investment banks, which emphasized proprietary trading and risk-taking.

Finally, since firm performance is an important control variable that is jointly related to compensation and firm investment, we note that an adding alternative measure of firm performance, return on equity (ROE), leaves our inferences unchanged.

6 Conclusions

The credit crisis has resulted in unprecedented loss of wealth across the globe. In debating the causes and remedies, compensation arrangements have been viewed as one of the causes of this crisis. In particular, bankers were accused of a short-term focus and speculative trading. We empirically investigate this issue, employing a panel of US banks, and looking at the relation between compensation and investment structure, with a further examination of risk and performance consequences.

Our specific research questions are: (1) what is the relation between investment mix and CEO cash bonus compensation, and to what extent is this evidence consistent with the clawback problem? (2) Is there a relation between short-term investments and risk? (3) To the extent that shorter-term asset mix is positively related to cash bonus, is it also positively related to performance? We find evidence of a positive relation between short-term investments and CEO cash bonus. We furthermore document two important results: short-term investments are associated with higher share price volatility, and are simultaneously negatively related to firm profitability.

These relations are consistent with the view that bank compensation arrangements have encouraged banks to increase their holding of risky trading assets, including the rapid increase in trading of subprime and Alt-A MBS, CMBS, and the other structured credit securities at the core of the credit crisis, providing evidence that compensation arrangements strongly discouraged long-term investment in some financial institutions. That cash was paid upfront, and cushioned CEOs exposure to compensation risk, in contrast to the recent findings of Fahlenbrach and Stulz (2010) which argue equity-based compensation exposed managers to the same risks as shareholders. Moreover, up-front bonuses created an agency problem to the extent that banks could not claw back past pay when performance deteriorated.

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Table 1: Descriptive Statistics for Select Variables

All balance sheet and income statement items are deflated by total assets. *Bonus*(*raw*): Annual cash bonus paid to the CEO (in thousands); *Bonus*: Annual cash bonus paid to the CEO normalized by yearly total compensation; *ShortTerm*: trading assets held for the short term normalized by longer term investments (AFS, HTM, and Loans); *Trading*: Balance of a bank's trading assets held for the short-term; *AFS*: Balance of assets classified as available for sale; *Loans*: Balance of loans net of loss provision; *ROA*: Net income divided by the book value of assets at year end; *Risk*: the stock price volatility (systematic plus idiosyncratic, in thousands); *Leverage*: Total liabilities divided by total assets; *Assets*: Total book value of assets (in billions).

Variable	N	mean	p50	sd	p25	p75
Bonus (raw)	1203	710.1386	255.0000	1370.5813	0	760.0000
Bonus	1203	0.1548	0.1273	0.1598	0	0.2488
ShortTerm	1203	0.0178	0.0004	0.0550	0	0.0093
Trading	1203	0.0138	0.0003	0.0437	0	0.0080
AFS	1203	0.1768	0.1657	0.0901	0.1114	0.2265
Loans	1203	0.6310	0.6654	0.1429	0.5856	0.7163
ROA	1203	0.0097	0.0116	0.0100	0.0087	0.0140
Risk	1203	0.7827	0.3294	1.1821	0.1859	0.6165
Leverage	1203	0.9250	0.9348	0.0570	0.8932	0.9691
Assets	1203	64.4291	14.0092	183.0901	6.1661	44.4114

Table 2: Correlations for Select Variables

*, **, *** significant at 10%, 5% and 1%, respectively. *LogAssets* is log of total assets. See Table 1 for other variable definitions.

