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How are Bankers Paid?

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We are grateful for feedback from Andrew Ellul (the editor), an anonymous referee, Allen Berger, Raluca Roman, and participants from a seminar at the FDIC CSR.

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Abstract

We empirically examine bank CEOs' compensation. We find that bank CEOs (a) are paid less than their nonfinancial counterparts, an effect driven by the CEOs of small bank; (b) experienced declining compensation during 2007–2009 (the hardest-hit banks cut compensation more) but pay is now 24% higher than pre-crisis levels; (c) are paid more at larger banks, those with less nonperforming loans, those with a higher proportion of noninterest income, and those with less demand-deposit dependence; and (d) have pay highly sensitive to ROA and ROE, but not stock returns. Tail risk is higher when compensation depends more on short-term measures of performance.

Keywords: Executive compensation, corporate governance, finance industry, TARP

JEL Classifications: F34, G32, G33, G38, K42

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> . . . inappropriate incentive structures played a role in encouraging behavior which contributed to the financial crisis . . .
>
> —Adair Turner, Chairman, U.K. Financial Services Authority

> Lehman's failure resulted in part from significant problems in its corporate governance, . . . exacerbated by compensation to its executives . . . that was based predominantly on short-term profits.
>
> —U.S. Financial Crisis Inquiry Commission

The issue of how banks behave and what this implies for bank fragility and systematic risk has taken center stage since the 2007–2009 financial crisis (e.g., Brunnermeier 2009; Goel, Song, and Thakor 2014; Mian and Sufi 2009; Thakor 2015). While much of the focus has been on the distortionary effect of deposit insurance and how it should be priced,[1] there is also the recognition that bank behavior is influenced by the manner in which bank executives are compensated. See, for example, Thakor (2014).[2] Indeed, the Dodd-Frank Act created oversight of executive compensation in banking. Despite this, our knowledge of the structure of executive compensation in banks is rather limited. Executive compensation research typically does not distinguish between banks and nonbanks and often excludes banks altogether from the sample.

Our goal is to fill this gap. The main question we analyze empirically is: how are bankers paid and how has this changed over time? Specifically, we examine how CEOs in banks are paid compared to their nonbank counterparts (to provide a relative perspective based on a well-studied benchmark), how bankers' pay has changed during and since the 2007–2009 crisis, the cross-sectional properties of bankers' pay (including its dependence on governance and the bank's business model), the sensitivity of bankers' pay to accounting and market-based measures of performance, and the impact of this sensitivity on actual bank performance.

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[1] See, for example, Chan, Greenbaum, and Thakor (1992) for a discussion fair deposit insurance pricing.

[2] The role of compensation in influencing behavior goes back to Holmstrom (1979). Houston and James (1995) empirically examine compensation in banking. Thakor's (2021) theoretical analysis indicates the possible effect of politics on bank behavior as well. Kumar (2020) documents the cost of such political interference.

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Our main results are as follows:

(1) ***Bankers' pay relative to counterparts in other firms****:* CEOs of financial firms (banks and nonbank financials) are paid less on average than CEOs of nonfinancials. They earn lower total/cash/equity pay than what the nonfinancial firm CEOs earn. Moreover, bank CEOs are paid less on average than nonbank financial firms' CEOs. These results are driven mainly by small bank CEOs who are paid the least. The compensation of CEOs of big banks is not significantly different from that of the CEOs of nonfinancial firms.

(2) ***Intertemporal behavior*****:** Total bank CEO compensation declined during the crisis, and banks that suffered bigger losses during the crisis cut their CEOs' pay more after the crisis. But bank CEO pay has now recovered and is 24% higher than it was in the precrisis period. This recovery is mostly due to an increase in cash pay. Additionally, banks that performed worse during the crisis implemented larger decreases in the portion of pay linked to short-term relative performance goals that involve peer-based benchmarks, ROE, and pay linked to peer firm performance.

(3) ***Cross-sectional properties*****:** Larger banks, those with a higher proportion of noninterest income, lower proportion of nonperforming loans, and a lower fraction of funding from demand deposits offer their CEOs higher total compensation. The effect of corporate governance on bank CEO pay operates through both entrenchment and selection channels. Banks with more co-opted boards and higher entrenchment index values pay their CEOs more, a reflection of the entrenchment channel that leads to poor governance being associated with higher CEO pay. Banks with a higher percentage of financial experts on the board also pay their CEOs more, a reflection of the selection channel that leads to better governance being associated with the selection of better CEOs who need to be paid more.

(4) ***Sensitivity of pay to performance measures*****:** Over the entire sample period, bank CEO pay is highly sensitive to both ROA and ROE, but not sensitive to stock returns. In terms of the dynamics during the sample period, the relationship between ROA and total pay has not changed much over

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the sample period, the sensitivity of total pay to ROE declined during the crisis but is now at precrisis levels, and the sensitivity of total pay to stock returns has declined postcrisis (specifically 2011–2013), but it has returned to precrisis sensitivity in the recent period (from 2014 to 2018). The portion of bank CEO pay tied to performance has increased since the crisis, due to increases in pay linked to long-term performance goals, ROA, and ROE.

***(5) Link between performance and dependence of pay on that measure of performance*:** Using ROA, ROE and stock returns as performance measures, we find no robust relationship between the extent of pay that is dependent on a specific performance measure and the bank's actual performance on that measure. However, we do find that tail risk is higher when bank CEO compensation depends more on short-term (less than 1 year) measures of performance, and lower when it depends more on ROE and ROA. Thakor (2020 recently posited a theoretical rationale for why optimal wage contracts might base compensation on short-term results.

Our paper is related to various strands of the literature. First, our basic thesis is that studying bankers' pay is important because it has potentially strong incentive effects and can influence both bank performance and risk-taking. This is echoed in numerous papers (e.g., Holmstrom 1979; John and John 1993; Houston and James 1995; Bettis et al. 2010, 2018; Fahlenbrach and Stulz 2011; Bolton et al. 2016).[3]

Second, our result that bank CEO compensation is very sensitive to ROE provides one reason for the proclivity of bankers to minimize capital *ceteris paribus*, despite the empirically-documented positive cross-sectional relationship between capital and bank value (e.g., Mehran and Thakor 2011), higher risk-adjusted stock returns for shareholders in banks with higher capital (Bouwman, Kim, and Shin 2018), the documented greater market share gains for banks with higher capital during financial crises (e.g., Berger and Bouwman 2013), and the importance of bank capital for creating funding liquidity (e.g., Donaldson, Piacentino, and Thakor 2018), preventing contagious liquidations of banks (Acharya and Thakor 2016) and conducting monetary policy (Gambacorta and Shin 2018). For example, Cornett et al. (2020) examine bank

[3] Houston and James (1995) conclude based on their analysis that CEO compensation in banking does not promote risk taking but rather is designed to increase bank charter value.

