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Matter for Risk Taking and Performance?**

Bernadette Minton, Department of Finance, The Ohio State University

Jérôme P. A. Taillard, Boston College

Rohan Williamson, Georgetown University

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Do Independence and Financial Expertise of the Board
Matter for Risk Taking and Performance?*

Bernadette A. Minton
The Ohio State University

Jérôme P. A. Taillard
Boston College

and

Rohan Williamson
Georgetown University

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Abstract

During the recent financial crisis, financial expertise among independent directors of commercial banks is negatively related to changes in both firm value and cumulative stock returns. Furthermore, financial expertise is positively associated with risk-taking levels in the run-up to the crisis using both balance-sheet and market-based measures of risk. These results are not driven by powerful CEOs who select independent experts to rubber stamp strategies that satisfy their risk appetite. They are, however, consistent with independent directors with financial expertise recognizing the residual nature of shareholders' claim and supporting a heightened risk profile for their bank.

Key Words: Governance, Risk Taking, Board Composition, Financial Expertise, Risk Management Committee

JEL Classification: G20, G21, G24, G32

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Introduction

One of the main observations related to the recent financial crisis is that financial institutions engaged in excessive risk taking. A failure of internal risk governance mechanisms has often been cited among the key contributing factors (see for example Bebchuk and Spamann (2010), Guerrero and Thal-Larsen (2008), Hashagen et al. (2009), and Strebel (2009)). In particular, calls for reform of the financial sector argue that the lack of financial expertise of board members played a major role in the crisis (e.g. Kirkpatrick (2009) and Walker (2009)). Financial expertise among independent directors is low among U.S. financial institutions. For instance, at the onset of the financial crisis, JP Morgan Chase had 12 independent directors of which only two had financial expertise according to our classification.¹ In this study, we examine the performance and risk-taking behavior of a broad sample of U.S. financial institutions both during and prior to the financial crisis and relate them to the financial expertise of their independent directors.

Our study tests the conjecture that, because of their understanding of more complex financial instruments and transactions, more financial experts among independent board members leads to more effective risk-taking behavior in financial institutions. The alternate hypothesis is that financial experts on the board recognize the government guarantee offered to banks and the residual nature of shareholders' claims, and hence, encourage excessive risk-taking as it is ex ante beneficial for shareholders (e.g. Merton (1977), Keeley (1990)). This behavior has been described as the "race to the bottom" in Acharya et al. (2011). Under this assumption, banks with more financial expertise might pursue riskier strategies with less capital to support them, and hence become more vulnerable when the crisis hits.

¹ See Appendix A for details.

Using the Boardex database on board characteristics and hand-collected data from financial institutions' proxy statements and annual reports, we construct a unique database for a sample of commercial banks, savings and loan associations (S&Ls), and investment banks during the period from 2003 to 2008 that documents whether each independent director has financial expertise. Over this period, the percent of independent directors on the board increases from 73% in 2003 to almost 80% in 2008. This high percentage of director independence is not surprising given the implementation of Sarbanes-Oxley (SOX).² During the same period, the average percent of financial experts among independent directors also increases from 21% in 2003 to 27% in 2008; however approximately a quarter of the financial institutions do not have a single financial expert among their independent directors at the onset of the crisis. Therefore, bank boards are mostly independent during our sample period but financial expertise is often lacking among these independent directors.

Our analysis proceeds in three steps. First, we examine how financial expertise and independence of the board relate to the financial performance of commercial banks during the financial crisis.³ In these analyses, we explicitly control for the reported existence of a Chief Risk Officer (CRO) and/or a risk management committee separate from the audit and asset and liabilities management (ALM) committees⁴ and for many other factors that could be correlated with performance during the crisis.

² In 2001, the year prior to the passage of SOX, the percentage of independent directors was significantly lower at about 58%.

³ In the main part of the study, we focus on commercial banks. In the robustness section, we confirm that our results extend to the sample of commercial banks, S&Ls, and investment banks.