	Bonus	ShortTerm	Trading	AFS	Loans	ROA	Risk	LogAssets
Bonus	1							
ShortTerm	0.0332	1						
Trading	0.0337	0.9997*	1					
AFS	0.0008	-0.1339*	-0.1364*	1				
Loans	-0.0876*	-0.2136*	-0.2073*	-0.5071*	1			
ROA	0.3638*	-0.0544	-0.054	-0.0002	0.0136	1		
Risk	-0.3008*	-0.0876*	-0.0886*	-0.0013	-0.0080	-0.4036*	1	
LogAssets	0.0395	0.6925*	0.6919*	-0.1704*	-0.0789*	0.0132	-0.1399*	1

Table 3: Bank Investment Mix and Compensation

This table presents estimations of equations 1 and 2. The regressions are conducted for three samples: the full sample (columns 1 and 2), the subset of firms with trading assets (columns 3 and 4), and the subset of firms with trading assets during 2001-2007 (columns 5 and 6). See Table 1 for variable definitions. All regressions include year dummies. ($l.VariableName$) indicates that the variable is lagged by one year. t-statistics in parentheses, *, **, *** significant at 10%, 5% and 1%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Bonus	ShortTerm	Bonus	ShortTerm	Bonus	ShortTerm
Constant	1.339***	-0.413***	0.725***	-0.592***	0.055	-0.783***
	[7.000]	[-13.020]	[4.724]	[-9.960]	[0.320]	[-9.677]
ShortTerm	3.497***		1.849***		1.028***	
	[6.995]		[6.199]		[3.178]	
ROA	0.873		2.211***		4.599**	
	[1.594]		[2.682]		[2.163]	
LogAssets	-0.070***		-0.034***		-0.005	
	[-5.774]		[-3.602]		[-0.475]	
l.Bonus		0.092***		0.145***		0.107***
		[10.290]		[9.212]		[4.694]
l.LogAssets		0.022***		0.027***		0.030***
		[21.027]		[15.712]		[12.459]
l.Leverage		0.048**		0.153***		0.316***
		[2.204]		[3.382]		[5.101]
Observations	1,103	1,103	667	667	264	264
R-squared	0.281	0.330	0.331	0.352	0.347	0.448
Time Period	1994-2010		1994-2010		2001-2007	

Table 4: Bank Investment Mix and Firm Risk

This table presents estimations of equations 3-5. The regressions are conducted for three samples: the full sample (columns 1-3), the subset of firms with trading assets (columns 4-6), and the subset of firms with trading assets during 2001-2007 (columns 7-9). See Table 1 for variable definitions. All regressions include year dummies. ($l.VariableName$) indicates that the variable is lagged by one year. t-statistics in parentheses, *, **, *** significant at 10%, 5% and 1%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Risk	Bonus	ShortTerm	Risk	Bonus	ShortTerm	Risk	Bonus	ShortTerm
Constant	0.0001	0.375***	-0.493**	-0.0001*	0.124	-0.738***	0.001***	0.014	-0.814***
	[1.101]	[6.063]	[-14.291]	[-1.761]	[1.570]	[-11.403]	[10.161]	[0.120]	[-10.143]
ShortTerm	0.00037			-0.00046			0.00105***		
	[0.691]			[-1.062]			[8.068]		
LogAssets	-0.0001			0.000***			-0.0001***		
	[-0.280]			[3.513]			[-7.063]		
L.ShortTerm		0.639***			0.545***			0.757***	
		[7.169]			[6.253]			[5.444]	
L.ROA		0.425			0.974			-1.781	
		[0.741]			[1.137]			[-0.898]	
L.LogAssets		-0.008**	0.023***		0.003	0.029***		0.002	0.030***
		[-2.235]	[22.196]		[0.596]	[16.671]		[0.245]	[12.529]
L.Bonus			0.067***			0.110***			0.104***
			[6.664]			[6.408]			[4.535]
L.Leverage			0.127***			0.269***			0.323***
			[4.802]			[5.410]			[5.210]
Observations	1,057	1,057	1,057	629	629	629	264	264	264
R-Squared	0.612	0.305	0.346	0.701	0.356	0.367	0.617	0.340	0.448
Time Period	1994-2010			1994-2010			2001-2007		