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behavior around Federal Reserve stress tests and find that while banks increase capital ratios at the starting point for annual stress tests, they completely reverse them in the other quarters, and that banks subject to stress tests spend considerably more on lobbying than do other banks. Recently, Pennacchi and Santos (2018) have developed a model in which linking bankers' pay to ROE is rational for bank shareholders. And our finding that bank CEO pay levels depend on the quality of corporate governance is consistent with previous empirical work which shows that the conditioning variables in CEO compensation may be strategically manipulated by CEOs themselves (e.g., Matějka, Merchant, and Van der Stede 2009; Gao, Huang, and Wu 2014; Morse, Nanda, and Seru 2011).

Third, our paper speaks to the issue of the "Finance wage premium" documented by Philippon and Reshef (2012), who highlight the post-1990 wedge that has opened up between the wages of senior executives in financial services and those in other industries. Ellul, Pagano, and Scognamiglio (2020) also find such a premium, but they point out that it hides significant within-financial-services heterogeneity, and that executives in banking and insurance actually make less than their counterparts in other industries. Our paper documents a similar comparison between executive compensation in banking and insurance, but we find further that this is driven primarily by what small banks pay their CEOs. When one considers large banks, CEO pay is comparable to that in nonfinancial firms.

Fourth, we also find that the business model of banks—as proxied by the dependence of demand deposits for short-term funding—affects CEO compensation.[4] Since a bank's culture must adapt to support its business model,[5] our findings are consistent with the previous evidence that bank culture affects bank behavior through the risk-taking channel (e.g., Ellul and Yerramilli 2013). For example, Fahlenbrach, Prilmeier, and Stulz (2012; hereafter FPS) provide evidence that the intertemporal persistence in performance during the financial crisis can be explained by culture and business models. In contrast to FPS,

[4] Merton and Thakor (2019) emphasize that demand depositors are customers of banks as well as their financiers and hence will wish to be insulated from the bank's credit risk, which implies that the bank's business model will influence its risk management, culture, and compensation. This is especially true for relationship loans (e.g., Bolton et al. 2016; and Boot and Thakor 1994, 2000), since Song and Thakor (2007) show that relationship loans are optimally more dependent on demand deposit funding by the bank.
[5] See Song and Thakor (2019).

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who find bank performance to be persistent, we find that at least some components of compensation change during and after the crisis.

We acknowledge that we are examining the properties of endogenously codetermined variables (compensation design, corporate governance, etc.), so the results should be viewed as interesting correlations rather than causal assertions.

1. Data and Summary Statistics

1.1 Data

Our data come from the following sources: Incentive Lab, the Federal Reserve Bank of Chicago, the Center for Research in Security Prices (CRSP), RiskMetrics, Execucomp, and Compustat.

1. We obtain executive compensation data, such as salary, bonus, stock grants, and option grants, from ExecuComp.
2. We obtain data on the specific performance metrics compensation is linked to via IncentiveLab (IL) data. IL collects grant data on the metrics used to design stock, option and bonus awards from firms' proxy statements. It includes details of all the stock, option and cash grants to all named executives of any firms in the 750 largest firms by revenue for the years 2006–2018. Additionally, IL backward and forward fills their data, so if a firm was ever in the 750 largest firms, IL has collected data on that firm for the entire sample period. On a more granular level, we use specific information on the performance metrics (ROE, vesting period, etc) employed in the grant for some of our tests.
3. We utilize governance data from RiskMetrics to construct measures such as the E-index, co-option, and board independence.
4. We utilize bank holding company (hereafter BHC) FR Y-9 data from the Federal Reserve Bank of Chicago.
5. We complement the compensation data with stock returns from CRSP and firm financial data from Compustat.

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For part of our analysis, we distinguish banks from nonbank financial firms and nonfinancial firms. We classify firms with SIC codes between 6000 and 6099 as banks and those with SIC codes between 6100 and 6999 as nonbank financial firms. All firms whose SIC code does not fall in the range between 6000 and 6999 are classified as nonfinancial firms. We further differentiate between big and small firms based on a firm being in the top-10 firms in terms of total assets in a given year. Our final sample includes 1,594 bank CEO-year observations and 21,188 nonbank CEO-year observations for the time period 2006–2018. We start in 2006, when the IL data are available.

1.2 Summary statistics

Table 1 displays summary statistics for the executives and banks in our sample. Appendix A defines all variables that we use in our analysis. Panel A presents compensation data for bank CEOs, while panel B presents pay data for nonfinancial firm CEOs. From Table 1, we see that bank CEOs earn less total pay than nonbank CEOs. We also see that equity pay comprises a much smaller portion of bank CEO pay compared to nonbank CEOs (32% vs. 46%). On the other hand, bank CEOs have a significantly larger portion of their compensation tied to ROE goals than CEOs at nonbanks (7% vs. 1%). In other respects, bank and nonbank CEO pay are remarkably similar.

Panel C presents bank-level summary statistics. We find significant variation in many variables, especially: ROE, noninterest income scaled by total income, cash scaled by deposits, and demand deposits scaled by total ST borrowing. The average bank for which we have compensation data for has an ROE of 4.9%, earns 27.5% of its income from noninterest sources, has a capital ratio of 0.111, has a nonperforming loan-to-asset ratio of 0.012, and has demand deposits as a fraction of total short-term borrowing of 0.135.

(Table 1 goes here)

2. Bank CEO Pay Relative to Nonbank CEO Pay

In this section, we compare the level of bank CEO pay to the level of CEO pay at both nonbank firms and nonbank financial firms. The purpose in doing this is to provide a perspective on bank CEO pay using the more familiar benchmark of CEO pay in nonfinancial firms. To do this, we estimate the following model:

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$$\mathrm{Y}_{it} = \beta_0 + \beta_1 \cdot \mathrm{Bank} + \beta_2 \cdot \mathrm{NonBank\ Financial} + \mathrm{X}_{it} \cdot \Gamma + \vartheta_t + \varepsilon_{it}, \qquad (1)$$

where *i* is the firm index, *t* is the year index, X is the vector of control variables, Γ is the coefficient vector for the control variables, ϑ_t is the year fixed effect, and ε_{it} is the error term. Y_{it} is one of the compensation measures (total compensation, cash compensation, etc.). *Bank* is a dummy variable that identifies CEOs from banks. *Nonbank financials* is a dummy variable that identifies CEOs from nonbank financial firms. The omitted category or the baseline are the nonfinancial firm CEOs. The coefficient β_1 (β_2) is a measure of the extent to which the dependent variable is different for a bank (nonbank financial firm) CEO as compared to a nonfinancial firm CEO. The control variables we include are the log of total assets, Tobin's q, cash/assets, debt/assets, stock return, ROA, and stock volatility. Note that the inclusion of nonfinancial firms in these tests precludes us from controlling for the bank-specific financial characteristics we include in Table 2.

