Banking Industry Deregulation and CEO Incentives:

Evidence from Bank CEO Turnover

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Abstract

The recent financial crisis has spawned unprecedented interest and debate about whether risk-taking incentives provided to bank CEOs played a role in the crisis. We add to this debate by examining the relation between bank CEO turnover and performance and whether this relation has been affected by banking deregulation. We argue that bank CEOs are more willing to engage in risky operations to exploit the growth opportunities arising from deregulation if they are less likely to be penalized for poor performance. Consistent with this expectation, we find that bank CEO turnover is significantly less sensitive to performance in the post-deregulation period. In addition, we find that the reduction in turnover-performance sensitivity primarily exists in banks that adopt more aggressive business policies in response to deregulation and in large banks, which are best positioned to take advantage of growth opportunities. Furthermore, our results indicate incentives deriving from bank CEO compensation and turnover contracts are complementary.

Key words: CEO turnover, Deregulation, Risk-Taking

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1. Introduction

The banking industry has undergone substantial changes since the late 1970s, largely as the result of deregulation and rapid market developments. Over that period, banks' growth opportunities expanded, and banks entered new markets, both geographic and product. Perhaps not surprisingly, the recent financial crisis has led to questions about the role of banking regulation in corporate governance and the effectiveness of corporate governance in the banking industry. In particular, policy makers and industry analysts have questioned whether the incentive structures in place encouraged excessive risk taking in the banking industry.

Several recent papers have examined the role that bank CEO compensation might have played in the financial crisis. Fahlenbrach and Stulz (2011) study bank CEOs' equity incentives and conclude that the recent crisis cannot be attributed to a lack of alignment between bank CEO incentives and shareholder value. In contrast, DeYoung et al. (2013) find that CEOs responded to increases in contractual risk-taking incentives by taking on riskier business policies, and the findings in Cheng et al. (2014) indicate that executives were rewarded for taking excessive risks.

We add to this debate by examining the role of banking deregulation in shaping CEO risk-taking incentives through another corporate governance mechanism – CEO turnover decisions. We investigate whether the incentives embedded in CEO turnover decisions are structured to promote risk taking, and whether this relation has been affected by the trend toward deregulation in the banking industry. We argue that CEOs' incentives to take risk depend not only on the compensation rewards, but also on other employment-related performance

consequences (see Houston and James 1995). A high probability of being fired in the case of poor performance can discourage risk taking. As a result, boards that want to encourage the firm's CEO to take risks can provide incentives through turnover policies. If bank boards respond to the growth opportunities arising from deregulation via turnover policies that promote risk taking, we expect to find lower CEO turnover in banks, and lower sensitivity of turnover to poor performance. Therefore, we examine the relation between CEO turnover and performance in the banking industry and whether that relation is affected by banking deregulation. We also consider CEO turnover decisions in nonbank firms, using them as a benchmark to control for other economic and regulatory forces that might affect CEO turnover decisions in general.

Our empirical tests use CEO turnover data from Engel et al. (2003) and Bushman et al. (2010). The combined samples cover the period from 1974-2005 and identify CEO turnovers for banks and nonbanks. As it is not always possible to determine whether a turnover was forced, we conduct our analyses using two measures of turnover: *Turn* (all CEO turnovers) and *Forced* (those turnovers that can be identified as forced). We identify banking firms as those with Bank Compustat data available, and nonbank firms as those with one-digit SIC codes other than 6. Our performance measures are industry-adjusted stock return and industry-adjusted change in ROA.

We first examine CEO turnover-performance sensitivity, running the regressions separately for banks and nonbank firms. When we examine the entire sample period, we do not find a significant difference between the turnover-performance sensitivity of banks and that of nonbank firms. We then allow the turnover-performance relation to differ before and after the deregulation period, consistent with the idea that incentives for risk taking may change as the industry is deregulated. Focusing on the earnings measure, we find that turnover is significantly less sensitive to performance in the post-deregulation period for banks, but not for nonbank firms.

These results are consistent with an increased incentive for risk taking embedded in bank CEO turnover decisions as growth opportunities increased.

We next investigate whether the post-deregulation decrease in turnover-performance sensitivity for bank CEOs varies predictably in the cross-section. DeYoung et al. (2013) find that CEOs at large banks were most responsive to the contractual incentives for risk taking after deregulation. We expect that bank boards that prefer more aggressive business policies in response to deregulation will provide incentives consistent with those policies. Consequently, we expect larger banks and banks with riskier business policies generally to display lower turnover-performance sensitivity in the post deregulation era. We assume that riskier business policies are associated with higher operating volatility, and, following prior literature (Hribar and Nichols, 2007), we proxy for operating volatility with revenue volatility. We also regress return volatility on four bank-specific measures that capture the riskier components of banking operations in the post-deregulation era and use the predicted return volatility as another indicator of risky policies. Our results indicate that bank CEO turnover is less sensitive to accounting performance after deregulation when bank risk taking is higher. Similarly, turnover-performance sensitivity is lower for large banks in the post-deregulation period.

Our final tests investigate whether the bank CEO incentives embedded in compensation and turnover are substitutes or complements. Partitioning the sample according to high or low pay-risk sensitivity (i.e., vega), we find that the firms with high equity incentives for risk taking also have low turnover-performance sensitivity in the post-deregulation period. This result suggests that the incentives deriving from bank CEO compensation and turnover are complementary.

Overall, our results suggest that CEO turnover policies in banking firms were structured to provide incentives for risk taking. Banks display lower sensitivity of CEO turnover to performance in the post-deregulation period. This relation does not hold for nonbank firms. Further, banks with riskier business policies and larger banks—those best positioned to take advantage of post-deregulation growth opportunities—had lower CEO turnover-performance sensitivity after deregulation. The incentives embedded in CEO turnover policies appear to complement the incentives arising from CEO compensation contracts. Our findings indicate that turnover policies are another important incentive mechanism in encouraging risk taking in the post-deregulation banking environment.

2. Background and Hypothesis Development

2.1 Background

Since the late 1970s, the banking industry has undergone a trend towards deregulation, resulting in a banking regulation structure very different from the structure in place during the 1930s. The banking regulation structure in the 1930s was a result of the Great Depression, which imposed strict restrictions on banks' business activities, including products and geographic location. The evolution in the industry has resulted from fast-paced technology and market developments, and major federal and state regulations. We provide a brief summary of the key changes brought about by deregulation of the banking industry below.[1]

First, deregulation removed the restrictions on prices banks charge in both borrowing and lending activities. On the borrowing side, the Federal Reserve's Regulation Q, which imposed ceilings on bank deposit interest rates, was in effect until the early 1980s, when the passage of Depository Institutions Deregulation and Monetary Control Act of 1980 (DIDMCA) gradually

[1] Our discussion is based on Carnell, Macey and Miller (2008), Sherman (2009), and Kroszner and Strahan (2013).

phased out most deposit rate ceilings. On the lending side, the 1978 Marquette decision by the Supreme Court undermined the importance of state usury laws that had historically restricted the rates banks could charge.[2] This was particularly important for credit card lending, as these activities are not geographically based. As a result, states gradually removed interest rate ceilings, resulting in a rapid expansion of credit card businesses.[3]

Second, deregulation eliminated the restrictions on geographic locations where banks could operate. Historically, states had regulatory authority over banks, and states had imposed numerous restrictions on banks' geographic expansion, including restrictions on both interstate banking and branching.[4] The first move toward change took place in 1978, when Maine passed a law allowing out-of-state bank holding companies (BHCs) to enter the state if banks from Maine were allowed to enter those states. However, no state responded until 1982, when similar laws were passed in Alaska and New York. Subsequently, other states also responded by passing similar laws. Eventually, full interstate banking was achieved with the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, which effectively permitted banks and holding companies to enter another state without permission.