Table 5: Bank Investment Mix and Firm Performance

This table presents estimations of equations 6-8. The regressions are conducted for three samples: the full sample (columns 1-3), the subset of firms with trading assets (columns 4-6), and the subset of firms with trading assets during 2001-2007 (columns 7-9). See Table 1 for variable definitions. All regressions include year dummies. ($l.VariableName$) indicates that the variable is lagged by one year. t-statistics in parentheses, *, **, *** significant at 10%, 5% and 1%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA	Bonus	ShortTerm	ROA	Bonus	ShortTerm	ROA	Bonus	ShortTerm
Constant	-0.009**	0.155**	-0.495***	0.003	-0.013	-0.742***	0.002	0.031	-0.807***
	[-2.418]	[2.543]	[-14.323]	[0.867]	[-0.164]	[-11.463]	[0.590]	[0.273]	[-9.967]
ShortTerm	-0.015**			-0.007			-0.016***		
	[-2.534]			[-1.466]			[-3.523]		
LogAssets	0.001***			0.0001			0.0001**		
	[2.586]			[0.031]			[1.961]		
L.ShortTerm		0.632***			0.536***			0.706***	
		[7.092]			[6.150]			[5.086]	
L.ROA		-0.0001			0.142			-4.623**	
		[-0.000]			[0.167]			[-2.357]	
L.LogAssets		-0.008**	0.023***		0.003	0.029***		0.003	0.030***
		[-2.181]	[22.203]		[0.626]	[16.692]		[0.414]	[12.598]
L.Bonus			0.067***			0.111***			0.104***
			[6.675]			[6.469]			[4.566]
L.Leverage			0.128***			0.273***			0.335***
			[4.840]			[5.480]			[5.417]
Observations	1,057	1,057	1,057	629	629	629	264	264	264
R-Squared	0.352	0.304	0.346	0.354	0.354	0.367	0.164	0.333	0.448
Time Period	1994-2010			1994-2010			2001-2007		

Table 6: Structure of Short Term Investments and Compensation, Risk, and Performance.

This table presents estimations of equations 1-8, where we tabulate equations 2, 5, and 8. *Treasury* is trading assets composed of U.S. treasury securities; *Foreign* is trading securities invested outside the U.S. *FederalLender* is trading securities issued or guaranteed by Fannie Mae, Ginnie Mae, and Freddie Mac. *Debt* is debt securities held for trading. *Other* includes all trading assets not in the above mentioned categories. See Table 1 for the other variable definitions. All analysis is for the subsample of firms over 2001-2007. All regressions include unreported year dummies, and unreported control variables per equations 1-8. t-statistics in parentheses, *, **, *** significant at 10%, 5% and 1%, respectively.

Panel A: Structure of Investments and Compensation

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Bonus	Bonus	Bonus	Bonus	Bonus
Treasury	11.390***				
	[3.742]				
Government		3.788***			
		[7.197]			
FederalLender			1.824		
			[0.663]		
Debt				3.009**	
				[2.067]	
Other					2.378***
					[3.272]
AFS	0.161	0.257**	0.132	0.112	0.207
	[1.336]	[2.144]	[1.152]	[0.936]	[1.619]
HTM	0.367***	0.427***	0.361***	0.340***	0.450***
	[3.105]	[3.661]	[3.125]	[2.870]	[3.512]
Loans	0.156*	0.236***	0.146*	0.128	0.241**
	[1.913]	[2.855]	[1.910]	[1.575]	[2.510]
Observations	485	485	485	485	485
R-Squared	0.219	0.263	0.184	0.201	0.214
Time Period			2001-2007		

Panel B: Structure of Investments and Risk

VARIABLES	(1) Risk	(2) Risk	(3) Risk	(4) Risk	(5) Risk
Treasury	0.013***				
	[4.209]				
Government		0.001			
		[1.038]			
FederalLender			-0.003		
			[-0.901]		
Debt				0.005***	
				[3.146]	
Other					0.003***
					[3.980]
AFS	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	[-2.883]	[-3.238]	[-3.631]	[-3.290]	[-2.234]
HTM	0.0001	-0.0001	-0.0001	-0.0001	0.0001
	[0.141]	[-0.116]	[-0.131]	[-0.074]	[0.942]
Loans	-0.0001***	-0.001***	-0.001***	-0.0001***	-0.0001***
	[-5.623]	[-5.698]	[-6.445]	[-5.934]	[-3.667]
Observations	485	485	485	485	485
R-Squared	0.519	0.507	0.505	0.513	0.517
Time Period			2001-2007		

