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Abstract

We investigate whether bank performance during the recent credit crisis is related to chief executive officer (CEO) incentives before the crisis. We find some evidence that banks with CEOs whose incentives were better aligned with the interests of shareholders performed worse and no evidence that they performed better. Banks with higher option compensation and a larger fraction of compensation in cash bonuses for their CEOs did not perform worse during the crisis. Bank CEOs did not reduce their holdings of shares in anticipation of the crisis or during the crisis. Consequently, they suffered extremely large wealth losses in the wake of the crisis.

Keywords: Financial crisis; CEO compensation; CEO incentives; Insider trading

JEL Classification: G01, G21, G32

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1. Introduction

In the search of explanations for the dramatic collapse of the stock market capitalization of much of the banking industry in the US during the credit crisis, one prominent argument is that executives at banks had poor incentives. For instance, Alan Blinder argues that these poor incentives are "one of [the] most fundamental causes" of the credit crisis (Wall Street Journal, 2009a). The argument seems to be that executives' compensation was not properly related to long-term performance, leading the Obama administration to discuss ways to change compensation practices "to more closely align pay with long-term performance" and to give more voice to shareholders through the adoption of "say on pay" for firms that received public funds through the Troubled Asset Relief Program (TARP).[1] Eventually, "say on pay" and other related governance measures became part of the Dodd-Frank Wall Street Reform and Consumer Protection Act.

We investigate in this paper how closely the interests of bank chief executive officers (CEOs) were aligned with those of their shareholders before the start of the crisis, whether the alignment of interests between CEOs and shareholders can explain the banks' performance in the cross section during the credit crisis, and how CEOs fared during the crisis.

Traditionally, corporate governance experts and economists since Adam Smith have considered that management's interests are better aligned with those of shareholders when managers' compensation increases when shareholders gain and falls when shareholders lose. As Murphy (1999) puts it in a widely cited review of the academic literature on managerial compensation: "Stock ownership provides the most direct link between shareholder and CEO wealth." Yet our results show that no evidence exists that banks with a better alignment of the CEO's interests with those of the shareholders had higher stock returns during the crisis. Some evidence shows that banks led by CEOs whose interests were better aligned with those of their shareholders had worse stock returns and a worse return on equity. Though options have been

[1] See Reuters (2009), Wall Street Journal (2009b), and Washington Post (2009).

blamed for leading to excessive risk-taking, there is no evidence in our sample that greater sensitivity of CEO pay to stock volatility led to worse stock returns during the credit crisis. We also do not find evidence that bank returns were lower if CEOs had higher cash bonuses. A plausible explanation for these findings is that CEOs focused on the interests of their shareholders in the build-up to the crisis and took actions that they believed the market would welcome. Ex post, these actions were costly to their banks and to themselves when the results turned out to be poor. These poor results were not expected by the CEOs to the extent that they did not reduce or hedge their holdings of shares in anticipation of poor outcomes.

There are many versions of the poor incentives explanation of the crisis. One version is that CEOs had strong incentives to focus on the short run instead of the long run. Another version is that option compensation gave incentives to CEOs to take more risks than would have been optimal for shareholders. A third version is that the high leverage of financial institutions implies that CEOs can increase the value of their shares by increasing the volatility of the assets because the shares are effectively options on the value of the assets. Though the incentives of CEOs can be such that they focus too much on the short run, that they take too much risk, and that they choose excessive leverage, it is by no means obvious that CEO incentives in banks had these implications. In particular, large holdings of equity by CEOs could in fact lead them to focus appropriately on the long run, to avoid some risks that might be profitable for shareholders, and to avoid excessive leverage.

To the extent that the market for a bank's stock is efficient, changes in a bank's long-term performance are properly reflected in the stock price. Thus, greater sensitivity of a CEO's wealth to his bank's stock price makes it advantageous for the CEO to improve his bank's long-term performance when it makes economic sense to do so. Focusing on the short run instead of the long run would be costly for CEOs because their stock price would be lower than if they had taken actions to maximize shareholder wealth. This argument is ignored by most critics who have blamed the crisis on compensation structures and who have focused on the "Wall Street bonus

culture." The above conclusion would not hold if the market is not efficient, because in that case the market might put more weight on short-run results and misvaluation could create pressure on management to take actions it would not take in an efficient market.[2] In an inefficient market, CEOs might have concluded that they had no choice but to focus on short-run profit maximization because they feared losing their job had they not grown aggressively. For instance, they might have chosen to grow the subprime securitization business because of fears that the market would have reacted poorly to lack of growth even though shareholders would have benefitted in the long run from the absence of such growth. However, even if the market is efficient and in principle CEOs have proper incentives to focus on the long-run consequences of their actions, CEOs might irrationally focus more on cash bonuses than on potential increases in their equity wealth not realizable until much later.

Much attention has been paid to the role of options in compensation. However, the incentive effects of options depend on the CEO's holdings of shares because they would be diluted in the CEO's portfolio if he had large holdings of shares. Further, when the CEO's portfolio of options is composed mostly of in-the-money options, the incentive effects of options do not differ much from the incentive effects of common stock holdings. Keeping the CEO's wealth constant, greater sensitivity of his wealth to increases in the volatility of his firm's stock return brought about by greater stock option holdings would increase the CEO's incentives to take risks as long as these options are not too much in the money. But, generally, granting options also affects the CEO's wealth, which can change his willingness to take risks (see Ross, 2004). Whether greater sensitivity of CEO wealth to volatility makes the CEO's interests better aligned with the interests of shareholders would seem to depend on many considerations. For example, if the CEO's holdings of stock make him more conservative, greater sensitivity of his wealth to volatility would help in aligning the CEO's incentives with those of shareholders.

[2] See Bolton, Scheinkman, and Xiong (2006) for a model in which optimal compensation puts more weight on short-run results to take advantage of speculative behavior in the stock market and Jensen (2005) for an analysis of the implications of overvalued equity for the incentives of management.

For given asset volatility and expected cash flows from assets, an increase in bank leverage would lead to an increase in the value of equity because equity is an option on the value of the assets for levered firms. However, higher leverage can also have costs. Many lines of business of banks are sensitive to the risk of their senior claims. For instance, derivatives trading businesses generally require a high credit rating for senior claims. Further, even if an increase in leverage increases stock prices, CEOs with a large equity stake in their firm could choose more conservative leverage to reduce the risk of their wealth.

CEOs with greater incentive alignment would therefore be expected to take different risks from those with weaker incentive alignment. To the extent that the bank exposures that performed poorly during the crisis were viewed as risky by CEOs in 2006, we would expect that bank CEOs with greater incentive alignment would have chosen to take fewer such exposures than CEOs with poor incentive alignment. CEOs with low holdings of shares would have had much less to lose in the event of bad outcomes as a result of these exposures.

We find that bank CEOs had substantial wealth invested in their banks. For the median CEO, the value of stock and options in his portfolio was more than eight times the value of his total compensation in 2006. Consequently, changes in his bank's stock price could easily wipe out all of a CEO's annual compensation. The median CEO owned 0.4% of the outstanding shares of his bank. Taking into account vested, but unexercised options, this fraction increases to 1.0%. The large holdings of vested unexercised options are striking. They are not consistent with the view that somehow the typical CEO knew that there was a substantial risk of a crash in the stock price of his bank.

A bank's stock return performance in 2007–2008 is negatively related to the dollar incentives derived from its CEO's holdings of shares and options in 2006. This effect is substantial. An increase of one standard deviation in dollar incentives is associated with lower returns of 9.6 percentage points. Similarly, a bank's return on equity in 2008 is negatively related to its CEO's dollar incentives in 2006. A one standard deviation increase in dollar incentives is associated with a

lower return on equity of 10.5 percentage points. This evidence suggests that CEOs took exposures that they felt were profitable for their shareholders ex ante but that these exposures performed very poorly ex post. The convexity introduced by options does not appear to have had an adverse impact on stock return performance or accounting performance measured by the return on equity (ROE) or by the return on assets (ROA).

Much concern has been expressed about the incentives of non-CEO bank executives. For instance, Blinder states that the top executives face incentives such that "[f]or them, it's often: Heads, you become richer than Croesus ever imagined; tails, you receive a golden parachute that still leaves you richer than Croesus. So they want to flip those big coins, too." (Wall Street Journal, 2009a). Data are available on the compensation of the top four highly paid non-CEO bank executives. We use that data to examine whether the incentives of non-CEO bank executives are related to bank performance during the crisis. We do not find evidence that the incentives of non-CEO executives at the end of 2006 are related to subsequent bank performance during the crisis. However, if we look at the sum of the incentives of the top five executives, we find that our results on CEO incentives are robust to this alternative specification.

It could be that the incentive effects of compensation policies were different for the subset of banks that made large losses or that were more systemically important. One way to identify such a subset is to examine firms that received funding from TARP. When we look at the subset of the 54 banks that received such funding in our data set we find no statistically significant difference in the relation between dollar equity incentives and returns in the subsamples of TARP and no-TARP recipients.