Third, deregulation removed the restrictions prohibiting commercial banks' involvement in underwriting and insurance activities. These restrictions originated with the passage of the Banking Act of 1933 (the Glass-Steagall Act) but began to be relaxed in the 1980s. In 1987, the Federal Reserve derived the "engaged principally" clause (under Section 20 of the Banking Act),

[2] The court ruled that Section 85 of the National Banking Act permitted a bank to charge up to the maximum interest rate allowed in its *home state*. As a consequence, the location of the borrower no longer mattered.

[3] At the same time, Congress passed the Garn-St. Germain Depository Institutions Act in 1982, which authorized thrifts to engage in commercial loans up to 10% of assets and to offer a new account that competed directly with money market mutual funds. These new expanded powers allowed thrifts to act more like banks and less like specialized mortgage lending institutions.

[4] States collected fees for granting bank charters, and levied taxes on these banks. However, states did not receive charter fees from banks chartered in other states. This provided strong incentives for states to prohibit interstate banking.

permitting BHC subsidiaries to underwrite certain "ineligible securities" if the revenue from such activities was below 5% of the subsidiary's gross revenue.[5] Subsequently, the Federal Reserve expanded the securities that "Section 20 subsidiaries" could underwrite to include corporate debt and equity securities (January 1989), and also increased the revenue limitation to 10% (September 1989) and 25% (December 1996). At the same time, several OCC rulings loosened the limitations on national banks' involvement in the insurance business. Congress eventually passed the Gramm-Leach-Bliley Act (GLBA), which completely dismantled the banking regulatory structure of Glass-Steagall, in 1999. GLBA effectively permitted Financial Holding Companies (FHCs) to have affiliates engaged in banking, insurance, and securities activities.

A large literature explores the economic consequences of banking deregulation. In general, the empirical evidence suggests that banking deregulation is associated with fewer but larger and more diversified banks, improvements in bank operating efficiency, reductions in bank operating costs, and better pricing of bank services for consumers (see, for example, Jayaratne and Strahan 1998; Black and Strahan 2001; Kroszner and Strahan 2013).

2.2 Hypothesis Development

Our objective is to investigate whether the incentives embedded in bank CEO turnover decisions are structured to promote risk taking, and whether this relation has been affected by the trend toward deregulation in the banking industry. In developing our hypotheses, we begin by discussing important features of bank governance and prior work on incentives in the banking industry.

Two key features of banks set bank governance apart from that of nonfinancial firms. First, compared with nonfinancial firms, banks have multiple stakeholders. Mehran, Morrison,

[5] These securities include municipal revenue bonds, commercial paper, and mortgage-related securities.

and Shapiro (2011) note that financial institutions usually have over 90% debt in their capital structure, so debtholders are major stakeholders. Shareholders' interests may diverge from those of debtholders, especially with respect to risk taking: shareholders may prefer risk taking to a certain extent, while debtholders prefer low volatility.

This risk-shifting agency problem is particularly relevant for banks for two reasons. First, banks are in the business of taking risks, and their business is usually opaque and complex. As Levine (2004) describes, "Banks can alter the risk composition of their assets more quickly than most non-financial industries, and banks can readily hide problems by extending loans to clients that cannot service previous debt obligations." Second, banks do not face the same intensity of creditor monitoring that other borrower firms do. Creditors of most firms (the banks themselves) monitor their borrowers' risk taking, but an important class of bank creditors—insured depositors—does not monitor banks because their claims are insured by the government. The government is effectively a key creditor of insured banks, and government regulators are tasked with constraining bank risk taking. Government regulators, however, may not have the same monitoring incentives as other creditors. Deposit insurance therefore generates moral hazard for banks. Given the importance of addressing risk-shifting incentives, corporate governance in banks involves not only aligning managers with shareholders, but also considering the interests of debtholders. John and John (1993) propose that providing managers with compensation structures that have low pay-performance sensitivity might be optimal in highly levered firms such as those in the banking industry.

The second key feature of banks is that they are regulated to a higher degree than nonbank firms. In addition to the restrictions on pricing, geographic location, and business activities mentioned earlier, banks are subject to supervision and monitoring by banking

regulators. Banks are required to file detailed regulatory reports to bank regulators on a regular basis, and regulators examine banks' financial condition and their compliance with laws and regulations. Banks are also subject to capital requirements imposed by the authority. It is not clear, however, whether regulatory monitoring substitutes for or complements other corporate governance mechanisms at the bank.

The unique features of the banking industry have given rise to a growing body of research examining corporate governance decisions in banks—in particular, the effects of banks' capital structure on the incentives of their CEOs. Early empirical research on bank CEO incentive structures focuses on the strength of incentives embedded in CEO compensation contracts. Barro and Barro (1990) find that changes in bank CEO compensation are associated with bank performance measured by stock returns and accounting earnings. However, when compared to CEOs in other industries, John and Qian (2003) document that bank CEOs have lower pay-performance sensitivity, supporting the prediction in John and John's (1993) model. Another line of early empirical research investigates whether bank CEO compensation is structured to promote risk taking. Saunders, Strock and Travlos (1990) find a positive association between bank CEOs' stock ownership and bank risk. In contrast, Houston and James (1995) document that, relative to CEOs in other industries, bank CEOs receive less cash compensation, holder fewer stock options, and have a smaller percentage of total compensation in equity. They also show a positive relation between equity-based incentives and bank charter values, which they interpret as contrary to the hypothesis that bank compensation policies are designed to encourage risk taking.

Deregulation of the banking industry has the potential to affect incentives for risk taking in banks. Keeley (1990) argues that risk-taking incentives from deposit insurance are constrained

by access to monopoly rents. Therefore, the lack of competition resulting from the banking regulation structure of the 1930s might explain bank stability during the period from 1940 to 1970. The removal of restrictions on pricing, geographic location, and underwriting activities could have a significant impact on banks' risk taking. The increased competition following deregulation is likely to threaten monopoly rents and could result in greater risk taking to exploit deposit insurance. However, the impact is also likely a function of how banks adapt to the new regulatory environment. Thus far, the empirical evidence on the impact of banking industry deregulation on bank risk taking is mixed. Galloway, Lee and Roden (1997) hypothesize that the market and regulatory developments beginning in the 1980s provided banks with more incentives to take risk, and find evidence consistent with that hypothesis. On the other hand, Kwan (1997) documents that the securities activities of BHCs are associated with greater risk, but there are also some potential diversification benefits.