Panel C: Structure of Investments and Performance

	(1)	(2)	(3)	(4)	(5)
VARIABLES	ROA	ROA	ROA	ROA	ROA
Treasury	-0.398***				
	[-4.090]				
Government		-0.068***			
		[-3.902]			
FederalLender			-0.031		
			[-0.351]		
Debt				-0.256***	
				[-5.589]	
Other					-0.118***
					[-5.139]
AFS	0.001	0.0001	0.004	0.001	-0.002
	[0.259]	[0.027]	[0.964]	[0.399]	[-0.577]
HTM	0.0001	-0.001	0.002	0.001	-0.004
	[0.075]	[-0.132]	[0.493]	[0.140]	[-1.094]
Loans	0.002	0.001	0.004	0.002	-0.003
	[0.785]	[0.378]	[1.509]	[0.828]	[-0.931]
Observations	485	485	485	485	485
R-Squared	0.097	0.092	0.083	0.109	0.106
Time Period			2001-2007		

Table 7: Robustness Tests

This table presents estimations of equations 1-8, where we tabulate equations 2, 5, and 8. *Shares* is the shares owned by the CEO normalized by total shares outstanding; *logOptions* is the logarithm of the dollar value of stock options; *Tenure* is the length of CEO tenure; *Return* is the prior year share price performance; MB is the market-to-book ratio; *Leverage* is total liabilities divided by total assets; *CommercialBank* is a dummy variable if a firm is a commercial bank (SIC 6020). See Table 1 for the other variable definitions. ($l.VariableName$) indicates that the variable is lagged by one year. Column 2 is for the subsample of firms with trading assets and conducted over 2001-2007. All regressions include unreported year dummies. t-statistics in parentheses, *, **, *** significant at 10%, 5% and 1%, respectively.

	(1)	(2)	(3)
VARIABLES	Bonus	Risk	ROA
Constant	0.267***	0.0007***	-0.012**
	[2.891]	[2.901]	[-2.427]
ShortTerm	0.853***	0.001**	-0.025***
	[8.765]	[2.481]	[-5.906]
ROA	0.104	-0.006***	
	[0.275]	[-2.589]	
Shares	-0.0001	-0.0001	0.0001*
	[-0.725]	[-0.007]	[1.669]
LogOptions	0.001	-0.0001*	0.000***
	[0.525]	[-1.816]	[2.734]
Tenure	0.001*	-0.0001	0.0001
	[1.847]	[-0.748]	[0.107]
Return	0.010	-0.0001***	0.001
	[1.083]	[-5.188]	[0.785]
Risk	-0.219		-2.970***
	[-0.051]		[-6.664]
MB	0.003	0.0001	0.002***
	[0.802]	[1.555]	[7.541]
LogAssets	-0.016***	-0.0001***	0.001***
	[-3.671]	[-3.257]	[3.308]
Leverage	0.010	0.0001	0.005
	[0.218]	[1.049]	[1.411]
Bonus		0.0001**	-0.0001
		[2.112]	[-0.104]
Observations	704	201	704
R-Squared	0.290	0.672	0.379
Time Period	1994-2010	2001-2007	1994-2010

Table 8: Small-Sample Tests on Investment Patterns and Firm Performance

This table reports the results of t-tests on abnormal returns across investment mix partitions. We compare the performance of firms that are not holding short-term investment assets (column 1), to firms that hold trading assets (column 2). The comparison is done for two time periods: the beginning of the crisis (May-Aug. 2007), and the entire crisis period starting 1 May 2007 and ending 30 Nov. 2008. *, **, *** significant at 10%, 5% and 1%, respectively.

	(1)	(2)		
	No-ShortTerm	ShortTerm	Diff	
May 2007 - Aug 2007	-1.21%	-7.95%	-6.74%	t = 2.25**
May 2007 - Nov 2008	18.51%	-32.45%	-50.97%	t = 3.72***
Number of Firms	29	34		