⁴ Nocco and Stulz (2006) and Stulz (2008) make the case for having an enterprise-wide risk management function put in place with a Chief Risk Officer (CRO) and/or a risk management committee at the board level. A concurrent paper by Ellul and Yerramilli (2010) focuses specifically on risk management structures put in place by the largest bank holding companies and find that banks with the highest score in terms of risk management at the onset of the crisis have lower exposure to several risk factors.

Our analysis of stock performance shows that financial expertise is negatively related to stock market performance over the 2007 to 2008 period. Although the relation is negative both for the full sample and for the subset of large banks, it is only statistically significant for the large banks, defined as having total assets greater than the median total assets for commercial banks in any given year.⁵ Interestingly, for this subsample, the negative relation remains statistically and economically significant even after augmenting the set of controls to include exposure to real estate loans, deposit financing, and mortgage-backed securities. The analysis of changes in overall firm value over the same period shows results that are consistent with the stock performance results: Financial expertise is negatively related to changes in firm value during the crisis, especially for large banks. There is no statistical evidence of a relation between levels of board independence and changes in firm value during the crisis.

Second, given that banks with higher levels of independent financial experts on their boards perform worse during the crisis, we test whether the presence of financial experts on boards is related to increases in risk exposures prior to the crisis. Leading up to the crisis, banks might have chosen to structure their balance sheets in ways that made them more vulnerable to the crisis. We find that among large commercial banks, those with more financial expertise had lower Tier-1 and total capital ratios. In contrast, financial expertise is not important in explaining the banks' involvement in real estate related loan activities. Independence levels of the board are not related to balance sheet risk measures in the run-up to the crisis.

In our analysis of market-based measures of risk-taking leading up to the crisis, we find that the fraction of independent directors with financial expertise is positively and significantly related to total firm risk after controlling for various bank characteristics. This effect is

⁵ Our full sample consists of bank holding companies with total assets greater or equal to \$1Bn. For the period between 2003 and 2008, the median value for total assets stands above \$3Bn dollars.

particularly strong among large commercial banks. In contrast, higher levels of independent directors are associated with lower total risk. This result is consistent with Faleye and Krishnan (2010) who find that the probability of lending to high risk borrowers declines with the fraction of independent directors.

Finally, we relate levels of financial expertise with stock performance prior to the crisis and over the entire period under study. We find that financial expertise is weakly positively related to stock performance in 2006. This finding supports the idea that financial expertise is associated with more risk taking that benefited shareholders before the crisis. This interpretation is also consistent with Beltratti and Stulz (2010) who study an international panel of large banks and find that pro-shareholder boards are associated with higher (lower) performance prior to (during) the crisis, potentially reflecting decisions that were thought to maximize shareholder value but that did not perform as expected when the crisis hit. Further, we show that this over-performance prior to the crisis is not strong enough to compensate for the significant underperformance during the crisis. Firms with higher levels of financial expertise at the end of 2003 significantly underperform over the period from January 2004 to December 2008.

Endogeneity concerns always exist in studies relating corporate governance aspects to firm performance (e.g. Hermalin and Weisbach (1998), Adams, Hermalin and Weisbach (2010)). To address this issue, we specify lagged independent variables similar to the main specifications of Coles, Daniel and Naveen (2008) and Linck, Netter and Yang (2008). As such, we cannot fully dispel the argument that, without the presence of financial expertise, banks with a higher appetite for risks would have performed even worse. The increased presence of independent financial experts on the board, however, did not lead these banks to outperform their peers during the crisis. Given the cross-sectional nature of our identification strategy, causal

interpretations also need to be made with caution. In particular, the presence of more financial experts among independent board members could be related to unobserved characteristics of financial institutions, such as risk appetite, that also lead these financial institutions to take on more risks that were not rewarded when the crisis hit.