Other work on the risk-taking consequences of banking industry deregulation focuses on the incentive structures of bank CEOs. Bank CEOs, as key decision makers, should have a significant impact on banks' business policies. Crawford, Ezzell and Miles (1995) test the hypothesis that bank CEO compensation is more sensitive to performance as a result of banking deregulation, and they find a significant increase in CEO pay-performance sensitivity during the 1982-1988 deregulation period compared to the 1976-1981 regulation period. Hubbard and Palia (1995) reach a similar conclusion using changes in interstate banking regulation as the empirical setting.

The severe consequences of the financial crisis of 2007-2008 have prompted additional research into whether and how bank CEO compensation structures affect bank performance and risk taking. Fahlenbrach and Stulz (2011) show that bank CEOs' equity incentives preceding the

financial crisis are not associated with banks' performance during the crisis. They conclude that the recent crisis cannot be attributed to a lack of alignment between bank CEO incentives and shareholder value. In contrast, DeYoung et al. (2013) study the relation between business policy decisions and risk-taking incentives from bank CEOs' compensation contracts at large commercial banks between 1994 and 2006. They find that bank CEOs' contractual risk-taking incentives increased substantially at large US commercial banks around 2000, and CEOs responded to these incentives by taking on more risk. Their findings indicate that the structure of bank CEO compensation may have played a role in the financial crisis through its effects on bank business policies.[6]

Our paper extends the above literature by examining CEO risk-taking incentives through another corporate governance mechanism – CEO turnover decisions. Prior research has largely ignored how the incentives provided through the turnover process affect bank CEO risk taking, with the notable exception of Houston and James (1995). However, their sample covers an earlier time period (1980 through 1990), and they do not investigate the role of banking deregulation in shaping CEO incentives, which is the objective of our study.

We argue that the likelihood of taking risk depends on the rewards for risk taking as well as the managerial consequences of poor performance. CEOs should be more inclined to take risk if there is a lower likelihood of being fired conditional on poor performance. As noted earlier, deregulation expands banks' growth opportunities and allows for more competition. Both effects seem likely to encourage more risk taking. Given DeYoung et al.'s (2013) findings of increased contractual risk-taking incentives following deregulation, we might also expect the incentives

[6] More recently, this line of research investigates the role of bank culture on risk taking. Cheng, Hong and Scheinkman (2014) hypothesize and find that riskier firms provide higher total pay to compensate for the extra risk borne by CEOs. Fahlenbrach, Prilmeier and Stulz (2012) document that a bank's stock performance during the 1998 crisis explains the stock performance during the 2007-2008 financial crisis, suggesting a bank's risk culture or business model plays a role in poor performance during the crisis.

embedded in CEO turnover decisions to be structured to promote risk taking. In this case, banking industry deregulation would be associated with an overall reduction in bank CEO turnover-performance sensitivity. Further, DeYoung et al.'s (2013) results also suggest that CEOs at larger banks were particularly responsive to compensation incentives. If turnover incentives elicit similar responses, we expect the reduction in CEO turnover-performance sensitivity to be greatest in large banks.

However, DeYoung et al. (2013) also find evidence that some bank boards responded to increased CEO risk taking by moderating CEO compensation incentives, which raises the possibility that risk-taking incentives embedded in CEO replacement decisions were similarly moderated. Further, banks might adapt to deregulation with different operating and financial decisions. To explore these possibilities, we examine cross-sectional variation in the impact of deregulation on bank CEO turnover-performance sensitivity. Banks that respond to the opportunities brought about by deregulation by adopting more aggressive business policies will be more risky, and we expect the incentive structure should to that additional riskiness. Therefore, the impact of banking industry deregulation on bank CEO turnover-performance sensitivity is likely to be more salient for riskier banks. We partition banks based on several proxies for bank riskiness and investigate how the effect of deregulation on CEO turnover-performance sensitivity varies with the risk profile of different banks.

3. Data and Sample

The data in our study come from several sources. We use CEO turnover, CEO age, and tenure data from Engel et al. (2003) and Bushman et al. (2010), with the combined sample covering the period from 1974-2005. Financial accounting and stock return data are drawn from

Compustat and CRSP, respectively. In addition, we use Bank Compustat to construct revenue volatility and different risk-taking measures, and ExecuComp to compute pay-risk sensitivity (vega).

We obtain the CEO turnover data from Engel et al. (2003) and Bushman et al. (2010). Using Forbes' annual compensation surveys, Engel et al. (2003) identify potential CEO turnover events from cases where the CEO listed in the survey changes. The sample in Engel et al. (2003) contains 1,631 unique firms over the period 1974-2000, with 1,813 CEO turnovers and 19,220 firm-year observations in the control sample (i.e., firm-years with no CEO turnover). On the other hand, Bushman et al. (2010) employ Standard & Poor's (S&P) ExecuComp database, and identify a CEO turnover for each year when the designated CEO in ExecuComp changes. Their sample includes 2,455 unique firms over the period 1992-2005, with 2,281 CEO turnovers and 19,124 firm-year observations in the control sample.

Given the differences in data sources used to construct the two CEO turnover samples, not all firms appear in both samples. In order to use the longest sample period possible, we include the 967 firms that appear in both samples. The initial sample has 17,323 firm-year observations (2,686 observations for banks, and 14,637 for nonbank firms) and 1,685 CEO turnovers spanning the years 1974-2005. After we impose data requirements for returns, earnings, and control variables, the sample is reduced to 16,465 firm-year observations, including 1,612 CEO turnovers. Truncating financial variables at 1% and 99% further reduces the sample to 15,557 firm-year observations, including 1,502 CEO turnovers. Finally, after removing the 36 CEO turnovers due to CEO death and the 24 CEO turnovers due to a control change, we have a regression sample of 15,497 firm-year observations, with 1,442 CEO turnovers and 14,055 firm-year observations in the control sample. Of the 15,497 firm-year observations, 13,052 are for

nonbank firms, and 2,445 are for banks. We impose additional data restrictions in our subsequent cross-sectional analyses. As a result, the number of observations varies across tests.

Both Engel et al. (2003) and Bushman et al. (2010) use Nexus and/or Factiva to search for articles or press releases to determine the reason for each CEO turnover. They identify forced turnovers according to whether the articles suggest that the CEO was forced out. Following their definitions, we categorize turnovers classified as "fired," "poor performance," "pursue other interests," "policy differences," "legal or scandal," "demoted," "resign under questionable circumstances," and "no reason" as forced. Prior studies (Warner et al. 1988; DeFond and Park, 1999) suggest that involuntary turnovers are often presented as retirements in press releases. Therefore, we also classify retirements when the CEO is younger than 60 as forced turnovers (Parrino 1997). Out of the 1,442 CEO turnovers in the regression sample, 340 are classified as forced turnovers.