From columns 1–3 of Table 2, we find that CEOs of banks and nonbank financial firms earn significantly lower pay as compared to CEOs of nonfinancial firms. The lower pay is in the form of both cash pay and equity pay. In unreported tests, we find that the coefficients for *Banks* and *Nonbank financials* are significantly different from one another. This indicates that bank CEOs obtain lower pay in comparison to nonbank financial firm CEOs. In terms of economic magnitudes, the coefficient reported in column 1 indicates that bank CEO pay is (33%) less than that of nonfinancial CEO pay.

In columns 4–6, we differentiate across banks and nonbank financial firms. Specifically, we distinguish between big banks—a bank categorized as a top-10 bank in a year based on book value of total assets—and all the other banks. We also divide the nonbank financial firms into six categories based on their main lines of business: life insurance (SIC codes between 6310 and 6319), health insurance (SIC codes between 6320 and 6329), property insurance (SIC codes between 6330 and 6339), nondeposit credit institutions (SIC codes between 6100 and 6199), broker/dealers (SIC codes between 6200 and 6299), and real estate firms (SIC codes between 6500 and 6599).

The results from columns 4 and 6 indicate that the lower pay for bank CEOs is predominantly due to the small banks in our sample. That is, controlling for size and other financial determinants of CEO pay,

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small banks offer a lower pay package to their CEOs as compared to nonfinancial firms. Additionally, CEO pay at big banks is not significantly different from pay at nonfinancials or nonbank financials.[6] From column 6, we obtain some weak evidence of lower equity pay among large banks. Focusing on the nonbank financial firms, we find strong evidence of lower total pay for CEOs of life insurance and property insurance firms, mainly because of lower equity pay. We also obtain robust evidence of lower pay for CEOs of real estate firms driven by both lower cash and equity pay.

In summary, the CEO pay pecking order has bank CEOs at the bottom, CEOs of nonbank financials at the next level, and nonfinancial CEOs at the top. The lower pay for bank CEOs is mainly driven by the effect of small banks, while the result for nonbank financial firm CEOs is driven by the insurance and real-estate firms.

(Table 2 goes here)

3. Bank CEO Pay Determinants: Intertemporal and Cross-Sectional Results

In this section we explore the inter-temporal and cross-sectional determinants of bank CEO pay. Our tests in this section include only bank CEOs and utilizes BHC control variables. We document the changes in bank CEO pay level and structure over time and also relate it to bank financial and governance characteristics. Throughout the paper, in our tests that include only banks, we include proxies for CAMELS (the declared set of financial criteria used by regulators for evaluating banks; see Agarwal et al. 2014 for more) because these are widely perceived as indicators of a bank's financial health. Specifically, we control for Capital adequacy by including bank capital ratio, Asset quality by including nonperforming loans scaled by total loans, Management quality by including operating expenses scaled by assets, Earnings by including ROA, Liquidity by including cash scaled by deposits, and Sensitivity to market risk by including noninterest income scaled by total assets (which is a proxy for the return earned on risky assets). Additionally, we control for the extent of bank's reliance on short-term sources of funding by including demand deposits scaled by total short-term (ST) borrowing. This is also a proxy for the bank's business model, where banks

[6] For brevity, we do not report the results comparing pay at big banks to pay at nonbank financials.

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that have a higher fraction of demand deposits are more dependent on them for short-term funding, and banks with a lower fraction are more dependent on the capital market for short-term funding.

3.1 Behavior of bank CEO compensation over time

In our first set of tests in this section, we investigate how bank CEO pay has changed over time. We focus on four distinct time periods: precrisis (2006–2007), crisis (2008–2010), postcrisis (2011–2013), and the most recent period (2014–2018). In our tests, we regress various measures that characterize bank CEO pay level or structure on bank financial characteristics and three time dummies. The dummies are *Crisis (2008–2010)*, *Postcrisis years (2011–2013)*, and *Recent (2014–2018)*. The baseline years for these tests (where all time dummies will equal zero) are the precrisis years of 2006 and 2007. The coefficients for the time dummies will indicate the extent to which pay is different in the specific time window (2008–2010, 2011–2013, or 2014–2018) relative to the baseline period (2006–2007).

In the first three columns of Table 3, we focus on the level of pay while in the rest of the columns we focus on the structure of pay. From column 1, we find that while bank-CEO total pay fell by 23.8% during the crisis years—relative to the precrisis years—it recovered in the postcrisis period. We find that pay during the most recent period was 24% higher as compared to the precrisis baseline period (2006–2007). From columns (2) and (3) we find that while the cash component of pay shows a time-trend similar to total-pay there does not appear to be any significant change in the equity component of pay, which comprises of grant date fair values of the sum of stock and option awards. In conclusion, while the crisis adversely affected bank CEO pay, it has recovered since, and the changes in pay are driven mostly by changes in cash pay.

From the coefficients for the control variables, we find that, not-surprisingly, larger banks, those with a higher proportion of noninterest income, those with a lower proportion of nonperforming loans, and those with a lower proportion of demand deposits offer higher pay to their CEOs. This higher pay is in terms of both cash and equity pay.

In columns 4–6, we study the changes in bank-CEO performance pay over time. The dependent variable in column 4 is *Perf. pay*, which measures the proportion of total pay linked to a specific

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performance metric. We find a significant increase in *Perf. pay*, both in the postcrisis years (12%) and in recent years (20.6%), relative to the precrisis years. The increase in the proportion of performance pay over time is consistent with the overall increase in performance pay among public firms in the U.S. (Bennett et al. 2017). In columns (5) and (6), we split performance pay into short-term (vesting within a year) and long-term (vesting beyond 1 year) performance pay and find that the increase in performance pay is mostly due to an increase in long-term performance pay. Thus, the proportion of bank CEO pay linked to specific performance measures, specifically those measured over multiple years has increased over time.

In the next two columns of Table 3, we document the changes in the proportion of performance pay tied to ROA and ROE. We find a significant increase in the proportion of pay linked to ROA over time, while the evidence of an increase in pay linked to ROE, especially during recent years, is strong. Finally, in the last two columns of Table 3, we split performance pay into absolute versus relative performance measures and find that both have increased in the postcrisis and in recent years.

(Table 3 goes here)

We further explore the time-series behavior of bankers' pay in terms of the impact of the crisis. In an influential paper, Fahlenbrach, Prilmeier, and Stulz (2012), argue that banks that fared poorly during the crisis did not change their behavior in terms of risk-taking postcrisis. In this section, we evaluate whether the banks that experienced losses during the crisis changed their CEO pay practices postcrisis.

The dependent variables in our Table 4, which presents the results of these tests, are the changes in our measures of bank CEO pay level and the structure between the postcrisis and precrisis periods. Our main independent variable is a dummy variable that identifies banks that suffered a loss in 2008 (the worst year of the financial crisis, when the S&P 500 was down 38.5%). Note that these tests are cross-sectional in nature, and we have one observation per bank. We find that about 34% of the banks in our sample reported negative earnings in 2008.