We test for this potential reverse causality interpretation of our results by examining whether the presence of independent financial experts on boards is positively related to the presence of a powerful CEO. The rationale behind the focus on powerful CEOs is that if boards are ineffective, it is because the top management, and in particular the CEO, have control of the firm (Hermalin and Weisbach (1998)). In our setting, it might be that powerful CEOs select independent experts to rubber stamp strategies that satisfy their risk appetite. For this test, we use four proxies of CEO power and interact these proxies with the financial expertise variable to test whether the negative relation found between performance during the crisis and levels of financial expertise is driven by banks where powerful CEOs are in place. The interaction terms are not significant in any of the specifications, thus providing evidence that rubber stamping of independent financial experts is not driving our main results.

Our definition of financial expertise follows Güner, Malmendier and Tate (2008): We classify an independent director as a financial expert if he or she works within a financial institution or has a finance-related role within a non-financial firm (e.g. CFO, accountant, treasurer, VP finance) or academic institution (e.g. professor in finance, accounting, economics or business), or is a professional investor (e.g. hedge fund, private equity). We also run our main tests on alternate definitions of financial expertise and our results hold. We also show that all of our main results hold when independence is defined more restrictively to include other potential

social and business ties between a director and the CEO of the bank (see Fracassi and Tate (2010)). Additionally, our results hold when we exclude the five largest commercial banks.

Several recent papers examine the role of internal governance mechanisms going into the financial crisis (e.g. Adams (2009), Erkens, Hung, and Matos (2009), and Ferreira, Kirchmaier, and Metzger (2010)). For instance, a fair amount of attention has been given to the incentives of bank management in the run-up to the crisis and during the crisis (see Fahlenbrach and Stulz (2011), Bebchuk, Cohen, and Spamann (2010), and Cornett, McNutt and Tehranian (2010)). Our research extends the literature by looking at a specific aspect of board governance that is relevant to the current debate on how to “fix” financial firms and regulate the industry going forward. We examine the financial background of independent directors for a broad sample of U.S. financial institutions.⁶ In stable times, the presence of external financial experts on the board is associated with higher risk taking and slightly above-average performance. Since financial expertise on the board is related to more risk taking, it is not surprising that banks with more independent financial experts on their board underperform during the crisis. These results are still consistent with the board acting to maximize shareholder value *ex ante*, with directors recognizing the residual nature of shareholders’ claim on a bank’s highly leveraged balance sheet. However, our results do challenge the popular view that more financial expertise on the boards of banks would unambiguously lower their risk profile.

The rest of the paper is organized as follows. In section I, we discuss the importance and implications of how the composition of the board of directors influences firm risk taking and

⁶ In a recent study, Fernandes and Fich (2009) examine how financial expertise relates to bank performance during the crisis. Their definition of expertise is quite different from ours as they define financial expertise of the board as the average number of years of banking experience among board directors. Overall, their results are different from ours. We conjecture that this is due to several factors including the different set of banks and controls they use, the different definition of financial expertise and their different empirical strategy; in particular, they focus on an event study around Lehman’s bankruptcy.

performance. Section II describes the sample. Performance during the crisis and how it relates to board composition is examined in Section III. Section IV discusses results related to risk taking, performance and board composition in the run-up to the crisis. Section V reviews the implications of the results and Section VI discusses several robustness tests. Section VII concludes.

I. Board structure and risk taking

At least since Merton (1977), it has been argued that deposit insurance has led shareholders to seek increased risk-taking activities in order to increase their residual claim on a financial institution. Furthermore, “too big to fail” considerations also provide implicit guarantees from the government in the form of potential bailouts if a given financial institution faces financial distress (see Acharya et al. (2010)). These government guarantees offer a put option to shareholders. As long as the financial distress costs related to the banks’ charter value does not exceed the benefits of increasing risk (see Marcus (1984) and Keeley (1990)), shareholders will want a board of directors that will advise managers to undertake risky investments. In that case, proxies for pro-shareholder boards, such as board independence, and measures of risk are expected to be positively related.⁷

Regulators try to mitigate these risk taking incentives by imposing capital requirements and restrictions on certain types of investments and behavior. If independent directors are also

⁷ Leaven and Levine (2009) show that bank regulations and specific ownership structures matter across countries. We avoid this issue by focusing only on U.S. financial institutions.