4. Empirical Design and Results

4.1 CEO Turnover-Performance Sensitivity and Deregulation

Table 1 reports descriptive firm and CEO characteristics for banks and nonbank firms. We also test mean and median differences between banks and nonbank firms. Perhaps not surprisingly, all firm characteristics differ significantly between banks and nonbank firms. Consistent with prior literature, *Size* and *BTM* are significantly higher for banks than nonbank firms. Interestingly, for the whole sample period, the turnover and forced turnover for banks are significantly lower than those of nonbank firms.

To examine bank CEO turnover-performance sensitivity, we use the following probit regression. We run the same test for nonbank firms as a benchmark.

$$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_3 Age_t + a_4 Tenure_t + a_5 Size_{t-1} + a_6 BTM_{t-1} + a_7 Volatility_{t-1} + \varepsilon \quad (1)$$

The indicator variable *Turn* equals one if there is a CEO turnover, and zero otherwise. The indicator variable *Forced* equals one if the CEO is forced to leave the company, and zero otherwise. We include control variables to capture factors other than performance that may lead to CEO turnover. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. *Volatility* is the standard deviation of monthly stock returns over the past 60 months.

We include two performance measures in our tests. *Return* is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. Both are industry-adjusted, with industry classifications based on two-digit SIC codes. In this paper, we focus on the accounting performance measure, *ΔROA*. Hermalin and Weisbach (1998) argue that accounting performance measures are better predictors of management turnover than stock performance because earnings reflect the actions of current management while stock returns reflect both current management and expectations about future management changes. This point is especially relevant for banks because bank leverage is typically very high. The payoff functions for debtholders and depositors are asymmetric; that is, debtholders do not receive additional payments for future growth options (e.g., when a firm's net asset value is higher than its current liquidation value), but they may be harmed by the firm's current losses. Thus, debtholders and depositors are likely to care more about firms' current earnings performance than growth expectations. These arguments are also consistent with DeYoung (1998), who finds that accounting performance is highly correlated with management quality for banks.

Our focus on accounting performance is potentially problematic if the quality of the accounting performance measure changes across time. If the quality of the accounting performance measure has decreased over time, then an observed reduction in CEO turnover-performance sensitivity could be due to changes in performance measure quality rather than incentives. In untabulated results, we examine the earnings timeliness of our sample firms.[7] We find that banks' earnings timeliness has not changed significantly during our sample period. Further, earnings timeliness in reflecting bad news is much higher for banks than for nonbank firms.[8] Prior work suggests that conditional conservatism is most likely explained by debt contracting (Watts 2003, Basu 1997, Collins et al. 2014 etc.). Banks' leverage is very high relative to leverage of firms in other industries. Thus, it is probably not surprising that banks' earnings are more timely in reflecting bad news. The high timeliness of earnings also suggests that accounting performance might be an important factor in bank CEO turnover.

We run regression (1) for both banks and nonbank firms. Table 2 reports the results. The specifications presented in the first three columns examine the likelihood of all types of CEO turnovers, and the last three specifications examine the likelihood of the CEO turnovers identified as forced. Consistent with prior work, the coefficient on *Return* is negative and significant for all six columns, indicating higher (lower) return performance is associated with lower (higher) CEO turnover. The coefficient on ΔROA is significantly negative for nonbank firms when *Turn* is the dependent variable, which indicates that accounting performance is also negatively related to CEO turnover. When *Forced* is the dependent variable, however, the coefficient on ΔROA for the nonbank firms is negative but insignificant. For banks, the

[7] See, for example, Basu (1997) or Engel, Hayes, and Wang (2003) for details about the calculation of earnings timeliness.

[8] Specifically, we measure the timeliness of bad news as the coefficient on negative returns in a Basu-type reverse regression, and we find that the timeliness of bad news for banks is about 0.9, while that of nonbank firms is about 0.3. The timeliness of good news, however, is similar between nonbank firms and banks.

coefficient on *ΔROA* is insignificant for both *Turn* (column 3) and *Forced* (column 6). This suggests that CEO turnover in banks is not sensitive to accounting performance when we consider the entire sample period. We also test whether the sensitivity of CEO turnover to accounting performance differs between nonbank firms and banks, and find insignificant differences between the coefficients on *ΔROA* for the two groups.

To investigate the impact of banking deregulation on CEO turnover performance sensitivity, we use an indicator for deregulation (*Dereg*) and interact it with both performance measures.

$$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_3 Return_{t-1} * Dereg + a_4 \Delta ROA_{t-1} * Dereg + a_5 Age_t + a_6 Tenure_t + a_7 Size_{t-1} + a_8 BTM_{t-1} + a_9 Volatility_{t-1} + \varepsilon \quad (2)$$

As discussed in Section 2, deregulation in the banking industry has been an evolving process. However, we test the deregulation hypothesis by dividing our sample into pre-deregulation and post-deregulation periods. The Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 (IBBEA) was a significant event in deregulation, and the deregulation process in the banking industry moved quickly after that. Thus, we set *Dereg* equal to one for firms with fiscal years ending after the passage of IBBEA in September of 1994, and zero otherwise.[9] Table 3 reports summary statistics for the variables used in the deregulation analyses. As can be seen from the table, the performance measures are generally higher for the control sample relative to the CEO turnover samples for nonbank firms in both periods. For banks, this pattern is only observed in the pre-deregulation period.

Table 4 presents the results from probit regression (2). Interestingly, the coefficients on *ΔROA* are significantly negative for banks in both the *Turn* and *Forced* regressions. This

[9] Given that deregulation in the banking industry has taken place over time, we run a robustness check using the deregulation index from Philippon and Reshef (2012) as our deregulation variable. Our results are robust to using the index measure.

suggests CEO turnover is negatively related to accounting performance in the more regulated period (i.e., before IBBEA). Consistent with our expectation, we find significantly positive coefficients on the interaction of *Dereg* and *ΔROA* in both bank turnover regressions. The positive coefficients imply that the sensitivity of bank CEO turnover to accounting performance is lower in the post-deregulation period. As a benchmark, we conduct similar regressions using nonbank firms. We do not observe the same pattern for CEOs in nonbank firms (columns 1 and 3), suggesting that the lower turnover-performance sensitivity results in the post-deregulation period are specific to banks rather than driven by economy-wide factors. Further, the coefficients on *ΔROA*Dereg* are significantly higher in banks than nonbank firms for both measures of turnover, consistent with banking deregulation having greater impact on banks than nonbank firms.