CEOs could have sharply decreased their holdings after 2006 but before the full impact of the crisis, so that they did not have to bear the cost of the exposures they took. In that case, they would have appeared to have incentives aligned with those of the other shareholders in 2006, but they would have traded out of these incentives or would have hedged them. Consequently, their behavior in 2006 might have been based on their knowledge that they would trade out of these

incentives before the value of their portfolio fell substantially. For such a strategy to make sense, CEOs would have had to be able to anticipate the crisis. We investigate the insider trading of bank CEOs in 2007–2008. We find no evidence that they traded out of their positions. CEOs therefore had to bear the losses associated with the poor outcomes of the exposures their banks had at the end of 2006. Our evidence on CEO trading of shares in 2007 and 2008 is consistent with the hypothesis that the crisis and its evolution were unexpected for bank top executives. It is also inconsistent with the hypothesis that CEOs focused knowingly and suboptimally on the short term. Some might argue that they should have known better, but our evidence also shows that they had stronger incentives than most to understand the risks they were taking and the overall performance of their bank.

A long literature on the compensation of bank CEOs helps put our results in perspective. This literature shows not only that CEO compensation depends on stock return and accounting performance (Barro and Barro, 1990) as does the compensation of CEOs generally, but also that the composition of pay differs from CEOs of other industries. In particular, the share of pay in the form of stock and options for bank CEOs is lower than in other industries (e.g., Adams and Mehran, 2003; and Houston and James, 1995). More recently, Kaplan and Rauh (2010) estimate and compare adjusted gross incomes for nonfinancial firm executives and financial service sector employees. Their evidence indicates that the financial industry has relatively more highly compensated individuals than the nonfinancial industry. Several papers investigate the impact of deregulation and greater competition on bank CEO compensation. In particular, Hubbard and Palia (1995) and Crawford, Ezzell, and Miles (1995) conclude that deregulation led to greater pay-for-performance sensitivity of CEO pay at banks. Finally, Mehran and Rosenberg (2007) investigate the incentive effects of option grants for bank CEOs. They find that asset volatility is higher for banks that grant more options. But, at the same time, these banks have less leverage, showing that the effects of option grants on bank policies are complex. Cheng, Hong, and Scheinkman (2009) examine size-adjusted annual compensation and show that it is related to bank risk measures.

Though much of the recent debate concerns the alignment of incentives between managers and shareholders, the existing literature suggests that greater pay-for-performance sensitivity could lead to more systemic risk, indicating that a conflict could arise between shareholder wealth maximization and financial stability. In particular, Crawford, Ezzell, and Miles (1995) find that, following deregulation, pay-for-performance sensitivity of CEO pay increased more at less well capitalized institutions. They interpret this result as evidence of a moral hazard problem induced by the existence of deposit insurance priced in a way that does not reflect the risks taken on by individual banks. More recently, a series of papers has analyzed whether bank CEO compensation is optimally designed to trade off two types of agency problems: the standard managerial agency problem as well as the risk-shifting problem between shareholders and debtholders that could be particularly severe in highly leveraged institutions (e.g., John, Mehran, and Qian, 2008; and John and Qian, 2003). These papers argue that leverage should reduce the pay-for-performance sensitivity of bank CEOs compared with other CEOs because of monitoring by debtholders. Accordingly, John and Qian (2003) show that bank CEOs have lower pay-for-performance sensitivity than other CEOs. This literature emphasizes that it could be optimal for shareholders to take more risks because doing so increases the value of the put granted to banks by the Federal Deposit Insurance Corporation (FDIC). John, Saunders, and Senbet (2000) develop a model in which it is optimal for the FDIC to set insurance premiums, taking into account the compensation contract of the bank's CEO.

The paper proceeds as follows. In Section 2, we introduce our sample of banks. In Section 3, we present data on CEO compensation and equity ownership at the end of fiscal year 2006. We then turn to the relation between CEO compensation, equity ownership, and bank performance during the crisis in Section 4. In Section 5, we investigate the relation between the incentives of the top four non-CEO executives and bank performance. Section 6 examines the incentive structure and its relation to performance in banks that received money from the Troubled Asset Relief

Program, and Section 7 analyzes the trading of CEOs in shares of their own bank after the end of 2006 and how their equity ownership evolves during the crisis. We conclude in Section 8.

2. The sample of banks

Our study requires compensation data, which we obtain from Standard and Poor's (S&P) Execucomp. We use that database as the starting point for the formation of our sample. We download all firm-year observations for firms with Standard Industry Classification (SIC) codes between 6000 and 6300 in fiscal year 2006. This yields 132 unique firms. We exclude firms with SIC code 6282 (Investment Advice), because these are not in the lending business (e.g., Janus, T Rowe Price). In addition, we manually go through the list of firms with SIC code 6199 (Finance Services) and SIC code 6211 (Security Brokers and Dealers). Such a manual search is necessary because SIC code 6211 includes not only investment banks but also pure brokerage houses such as Charles Schwab.[3] Though our sample has investment banks, we exclude pure brokerage houses. We also report tests that exclude investment banks. Further, SIC code 6199 contains both American Express and Citigroup even though American Express is not a bank in the traditional sense. For increased transparency, we list in the appendix the firms we exclude from our analysis and those we include. Our final raw sample contains 98 firms. Three of those banks do not have complete data on CEO compensation and equity holdings. In addition to compensation data, we obtain accounting data from Compustat, banking data from Compustat Bank, insider trading data from Thomson Financial, and stock return data from the Center for Research in Security Prices (CRSP).

Table 1 provides summary statistics for our sample of banks. It shows that we cover very large financial institutions. This is not surprising because ExecuComp is biased toward larger firms. The median asset value is $15.5 billion, and the mean asset value is $129.3 billion. The sum of total

[3] Using the finer North American Industry Classification System (NAICS) does not resolve the issues. For example, Goldman Sachs Group is classified as 523110 (Investment Banking & Brokerage), while Bear Stearns is classified as 523120 (Securities Brokerage).

assets of sample firms at fiscal year-end 2006 is $12.3 trillion. At the end of 2006, the average (median) market capitalization of sample banks is $18.7 billion ($2.8 billion). The average net income over assets (over equity) is 1.2% (13.5%). We also report two measures of capital strength: the Tier 1 capital ratio and the tangible common equity divided by tangible assets. The Tier 1 capital ratio is on average 9.7% and the tangible common equity ratio is 6.7% at fiscal year-end 2006. The average Tier 1 capital ratio makes these banks well capitalized. Even the lowest Tier 1 ratio (5.73%) is substantially above the regulatory minimum of 4%. No bank in our sample has negative net income in 2006.

Our study examines the accounting and stock return performance of the sample banks until the end of 2008. Table 2 shows the attrition of sample firms from fiscal year-end 2006 to the end of 2008. Of the 95 banks with complete CEO compensation data in 2006, 77 survived until December 2008. Twelve banks were acquired, and 6 banks were delisted from the exchange due to a violation of listing requirements or bankruptcy.

3. CEO compensation and equity ownership at the end of fiscal year 2006

We now turn to an examination of CEOs' and other proxy-named executives' compensation and of their equity and option holdings at the end of 2006. In 2006, the Securities and Exchange Commission (SEC) adopted new disclosure requirements concerning, among other items, executive compensation. The amendments to the compensation disclosure rules were intended to provide investors with a clearer and fuller picture of the compensation of named executive officers. The new rules were designed to improve tabular presentation and to offer material qualitative information regarding the manner and context in which compensation is awarded and earned. Firms had to comply with the new rules if their fiscal year ended on or after December 15, 2006. We use the new table on outstanding equity awards at fiscal year-end that provides detailed information on exercise prices and expiration dates for each outstanding option grant to calculate the option's Black-Scholes value as well as its sensitivity to volatility and stock price changes. In

addition, we use the narrative on executive compensation to analyze what fraction of the annual accounting bonus was paid in cash and what fraction was paid in equity. The summary tables on executive compensation, which are available through ExecuComp, report equity grants for annual performance in the year the grant was made, and not in the year during which performance was measured.[4] Hence, we manually retrieve the information on the decomposition of the annual bonus for operating performance into cash bonus and equity bonus by reading the narrative on executive compensation and by looking at the following year's proxy statement.[5]

Five of our sample firms have fiscal years ending before December 15, 2006 (Bear Stearns, Goldman Sachs, Lehman Brothers, Morgan Stanley, and Washington Federal Savings) and do not report executive compensation according to the new disclosure rules. For those firms, only aggregate information on exercisable and unexercisable past option grants is available. We use the methodology of Core and Guay (2002) to calculate the average characteristics of previously granted unexercisable and exercisable options. Core and Guay (2002) treat all previously granted unexercisable and all previously granted exercisable options as two single grants. The exercise price of each aggregated grant is then derived from the reported average realizable value of the options. In addition, Core and Guay (2002) assume that unexercisable options have a time-to-maturity that is three years greater than that of the exercisable options. We use the two aggregated grants and their imputed characteristics to approximate the Black-Scholes value and delta and vega of the previously granted options for these five firms. Core and Guay (2002) show the validity and robustness of their approximation.