acting in the interest of regulators and depositors, board independence could be associated with less risk taking.⁸

The Bank of International Settlements (BIS), in their 2006 report “Enhancing Corporate Governance for Banking Organisations,” stressed that banks should have independent directors and that these directors should have sufficient knowledge of the main financial activities of the bank to “enable effective governance and oversight.” The “key characteristic of independence is the ability to exercise sound judgment after consideration of all relevant information and views without influence from management.” On the one hand, for a given level of independence, a more financially knowledgeable board might be better able to understand the complexity of certain financial transactions and their associated risks, which allows the board to recognize and avoid risks that will not pay off or which are unsound for the financial stability of the bank. On the other hand, a better understanding of more complex investments might lead the independent financial experts to encourage risk taking activities if they believe that doing so will increase shareholder’s residual claim on the bank’s assets.

Empirically, Güner, Malmendier and Tate (2008) show that, within *non-financial* firms, financial expertise on boards can impact corporate decisions in a way that is not necessarily beneficial to shareholder value. Conversely, Dionne and Triki (2005) show that financially knowledgeable directors can positively impact firm behavior with regards to hedging policies and Agrawal and Chadha (2005) show that boards with more financial expertise have fewer restatements.

⁸ Pathan (2009) finds that board size and independence are negatively associated with total and idiosyncratic firm risk for a sample of U.S. bank holding companies during the period from 1997 to 2004.

Given the above discussion and the extant evidence among non-financial firms, it is an empirical question as to whether or not financial expertise of independent board members will be associated with increased risk taking and performance among financial institutions.

Finally, much of the discussion surrounding the crisis and how the government would respond to each distressed financial institution has revolved around the idea that large institutions are different from small institutions. In particular, if implicit government backing is stronger for large firms (too big to fail), it might affect *ex ante* how board members view the optimal risk taking level. Furthermore, a bank's size can affect its risk profile in several ways. Larger financial institutions tend to be better diversified and hence less vulnerable to shocks. However, larger institutions might also engage in riskier activities, such as more off-balance sheet operations. Thus, our empirical design will run each set of tests on both the full sample of financial firms and the subsample of large firms.

II. Sample description and board characteristics

II.A The sample

Ideally, we would like a large cross-section of comparable financial institutions over a reasonable time period to investigate the impact of the independence, financial expertise and risk monitoring of the board on risk taking and firm value. In order to achieve this goal, the original sample of financial institutions is taken from the BoardEx database. BoardEx is a business intelligence database that includes profiles of over 350,000 business leaders across 19 countries. The database also includes details on over 600,000 organizations with which these individuals are associated. This study uses all U.S. banks and specialty and other finance firms from BoardEx which total 652 individual firms from 2000 to 2008. Given the much smaller and

potentially biased coverage prior to 2003, we focus only on the 2003 to 2008 period. Furthermore, we eliminate small local banks from our study by focusing only on those with more than one billion dollars in assets. All insurance companies, REITs and investment companies are eliminated by keeping only those firms in the Standard Industrial Classification codes of 602, 603, 6211 and 6282. The remaining sample includes commercial banks, savings and loan associations (S&Ls) and investment banks. Commercial banks comprise 75% of the sample, S&Ls about 23% and investment banks 2%.

One of the main concerns related to the empirical analysis is the potential heterogeneity among financial institutions. The impact of the financial crisis arguably might differ across commercial banks, S&Ls and investment banks. To make sure that there is consistency across the sample, we focus our main analysis on the subset of commercial banks. We discuss the impact on investment banks and S&Ls relative to commercial banks in the robustness section. The sample of commercial banks varies from 182 banks in 2003 to 119 in 2008, with a maximum of 206 banks in 2005. We also require that firms have data on Compustat and CRSP over the sample period.⁹

For comparison we report firm characteristics for the full sample of financial institutions for year-end 2006 (onset of crisis) in Table B of the Appendix. Summary statistics are shown for commercial banks, S&Ls, and investment banks separately. There is much heterogeneity across bank types; pertaining to firm size, as measured by total assets, and performance, as measured by return on assets (ROA) and return on equity (ROE). Investment banks are much bigger than their counterparts and have higher profitability in 2006. The heterogeneity across different bank types confirms the appropriateness to focus on commercial banks in our main analysis.