4.2 Cross-Sectional Tests

In this section, we investigate whether the decrease in CEO turnover-performance sensitivity for banks varies predictably in the cross-section. We first examine how variation in the extent to which banks adopt aggressive policies following deregulation affects CEO turnover-performance sensitivity. We expect that boards wanting more aggressive policies to take advantage of growth opportunities will provide career incentives for CEOs to implement those policies. Consequently, CEO turnover should be less sensitive to performance when banks adopt more aggressive policies. We assume that banks with more aggressive and hence riskier policies are likely to display higher operating volatilities. We use revenue volatility to proxy for operating volatility (Hribar and Nichols 2007).[10] Specifically, we obtain data on interest revenues

[10] Another common proxy for operating volatility is operating cash flow volatility. We are unable to use this proxy because cash flow data is not available on Compustat until after 2004.

from trading, investment securities, loans/claims/advances, and miscellaneous items, along with non-interest income, from Bank Compustat and compute revenue as the sum of these income items. Revenue volatility is estimated as the standard deviation of revenues over the past four years. We then run the following probit regression:

$$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_4 Op\_Vola + a_5 Return^* Op\_Vola + a_5 \Delta ROA_{t-1}^* Op\_Vola + a_6 Dereg + a_6 Op\_Vola^* Dereg + a_7 Return_{t-1}^* Dereg + a_8 \Delta ROA_{t-1}^* Dereg + a_9 Return_{t-1}^* Op\_Vola^* Dereg + a_{10} \Delta ROA_{t-1}^* Op\_Vola^* Dereg + a_{11} Age_t + a_{12} Tenure_t + a_{13} Size_{t-1} + a_{14} BTM_{t-1} + a_{15} Volatility_{t-1} + \varepsilon \quad (3)$$

Table 5 reports the results from regression (3). If some bank boards encourage more aggressive business policies in response to deregulation by altering the incentive mechanisms in CEO turnover decisions, then we expect these firms to exhibit higher operating volatility and lower CEO turnover-performance sensitivity following deregulation. Further, CEO turnover-performance sensitivity will be lower when post-deregulation operating volatility is high. Consistent with our expectations, average revenue volatility is significantly higher in the post-deregulation period (0.004) than the pre-deregulation period (0.002). We also find that the coefficient on $\Delta ROA_{t-1}^* Op\_Vola^* Dereg$ is significantly positive, indicating CEO turnover is less sensitive to accounting performance after deregulation when operating volatility is high.[11]

As an alternative to revenue volatility, we also use a measure of banks' predicted return volatility. We regress return volatility on four bank-specific measures that capture the riskier components of post-deregulation banking operations: the ratio of non-interest income to net operating income, the risk-adjusted Tier 1 ratio, short-term borrowings scaled by total assets, and

[11] We also note that the coefficient on $\Delta ROA^* Op\_Vola$ is negative (although not significant), suggesting that operating volatility does not significantly dampen the turnover performance sensitivity before deregulation. If high operating volatility always reduces CEO turnover-performance sensitivity, then we expect this coefficient to be positive.

the ratio of tangible common equity to tangible total assets. We use the coefficients to calculate a predicted return volatility and separate banks into high and low risk-taking subsamples.[12] If some banks encourage their CEOs to adopt riskier policies in order to realize the growth opportunities provided by deregulation, then we should observe a decrease in CEO turnover-performance sensitivity for these banks. Table 6 reports the results. Consistent with our expectation, the coefficient on *ΔROA*Dereg* is positive and significant for columns (1) and (3) (high risk-taking banks) but not for columns (2) and (4) (low risk-taking banks). Furthermore, the coefficients on *ΔROA*Dereg* are significantly different between high and low risk-taking banks for both *Turn* and *Forced*. The results in Tables 5 and 6 suggest that high risk-taking banks adopted riskier policies after deregulation and reduced their sensitivity of CEO turnover to accounting performance.

Lastly, we examine whether the impact of deregulation on CEO turnover-performance sensitivity differs between large and small banks. Since large banks are better positioned to take advantage of the opportunities brought about by deregulation, we expect to observe a greater decrease in CEO turnover-performance sensitivity for large banks than for small banks. Table 7 reports the results. As expected, the coefficient on *ΔROA*Dereg* is positive and significant for columns (1) and (3), suggesting that large banks used CEO turnover policies to provide incentives to expand operations in the deregulated period. Interestingly, the coefficient on *ΔROA*Dereg* is negative and significant for the small banks in columns (2) and (4), suggesting that large and small banks responded differently to poor accounting performance after deregulation. The differences between the large and small banks' coefficients on *ΔROA*Dereg* are statistically significant. These results provide support for the hypothesis that large banks

[12] Not all of the bank-specific measures are available for the pre-deregulation period, so we are unable to compare values of this risk-taking measure between the pre- and post-deregulation periods.

adjusted CEO turnover incentives to take advantage of the growth opportunities from deregulation.

4.3 Compensation and Turnover Incentives

In our final test, we investigate whether CEO incentives from compensation and turnover are substitutes or complements. We use vega, the sensitivity of a manager's wealth to stock return volatility, to proxy for incentives embedded in compensation contracts (Guay 1999). The indicator *High_Vega* equals one if the vega in a CEO's option portfolio is higher than the sample median, and zero otherwise.[13] We interact *High_Vega* with the performance measures and run the following probit regression.

$$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_3 High\_Vega_{t-1} + a_4 \Delta Return_{t-1} * High\_Vega_{t-1} + a_4 \Delta ROA_{t-1} * High\_Vega_{t-1} + a_5 Age_{t} + a_6 Tenure_{t} + a_7 Size_{t-1} + a_8 BTM_{t-1} + a_9 Volatility_{t-1} + \varepsilon \quad (4)$$

The results are presented in Table 8. The coefficients on $\Delta ROA_{t-1} * High\_Vega_{t-1}$ are positive when the dependent variables are *Turn* and *Forced,* and it is significant for *Forced*. These results indicate that banks with high CEO vega also display low turnover-performance sensitivity in the post-deregulation period, providing some preliminary evidence that incentives derived from bank CEO compensation and turnover are complementary.

5. Conclusion

The recent financial crisis has generated considerable debate over whether bank CEOs are provided with incentives to take excessive risks. Several recent papers have examined the

[13] The data to calculate vega is not available for the entire sample period. We use the available post-1992 data to calculate a firm-specific measure of CEO risk-taking incentives from equity-holdings. Therefore, our results do not speak to the relationship between incentives from compensation and incentives from turnover in the pre-deregulation period.

role that bank CEO compensation may have played in the financial crisis, providing mixed evidence (Fahlenbrach and Stulz 2011, DeYoung et al. 2013, Cheng et al. 2014). We add to this debate by examining how banking deregulation affects the provision of risk-taking incentives through CEO turnover decisions. We argue that CEOs will have greater incentives to take risk if they are less likely to be fired for bad performance. Thus, if bank boards respond to the growth opportunities from deregulation by adjusting turnover policies to encourage risk taking, we expect CEO performance sensitivity to decrease after deregulation. Consistent with this expectation, we find that bank CEO turnover is significantly less sensitive to accounting performance after deregulation. We also find that the decrease in turnover-performance sensitivity exists only in banks that adopt more aggressive business policies in response to deregulation and in large banks, which are best positioned to take advantage of the growth opportunities arising from deregulation. Furthermore, we provide some preliminary evidence that incentives deriving from bank CEO compensation and turnover contracts are complementary.

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Table 1: Descriptive Statistics for Nonbank Firms and Banks

This table reports the descriptive statistics for nonbank firms and banks for the whole sample period. The indicator variable *Turn* equals one if there is a CEO turnover, and zero otherwise. The indicator variable *Forced* equals one if the CEO is forced to leave the company, and zero otherwise. *Return* is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. Volatility is the standard deviation of monthly stock returns over the past 60 months. Mean (median) differences between nonbank firms and banks are tested. *, **, *** denote significance at the 10%, 5% and 1% levels with two-tailed tests.