[4] For example, the proxy statement of CitiGroup for fiscal year 2006 (filed in March 2007) accurately describes the problem: "In accordance with SEC regulations, the stock awards granted in January 2006 in respect of the executive's performance during 2005 are required to be reported in this proxy statement, which generally describes awards made in respect of performance in 2006. Barring a change in the SEC regulations, the stock awards granted in January 2007 in respect of each executive's 2006 performance will be reported in the Grants of Plan-Based Awards Table in the 2008 proxy statement if the executive is a named executive officer in 2007."

[5] We are unable to identify equity grants for 2006 performance for about 20% of the sample because of turnover or because the equity grants are not separated into grants for annual operating performance and other long-term objectives such as retention.

Columns 1 and 2 of Table 3 provide means and medians of CEOs' compensation, annual bonus for 2006 performance, equity portfolio, equity incentives, and equity risk. Columns 3 and 4 provide statistics for the next four highest paid executives, measured by total pay. We first average compensation variables by firm across the four non-CEO executives and then calculate the cross-sectional mean and median. Columns 1 and 2 have 95 observations because three firms do not report CEO equity holdings for 2006 as a result of a change in CEO. The total compensation (including new option and stock grants, but excluding gains from exercising options) of sample CEOs was on average $7.8 million for 2006, and the median compensation was $2.5 million. The next five rows split the total pay into its components. The majority of CEO compensation stems from performance-based pay, as the average base salary of $760,000 is less than 10% of the average total compensation. John and Qian (2003) use a sample constructed similarly to ours and investigate compensation for 120 commercial banks from 1992 to 2000. In that study, they find that the ratio of average salary to average total direct compensation is higher than what we find (16% versus 10%). However, the distribution of that ratio is skewed. The median base salary of $750,000 is about 30% of the median total compensation. The last row in the first part of the table shows that cash bonuses are large relative to cash salary. The average value of cash bonus (measured as the sum of nonincentive-based pay, bonus, and long-term incentive plan payouts) over cash salary is 2.8, with a median of 0.9. When executives receive high cash bonuses for success but when bonuses cannot go below zero for failure, executives potentially have incentives to take risks that are not in the interests of the shareholders or of the safety and soundness of their institutions because that part of their compensation is not affected by the size of the loss that results from their actions. Consequently, we include the ratio of cash bonus to salary in all regressions.

Annual bonuses for achievements of accounting based goals are paid both in cash and equity to align incentives of CEOs and shareholders. The next subset of statistics shows the decomposition of the annual bonus for 2006 performance into cash and equity grants. A significant fraction of 40% of the annual bonus for accounting performance is paid in equity. Furthermore, this statistic is

somewhat understating the true significance of equity bonuses, because the higher the total bonus for 2006 performance, the higher the fraction that is paid in equity (the correlation between cash bonus divided by total bonus and total bonus is -0.22). This result has important implications for critics' argument that annual bonuses are distorting incentives. More than 40% of the annual bonus is paid in equity, which does not vest for several years to come. Given the size of the annual bonuses, it is not surprising that the cash flows to executives from cash bonuses and sales of vested shares were large.[6] However, our focus is not on the size of compensation but on the incentive effects of compensation and, more precisely, on the incentives of CEOs immediately before the crisis.

As Hall and Liebman (1998) and Core and Guay (1999) point out, most CEO equity incentives stem from the existing portfolio of stock and options, and not from annual grants. A similar result holds for our sample. We define the total dollar value of equity of a CEO at the end of fiscal year 2006 as the sum of unrestricted and restricted shares held multiplied by the end-of-year share price plus the Black-Scholes value of exercisable and unexercisable stock options plus the fair value of unearned equity incentive plans.[7] The mean (median) value of the CEO's equity stake is $87.5 million ($35.6 million). Twenty-one CEOs in our sample have equity stakes valued at more than $100 million. The top five equity positions at the end of fiscal year 2006 are held by James Cayne (Bear Stearns, $1,062 million), Richard Fuld (Lehman Brothers, $911.5 million), Stan O'Neal (Merrill Lynch, $349 million), Angelo Mozilo (Countrywide Financial, $320.9 million), and Robert J. Glickman (Corus Bankshares, $281.1 million).

[6] Bebchuk, Cohen, and Spamann (2009) provide statistics on the cumulative cash flows to executives at Bear Stearns and Lehman from cash bonuses and share sales.

[7] The treatment of restricted shares in the 'ownership by officers and directors' table, from which ExecuComp derives the total number of shares held by executives, is not consistent across firms. We manually go through the proxy statements and determine whether unvested restricted shares are counted toward the number of shares held by executives. If not, we add the number of unvested restricted shares to the number reported in the beneficial ownership table to determine the total ownership from shares. For an example, see the proxy statement of Goldman Sachs filed on February 21, 2007.

Most of the value of the executives' equity portfolio stems from shares and vested, exercisable options, which are voluntarily held.[8] The value of the equity portfolio is large relative to the total annual compensation. The median ratio of the value of the overall equity portfolio divided by total annual compensation is 8.1 for CEOs. The median CEO ownership percentage from shares in our sample is 0.4. John and Qian (2003) found median CEO equity holdings of 0.25% for their sample of commercial banks. The median percentage ownership from shares and exercisable options, as reported in the bank's proxy statement, is 1.0%.

We use the detailed option plan table (or the Core and Guay (2002) approximation) to calculate the delta and vega of each option grant (current and past grants). To calculate delta and vega, we need the option's exercise price, expiration date, volatility, the current stock price, the relevant interest rate, and the dividend yield. Option exercise price and expiration date come directly from ExecuComp. We use the fiscal year-end closing price of 2006 as the current stock price, the three-year lagged volatility at the end of 2006 as an estimate of the volatility, and the annual cash dividend for 2006 divided by the fiscal year-end closing price as an estimate of the dividend yield. The ten-year Treasury rate is used as an estimate of the risk-free interest rate.

Table 3 presents two measures of sensitivity of the equity portfolio of the CEO to changes in the bank's stock price. We show that the average (median) CEO ownership from shares and delta-weighted options (percentage ownership) represents 2.4% (1.0%) of the outstanding shares. In other words, the average (median) CEO's wealth increases by $24 ($10) for every $1,000 in created shareholder wealth. By way of comparison, Murphy (1999) shows that the median gain for the CEO of a firm in the largest half of the S&P 500 is $4.36 for every $1,000 in created shareholder wealth in 1996, which is much less than the median gain for the bank CEOs in our sample. The second measure is the dollar gain for a 1% increase in shareholder value (dollar gain

[8] Many companies have established target stock ownership plans for their executives, so that the executive is not free to sell his or her entire stake (see, e.g., Core and Larcker, 2002). These target plans typically require the CEO to hold three to five times his base salary in stock. These values are largely exceeded in our study. For example, Table 3 shows that the median CEO holds shares worth more than 25 times his base salary.

from +1%). Table 3 shows that the average (median) dollar gain is $1.1 million ($0.5 million) for a 1% change in firm equity value.

We calculate the percentage change in the equity portfolio value of a CEO for a 1% increase in volatility using options only. We call this measure percentage equity risk sensitivity. Although common stock has some exposure to volatility (because it can be considered a call option), Guay (1999) shows that, for the typical firm, the volatility exposure of common stock is negligible. This result might not apply to banks because they are highly levered. Nevertheless, we use the traditional approach to estimate the equity risk sensitivity because its interpretation is well understood. By proceeding this way, we could understate the equity risk sensitivity of CEOs. The median CEO in our sample stands to gain 0.3% of his total portfolio value if the stock price volatility increased by 1%. Alternatively, we can estimate the change in the dollar value of the CEO's wealth for a 1% increase in stock price volatility. We call this measure the dollar equity risk sensitivity. In our sample, the median dollar equity risk sensitivity is $53,100. A risk-averse CEO would have to trade off the monetary value of an increase in volatility against its impact on the volatility of his wealth.

Columns 3 and 4 show the decomposition of total pay for non-CEO executives. While the level of total pay is lower, the decomposition of pay is remarkably similar. In particular, non-CEO executives also receive a significant cash bonus. The ratio of cash bonus over salary is very similar to the ratio for CEOs. Non-CEO executives also hold large equity portfolios, holding on average (median) $20.2 million ($6 million) worth of equity. There are 19 non-CEO executives who hold in excess of $100 million in equity and 12 of these executives work for investment banks. However, options contribute more to the value of the equity portfolio than they did for CEO equity portfolios. For non-CEO executives, the median percentage ownership is 0.2%, and the median dollar gain from +1% is $83,000. Concerning the equity risk measures, for non-CEO executives, the percentage equity risk sensitivity is slightly larger than for CEOs, because their equity portfolio consists of proportionally more options.

It is interesting to compare two ratios between non-CEOs and CEOs. The ratio of cash bonus to salary for non-CEOs is high. This appears to be a distinguishing feature of the financial industry. The average ratio of cash bonus to salary for non-CEO executives for nonfinancial firms in the ExecuComp universe is only 1.1 for fiscal year 2006, compared with 3.2 for sample firms. No statistically significant difference emerges between CEOs and non-CEOs. However, the relative measure of the importance of equity incentives, value of total equity portfolio divided by the total annual compensation, is much smaller for non-CEO executives than for CEOs. These results suggest that cash bonuses are more important for non-CEO executives.