⁹ Depending on the specifications of our tests, the sample size is sometimes reduced further due to data availability issues on some balance sheet items, stock market data or call report data.

II.B Board characteristics

We use several variables to characterize bank boards. The first two are board size and board independence. Board size and independence are commonly associated with board governance (e.g. De Andres and Vallelado (2008), and Kumar and Sivaramakrishnan (2008) are recent examples). Data on board size and board independence are taken from BoardEx which reports the disclosure made by firms along those dimensions.

Board size is defined as the number of directors on the board. Decision making costs are assumed to be lower in smaller boards than in larger boards. As such, smaller boards might be more effective monitors. However, for the same reasons developed in section I, being more “effective” does not necessarily mean taking on less risk. The prediction regarding risk taking will ultimately depend on whether these boards favor shareholders’ interests over the interests of other stakeholders, such as regulators. Cheng (2008) also argues that because of the coordination problems that can arise in larger boards, the decisions of larger boards might be less extreme, resulting in lower levels of risk.

Our measure of board independence is the ratio of the number of directors reported as independent in a firm’s proxy statement relative to board size. Independence is based on the definition set by the NYSE and NASDAQ guidelines.

[Insert Table I here]

Panel A of Table I reports summary statistics for these board characteristics. Overall, board size has been decreasing over the sample period. The average board size decreased

slightly from about 13.3 board members in 2003 to about 12.4 members in 2008. Levels of board independence are high among our sample of banks. In 2003, 73% of the board is independent. By 2008, independent directors make up over 78% of the board.

II.C Financial expertise

Information on the financial expertise of independent directors is collected from annual bank proxy statements and Boardex. Following Güner, Malmendier and Tate (2008), we classify an independent director as a financial expert if he or she works within a banking institution or a non-bank financial institution, or has a finance-related role within a non-financial firm (e.g. CFO, accountant, treasurer, or VP finance) or academic institution (e.g. professor in finance, accounting, economics or business), or is a professional investor (e.g. hedge fund, private equity). Figure 1 presents a pie chart summarizing the average composition of financial expertise over the sample period. As Figure 1 shows, about 29% of independent directors with finance expertise hold finance related positions at non-financial firms and more than half of the financial experts are executives in financial firms, with 40% holding positions at non-bank financial institutions. Commercial bankers make up 10% of independent directors with expertise in finance.¹⁰

[Insert Figure 1 here]

¹⁰ Busy boards are not a feature of our sample. The fraction of financial experts among independent directors is low on average, and among those financial experts, only 10% of them work or have worked within the last five years in a commercial bank.

We calculate our financial expertise measure as the fraction of reported independent directors that are classified as financial experts. Column five in Panel A of Table I summarizes the average level of financial expertise across the sample. As with board independence, financial expertise increases over the sample period. On average, the fraction of finance experts among independent directors increases from 21% in 2003 to 27% in 2008. Overall, the statistics in Panel A of Table I show that boards are getting more independent and independent directors possess more financial expertise over time. However, only a minority of independent directors have financial expertise. Figure 2 plots the distribution of independent financial expertise among commercial banks in our sample. It is interesting to note that the spread is relatively significant between zero and one. Furthermore, the figure shows that almost 25% of banks have no financial experts among their independent directors.¹¹

[Insert Figure 2 here]

Panel B of Table I reports the representation of three different types of directors on board committees: Financial experts among independent directors; non-financial experts among independent directors and; non-independent directors (insiders). A director can be on multiple committees. Although not reported, more than 62% (59%) of independent financial (non-financial) experts serve on multiple committees, while only a small minority of insiders sits on more than one committee (18%). Furthermore, a committee can have multiple roles (e.g. the

¹¹ Given this high proportion of zero financial expertise among independent directors, we also run all of our tests defining financial expertise as an indicator variable that takes value one if at least one independent director has financial expertise and zero otherwise. All the results using this variable are qualitatively similar to those shown in the paper and are therefore not shown.