	Nonbank Firms (N=13,052)			Banks (N=2,445)		
Variable	Mean	Median	Std Dev	Mean	Median	Std Dev
Turn	0.097***	0.000***	0.296	0.074	0.000	0.261
Forced	0.025***	0.000**	0.156	0.017	0.000	0.129
Return	0.091***	0.042***	0.310	0.053	0.025	0.264
ΔROA	0.006***	0.003***	0.051	0.001	0.000	0.010
Age	57.461	58.000	7.056	57.506	58.000	6.302
Tenure	9.175	7.000***	7.619	9.343	8.000	6.879
Size	8.073***	7.975***	1.268	9.593	9.403	1.412
BTM	0.729***	0.755***	0.268	0.948	0.974	0.100
Volatility	0.093***	0.086***	0.038	0.086	0.081	0.027

Table 2: CEO turnover-performance sensitivity

This table reports the coefficients and t-statistics from the following probit regression for both nonbank firms and banks.
$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_3 Age_t + a_4 Tenure_t + a_5 Size_{t-1} + a_6 BTM_{t-1} + a_7 Volatility_{t-1} + \varepsilon$

The indicator variable *Turn* equals one if there is a CEO turnover, and zero otherwise. The indicator variable *Forced* equals one if the CEO is forced to leave the company, and zero otherwise. *Return* is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. Volatility is the standard deviation of monthly stock returns over the past 60 months. *, **, *** denote significance at the 10%, 5% and 1% levels with two-tailed tests. Standard errors are clustered by firm.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Turn	Turn	Turn	Forced	Forced	Forced
	All	Nonbank Firms	Banks	All	Nonbank Firms	Banks
Return	-0.195***	-0.171***	-0.338**	-0.503***	-0.484***	-0.585***
	(3.55)	(2.92)	(2.00)	(5.39)	(4.80)	(2.76)
ΔROA	-0.943***	-0.866**	-4.618	-0.748	-0.624	1.729
	(2.72)	(2.55)	(0.86)	(1.39)	(1.19)	(0.25)
Age	0.055***	0.051***	0.094***	-0.009**	-0.011**	-0.003
	(10.37)	(9.12)	(8.19)	(2.10)	(2.44)	(0.28)
Tenure	-0.009***	-0.007**	-0.018**	-0.010***	-0.009**	0.000
	(3.41)	(2.40)	(2.27)	(2.59)	(2.28)	(0.03)
Size	0.046***	0.070***	0.084***	0.079***	0.106***	0.132***
	(4.42)	(5.67)	(2.71)	(4.81)	(5.54)	(2.82)
BTM	-0.164***	-0.079	0.625	-0.086	0.031	0.309
	(2.76)	(1.27)	(1.64)	(0.82)	(0.28)	(0.43)
Volatility	1.656***	1.650***	1.418	3.825***	3.702***	5.315***
	(3.64)	(3.47)	(0.85)	(7.01)	(6.48)	(3.28)
Constant	-4.885***	-4.864***	-8.406***	-2.355***	-2.516***	-4.043***
	(14.26)	(13.55)	(9.27)	(8.26)	(8.16)	(3.69)
N	15497	13052	2445	14395	12091	2304
Differences in coefficients on *ΔROA*		0.48 (Prob > χ^2 = 0.4866)			0.12 (Prob > χ^2 = 0.7343)	

Table 3: Descriptive Statistics for Nonbank Firms and Banks in the Pre-Deregulation and Post-Deregulation Periods

This table presents the descriptive statistics for firm and CEO characteristics for both nonbank firms and banks in the sample periods before and after deregulation. The *Turn* sample includes all CEO turnovers. The *Forced* sample includes only the turnovers that are classified as forced turnovers. The control sample includes observations without turnovers.

Return is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. Volatility is the standard deviation of monthly stock returns over the past 60 months.

Panel A: Nonbank Firms

Before Deregulation

	Turn sample (N = 624)			*Forced* sample (N = 92)			Control sample (N = 6865)		
Variable	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
Return	0.047	0.023	0.260	0.021	-0.048	0.321	0.085	0.040	0.288
ΔROA	-0.001	0.000	0.043	-0.005	-0.002	0.056	0.006	0.003	0.045
Age	62.819	65.000	8.443	55.141	57.000	11.174	57.628	58.000	6.714
Tenure	10.123	9.000	7.755	7.391	7.000	5.218	9.403	7.000	7.585
Size	7.967	7.853	1.222	7.705	7.512	1.343	7.667	7.611	1.189
BTM	0.829	0.861	0.242	0.870	0.916	0.273	0.800	0.832	0.258
Volatility	0.082	0.080	0.026	0.092	0.085	0.033	0.088	0.084	0.029

After Deregulation

	Turn sample (N = 638)			*Forced* sample (N = 209)			Control sample (N = 4925)		
Variable	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
Return	0.067	0.023	0.331	-0.036	-0.060	0.333	0.109	0.051	0.341
ΔROA	0.001	0.001	0.054	-0.001	0.000	0.058	0.008	0.003	0.057
Age	60.404	62.000	6.758	55.249	56.000	5.098	56.169	57.000	6.909
Tenure	10.600	9.000	7.726	7.354	6.000	4.705	8.551	6.000	7.582

Size	8.653	8.484	1.145	8.721	8.587	1.208	8.576	8.442	1.187
BTM	0.654	0.672	0.250	0.691	0.717	0.270	0.626	0.642	0.250
Volatility	0.099	0.091	0.041	0.111	0.101	0.043	0.100	0.089	0.047

Panel B: Banks

Before Deregulation									
	Turn sample (N = 106)			*Forced* sample (N = 16)			Control sample (N = 1300)		
Variable	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
Return	0.011	0.000	0.254	-0.036	-0.023	0.197	0.060	0.030	0.265
ΔROA	-0.002	0.000	0.008	-0.005	-0.003	0.010	0.000	0.000	0.007
Age	63.038	64.000	5.110	56.375	57.000	4.646	57.142	58.000	6.381
Tenure	9.925	10.000	6.069	8.375	7.500	5.898	8.486	7.000	6.161
Size	9.423	9.413	1.251	9.695	9.933	1.354	9.146	8.920	1.239
BTM	0.995	1.000	0.029	0.996	0.998	0.023	0.990	0.999	0.053
Volatility	0.084	0.080	0.024	0.089	0.092	0.025	0.086	0.079	0.026

After Deregulation									
	Turn sample (N = 74)			*Forced* sample (N = 23)			Control sample (N = 965)		
Variable	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
Return	0.002	-0.002	0.199	-0.031	-0.010	0.190	0.051	0.019	0.267
ΔROA	0.001	0.001	0.008	0.003	0.002	0.008	0.002	0.001	0.014
Age	62.068	63.000	5.648	56.957	58.000	4.637	57.040	57.000	5.933
Tenure	11.392	9.000	7.001	9.043	9.000	5.278	10.276	8.000	7.674
Size	10.352	10.123	1.399	10.780	10.766	1.264	10.155	9.979	1.427
BTM	0.911	0.933	0.080	0.920	0.938	0.069	0.888	0.917	0.120
Volatility	0.091	0.084	0.035	0.107	0.093	0.050	0.087	0.083	0.027

Table 4: Deregulation and CEO turnover-performance sensitivity

This table reports the coefficients and t-statistics from the following probit regression for both nonbank firms and banks.