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From columns 1–3, we find strong evidence that banks that suffered a loss during the crisis[7] significantly reduce the level of CEO pay and this reduction occurs in both the cash and equity components of pay. Furthermore, we also find a significant reduction in the fraction of pay linked to short-term performance measures, and especially ROE. Finally, we find a significant reduction in the fraction of pay linked to relative measures of performance. Thus, we do find significant changes in the pay practices among banks that suffered losses during the crisis. These banks reduce the level of CEO pay and the fraction of pay linked to short-term accounting-based performance measures, specifically ROE.

(Table 4 goes here)

In sum, our intertemporal evidence from the analysis above indicates that bank CEO pay, which fell during the crisis years with banks that suffered losses cutting the pay of their CEOs more, has recovered in the postcrisis period, the recovery being driven by the cash component of pay. There also has been a significant increase in performance pay, especially that linked to long-term performance, and this increase is driven by an increase in the proportion of pay linked to both ROA and ROE and to both absolute and relative performance metrics.

In Table IA 1, we relate bank CEO pay level to bank financial characteristics within the four time windows used in the time-series tests (2006–2007, 2008–2010, 2011–2013, and 2014–2018) to investigate if and how the pay determinants vary over time. We find that total pay is significantly related to firm size across all four subperiods, while the relationship of total pay to noninterest income holds for all subperiods, except 2011–2013, and the relationship to ROA only holds during 2011–2013. Finally, the relationship of total pay to nonperforming loans holds only during the crisis (2008–2010) and postcrisis (2011–2013) periods, whereas the relationship to demand deposits exists for all subperiods, except 2008–2010.

3.2 Cross-sectional characteristics: Bank governance and bank CEO pay

In our next set of tests, we relate bank governance characteristics to bank CEO pay. Note that in these tests, we control for all the bank financial characteristics that we include in Table 3. Their coefficients

[7] We only distinguish between banks that suffered losses and those that did not. In our sample, 34% of banks experienced negative earnings during the crisis.

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are suppressed to conserve space. The specific governance characteristics we study include *Board independence*, *% fin expert directors*, *E-index*, and *Co-option*. Appendix A defines all variables that we use in our analysis.

From column 1 of Table 5, we find that banks with a higher proportion of financial experts in their board and those with a higher entrenchment index and more proportion of co-opted directors, those who are appointed to the board after the CEO appointment (see Coles et al. 2014) offer higher pay to their CEO. These findings indicate that CEO pay is influenced by corporate governance. Interestingly, both bad and good governance can lead to higher CEO pay because of two possible channels of effect: entrenchment and selection. The finding that high co-option and E-index lead to higher pay suggest that CEO entrenchment is associated with higher CEO pay. The selection effect refers to better governance resulting in the choice of better CEOs, who would then need to be paid more for their higher talent. If we interpret a larger percentage of financial expert directors as better governance, then the selection effect explains why with banks more such directors pay their CEOs more. From column 2, we find that both greater finance representation on the board and a more co-opted board award higher cash pay to the CEO. From column 3, we find that a higher entrenchment index and greater board co-option are associated with higher equity pay.

In summary, in our cross-sectional evidence is that we find that while greater board co-option is uniformly associated with higher bank CEO pay, greater finance industry representation and higher entrenchment index are selectively associated with higher cash and equity pay respectively, suggesting that both bad and good governance may drive higher CEO pay. Moreover, larger banks, those with lower nonperforming loans, and with business models involving more noninterest income and a lesser dependence on deposit funding pay their CEOs more.

(Table 5 goes here)

4. Sensitivity of Pay to Performance Measures

In the next set of tests, we investigate the pay-performance sensitivity (PPS) of bank CEOs. We employ three measures of performance: *ROA*, *ROE*, and stock return (*Return)*. Given the strong correlation between ROA and ROE, we do not include them at the same time in our regressions. Our dependent variable

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in these tests is the logarithm of total pay. Apart from the set of financial controls included in Table 2, these tests also include year fixed effects. From columns 1 and 2 of Table 6, we find that while total pay of bank CEOs is significantly related to ROA and ROE, there is no significant relationship with stock returns. In column 3, we evaluate whether the pay-for-performance sensitivity changes across the four subperiods we looked at in Table 3: 2006–2007, 2008–2010, 2011–2013, and 2014–2018. We do this by including interaction terms between dummy variables *Crisis (2008–2010)*, *Postcrisis (2011–2013)*, and *Recent (2014–2018)* and the measures of performance. Here, the baseline omitted category is the precrisis years. From column 3, we find that while there has not been any significant change in the relationship between total pay and ROA over time, there is a significant decrease in the sensitivity of total pay to stock returns during the postcrisis period. This dip reverses during the recent times, when the sensitivity is no different from the precrisis period. From column 4, we find that while sensitivity of pay to ROE significantly decreased during the crisis years, it has reverted to its precrisis levels during the postcrisis and recent time periods.

Note that while our results in Table 2 indicate an increase in the fraction of bank-CEO pay explicitly linked to ROA and ROE targets, our results in Table 6 show no significant change in the pay-for-performance sensitivity among bank CEOs. This can happen because performance pay is endogenous and thus banks that lag other banks on a specific performance metric may link a larger fraction of CEO pay to that performance metric. Because of this, in the cross-section, we may not detect a change in the strength of the positive relationship between pay and performance.

In columns (5) and (6), we differentiate banks based on their level of capital and estimate the pay for performance sensitivities. We do not find any significant difference in the pay for performance sensitivities across banks with high and low levels of capital.

In conclusion, relative to the precrisis period, PPS to ROE dipped during the crisis but has since returned to normal levels. There also appears to be a dip in the PPS to stock returns during the postcrisis period.

(Table 6 goes here)

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5. Structure of Bank CEO Pay, Firm Performance, and Risk-Taking

In the last set of tests, we investigate the relationship between bank CEO performance structure, firm performance, and risk-taking.

5.1 Bank pay structure and performance

In this section, we relate bank CEO pay-structure to bank performance. As before, we evaluate three measures of bank performance, ROA, ROE and Return. Our main independent variables are the portion of the bank CEO's pay linked to short-term and long-term performance measures, ROA, ROE, and stock returns. The specific estimation equation is:

$$\text{FirmPerformance}_{it} = \beta_0 + \beta_1 \cdot \text{PerformancePay}_{it} + \beta_2 \cdot \text{Crisis}_t \cdot \text{PerformancePay}_{it} + \beta_3 \cdot \text{Crisis}_t + \text{X}_{it-1} \cdot \Gamma + \varepsilon_{it}, \quad (2)$$

where *i* is the firm index, *t* is the year index, X is the vector of control variables, Γ is the coefficient vector for the control variables, and ε_{it} is the error term. $\text{PerformancePay}_{it}$ is the portion of CEO pay linked to short-term or long-term performance metrics, ROA, ROE, or stock return goals. Crisis is a dummy variable that identifies the crisis years. The control variables we include are lagged values of: the natural logarithm of total assets, capital ratio, noninterest income scaled by total income, nonperforming loans scaled by total loans, cash scaled by deposits, expenses scaled by assets, and demand deposits scaled by total short-term borrowing. The objective of these tests is to assess whether pay packages that focus on a specific performance metric result in banks' outperformance along that metric. This can happen both because of the CEO "managing to that metric" and through performance manipulation. On the other hand, if banks that lag along a particular dimension of performance link a higher fraction of CEO pay to that dimension, then we may fail to find a significant relationship between pay linked to a specific metric and performance along that metric.