4. CEO incentives and bank performance during the crisis

In this section, we investigate the relation between CEO incentives as of the end of fiscal year 2006 and bank performance during the crisis. For the purpose of this paper, we consider the returns of banks from July 1, 2007 to December 31, 2008, to correspond to the returns during the crisis period. Admittedly, the crisis did not end in December 2008. Bank stocks lost substantial ground in the first quarter of 2009. However, during the period we consider the banking sector suffered losses not observed since the Great Depression. The subsequent losses were at least partly affected by uncertainty about whether banks would be nationalized. Because it is not clear how the impact on bank stocks of the threat of nationalization would be affected by the incentives of CEOs before the crisis, it could well be that it is better to evaluate returns only until the end of 2008.

A longstanding debate exists in the corporate finance literature on how to assess long-run performance (see Fama, 1998, and Loughran and Ritter, 2000). One approach is to use buy-and-hold returns. Using buy-and-hold returns is generally a better approach when attempting to explain the cross-sectional variation in performance when performance can be affected by many factors. Another approach is to construct portfolios and evaluate the abnormal performance of these portfolios from the intercept of regressions of the returns of the portfolios on known risk factors.

This approach has the advantage of evaluating performance in the context of a portfolio strategy. In this paper, we report buy-and-hold returns.[9]

We use three measures to describe short-term and equity incentives and two measures to describe the equity risk exposure of bank CEOs. We study the ratio of cash bonus to cash salary to gauge short-term incentives. The equity incentive measures are dollar gain from +1% and percentage ownership. The equity risk exposure is measured by dollar equity risk sensitivity and percentage equity risk sensitivity.

We investigate the determinants of returns of individual banks using multiple regressions of buy-and-hold returns of banks from July 1, 2007 to December 31, 2008, on various bank characteristics.[10] The first five regressions of Table 4 use each one of our incentive and risk exposure measures, respectively. Other determinants of stock performance are the performance of the bank's stock in 2006, the equity book-to-market ratio, and the log of the bank's market value. Past returns, the book-to-market ratio, and the log of market value are all variables known to be related to returns. However, here, these variables could affect performance for reasons other than for their role as risk factors that affect expected returns. For instance, it could be that larger banks were able to take more risks. A log transformation is applied to both the percentage ownership and the percentage equity risk sensitivity. This transformation reduces the influence of extreme values of these variables and makes the distribution closer to the normal distribution (e.g., Demsetz and Lehn, 1985; and Himmelberg, Hubbard, and Palia, 1999). We winsorize the dollar incentive measures at the 2nd and 98th percentile. Columns 1 through 5 show results from regressions of the buy-and-hold returns on each of the five incentive and risk exposure measures without controls. Regression 1 uses the measure of cash bonus over salary as an indicator of high short-term CEO

[9] However, we have verified that using long-short portfolios sorted on executive ownership and equity risk characteristics yields similar results. The characteristics-adjusted alphas (using the three Fama-French factors) for portfolios long in high equity ownership (equity risk) and short in low equity ownership (equity risk) portfolios are qualitatively similar to the results reported in Table 4, but generally of lower significance.

[10] If banks delist or merge prior to December 2008, we put proceeds in a cash account until December 2008. We have verified that our results are qualitatively and quantitatively similar if proceeds are put in a bank industry index (using the Fama-French 49 bank industry classification) instead.

incentives. The coefficient is negative and statistically significant, suggesting that firms with CEOs who receive more short-term incentives have lower returns. However, this result is not robust to the inclusion of control variables in Columns 6 through 9.[11] Column 2 examines the logarithm of dollar gain from +1%. The coefficient on dollar gain from +1% is significantly negative and remains significant in all specifications. The coefficient on percentage ownership in Regression 3 is negative as well but not significant. We also estimate this regression without the log transformation, in which case the coefficient on percentage ownership is negative and marginally significant. However, the significance is driven by a few large values and disappears when we winsorize percentage ownership at the 5% level. We then turn to equity risk exposure. Regression 4 uses the dollar measure. The coefficient is negative and insignificant. In Regression 5, the coefficient on the percentage measure is positive and significant.

In Regressions 6 through 9 respectively, we use cash bonus, dollar and percentage equity incentives, and dollar and percentage risk exposure measures, and we control for other determinants of performance measured as of the end of 2006. In Regression 6, the dollar gain from the +1% measure has a negative significant coefficient. This effect is economically significant. The standard deviation of the logarithm of dollar incentives is 1.54. Consequently, an increase of one standard deviation in dollar gain from +1% is associated with lower returns of 9.6% (0.062 x 1.54). Neither the cash bonus nor the equity risk measure shows coefficients that are significantly different from zero. Also, a bank's return during the crisis is negatively related to the bank's stock return performance in 2006, although the result is not statistically significant. Beltratti and Stulz (2009) find this result, but with statistical significance, for a sample of international banks. This result suggests that banks that took on more exposures that the market rewarded in 2006 suffered more during the crisis. We find next that banks with a higher book-to-market ratio in 2006 have worse performance during the crisis. A possible explanation for this result is that banks with less

[11] The effect does not disappear because of the inclusion of several incentive and risk exposure measures. The significant coefficient on cash bonus disappears once we control for the market value and the book-to-market ratio.

franchise value took more risks that worked out poorly during the crisis. Turning to Regression 7, percentage ownership has a negative insignificant coefficient and percentage equity risk sensitivity has a positive insignificant coefficient. The coefficients on the other explanatory variables are similar to those of Regression 6. Regressions 8 and 9 require information on the Tier 1 capital ratio of banks. This requirement removes from the sample all nondepository banks. In particular, all investment banks drop out of the sample. Banks that were better capitalized at the end of 2006 fared better during the crisis. The coefficients on the incentive and risk exposure variables of CEOs are largely the same. It follows, therefore, that our results cannot be explained by the large share ownership of some CEOs of investment banks that performed poorly.

The results of Table 4 are robust to changes in the sample period, inclusion of additional control variables, and different treatment of outliers. In regressions not reproduced here, we use tangible common equity to assets as a measure of the capital ratio and obtain similar results. We also find similar results if we use returns from January 1, 2007 to December 31, 2008, or if we use only 2008. The same results hold if we do not winsorize dollar incentives or if we truncate dollar incentives.

So far, we have focused on bank performance measured by stock returns. We now turn to the performance of banks using two measures of accounting performance: return on assets and return on equity. In Fig. 1, we show the evolution of quarterly ROA from 2005Q4 to 2008Q3. Not surprisingly, the average ROA plummets in 2008. For our regression analysis, return on assets is defined as the cumulative quarterly net income from 2007Q3 to 2008Q3 divided by total assets at the end of 2007Q2.[12] For return on equity, we divide the cumulative quarterly net income by the book value of equity at the end of 2007Q2. Table 5 shows results for ROA; Table 6 shows results for ROE. In the regressions we report in Tables 5 and 6, we use the same control variables as those

[12] Our definition of ROA is common in the literature, but it creates a measure that systematically changes with capital structure. We have verified that our results are not driven by the influence of capital structure and reestimated regressions with operating profits over assets as the left-hand side variable. Our results on CEO equity incentives remain unchanged.

used in Table 4. The first two regressions use all banks; the last two regressions require availability of the Tier 1 capital ratio and thus exclude investment banks. Table 5 shows that the CEO dollar incentive measure has a significantly negative relation with ROA. A one standard deviation increase in dollar gain from the +1% measure (1.54) decreases the ROA by 0.77%, which appears economically significant relative to the sample mean ROA of 1.13%. The result is robust to the exclusion of investment banks (Column 3). Regarding the other ownership measures we examine, the percentage ownership measure is statistically significantly negative in the subsample that excludes investment banks. The economic magnitude is smaller than that of dollar gain from the +1% measure. A one standard deviation increase in percentage ownership is associated with a higher ROA of 0.52%. With the equity risk sensitivity measures, neither the dollar measure nor the percentage measure is significant. Our measure of short-term incentives, cash bonus divided by salary, is not related to ROA. The only other explanatory variable that is significant in the regressions is the book-to-market ratio.

Turning to the four ROE regressions in Table 6, the CEO's dollar incentive measure always has a negative significant coefficient. The economic magnitude appears large. A one standard deviation increase in dollar gain from the +1% measure decreases ROE by 10.5% (11.2%) in Column 1 (Column 3). These effects are similar in magnitude to the effects reported for the buy-and-hold return regressions in Table 4. In Regression 4, which uses the sample of depository banks only, the percentage ownership measure also has a negative significant coefficient. Neither the cash bonus nor the risk sensitivity measures are significant. In addition to book-to-market, the lagged ROE is significant in Regressions 1 and 2.

We estimate other regressions using ROA and ROE that we do not reproduce in a table. First, we estimate regressions in which the additional explanatory variables besides the CEO incentive and risk exposure measures are the log of the bank's market value at the end of 2006, the volatility of its stock return in the three previous years, and the Tier 1 capital ratio. We find that the coefficient on dollar gain from the +1% measure is negative and significant in the ROE regression.