$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_3 Dereg + a_4 Return_{t-1} * Dereg + a_5 \Delta ROA_{t-1} * Dereg + a_6 Age_t + a_7 Tenure_t + a_8 Size_{t-1} + a_9 BTM_{t-1} + a_{10} Volatility_{t-1} + \varepsilon$

The indicator variable *Turn* equals one if there is a CEO turnover, and zero otherwise. The indicator variable *Forced* equals one if the CEO is forced to leave the company, and zero otherwise. *Return* is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. Volatility is the standard deviation of monthly stock returns over the past 60 months. *Dereg* equals one for firms with fiscal years end after the passage of IBBEA in September of 1994, and zero otherwise. *, **, *** denote significance at the 10%, 5% and 1% levels with two-tailed tests. Standard errors are clustered by firm.

	(1)	(2)	(3)	(4)
Dependent Variable	Turn	Turn	Forced	Forced
	Nonbank Firms	Banks	Nonbank Firms	Banks
Return	-0.134	-0.227	-0.193	-0.403
	(1.48)	(0.92)	(1.13)	(1.09)
ΔROA	-0.928*	-17.694*	-1.357	-22.980*
	(1.72)	(1.90)	(1.30)	(1.68)
Dereg	0.245***	0.060	0.446***	0.290
	(7.37)	(0.50)	(7.23)	(1.51)
*Return*Dereg*	-0.034	-0.106	-0.361*	-0.055
	(0.29)	(0.31)	(1.69)	(0.11)
*ΔROA*Dereg*	0.238	20.772**	1.129	35.939**
	(0.34)	(1.99)	(0.99)	(2.29)
Age	0.052***	0.095***	-0.008*	-0.002
	(9.16)	(8.30)	(1.83)	(0.19)
Tenure	-0.007**	-0.018**	-0.009**	0.000
	(2.47)	(2.25)	(2.21)	(0.01)
Size	0.033**	0.079**	0.040*	0.111**
	(2.48)	(2.25)	(1.78)	(2.04)
BTM	0.075	0.859	0.284**	1.616
	(1.16)	(1.56)	(2.39)	(1.52)
Volatility	0.946**	1.123	2.539***	4.487***
	(1.99)	(0.69)	(4.48)	(2.77)
Constant	-4.818***	-8.641***	-2.422***	-5.227***
	(13.22)	(9.70)	(7.39)	(4.34)
N	13052	2445	12091	2304
Differences in coefficients on *ΔROA*Dereg*	3.87 (Prob > χ^2 = 0.0493)		4.94 (Prob > χ^2 = 0.0263)	

Table 5: Deregulation, operating volatility and bank CEO turnover-performance sensitivity

This table reports the coefficients and t-statistics from the following probit regression for banks. $Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_4 Op\_Vola + a_5 Return * Op\_Vola + a_5 \Delta ROA_{t-1} * Op\_Vola + a_6 Dereg + a_6 Op\_Vola * Dereg + a_7 Return_{t-1} * Dereg + a_8 \Delta ROA_{t-1} * Dereg + a_9 Return_{t-1} * Op\_Vola * Dereg + a_{10} \Delta ROA_{t-1} * Op\_Vola * Dereg + a_{11} Age_t + a_{12} Tenure_t + a_{13} Size_{t-1} + a_{14} BTM_{t-1} + a_{15} Volatility_{t-1} + \varepsilon$

The indicator variable *Turn* equals one if there is a CEO turnover, and zero otherwise. The indicator variable *Forced* equals one if the CEO is forced to leave the company, and zero otherwise. *Return* is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. Volatility is the standard deviation of monthly stock returns over the past 60 months. Op_Vola is operating volatility, calculated as the standard deviation of the past four years of revenue, where revenue is scaled by total assets. *Dereg* equals one for firms with fiscal years end after the passage of IBBEA in September of 1994, and zero otherwise. *, **, *** denote significance at the 10%, 5% and 1% levels with two-tailed tests. Standard errors are clustered by firm.

Dependent Variable	Turn	Forced
Return	-0.181	-0.254
	(0.42)	(0.42)
ΔROA	14.223	18.314
	(1.02)	(0.61)
Op_Vola	0.196	-0.487
	(0.58)	(0.89)
Return Op_Vola*	-0.896	-2.177
	(0.60)	(1.28)
ΔROA Op_Vola*	-55.643	-89.619
	(1.44)	(1.54)
Dereg	0.140	0.090
	(0.79)	(0.31)
Op_Vola Dereg*	0.086	0.981
	(0.25)	(1.52)
*Return*Dereg*	0.179	0.485
	(0.30)	(0.64)
*ΔROA*Dereg*	-23.757	-53.459
	(1.30)	(1.51)
*Return*Op_Vola*Dereg*	0.560	1.266
	(0.31)	(0.65)
*ΔROA*Op_Vola*Dereg*	88.499**	152.847**
	(2.03)	(2.52)

Age	0.098***	-0.005
	(7.62)	(0.42)
Tenure	-0.022**	-0.002
	(2.48)	(0.14)
Size	0.049	0.041
	(1.35)	(0.75)
BTM	1.698*	1.025
	(1.75)	(0.63)
Volatility	1.378	6.490**
	(0.66)	(2.01)
Constant	-9.449***	-3.932**
	(7.55)	(2.29)
N	1996	1875

Table 6: Deregulation, Banks' Risk Taking and Bank CEOs' Turnover-Performance Sensitivity

This table reports the coefficients and t-statistics from the following probit regression for high versus low risk-taking banks.

$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_3 Dereg + a_4 Return_{t-1} * Dereg + a_5 \Delta ROA_{t-1} * Dereg + a_6 Age_t + a_7 Tenure_t + a_8 Size_{t-1} + a_9 BTM_{t-1} + a_{10} Volatility_{t-1} + \varepsilon$

We use post-deregulation data to separate banks into high and low risk taking according to predicted return volatility. The predicted return volatility is calculated by regressing return volatility on four bank-specific measures: the ratio of non-interest income to net operating income, risk-adjusted Tier 1 ratio, short-term borrowings scaled by total assets, and the ratio of tangible common equity to tangible total assets. Banks with predicted return volatility higher (lower) than sample median are classified as high (low) risk taking.

The indicator variable *Turn* equals one if there is a CEO turnover, and zero otherwise. The indicator variable *Forced* equals one if the CEO is forced to leave the company, and zero otherwise. *Return* is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. Volatility is the standard deviation of monthly stock returns over the past 60 months. *Dereg* equals one for firms with fiscal years end after the passage of IBBEA in September of 1994, and zero otherwise. *, **, *** denote significance at the 10%, 5% and 1% levels with two-tailed tests. Standard errors are clustered by firm.