Table 7 reports the results of these tests. The coefficient, β_1, measures the extent to which firm performance is related to pay structure during normal years, while the coefficient, β_2, measures the extent to which the relationship between performance and pay was different during the crisis. The biggest

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takeaway from this analysis is that there is no robust relationship between the specific performance measure to which pay is linked and the bank's performance on that measure, in contrast to what we might expect theoretically. From columns 1–3, we find that in normal times more pay linked to long-term performance is associated with higher stock returns, but this relationship breaks down during the crisis. From columns 4–6, we find that while higher proportion of pay linked to ROA is related to better stock returns in normal times, higher proportion of pay related to ROE is related to better accounting performance during the crisis. Finally, we find that higher pay linked to stock return is associated with worse accounting performance during normal times and lower stock return during the crisis years.[8]

Thus, our results show an insignificant relationship between performance-pay and bank performance along that dimension. This may be due to the endogenous nature of performance pay alluded to earlier. That is, to the extent banks that lag along a particular dimension of performance choose to link a higher fraction of CEO pay to that performance, the relationship between performance pay and performance along that dimension is likely to be ambiguous.

(Table 7 goes here)

5.2 Structure of bank CEO compensation and tail risk

In our final set of tests, we relate bank CEO pay structure to firm risk. We use tail risk as our risk measure and dependent variable in these tests, where tail risk is defined as the negative of the average return of the firm's stock during the worst 5% of daily returns in a given year. Our estimation equation is the same as that in Table 7.

Table 8 presents the results of these tests. Column 1 uses measures of pay linked to short-term and long-term performance measures. The results indicate that a higher proportion of pay linked to short-term performance measures is associated with higher tail risk, especially during the crisis. This highlights an important cost of short-term performance pay. From column 2, we find that a higher proportion of pay

[8] The *ROA pay x Crisis* interaction term is absent in Tables 7 and 8, because no bank CEOs had pay linked to ROA during the crisis period.

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linked to ROA and ROE is associated with lower tail risk. To summarize, we find that a higher proportion of pay linked to short-term performance metrics increases tail risk especially during the crisis years.

(Table 8 goes here)

6. Conclusion

In this paper, we use a comprehensive data set containing performance metrics used in incentive contracts to investigate the structure and evolution of bank compensation from 2006 through 2018. This includes analysis on the level of pay, the components of pay, the time series of pay, pay-performance-sensitivity, and the sensitivity of CEO pay linked to performance and firm performance. Additionally, we examine differences between CEO pay at banks relative to pay at nonbanks and nonbank financial firms.

The main takeaways of our study are that (a) bank CEOs are paid less than their nonbank counterparts, but this effect is mostly driven by the compensation of small bank CEOs, as large bank CEOs are paid as much as their nonfinancial firm counterparts; (b) total bank CEO compensation declined during the crisis but has recovered since and is now 24% higher than precrisis levels; (c) larger banks, those with less nonperforming loans, and those with business models involving higher noninterest income and lower dependence on deposit funding pay their CEOs more; (d) bank compensation is sensitive to ROA and ROE, but not to stock returns; and (e) there is no robust relationship between the dependence of bank CEO compensation on a specific performance measure and the bank's actual performance on that measure, but greater dependence of bank CEO compensation on short-term measures of bank performance is associated with higher tail risk.

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Appendix

- *Bank* is a dummy variable that takes the value of one if the firm has a SIC code between 6000 and 6099 and zero otherwise.
- *Big (Small) bank* is a dummy variable equal to one if the bank's total assets are (not) in the top 10 of all banks in a given year and zero otherwise.
- *Board independence* is the fraction of a firm's board composed of independent directors.
- *Broker/dealer* is a dummy variable equal to one if a firm has a SIC code between 6200 and 6299.
- *Capital ratio* is bank capital scaled by total assets.
- *Cash pay* is all executive compensation excluding stock and option awards.
- *Cash/deposits* is cash scaled by total deposits.
- *Cash/total assets* (or Cash ratio) is the ratio of cash and short-term equivalents to the book value of total assets.
- *Co-option* is the fraction of directors who joined the board after the current CEO following Coles, Daniel, and Naveen (2014).
- *Debt/total assets* (or Leverage) is the ratio of the sum of long- and short-term debt to the book value of total assets.
- *Demand deposits/total short-term borrowing* is the ratio of demand deposits to the sum of long- and short-term debt to the book value of total assets.
- *E-index* is the Entrenchment index calculated following Bebchuck, Cohen, and Ferrell (2009).
- *Equity pay* is all compensation paid in stock and option awards.
- *Expenses/assets* is total expenses scaled by total assets.
- *Health insurance* is a dummy variable equal to one if a firm has a SIC code between 6320 and 6329.
- *Life insurance* is a dummy variable equal to one if a firm has a SIC code between 6310 and 6319.
- *log(assets)* is the natural logarithm of total assets.
- *Long-term (LT) pay* is performance-based pay that vests in 12 months or more after the grant date.

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- *Nondeposit credit institution* is a dummy variable equal to one if a firm has a SIC code between 6100 and 6199.
- *Noninterest income/total income* is the ratio of noninterest income to total income.
- *Performance pay* is the fraction of pay related to performance-based metrics.
- *Percentage financial expert directors* is the fraction of firm's directors who are financial experts.
- *Property insurance* is a dummy variable equal to one if a firm has a SIC code between 6330 and 6339.
- *Real estate* is a dummy variable equal to one if a firm's SIC code is between 6500 and 6599.
- *Return* is the 1-year percentage return for the firm's stock over the previous fiscal year.
- *ROA pay* is the fraction of pay related to a return on assets metric.
- *ROA* is return on assets calculated as the ratio of net income to total assets.
- *ROE* is return on equity calculated as the ratio of net income to shareholders equity.
- *ROE pay* is the fraction of pay related to a return on equity metric.
- *Short-term (ST) pay* is defined as performance-based pay that vests in less than 12 months after the grant date.
- *Stock return pay* is the fraction of pay related to stock market-based metrics.
- *Tail Risk* is the negative of the average return on a firm's stock during the worst 5% daily returns during the year.
- *Tobin's q* is the ratio of market value of total assets to book value of total assets.
- *Volatility* is the stock return volatility calculated as the annualized volatility of daily stock returns during the previous year.

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Table 1. Summary statistics

This table presents summary statistics for different aspects of compensation characteristics from 2006 to 2018. Panel A presents information for bank CEOs (SIC codes between 6000 and 6099), and panel B presents information for nonbank firm CEOs (all SIC codes excluding 6000–6099). All variables are winsorized at the 1st and 99th percentiles. The appendix defines the variables.