The coefficient on volatility is negative and significant. We also estimate these regressions on changes in ROA and changes in ROE. The dollar gain from the +1% measure has a significant negative coefficient and the dollar equity risk sensitivity measure has a positive significant coefficient.

5. Non-CEO executive incentives, risk exposure, and bank performance during the crisis

While a long-standing tradition in executive compensation is to treat the CEO as a sufficient statistic for the rest of the organization (e.g., Jensen and Murphy, 1990; Hall and Liebman, 1998; and Core and Guay, 1999), pervasive concerns have arisen that the incentives of non-CEO bank executives led to excessive risk-taking. For instance, the Federal Reserve stated in a press release that "[f]laws in incentive compensation practices were one of many factors contributing to the financial crisis. Inappropriate bonus or other compensation practices can incent senior executives or lower level employees, such as traders or mortgage officers, to take imprudent risks that significantly and adversely affect the firm."[13] To examine this issue, we analyze the relation between stock and accounting performance and the average incentives and risk exposure for the next four highest paid non-CEO proxy-named executives (measured by total compensation). In addition, we estimate regressions that use the sum of the incentives and risk exposure of the top five executives, including the CEO, to analyze whether our conclusions from Section 4 are robust to this alternative specification. To conserve space, we describe, but do not report, results from these additional tests.

When we analyze buy-and-hold returns and non-CEO incentives we find, similar to the results for CEOs, some weak evidence that the ratio of cash bonus to salary is negatively related to buy-and-hold returns. But, again, once we include control variables, this result disappears. In

[13] See press release of October 22, 2009, announcing a "proposal designed to ensure that incentive compensation policies of banking organizations do not undermine the safety and soundness of their organizations."

regressions including firm-specific control variables, none of the non-CEO incentive and risk exposure measures has explanatory power for buy-and-hold returns. We also analyze buy-and-hold returns and the sum of the incentives and risk exposure of the top five executives, including the CEO. The results are consistent with our earlier analysis of CEOs only. In particular, the dollar gain from the +1% measure displays an economically strong inverse relation with buy-and-hold returns.

We do not find evidence that non-CEO executive equity incentives or risk exposure are associated with ROA or ROE in any of the specifications. We finally examine the relation between ROA and ROE and the sum of the equity incentives and risk exposure of the top five highest paid executives and corroborate our earlier findings for CEOs only. Some weak evidence shows a relation between dollar gain from +1% of the executive team and return on assets in the specification that excludes investment banks. In addition, a strong link exists between dollar gain from the +1% measure of the entire executive team and return on equity. For all other incentive and risk exposure measures, we do not find coefficients that are statistically different from zero.

Overall, the evidence in this section suggests that the relation between executive equity incentives and performance of sample banks is driven by the equity incentives of the CEO.

6. Executive equity incentives, risk exposure, and bank performance for TARP recipients

A possible concern with our analysis is that short-term incentives, equity incentives, and risk exposure might have played a different role in banks that made larger losses or were more systemically important. One approach to identify such banks, albeit ex post and with inherent selection biases, is to use the subset of banks that received funding from the Troubled Asset Relief Program. Because there are obvious concerns with respect to stock returns (the granting of TARP money could have increased returns toward the end of our sample period relative to the returns of other banks), we focus in this section on the accounting returns that are measured at the end of the third quarter of 2008 and thus prior to the distribution of TARP money.

We identify sample banks that received TARP funding from a comprehensive list of TARP recipients published by *USA Today*.[14] In our sample of 98 banks, 54 received TARP money. In unreported tests, we compare the CEO incentives and risk measures of TARP firms with those of non-TARP firms at the end of 2006. At the 5% level, we cannot reject the null hypothesis that average and median CEO incentives and risk measures are identical for TARP and non-TARP firms. In Table 7, we reestimate the regressions of Tables 5 and 6, Column 1, but interact the incentive and risk exposure measures with an indicator variable equal to one if a firm received TARP money. To avoid having outliers determine the regression estimates in the subsamples, we truncate ROA and ROE at the 1% level. In all regressions in Table 7, the coefficient on the incentive or risk exposure measure indicates the association between the measure and the return for the group of non-TARP firms. The coefficient on the interaction term of TARP and the incentive or risk exposure measure shows how the association between the measure and the return differs between TARP firms and non-TARP firms. Statistical significance on the interaction term hence demonstrates that a statistically different association exists in firms that receive TARP funding and those that do not.

The first column in Table 7 shows the results for ROA. There is no evidence that incentives or risk exposure in TARP firms had a different effect on the ROA than incentives or risk exposure in non-TARP firms. Column 2 shows the results for ROE. Again, there is no evidence that incentives or risk exposure had a different impact for TARP firms than other firms.

7. CEO equity losses during the crisis

We have uncovered no evidence supportive of the view that better alignment of incentives between CEOs and shareholders would have led to better bank performance during the crisis or that

[14] See http://www.usatoday.com/money/economy/tarp-chart.htm. In unreported regressions, we also add firms that would in all likelihood have received TARP funding but did not survive long enough (e.g., Bear Stearns, Lehman Brothers, Countrywide, IndyMac, WashingtonMutual, and Wachovia). Adding these firms does not change our results reported in Table 7.

larger risk exposure through option compensation is to blame for the poor performance of banks. Our evidence is consistent with the hypothesis that CEOs who took exposures that performed poorly during the crisis did so because they thought that doing so was good for shareholders as well as for themselves. Our evidence provides no support for the hypothesis that option compensation led CEOs to take on more exposures that performed poorly during the crisis. Finally, our evidence is consistent with the hypothesis that CEOs did not expect these exposures to work out poorly.

So far we proceeded with our analysis using CEO share and option holdings at the end of 2006. If CEOs saw the crisis coming some time after the end of 2006, they could have sold their holdings—at least as long as they were not concerned about or could avoid insider trading litigation risks—and hence would not have been affected adversely by their decisions. We investigate in this section how share ownership of CEOs evolved during the crisis. For this analysis, we use ExecuComp and the database on insider transactions from Thomson Financial. We aggregate CEO transactions by firm and quarter. We are able to match 88 of the 95 bank CEOs in ExecuComp to the Thomson Financial database.

Fig. 2 reports the quarterly mean CEO net share purchases between 2007Q1 and 2008Q4, divided by their ownership from shares at the end of 2006. We do not include ownership through options in the denominator, because most of the options are underwater by the end of 2008. Scaling by ownership from shares at the end of 2006 thus takes better into account the effective sales of the CEOs. Throughout the crisis period, in all but one quarter, CEOs sell around 2% of their holdings per quarter. In any given quarter, less than 50% of all CEOs trade at all. The exception is for the quarter ending in September 2008, when, conditional on trading, CEOs sell almost 10% of their holdings on average. Fig. 2 also shows the increase in ownership of CEOs through new grants of stock. They receive grants throughout the period. Overall, taking sales and new grants into account, there is no evidence of large selling efforts by CEOs except for those who traded in the quarter ending in September 2008, a quarter marked by the Lehman bankruptcy. The solid line, capturing total changes in CEO ownership, oscillates around zero through the sample period.

In Table 8, we attempt to estimate the dollar loss of CEOs in our sample on their stock holdings resulting from the fall in the value of their holdings over the period from the end of fiscal year 2006 through December 31, 2008. Our starting point for each CEO is the shares held at the end of 2006. We use the insider trading data to evaluate the price at which the CEO sold shares, if he sold shares.[15] The CEO's total dollar loss is then defined as the loss in value of the shares not sold, evaluated using the price of the shares at the end of December 2008 or when the CEO loses his job plus the loss from selling shares, measured as the difference between the value of shares at the end of 2006 and the price of the shares sold. The average value of shares held at the end of 2006 is $61.503 million. On average, a CEO lost $28.771 million on the shares not sold and $2.719 million on the shares sold. More than three-quarters of the CEOs did not report any insider sales. On average, a CEO lost $31.490 million. The median loss is sharply less, however, at $5.084 million. It follows from Table 8 that CEOs made large losses on their wealth during the crisis and that most of these losses come from holding on to their shares. Had CEOs seen the crisis coming, they presumably could have avoided most of these losses by selling their shares. They clearly did not do so.

We also investigate what happened to the options held by CEOs. Strikingly, only 12% of the options granted before 2007 were out of the money at fiscal year-end 2006. In contrast, approximately 70% of all options granted before 2007 were out of the money at the end of the sample period. Consequently, CEOs suffered large losses on their option portfolios as well.[16]

[15] We implicitly assume that a CEO first sells the shares he already owned in 2006 and does not sell shares from more recent stock grants. Given the vesting restrictions on new stock grants and our relatively short sample period, we do not believe this is a major cause of concern. We are able to exclude sales of shares linked to option exercises, if the option exercise and subsequent sale are reported concurrently. Shares that are acquired through option exercises and immediately sold receive a special code in the Thomson Financial Database, and we exclude those transactions. However, if the executive exercises the options in 2007, acquires the shares, and then waits a week before selling them, we would erroneously consider this transaction an outright sale of shares owned in 2006. Because many options had strike prices higher than stock prices during the financial crisis, we do not believe this is a major concern.