Compensation and Nominating committee). Hence, to compute the different proportions for a given type of director, we aggregate the multiple roles and then compute proportions.

Among independent directors, the main difference between financial experts and non-financial experts is the larger proportion of financial experts on audit committees. This result is expected given the provisions of Sarbanes-Oxley, which mandates at least one independent financial expert on the audit committee. Interestingly, financial experts are not more represented on risk management committees even when compared to insiders. There is a much starker contrast when comparing independent director to insiders on the board: Insiders have almost no role to play on the audit, compensation, nominating and governance committees. This evidence points toward the importance of independent directors in these committees.

In Panel C of Table I, we present a correlation matrix for our proxies of board independence, finance expertise and selected bank characteristics. There are several features of the data worth highlighting. First, there is a positive correlation between board size and bank size, which is consistent with the results presented in Adams and Mehran (2003, 2008). Second, equity capital is negatively related to bank size. Third, in terms of our board governance measures, it is noteworthy to mention the lack of correlation between our novel measure of finance expertise of the board and other board characteristics. Lastly, there is a slight negative correlation between bank size and the fraction of financial experts among independent directors: Larger banks do not have a higher proportion of independent financial experts on their boards.

II.D Risk management structures

We also collect data on the risk management function of the bank to control for this function in our empirical tests. We measure risk monitoring at a commercial bank by the

disclosure of a Chief Risk Officer (CRO) position and a risk committee separate from the audit and pure Asset and Liabilities Management (ALM) committees. To detect the presence of these two risk monitoring functions, we perform multiple key word searches of all 10-Ks and DEF 14-A (proxy) statements during the sample period. We then verify manually each flagged financial statement and hand-collect all the disclosed information regarding both the executive positions and committees related to risk management. By relying on voluntarily disclosed information by firms, we are probably underestimating the true number of firms having these risk functions in place. We view the disclosure of these functions in the financial statements as a signal of the importance attributed to the risk management function by management. From Panel B of Table I, we see that the risk management structures (CRO, and risk committee, discussed below) are also positively related to bank size. This fact is not surprising given the increased complexity of operations at larger commercial banks.

III. Board characteristics and the crisis

In this section, we examine the associations between independence, financial expertise of the board and stock performance and changes in Tobin's Q during the crisis period (2007-2008).¹²

III.A Stock performance

Table II presents the regression coefficients of stock performance during the crisis period on bank and board characteristics. Stock performance is measured as the nominal cumulative

¹² We do not use accounting-based measures of performance such as write-downs on toxic assets as these numbers can be booked at different times for different banks, sometimes reversed and are generally subject to changes in accounting rules and government intervention.

stock return from January 2007 to December 2008.¹³ The set of firm and board characteristics used as controls in the regressions are measured at fiscal year-end 2006, except for banks' past cumulative stock returns measured during the calendar year of 2006 and beta, which is computed using a market model with daily returns over 2006. The last three columns of Table II present results when using an "augmented" set of controls in the regressions. This set of controls includes the same variables as those used in the first three columns and adds several extra dimensions of risk exposures from Call Report (FR Y-9C) data: The proportion of total loans to total assets, the proportion of deposits to total assets, a measure of real estate exposure with real estate loans to total assets, the amount of non-deposit short-term financing, the level of off-balance sheet securitized assets (home equity, car loans, credit cards, etc.) and finally a measure of exposure to mortgage-backed securities with the total amount of mortgage-backed securities held on the balance sheet (including those held by the firm, available for sale and in the trading account) relative to total assets. These data are all winsorized at the 1% and 99% levels.

[Insert Table II here]

Panel A of Table II gives the results for the full sample. Few firm characteristics are significantly related to performance. Beta is positively and significantly related to stock performance over the crisis period in all specifications. The presence of a Chief Risk Officer (CRO) has a positive relationship with firm stock performance and is significant for four out of the six specifications.