A. Banks

Variable	Mean	SD	P25	P50	P75	N
Total pay	3,861.03	4,792.56	1,068.37	2,116.47	4,292.67	1,594
Cash pay	1,885.21	1,726.52	833.50	1,376.26	2,230.96	1,599
Equity pay	1,953.61	3,503.88	0.02	575.95	2,096.58	1,594
% equity pay	0.32	0.26	0.00	0.32	0.50	1,594
% ROE pay	0.07	0.13	0	0	0.12	645
% ROA pay	0.02	0.06	0	0	0	645
% stock return pay	0.07	0.13	0	0	0.09	645
% short-term pay	0.19	0.18	0	0.18	0.28	645
% long-term pay	0.19	0.20	0	0.16	0.33	645

B. Nonbanks

Variable	Mean	SD	P25	P50	P75	N
Total pay	5,672.35	5,421.32	1,914.62	4,018.65	7,491.24	21,188
Cash pay	2,369.54	2,139.31	1,003.48	1,741.27	2,974.04	21,253
Equity pay	3,246.78	3,912.42	540.33	1,950.06	4,490.62	21,188
% equity pay	0.46	0.27	0.29	0.52	0.66	21,156
% ROE pay	0.01	0.06	0	0	0	11,332
% ROA pay	0.00	0.02	0	0	0	11,332
% stock return pay	0.11	0.18	0	0	0.21	11,332
% short-term pay	0.20	0.18	0.08	0.16	0.25	11,332
% long-term pay	0.20	0.21	0	0.18	0.35	11,332

C. Bank controls

Variable	Mean	SD	P25	P50	P75	N
log(assets)	16.641	1.649	15.502	16.196	17.428	1,527
Capital ratio	0.111	0.029	0.092	0.107	0.126	1,518
Non-int income/total income	0.275	0.196	0.142	0.228	0.343	1,527
ROA	0.006	0.006	0.004	0.006	0.008	1,416
ROE	0.049	0.062	0.038	0.055	0.074	1,416
Nonperforming loans/assets	0.012	0.013	0.004	0.007	0.014	1,414
Cash/deposits	0.103	0.178	0.032	0.048	0.089	1,397
Expenses/assets	0.002	0.002	0.001	0.001	0.002	1,518
Demand deposits/total ST borrowing	0.135	0.106	0.057	0.098	0.198	1,397

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Table 2. Level of pay: Banks versus nonbanks

This table presents panel regressions of the natural logarithm of total compensation on bank, nonbank financial, specific financial firm type dummies, and firm-level characteristics. *Bank* is a dummy equal to one if a firm is a bank. *Big bank* (*Small bank*) is equal to one if a bank's total assets are (are not) in the top-10 largest (among all banks) banks in a given year. All tests include industry year fixed effects. Our sample is from 2006 to 2018. Robust standard errors are clustered at the firm level. The appendix defines the variables. **p* < .1; ***p* < .05; ****p* < .01.

Variables	(1) *log(Total comp)*	(2) *log(Cash comp)*	(3) *log(Equity comp)*	(4) *log(Total comp)*	(5) *log(Cash comp)*	(6) *log(Equity comp)*
Bank	-1.112***	-0.698***	-2.470***			
	[-19.61]	[-16.13]	[-11.70]			
Nonbank financials	-0.253***	-0.123***	-0.619***			
	[-5.93]	[-3.09]	[-4.99]			
Big bank				-0.117	-0.116	-0.740*
				[-1.03]	[-1.29]	[-1.74]
Small bank				-1.163***	-0.714***	-2.579***
				[-21.09]	[-17.19]	[-11.74]
Life insurance				-0.668***	-0.254	-1.322***
				[-3.10]	[-1.28]	[-2.59]
Health insurance				0.089	0.201*	-0.080
				[0.67]	[1.85]	[-0.22]
Prop insurance				-0.327***	0.031	-1.208***
				[-3.17]	[0.34]	[-4.23]
Nondeposit credit inst				-0.112	-0.110	-0.626
				[-1.12]	[-0.62]	[-1.17]
Broker/dealer				0.018	0.229***	-0.130
				[0.16]	[2.58]	[-0.41]
Real estate				-0.372***	-0.346***	-0.711***
				[-5.64]	[-5.79]	[-3.69]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,516	20,575	20,517	20,516	20,575	20,517
R^2	.509	.428	.173	.514	.436	.176

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Table 3. Determinants of bankers' pay

This table presents panel regressions of the natural logarithm of bank CEO compensation on time window dummies, and firm-level characteristics. The omitted (baseline period) time window is 2006–2007. Our sample is from 2006 to 2018. Robust standard errors are clustered at the firm level. The appendix defines the variables. *p < .1; **p < .05; ***p < .01.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variables	*log(TDC1)*	*log(Cash pay)*	*log(Equity pay)*	*Perf pay*	*ST pay*	*LT pay*	*ROA pay*	*ROE pay*	*Absolute pay*	*Relative pay*
Crisis (2008–2010)	-0.238***	-0.183***	-0.430	0.002	0.030	-0.034	0.021*	0.005	-0.030	0.045
	[-3.38]	[-2.87]	[-1.38]	[0.04]	[0.99]	[-0.98]	[1.85]	[0.24]	[-0.74]	[1.55]
Postcrisis (2011–2013)	0.154**	0.226***	0.452	0.120***	0.049	0.075*	0.057***	0.030	0.105**	0.105***
	[2.10]	[3.08]	[1.43]	[2.79]	[1.41]	[1.88]	[2.70]	[1.29]	[2.23]	[3.48]
Recent (2014–2018)	0.240***	0.335***	0.522	0.206***	0.019	0.163***	0.074***	0.089***	0.163***	0.140***
	[3.06]	[4.25]	[1.46]	[4.19]	[0.52]	[3.97]	[3.19]	[3.40]	[3.35]	[3.27]
log(assets)	0.427***	0.259***	0.835***	0.018	-0.021*	0.039***	0.013	0.016	0.018	0.035**
	[14.50]	[8.96]	[9.29]	[1.09]	[-1.80]	[3.07]	[1.44]	[1.51]	[1.35]	[2.03]
Capital ratio	1.802*	0.049	7.697	0.914	0.336	0.558	0.105	-1.051***	1.214	-0.656
	[1.71]	[0.04]	[1.32]	[1.19]	[0.36]	[0.71]	[0.24]	[-2.95]	[1.66]	[-0.81]
Non-int income/total income	0.794***	0.476**	2.847***	0.022	0.129	-0.094	-0.189***	0.160***	0.185	-0.096
	[3.28]	[2.30]	[3.36]	[0.14]	[0.86]	[-0.87]	[-2.83]	[3.26]	[1.13]	[-0.75]
ROA	9.540*	3.514	11.973	4.341	3.038	1.198	0.209	2.671*	2.320	3.107
	[1.90]	[0.93]	[0.62]	[1.32]	[1.23]	[0.44]	[0.18]	[1.73]	[0.81]	[1.15]
Nonperforming loans/assets	-4.760**	-5.484***	-3.117	-3.732**	-2.588**	-0.791	-1.047**	0.853	-2.821*	-0.920
	[-2.51]	[-2.94]	[-0.23]	[-2.01]	[-2.30]	[-0.47]	[-2.11]	[0.82]	[-1.92]	[-0.49]
Cash/deposits	-0.067	0.057	-1.112	-0.087	-0.143*	0.072	0.015	-0.040	-0.067	-0.147*
	[-0.29]	[0.32]	[-1.38]	[-0.72]	[-1.75]	[0.90]	[0.36]	[-0.63]	[-0.59]	[-1.68]
Expenses/assets	-10.640	-14.505	-75.562	-4.639	-3.469	-5.457	0.747	2.806	-3.660	-13.344
	[-0.64]	[-0.78]	[-0.89]	[-0.37]	[-0.33]	[-0.53]	[0.15]	[0.43]	[-0.32]	[-1.35]
DD/ST borrowing	-0.792**	-0.611**	-2.123	-0.101	0.024	-0.117	0.135	-0.037	-0.187	0.026
	[-2.52]	[-1.98]	[-1.60]	[-0.60]	[0.16]	[-0.83]	[1.42]	[-0.32]	[-1.07]	[0.14]
Observations	1,175	1,179	1,175	507	507	507	507	507	507	507
R^2	.673	.538	.305	.250	.102	.257	.156	.180	.232	.165