[16] Murphy (2009) provides additional evidence that the intrinsic value of in-the-money executive stock options decreased dramatically during the financial crisis, in particular for TARP firms.

A valid concern is whether we overestimate the equity losses of insiders. We could be missing hedging activities by insiders that are carried out through off-market equity transactions such as zero-cost equity collars, exchange funds, equity swaps, or variable prepaid forward contracts. All these transactions have in common that the insider does not sell the shares and thus retains the voting rights of the stock while receiving significant downside protection.

It is important to note that the SEC has mandated reporting of such hedging transactions since 1996. Thomson Financial, our data provider for insider transactions, has specific fields that capture trading of prepaid variable forward contracts, exchange funds, and equity swaps. When we search for zero-cost collars, exchange funds, and prepaid variable forward contracts by the CEOs of sample banks, we do not find a single hedging transaction.[17]

While some debate is ongoing on the issue of whether insiders underreport hedging transactions, it is argued by most legal experts that not reporting hedging transactions is illegal (see Wall Street Journal, 2004). Overall, we have no reason to believe that significant hedging activities attenuate the finding of large equity losses shown in Table 8.

8. Conclusion

Based on our evidence, lack of alignment of bank CEO incentives with shareholder interests cannot be blamed for the credit crisis or for the performance of banks during that crisis. Whether we look at depository banks only or at a larger sample that includes investment banks as well, there is no evidence that banks with CEOs whose incentives were less well aligned with the interests of their shareholders performed worse during the crisis. When we attempt to explain the performance of banks in the cross section, we find evidence that banks where CEOs had better incentives in terms of the dollar value of their stake performed significantly worse than banks where CEOs had poorer incentives. For the whole sample, neither cash bonus nor stock options had an adverse

[17] The lack of reported hedging activities is not surprising in light of the very small samples of hedging transactions in two comprehensive studies on off-market equity transactions (see Bettis, Bizjak, and Lemmon, 2001; and Jagolinzer, Matsunaga, and Yeung, 2007).

impact on bank performance during the crisis. We also investigate whether CEO and non-CEO incentives in banks that received TARP funds have a different relation to bank performance than that observed in banks that did not receive TARP funds. We find that the relation between bank performance and CEO incentives does not differ between TARP and non-TARP banks.

A possible explanation for our results is that CEOs with better incentives to maximize shareholder wealth took risks that other CEOs did not. Ex ante, these risks looked profitable for shareholders. Ex post, these risks had unexpected poor outcomes. These poor outcomes are not evidence of CEOs acting in their own interest at the expense of shareholder wealth.

Support for this possible explanation is provided by our examination of the wealth consequences of the crisis for bank CEOs. If CEOs took risks that they knew were not in the interests of their shareholders, we would expect them to have sold shares ahead of the crisis. We find that this did not happen. CEOs, therefore, made large losses on their holdings of shares and on their holdings of options. On average, CEOs in our sample lost at least $30 million and the median CEO loss is more than $5 million.

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Appendix

We download all firms that are in Standard and Poor's ExecuComp database in 2006 and have an SIC code between 6000 and 6300. From this list, we exclude some firms because they are mostly concerned with investment advice, pure brokerage business, or wire transferring and do not match well our definition of a lending institution. Appendix A.1 shows the firms we exclude from the final sample, and appendix A.2 shows all sample firms.

A.1. Excluded financial firms in SIC codes 6000–6300

A G Edwards
Affiliated Managers Group Inc.
American Express
Americredit Corp
Bankrate Inc.
Bisys Group
Capital One Financial
Charles Schwab
CIT Group
CME Group
Eaton Vance Corporation
E-Trade Financial Group
Federated Investors Inc.
Financial Federal Corporation
Finova Group
Franklin Resources Inc
Intercontinental Exchange
Investment Technology Group
Janus Capital Group Inc
LaBranche & Co
Legg Mason Inc
Mellon Financial Corp
Metavante Technologies
Moneygram International
Nuveen Investments
Price (T Rowe) Group
Raymond James Financial
SEI Investments Company
Southwest Securities Group (SWS Group)
State Street Corporation
TD Ameritrade Holding
Tradestation Group
Waddell&Reed

A.2. Sample firms

1. Anchor Bancorp Inc./WI
2. Associated Banc-Corp.
3. Astoria Financial Corp.
4. Bank Mutual Corp.
5. Bank of America Corp.
6. Bank of Hawaii Corp.
7. Bank of New York Mellon Corp.
8. BB&T Corp.
9. Bear Stearns Companies Inc.
10. Boston Private Financial Holdings
11. Brookline Bancorp Inc.
12. Cascade Bancorp
13. Cathay General Bancorp
14. Central Pacific Financial Corp.
15. Chittenden Corp.
16. Citigroup Inc.
17. City National Corp.
18. Colonial Bancgroup
19. Comerica Inc.
20. Commerce Bancorp Inc./NJ
21. Compass Bancshares Inc.
22. Corus Bankshares Inc.
23. Countrywide Financial Corp.
24. Cullen/Frost Bankers Inc.
25. Dime Community Bancshares
26. Downey Financial Corp.
27. East West Bancorp Inc.
28. Fannie Mae
29. Fifth Third Bancorp
30. First Bancorp
31. First Commonwealth Financial Corp./PA
32. First Financial Bancorp Inc./OH
33. First Horizon National Corp.
34. First Indiana Corp.
35. First Midwest Bancorp Inc.
36. First Niagara Financial Group
37. Firstfed Financial Corp./CA
38. Firstmerit Corp.
39. Flagstar Bancorp Inc.
40. Franklin Bank Corp.
41. Fremon General Corp.
42. Glacier Bancorp Inc.
43. Goldman Sachs Group
44. Greater Bay Bancorp
45. Hanmi Financial Corp.
46. Hudson City Bancorp Inc.
47. Huntington Bancshares
48. Independent Bank Corp.
49. Indymac Bancorp Inc.
50. Investors Financial Services Corp.
51. Irwin Financial Corp.
52. Jefferies Group Inc.
53. JPMorgan Chase & Co.
54. Keycorp
55. Lehman Brothers Holdings Inc.
56. M&T Bank Corp.
57. MAF Bancorp Inc.
58. Marshall & Ilsley Corp.
59. Mercantile Bankshares Corp.
60. Merrill Lynch & Co Inc.
61. Morgan Stanley
62. National City Corp
63. New York Community Bancorp Inc.
64. Northern Trust Corp.
65. PNC Financial Services Group Inc.
66. Popular Inc.
67. Prosperity Bancshares Inc.
68. Provident Bankshares Corp.
69. Regions Financial Corp.
70. SLM Corp.
71. South Financial Group Inc.
72. Sovereign Bancorp Inc.
73. Sterling Bancorp/NY
74. Sterling Bancshares/TX
75. Sterling Financial Corp./WA
76. Suntrust Banks Inc.
77. Susquehanna Bancshares Inc.
78. SVB Financial Group
79. Synovus Financial Corp.
80. TCF Financial Corp.
81. TD Banknorth Inc.
82. Trustco Bank Corp/NY
83. US Bancorp
84. UCBH Holdings Inc.
85. Umpqua Holdings Corp.
86. Unionbancal Corp.
87. United Bankshares Inc./WV
88. United Community Banks Inc.
89. Wachovia Corp.
90. Washington Fed Inc.
91. Washington Mutual Inc.
92. Webster Financial Corp.
93. Wells Fargo & Co.
94. Westamerica Bancorporation
95. Wilmington Trust Corp.
96. Wilshire Bancorp. Inc.
97. Wintrust Financial Corp.
98. Zions Bancorporation

Table 1

Sample summary statistics for calendar year 2006

The table shows summary statistics for key variables for a sample of 95 bank holding companies and investment banks for fiscal year 2006. Sample selection criteria are described in Section 2. The list of sample banks is provided in the Appendix. The data are from the Compustat annual and Compustat Bank annual databases. Tier 1 capital ratio is calculated according to the Basel Accord for reporting risk-adjusted capital adequacy and is taken from the Compustat Bank database. The tangible common equity ratio is defined as tangible common equity divided by total assets less intangible assets (including goodwill). Those data are provided by the Compustat annual database. All accounting variables are measured in millions of dollars.

Variable	Number	Minimum	Lower quartile	Median	Upper quartile	Maximum	Mean	Standard deviation
Total assets	95	2008.5	6717.6	15497.2	60712.2	1459737.0	129307.2	303878.5
Total liabilities	95	1788.8	6083.5	14685.0	56768.3	1324465.0	119265.6	280902.5
Market capitalization	94	366.5	1222.5	2788.4	13273.0	273598.1	18725.5	44489.8
Net income / total assets	95	0.03%	0.84%	1.16%	1.45%	2.55%	1.17%	0.47%
Net income / book equity	95	0.33%	10.42%	13.01%	16.63%	29.18%	13.46%	5.67%
Cash / total assets	95	0.38%	1.63%	2.26%	2.79%	6.47%	2.35%	1.20%
Dividend per share	95	0.00	0.45	0.88	1.30	2.32	0.93	0.58
Book-to-market ratio	94	0.27	0.43	0.50	0.64	0.87	0.53	0.15
Tier 1 capital ratio	83	5.73%	8.43%	9.42%	11.09%	19.04%	9.70%	2.00%
Tangible common equity ratio	83	1.63%	5.32%	6.36%	7.40%	22.91%	6.69%	2.73%

Table 2

Attrition of banks included in sample

The sample includes 95 commercial and investment banks covered by ExecuComp in fiscal year 2006. "Remaining in sample" signifies that the bank is still listed on a major US exchange in December 2008. "Merged or acquired" signifies that the bank left the sample due to an acquisition or merger during the sample period, and "Delisted by exchange" signifies a delisting of the bank due to a violation of listing requirements or bankruptcy.