¹³ We require at least six months of valid monthly stock return data in order to compute the cumulative returns. Therefore, the sample includes banks that delist between June 2007 and December 2008, as long as they were trading since January 2007.

Holding firm characteristics constant, board size is not significantly related to stock performance during the crisis when using the base set of controls in the first three columns. However, the percent of independent directors is significantly and negatively associated with stock performance during the crisis. With the base set of controls in the full sample of commercial banks, more independent boards performed worse during the crisis. We performed several robustness checks including different control variables such as the credit rating of financial institutions. For instance, if beta is taken out, then other firm characteristics, such as equity capital, become significant in explaining stock returns during the crisis. However, our board governance results hold across all specifications.

In the second set of three columns of Table II Panel A, we include the set of variables that reflect financing and other operating and financing choices made by the bank. The results show that independence is still negatively associated with performance, while financial expertise is not related to worse performance during the crisis. Not surprisingly, exposure to real estate is strongly and negatively related to performance during the crisis.

As discussed in Section I, there are reasons to believe that large banks might behave differently from small banks. To examine this issue further, we run the same set of regressions on the subset of large banks, defined as those with total assets above the median total asset value in the cross-section at the onset of the crisis (fiscal year-end 2006). Focusing on large banks has the added advantage of reducing the heterogeneity within the sample. The results are shown in Panel B of Table II.

For the large banks, beta is now statistically significant for only two of the six specifications and all other base controls are not significant. Interestingly, the only firm characteristic that is significant throughout is the exposure to real estate as measured by real

estate loans to total assets. The negative association between real estate loans and performance is not surprising given the central role of the real estate bubble in the financial crisis.

In terms of our board governance variables, board independence is negative and significant for all specifications though less so for the base specification. In all specifications financial expertise among independent board members is negatively related to stock performance during the crisis. The associations are economically and statistically significant. A one standard deviation increase in financial expertise levels is associated with a five percent drop in the stock market performance during the crisis, relative to a mean (and median) stock performance of about -40% between January 2007 and December 2009. Furthermore, the negative association remains when we use the augmented set of controls in the regressions.

III.B Firm value

Table III presents the coefficients of regressions of changes in firm value, as measured by percentage changes in Tobin's Q (Market to book value of assets) during the crisis period, from fiscal year-end 2006 to fiscal year-end 2008.¹⁴ We use the same sets of controls as those used in Table II.

[Insert Table III here]

Panel A shows the results for the full sample of commercial banks while Panel B focuses on the large commercial banks. The results are similar to those from the stock performance

¹⁴ This measure has two caveats when compared to stock market performance during the same period. First, it contains a survivorship bias, as it can only be computed if the bank survived to report 2008 fiscal year-end numbers. Second, the debt is computed at book value. It is unclear whether debt book values at fiscal year-end 2008 were close to their market values and whether accounting practices across banks might have created a bias in this measure.

regressions. In terms of controls, the negative relation between stock performance in 2006 and changes in firm value during the crisis is the most consistent result while board size is significant for four of the six specifications. Again, exposure to real estate as measured by the percentage of real estate loans on the balance sheet is negative throughout. As shown in Panel A, total loans are also associated with significantly higher losses in firm value during the crisis while more off-balance sheet securitization is associated with an increase in value. These results are broadly consistent with banks suffering from their general lending activities.

In terms of our board governance variables, financial expertise is negative and weakly significant only for the smaller set of controls when looking at the full sample. When using the augmented set of controls, the effect disappears; while independence does not matter in any of the specifications used.

The results in Panel B of Table III show that, for large banks, financial expertise is negatively correlated with changes in firm value in all but one specification. The coefficient on independence, however, is never statistically significant.