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Table 4. Did banks with losses in the financial crisis change their compensation after the crisis?

This table presents regressions of the change in compensation level or the percent of compensation linked to performance goals on a negative 2008 net income dummy variable. The dependent variable is calculated at the firm level, as the difference between the dependent (pay level or performance pay) variable in the 2 years after the crisis relative to before the crisis. Specifically, we calculate the firm average in the 2 years following the crisis and subtract from it, the average calculated the 2 years prior to the crisis. There is only one observation per firm for all tests. The appendix defines the variables. *p < .1; **p < .05; ***p < .01.

Variables	(1) *Ch(log(TDC1))*	(2) *Ch(log(CashPay))*	(3) *Ch(log(EqPay))*	(4) *Ch(Perf pay)*	(5) *Ch(ST pay)*	(6) *Ch(LT pay)*	(7) *Ch(ROA pay)*	(8) *Ch(ROE pay)*	(9) *Ch(Rel pay)*	(10) *Ch(Abs pay)*
NI(2008) < 0	-0.528***	-0.322**	-1.630**	-0.031	-0.121**	-0.006	-0.005	-0.128*	-0.086*	-0.096
	[-3.34]	[-2.07]	[-2.24]	[-0.62]	[-2.43]	[-0.88]	[-0.15]	[-2.01]	[-1.76]	[-1.35]
Observations	81	81	81	32	32	32	32	32	32	32
R^2	.124	.052	.060	.013	.164	.025	.001	.119	.094	.057

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Table 5. Determinants of bankers' pay: Governance

This table presents panel regressions of the natural logarithm of bank CEO compensation on time window dummies, firm-level characteristics, and governance characteristics. The omitted (baseline period) time window is 2006–2007. Our sample is from 2006 to 2018. All controls used in Table 2 are included in all specifications but have been omitted for brevity. Robust standard errors are clustered at the firm level. The appendix defines the variables. *$p < .1$; **$p < .05$; ***$p < .01$.

Variables	(1) *log(TDC1)*	(2) *log(Cash pay)*	(3) *log(Equity pay)*	(4) *Perf pay*	(5) *ST pay*	(6) *LT pay*	(7) *ROA pay*	(8) *ROE pay*	(9) *Absolute pay*	(10) *Relative pay*
Board independence	0.007	-0.337	1.158	0.136	0.033	0.054	-0.104	0.017	0.163	0.271
	[0.02]	[-1.09]	[0.60]	[0.63]	[0.17]	[0.35]	[-1.17]	[0.17]	[0.69]	[1.33]
% fin expert directors	0.573*	0.529*	-0.729	0.012	-0.063	0.186	0.114	0.033	0.004	-0.002
	[1.82]	[1.74]	[-0.51]	[0.06]	[-0.36]	[1.53]	[1.33]	[0.30]	[0.03]	[-0.01]
E-index	0.115**	0.039	0.553***	0.015	0.014	0.002	-0.003	-0.012	0.005	-0.013
	[2.46]	[0.94]	[3.13]	[0.67]	[0.64]	[0.11]	[-0.25]	[-0.95]	[0.19]	[-0.53]
Co-option	0.570***	0.337**	1.422**	0.035	-0.009	0.077	0.005	-0.017	0.059	-0.018
	[3.93]	[2.51]	[2.54]	[0.48]	[-0.14]	[1.48]	[0.11]	[-0.52]	[0.81]	[-0.28]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	842	843	842	423	423	423	423	423	423	423
R^2	.677	.515	.335	.276	.145	.305	.164	.220	.257	.182

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Table 6. Bank pay performance sensitivity

This table presents panel regressions of the natural logarithm of bank CEO total compensation on firm performance, a high capital dummy, firm performance interacted with time period dummies, and firm-level controls. All specifications include year fixed effects. Our sample is from 2006 to 2018. Robust standard errors are clustered at the firm level. The appendix defines the variables. *p < .1; **p < .05; ***p < .01.

Variables	(1) *log(TDC1)*	(2) *log(TDC1)*	(3) *log(TDC1)*	(4) *log(TDC1)*	(5) *log(TDC1)*	(6) *log(TDC1)*
ROA	17.960***		44.041**		20.220***	
	[3.00]		[2.36]		[3.31]	
ROE		1.281**		3.174**		1.318***
		[2.50]		[2.59]		[3.11]
Return	0.071	0.084	0.335	0.363	0.080	0.086
	[0.90]	[1.07]	[1.42]	[1.61]	[0.80]	[0.87]
ROA x Crisis (2008–2010)			-29.846			
			[-1.47]			
ROA x Postcrisis (2011–2013)			-21.965			
			[-1.18]			
ROA x Recent (2014–2018)			-22.576			
			[-1.18]			
ROE x Crisis (2008–2010)				-2.465**		
				[-2.03]		
ROE x Postcrisis (2011–2013)				-0.512		
				[-0.42]		
ROE x Recent (2014–2018)				1.008		
				[0.59]		
Return x Crisis (2008–2010)			-0.284	-0.271		
			[-0.98]	[-1.01]		
Return x Postcrisis (2011–2013)			-0.446*	-0.465*		
			[-1.72]	[-1.88]		
Return x Recent (2014–2018)			-0.044	-0.083		
			[-0.14]	[-0.28]		
High capital					-0.156**	-0.176**
					[-2.29]	[-2.55]
ROA x High capital					-4.440	
					[-0.66]	
ROE x High capital						-0.154
						[-0.17]
Return x High capital					-0.026	0.001
					[-0.22]	[0.01]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,279	1,279	1,279	1,279	1,279	1,279
R^2	.679	.678	.682	.682	.683	.681

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Table 7. Firm performance and compensation structure

This table presents panel regressions of different measures of firm performance on different measures of performance-based pay, performance-based pay interacted with a crisis time period dummy, and firm-level characteristics. The main independent variables are the portion of bank CEO pay that either vests within or not within 12 months (short-term and long-term) or pay linked to specific performance goals (ROE, ROA, and stock return). Our sample is from 2006 to 2018. Robust standard errors are clustered at the firm level. The appendix defines the variables. *$p < .1$; **$p < .05$; ***$p < .01$.