Event	Number of Observations	Frequency (percent)
Remaining in sample	77	81.1
Merged or acquired	12	12.6
Delisted by exchange	6	6.3

Table 3

Executive compensation and equity ownership at the end of fiscal year 2006

The table shows summary statistics for key compensation variables for a sample of 95 bank holding companies and investment banks for fiscal year 2006. The data are from the Compustat Execucomp database. Values are reported in thousands of dollars. Most of the variables of the table are taken directly from ExecuComp. Columns 1 and 2 show the means and medians for chief executive officers (CEOs) only. Columns 3 and 4 show means and medians for the average values of the next four highest paid proxy-named executives. "Cash bonus" is defined as the sum of bonus and non-equity incentive awards payouts. "Bonus for 2006 performance" shows the total bonus if the portion of equity awards explicitly granted in 2007 for 2006 performance is allocated to 2006. "Percentage ownership" uses the detailed information on current and previous option grants to calculate the options' delta and multiplies the number of options held in each series by its delta when calculating the percentage ownership. "Dollar gain from +1%" is equal to the dollar change in the executive's stock and option portfolio value for a 1% change in the stock price. "Percentage equity risk" is defined as the percentage change in the equity portfolio value for a 1% increase in stock volatility and is calculated from all option series held by the CEO. "Dollar equity risk" is equal to the dollar change in the executive's equity portfolio value for a 1% change in stock volatility.

	CEO		Average of non-CEO executives	
	Mean	Median	Mean	Median
Annual compensation				
Total compensation	7797.7	2453.5	3791.6	1104.6
Salary	761.5	747.8	392.4	351.4
Cash bonus	2137.7	636.8	1363.0	257.1
Dollar value of annual stock grant	2652.7	295.7	1112.5	97.0
Dollar value of annual option grant	1608.3	196.0	549.2	115.7
Other compensation	637.5	129.0	370.7	80.2
Cash bonus / salary	2.8	0.9	3.2	0.7
Bonus paid for 2006 performance				
Total bonus	5314.2	1370.0	3102.8	619.5
Cash bonus	2390.1	637.8	1517.1	262.8
Equity bonus	2924.1	409.5	1588.4	216.3
Total bonus / salary	7.1	1.8	7.4	1.6
Cash bonus / total bonus	0.6	0.6	0.6	0.6
Equity portfolio value				
Value of total equity portfolio	87466.9	35557.0	20156.0	5993.0
Value of shares	61189.6	22255.3	11014.1	3151.9
Value of exercisable options (Black-Scholes)	17357.7	5729.1	4934.6	1073.9
Value of unexercisable options (Black-Scholes)	3242.6	929.3	1586.7	277.4
Value of unvested restricted stock	5677.0	0.0	2602.0	8.5
Value of total equity portfolio / total annual compensation	17.3	8.1	7.6	4.2
Value of shares / salary	102.6	25.7	28.5	8.6
Equity portfolio incentives				
Percentage ownership from shares	1.6	0.4	0.2	0.1
Percentage ownership	2.4	1.0	0.4	0.2
Dollar gain from +1%	1119.3	467.8	278.1	83.2
Equity portfolio risk exposure				
Percentage equity risk	0.4	0.3	0.6	0.5
Dollar equity risk	189.0	53.1	60.4	19.5

Table 4

Buy-and-hold returns and chief executive officer (CEO) annual cash bonus, ownership incentives, and equity risk sensitivity

The table shows results from cross-sectional regressions of buy-and-hold returns for banks from July 2007 to December 2008 on CEO cash bonus, equity incentives, equity risk, and firm characteristics measured at the end of fiscal year 2006. "Cash bonus / salary" is the dollar amount of the annual bonus for 2006 performance paid in cash divided by the cash salary. "Dollar gain from +1%" is the dollar change in the value of the CEO's equity portfolio for a 1% change in the stock price. "Ownership (%)" is the sum of all shares (restricted and unrestricted) and delta-weighted options (exercisable and unexercisable) held by the CEO divided by the total number of shares outstanding multiplied by 100. "Equity risk ($)" is defined as the dollar change in the equity portfolio value for a 1% increase in stock volatility. "Equity risk (%)" is defined as the percentage change in the equity portfolio value for a 1% increase in stock volatility and is calculated from all option series held by the executive. A log transformation is applied to both the percentage ownership and percentage equity risk measure. The firm characteristics are measured at the end of year 2006. These characteristics include the stock return in 2006, the book-to-market ratio, the natural logarithm of the market capitalization, and the Tier 1 capital ratio. Standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cash bonus / salary	-0.010**					-0.003	-0.003	0.014	0.015
	(0.004)					(0.005)	(0.005)	(0.025)	(0.025)
Dollar gain from +1%		-0.078***				-0.062*		-0.079**	
		(0.022)				(0.030)		(0.035)	
Ownership (%)			-0.025				-0.036		-0.049
			(0.027)				(0.030)		(0.032)
Equity risk ($)				-0.013		0.025		0.030	
				(0.017)		(0.020)		(0.024)	
Equity risk (%)					0.030*		0.022		0.023
					(0.018)		(0.019)		(0.022)
Stock return in 2006						-0.148	-0.147	-0.295	-0.310
						(0.279)	(0.280)	(0.302)	(0.304)
Book-to-market						-0.607***	-0.601***	-0.583**	-0.577**
						(0.234)	(0.234)	(0.240)	(0.240)
Log (market value)						-0.027	-0.064**	0.014	-0.035
						(0.032)	(0.026)	(0.042)	(0.036)
Tier 1 capital ratio								0.038**	0.039**
								(0.018)	(0.018)
Number of observations	93	94	94	90	90	88	88	77	77
R-squared	0.06	0.12	0.01	0.01	0.03	0.20	0.20	0.23	0.23

Table 5

Return on assets (ROA) and CEO annual cash bonus, ownership incentives, and equity risk sensitivity

The table shows results from cross-sectional regressions of the return on assets on CEO cash bonus, ownership incentives, equity risk exposure, and control variables. Return on assets is defined as the cumulative quarterly net income from 2007Q3 to 2008Q3 divided by the total assets at the end of 2007Q2. "Dollar gain from +1%" is the dollar change in the value of the CEO's equity portfolio for a 1% change in the stock price. "Ownership (%)" is the sum of all shares (restricted and unrestricted) and delta-weighted options (exercisable and unexercisable) held by the CEO divided by the total number of shares outstanding multiplied by 100. "Equity risk ($)" is defined as the dollar change in the CEO's equity portfolio value for a 1% increase in stock volatility. "Equity risk (%)" is defined as the percentage change in the equity portfolio value for a 1% increase in stock volatility and is calculated from all option series held by the executive. A log transformation is applied to both the percentage ownership and percentage equity risk measure. The control variables include the natural logarithm of the market capitalization, the Tier 1 capital ratio, and the book-to-market ratio, all measured at the end of fiscal year 2006. Lagged return is the lagged return on assets, measured over the five previous quarters to be consistent. Standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

	(1)	(2)	(3)	(4)
Cash bonus / salary	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.002)	(0.002)
Dollar gain from +1%	-0.005*		-0.007**	
	(0.003)		(0.003)	
Equity risk ($)	0.002		0.002	
	(0.002)		(0.002)	
Ownership (%)		-0.003		-0.004*
		(0.002)		(0.002)
Equity risk (%)		0.002		0.002
		(0.001)		(0.002)
Lagged ROA	-0.126	-0.131	-0.360	-0.386
	(0.236)	(0.235)	(0.513)	(0.512)
Book-to-market	-0.053**	-0.052**	-0.066***	-0.066***
	(0.020)	(0.020)	(0.022)	(0.022)
Log (market value)	0.000	-0.003	0.005	0.000
	(0.002)	(0.002)	(0.003)	(0.003)
Tier 1 capital ratio			0.002	0.002
			(0.002)	(0.002)
Number of observations	84	85	73	73
R-squared	0.13	0.13	0.22	0.22

Table 6

Return on equity (ROE) and CEO annual cash bonus, ownership incentives, and equity risk sensitivity