	(1)	(2)	(3)	(4)
Dependent Variable	Turn	Turn	Forced	Forced
	High Risk-Taking	Low Risk-Taking	High Risk-Taking	Low Risk-Taking
Return	-0.266	-0.664**	-0.382	-0.950**
	(0.67)	(1.97)	(0.67)	(2.35)
ΔROA	-21.159	23.951*	-36.035	37.925
	(1.53)	(1.65)	(1.47)	(1.22)
Dereg	0.262	0.085	0.529	0.214
	(1.10)	(0.59)	(1.43)	(1.19)
*Return*Dereg*	0.219	0.472	-0.181	1.285**
	(0.50)	(0.82)	(0.25)	(2.05)
*ΔROA*Dereg*	38.714*	-26.798*	61.418**	-41.687
	(1.72)	(1.75)	(2.16)	(1.20)
Age	0.107***	0.093***	-0.015	0.005
	(5.59)	(5.93)	(0.87)	(0.32)
Tenure	-0.029**	-0.010	-0.007	0.018
	(2.24)	(0.89)	(0.31)	(0.91)
Size	-0.025	0.185***	-0.035	0.345***
	(0.46)	(2.66)	(0.44)	(3.46)

BTM	2.322	1.570	4.318	1.252
	(1.63)	(1.28)	(1.60)	(0.88)
Volatility	-0.440	4.213	1.275	14.171***
	(0.20)	(1.02)	(0.28)	(2.70)
Constant	-9.601***	-10.482***	-5.618**	-8.321***
	(6.15)	(5.03)	(2.23)	(3.17)
N	1027	1000	963	941
Differences in coefficients on *ΔROA*Dereg*	5.85 (Prob > χ^2 = 0.0156)		5.32 (Prob > χ^2 = 0.0211)	

Table 7: Deregulation, Bank Size and Bank CEOs' Turnover-Performance Sensitivity

This table reports the coefficients and t-statistics from the following probit regression for both small and large banks. Banks are classified as large (small) if total assets are higher (lower) than the sample median.

$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_3 Dereg + a_4 Return_{t-1} * Dereg + a_5 \Delta ROA_{t-1} * Dereg + a_6 Age_t + a_7 Tenure_t + a_8 Size_{t-1} + a_9 BTM_{t-1} + a_{10} Volatility_{t-1} + \varepsilon$

The indicator variable *Turn* equals one if there is a CEO turnover, and zero otherwise. The indicator variable *Forced* equals one if the CEO is forced to leave the company, and zero otherwise. *Return* is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. Volatility is the standard deviation of monthly stock returns over the past 60 months. *Dereg* equals one for firms with fiscal year end after the passage of IBBEA in September of 1994, and zero otherwise. *, **, *** denote significance at the 10%, 5% and 1% levels with two-tailed tests. Standard errors are clustered by firm.

	(1)	(2)	(3)	(4)
Dependent Variable	Turn	Turn	Forced	Forced
	Large banks	Small banks	Large banks	Small banks
Return	-0.220	-0.436	-0.290	-1.209*
	(0.77)	(1.07)	(0.68)	(1.66)
ΔROA	-27.281***	12.903	-36.427***	42.928**
	(2.77)	(1.28)	(2.86)	(2.07)
Dereg	-0.201	0.305*	0.158	0.308
	(1.31)	(1.92)	(0.72)	(0.93)
*Return*Dereg*	-0.322	0.411	-0.346	1.283
	(0.73)	(0.78)	(0.58)	(1.63)
*ΔROA*Dereg*	42.028***	-17.605*	60.521***	-32.404*
	(3.12)	(1.66)	(3.21)	(1.68)
Age	0.119***	0.077***	0.001	0.003
	(8.42)	(5.08)	(0.06)	(0.22)
Tenure	-0.007	-0.028***	0.011	-0.028
	(0.48)	(2.68)	(0.76)	(1.15)
Size	0.118***	0.081	0.132*	0.264**
	(2.60)	(0.98)	(1.76)	(2.09)
BTM	0.200	1.399*	0.310	4.293
	(0.20)	(1.65)	(0.27)	(1.30)
Volatility	1.026	1.370	3.670*	8.302
	(0.48)	(0.39)	(1.72)	(1.44)
Constant	-9.882***	-8.073***	-4.359***	-9.489***
	(6.71)	(5.99)	(2.75)	(2.74)
N	1432	1013	1344	960
Differences in coefficients on *ΔROA*Dereg*	12.21 (Prob > χ^2 = 0.0005)		11.97 (Prob > χ^2 = 0.0005)	

Table 8: Deregulation, Bank CEO Compensation, and Bank CEOs' Turnover-Performance Sensitivity

This table reports the coefficients and t-statistics from the following probit regression for the post deregulation period.
$Prob(Forced/Turn=1) = a_0 + a_1 Return_{t-1} + a_2 \Delta ROA_{t-1} + a_3 High\_Vega_{t-1} + a_4 \Delta Return_{t-1} * High\_Vega_{t-1} + a_4 \Delta ROA_{t-1} * High\_Vega_{t-1} + a_5 Age_t + a_6 Tenure_t + a_7 Size_{t-1} + a_8 BTM_{t-1} + a_9 Volatility_{t-1} + \varepsilon$

The indicator variable *Turn* equals one if there is a CEO turnover, and zero otherwise. The indicator variable *Forced* equals one if the CEO is forced to leave the company, and zero otherwise. *Return* is the annual buy-and-hold stock return. *ΔROA* is the change in return on assets, which is measured as pre-tax operating income divided by total assets. *Age* is the age of the CEO. *Tenure* is the number of years the CEO has been in office. *Size* is the log of total assets. *BTM* is book value of assets divided by the market value of assets. Volatility is the standard deviation of monthly stock returns over the past 60 months. *High_Vega* equals one if a firm's Vega is higher than the sample median. Since Vega data is available only after deregulation, the test is run on post-deregulation data. *, **, *** denote significance at the 10%, 5% and 1% levels with two-tailed tests. Standard errors are clustered by firm.

	Turn	Forced
Return	-0.440	0.087
	(1.31)	(0.27)
ΔROA	1.447	-6.706
	(0.26)	(0.88)
High_Vega	-0.351**	0.005
	(2.12)	(0.02)
Return * *High_Vega*	0.306	-0.649
	(0.66)	(1.32)
ΔROA * *High_Vega*	8.954	23.522**
	(1.20)	(1.98)
Age	0.096***	0.001
	(4.84)	(0.08)
Tenure	-0.019	-0.002
	(1.64)	(0.15)
Size	0.108*	0.111
	(1.76)	(1.52)
BTM	1.150*	1.598
	(1.91)	(1.19)
Volatility	2.395	5.987***
	(1.01)	(3.88)
Constant	-9.100***	-5.256***
	(6.41)	(4.01)
N	988	938