Variables	(1) *ROA*	(2) *ROE*	(3) *Return*	(4) *ROA*	(5) *ROE*	(6) *Return*
Short-term pay	-0.000	0.000	0.030			
	[-0.14]	[0.00]	[0.50]			
Short-term pay x Crisis	0.004	0.022	-0.127			
	[1.37]	[0.67]	[-0.65]			
Long-term pay	-0.001	-0.007	0.147**			
	[-0.56]	[-0.54]	[2.23]			
Long-term pay x Crisis	0.003	0.069	-0.555**			
	[0.66]	[1.56]	[-2.40]			
ROA pay				-0.002	-0.023	0.343***
				[-1.23]	[-1.15]	[3.16]
ROE pay				-0.001	-0.014	0.085
				[-1.08]	[-1.46]	[1.16]
ROE pay x Crisis				0.011***	0.119***	-0.090
				[3.20]	[3.18]	[-0.44]
Stock price pay				-0.003**	-0.034**	0.070
				[-2.57]	[-2.43]	[0.77]
Stock price pay x Crisis				0.001	0.036	-0.488**
				[0.21]	[1.18]	[-2.33]
Crisis	-0.004***	-0.046***	-0.049	-0.004***	-0.046***	-0.089***
	[-4.01]	[-3.65]	[-0.94]	[-5.03]	[-4.79]	[-2.78]
log(assets)	0.000	0.004	-0.003	0.000	0.004	-0.004
	[1.22]	[1.31]	[-0.27]	[1.24]	[1.31]	[-0.43]
Capital ratio	0.009	-0.336**	1.194*	0.010	-0.321***	1.552**
	[0.75]	[-2.57]	[1.80]	[0.96]	[-2.82]	[2.40]
Non-int income/total income	0.001	-0.011	0.069	0.001	-0.010	0.112
	[0.32]	[-0.41]	[0.56]	[0.27]	[-0.34]	[0.88]
Nonperforming loans/assets	-0.122***	-1.401***	1.097	-0.130***	-1.446***	1.012
	[-3.54]	[-3.29]	[1.01]	[-3.82]	[-3.47]	[0.96]
Cash/deposits	-0.003	-0.021	0.127	-0.003	-0.020	0.123
	[-1.53]	[-1.14]	[1.58]	[-1.49]	[-1.10]	[1.57]
Expenses/assets	-0.075	0.296	-16.543***	-0.101	-0.049	-16.120**
	[-0.49]	[0.18]	[-2.68]	[-0.71]	[-0.03]	[-2.49]
DD/total ST borrowing	0.000	-0.000	0.293***	0.000	0.000	0.242**
	[0.08]	[-0.02]	[3.02]	[0.18]	[0.01]	[2.39]
Observations	449	449	449	449	449	449
R^2	.310	.311	.096	.328	.326	.100

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Table 8. Firm risk and compensation structure

This table presents panel regressions of tail risk on different measures of performance-based pay, performance-based pay interacted with a crisis time period dummy, and firm-level characteristics. The main independent variables are the portion of bank CEO pay that either vests within or not within 12 months (short-term and long-term) or pay linked to specific performance goals (ROE, ROA, and stock return). Our sample is from 2006 to 2018. Robust standard errors are clustered at the firm level. The appendix defines the variables. *$p < .1$; **$p < .05$; ***$p < .01$.

Variables	(1) *Tailrisk*	(2) *Tailrisk*
Short-term pay	-0.019**	
	[-2.14]	
Short-term pay x Crisis	0.041*	
	[1.77]	
Long-term pay	-0.015*	
	[-1.96]	
Long-term pay x Crisis	0.026	
	[1.25]	
ROA pay		-0.041***
		[-5.55]
ROE pay		-0.023***
		[-2.73]
ROE pay x Crisis		0.020
		[0.62]
Stock price pay		-0.007
		[-0.61]
Stock price pay x Crisis		0.021
		[0.83]
Crisis	0.021***	0.029***
	[3.44]	[6.53]
log(assets)	0.002	0.003**
	[1.64]	[2.02]
Capital ratio	-0.287**	-0.326***
	[-2.39]	[-2.81]
Non-int income/total income	-0.036**	-0.041***
	[-2.48]	[-2.74]
Nonperforming loans/assets	-0.399*	-0.390*
	[-1.98]	[-1.85]
Cash/deposits	-0.026***	-0.023***
	[-3.54]	[-3.11]
Expenses/assets	3.825***	3.810***
	[4.08]	[3.86]
DD/total ST borrowing	-0.044***	-0.038***
	[-4.25]	[-3.29]
Observations	438	438
R^2	.318	.320

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Internet Appendix

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Table IA 1: Pay Determinants: Time Series

This table presents panel regressions of the natural logarithm of bank CEO total compensation on bank holding company controls in different time windows. All specifications include year fixed effects. Our sample is from 2006 to 2018. Robust standard errors are clustered at the firm level. Variable definitions are in the Appendix. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Log(TDC1)	Log(TDC1)	Log(TDC1)	Log(TDC1)
Period	2006-2007	2008-2010	2011-2013	2014-2018
Log(Assets)	0.505***	0.331***	0.459***	0.421***
	[15.10]	[6.11]	[14.20]	[15.56]
Capital Ratio	3.836	2.319	0.935	-0.337
	[1.17]	[1.39]	[0.57]	[-0.21]
Non-Int Income/Total Income	0.985*	1.022***	0.548	0.743***
	[1.90]	[2.86]	[1.62]	[2.88]
ROA	18.792	7.039	17.464**	7.022
	[1.02]	[1.12]	[2.06]	[0.72]
Nonperforming Loans/Assets	-12.358	-6.023*	-5.400*	1.229
	[-0.86]	[-1.95]	[-1.89]	[0.52]
Cash/Deposits	0.079	0.572*	-0.373	-0.272
	[0.13]	[1.82]	[-1.59]	[-0.97]
Expenses/Assets	17.338	-27.196	17.812	-12.010
	[0.42]	[-0.95]	[0.63]	[-0.57]
DD/Total ST Borrowing	-2.121**	0.868	-1.094**	-0.954***
	[-2.51]	[1.22]	[-2.58]	[-2.76]
Observations	191	303	292	389
R-squared	0.756	0.510	0.737	0.689
Year FE	Y	Y	Y	Y

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