The table shows results from cross-sectional regressions of the return on equity on CEO cash bonus, ownership incentives, equity risk exposure, and control variables. Return on equity is defined as the cumulative quarterly net income from 2007Q3 to 2008Q3 divided by the book value of common equity at the end of 2007Q2. "Dollar gain from +1%" is the dollar change in the value of the CEO's equity portfolio for a 1% change in the stock price. "Ownership (%)" is the sum of all shares (restricted and unrestricted) and delta-weighted options (exercisable and unexercisable) held by the CEO divided by the total number of shares outstanding multiplied by 100. "Equity risk ($)" is defined as the dollar change in the CEO's equity portfolio value for a 1% increase in stock volatility. "Equity risk (%)" is defined as the percentage change in the equity portfolio value for a 1% increase in stock volatility and is calculated from all option series held by the CEO. A log transformation is applied to both the percentage ownership and percentage equity risk measure. The control variables include the natural logarithm of the market capitalization, the Tier 1 capital ratio, and the book-to-market ratio, all measured at the end of fiscal year 2006. Lagged return is the lagged return on equity, measured over the five previous quarters to be consistent. Standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

	(1)	(2)	(3)	(4)
Cash bonus / salary	0.000	0.000	0.009	0.009
	(0.004)	(0.004)	(0.021)	(0.020)
Dollar gain from +1%	-0.068**		-0.073**	
	(0.027)		(0.028)	
Equity risk ($)	0.025		0.022	
	(0.016)		(0.019)	
Ownership (%)		-0.043		-0.051**
		(0.026)		(0.024)
Equity risk (%)		0.024		0.019
		(0.015)		(0.017)
Lagged ROE	-0.532**	-0.533**	-0.406	-0.426
	(0.249)	(0.248)	(0.474)	(0.472)
Book-to-market	-0.754***	-0.748***	-0.821***	-0.820***
	(0.232)	(0.231)	(0.239)	(0.239)
Log (market value)	0.016	-0.028	0.043	-0.008
	(0.025)	(0.022)	(0.033)	(0.029)
Tier 1 capital ratio			0.019	0.020
			(0.018)	(0.018)
Number of observations	83	83	74	74
R-squared	0.21	0.23	0.29	0.29

Table 7

Troubled Asset Relief Program (TARP) recipients, ownership incentives, equity risk sensitivity, and return on assets (ROA) and return on equity (ROE)

The table shows results from cross-sectional regressions of the return on assets (column 1) and the return on equity (column 2) on chief executive officer (CEO) cash bonus, ownership incentives, equity risk exposure, and control variables. Return on assets (return on equity) is defined as the cumulative quarterly net income from 2007Q3 to 2008Q3 divided by the book value of assets (common equity) at the end of 2007Q2. "Dollar gain from +1%" is the dollar change in the value of the executive's equity portfolio for a 1% change in the stock price. "Equity risk ($)" is defined as the dollar change in the executive's equity portfolio value for a 1% increase in stock volatility. TARP recipient indicator is an indicator variable equal to one if the bank received funding from the Troubled Asset Relief Program and zero otherwise. The control variables include the natural logarithm of the market capitalization and the book-to-market ratio, all measured at the end of fiscal year 2006. Lagged return is the lagged return on assets (equity), measured over the five previous quarters to be consistent. Standard errors are reported in parentheses. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.

	ROA	ROE
TARP recipient indicator	-0.016	-0.281
	(0.024)	(0.230)
Cash bonus / salary	0.000	0.006
	(0.000)	(0.004)
TARP indicator x cash	0.001	-0.003
bonus / salary	(0.002)	(0.016)
Dollar gain from +1%	-0.006*	-0.086***
	(0.003)	(0.032)
TARP indicator x dollar	0.005	0.066
gain from +1%	(0.005)	(0.049)
Equity risk ($)	0.001	0.020
	(0.002)	(0.017)
TARP indicator x	-0.001	-0.007
Equity risk ($)	(0.004)	(0.036)
Lagged return	-0.176	-0.471**
	(0.235)	(0.227)
Log (market value)	-0.002	0.008
	(0.003)	(0.027)
Book-to-market	-0.049**	-0.687***
	(0.024)	(0.217)
Number of observations	83	82
R-squared	0.19	0.28

Table 8

Dollar losses of chief executive officers' (CEOs') stock portfolios during the credit crisis

The table shows the cumulative trading losses and the losses from shares held from the beginning to the end of the sample period. The sample contains 80 bank CEOs. A CEO who turned over prior to September 2007 is excluded from the sample. Cumulative trading losses are calculated as shares sold multiplied by the difference of the price at the 2006 fiscal year-end and the transaction price. Sales related to concurrent option exercises are excluded in the calculations. "Loss from not acting" is calculated as the shares held at the end of the sample period multiplied by the difference of the 2006 fiscal year-end price and the stock price at the end of the sample period. End of the sample period is defined as either December 2008, the month of the turnover of the CEO, or the month of the corporate event (merger, delisting), whichever comes first. "Total dollar loss" is calculated as the sum of the cumulative trading loss and the loss from not acting. If Thomson Financial does not report a sale of shares unrelated to options, it is assumed that the CEO did not sell any of his shares, and cumulative trading losses are set to zero. All numbers, except for stock prices, are reported in thousands of dollars.

	Mean	Minimum	Q1	Median	Q3	Maximum
Stock price end of fiscal year 2006	40.36	11.12	23.95	35.58	48.75	152.48
Stock price end of sample period	21.91	0.10	7.98	14.72	32.38	89.65
Total value of shares held end of fiscal year 2006	61503.82	347.48	7065.16	23628.25	57337.03	894128.54
Loss from not acting	28771.49	-13628.19	784.05	5076.10	19150.44	368429.27
Cumulative trading loss	2719.45	-686.16	0.00	0.00	56.63	201538.71
Total dollar loss	31490.94	-13628.19	916.83	5084.30	20315.48	368429.27

Fig. 1. Evolution of the return on assets (ROA), 2005Q4–2008Q3

The figure plots the evolution of average and median return on assets, defined as net income divided by total assets, of a sample of 95 bank holding companies and investment banks for 12 quarters from 2005Q4 to 2008Q3.

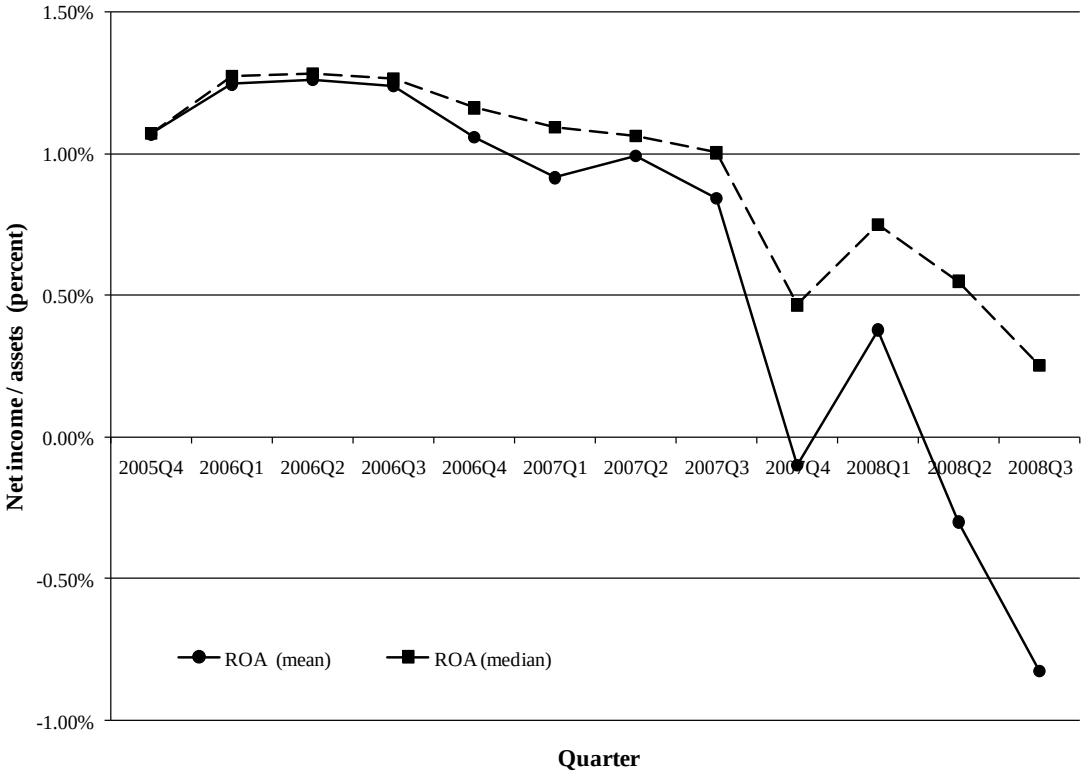

Fig. 2. Chief executive officer (CEO) insider trading

The figure shows the average total changes in CEO ownership and ownership changes caused by trading and new grants. The sample contains 80 bank CEOs that are covered by both ExecuComp and Thomson Financial's insider trading database. A CEO who turned over prior to September 2007 is excluded from the sample. For each CEO, all insider transactions unrelated to option exercises reported by Thomson Financial are aggregated by firm and quarter. If a CEO does not trade or does not receive new grants, he is included in the cross-sectional average for a given quarter with a value of zero. The change in ownership is defined as the number of shares traded or granted divided by the total CEO ownership from stocks, excluding options, at the end of fiscal year 2006.