In summary, the results show that financial expertise of independent directors plays a significant role during the crisis. Once we control for many risk exposures, however, their presence is not statistically significantly related to performance for the full sample of commercial banks. In contrast, the negative relation between the level of financial expertise among independent directors and firm performance during the crisis is robust across almost all specifications for large banks. Taken together, these results are consistent with the idea that banks with more financial expertise among independent directors perform worse during the crisis, particularly for large commercial banks. We turn our investigation to understanding the reasons behind this result in the next section of our study.

IV. Board composition, firm risk, and performance in the pre-crisis period

In sections IV.A and IV.B, we examine the associations between board characteristics and two groups of risk measures in the run-up to the crisis: measures of balance sheet risk (section IV.A) and a market-based measure of risk (section IV.B). In section IV.C and IV.D, we relate stock performance to our board characteristics both during the run-up period and for the full sample period. As in section III, we also run every specification focusing solely on the large commercial banks.

IV.A Board composition and balance sheet risk

In this section, we focus on two balance sheet choices: real estate related activity and bank leverage.¹⁵ Data on the bank balance sheets are from FR Y-9C filings and are available from the Federal Reserve Commercial Bank Holding Company Database. We examine real estate activity since we show in the previous section that the participation in real estate activities has a significant negative impact on bank performance during the crisis. Bank leverage is examined through the lens of capital ratios. Given that equity capital serves as a buffer to weather financial crises, capital ratios are direct measures of the willingness of the bank to take on a riskier profile. Commercial banks have discretion in choosing levels of equity capital, as long as it is above the minimum regulatory levels.¹⁶ The higher the capital cushion, the safer is the bank. However, from a shareholders' perspective, the higher levels of capital dampen the potential returns on equity. The cross-sectional regression results for capital ratios and real estate exposure at the onset of the crisis are shown in Table IV.

¹⁵ See the robustness section for the discussion of results along other dimensions of risk taking.

¹⁶ The distribution of Tier-1 capital ratios is bell-shaped and does not exhibit any lower bound spike.

[Insert Table IV here]

Panel A of Table IV provides the results for Tier-1 capital ratio as the dependent variable.¹⁷ Interestingly, lagged net interest margin, a measure of bank profitability, is consistently negatively associated with equity capital. In terms of our board governance variables, among large banks, we find that financial expertise is negatively related to Tier-1 capital ratio, which is consistent with the idea that banks with more financial experts had more leverage and hence were more exposed at the onset of the crisis. The other board governance variables are unrelated to the financial institutions' capital buffer.

Panel B of Table IV provides the regression results where the left hand side variable is exposure to real estate defined as the proportion of loans secured by real estate on the balance sheet at the fiscal-year end 2006. Our measures of independence and expertise do not explain real estate exposures for banks across most specifications. This result could be due to the fact that the entire banking sector ramped up its exposure to real estate *prior* to 2006 (see Bhattacharyya and Purnanandam (2010)).

Overall, board independence and board size do not matter for different balance sheet operating and financing choices made by banks in our sample. Financial expertise is important for equity capital among large banks but is not an important determinant for levels of real estate investment. This result could be driven by the idea that boards of directors are more involved with the financing choices of the firm and less so with the investment side of banks.

¹⁷ Results explaining Tier-1 capital to risk-adjusted assets and total capital to risk-adjusted assets yield quantitatively similar results and are hence not shown.

IV.B Board composition and market-based risk

Table V presents the OLS regression coefficients for panel regressions of total risk, our market-based measure of risk taking, on firm and board characteristics. Total risk is measured annually by the standard deviation of daily stock returns over the year. In addition to controlling for the risk monitoring function and bank characteristics described above, our three board characteristics are included. All explanatory variables are lagged. Year indicator variables are also included in the regressions but their coefficients are not reported. Due to the persistence found in our board-related measures, we estimate the panel regressions with standard errors corrected for heteroskedasticity using clustering at the firm level (see Hermalin and Weisbach (1998)).

[Insert Table V here]

Panel A provides the results for all commercial banks in the sample. The results for the run-up to the crisis can be found in the middle three columns of the table. Although our focus is on risk-taking prior to the crisis, given the dramatic time trend in the measure, we also provide results over the full sample (in the first three columns) and during the crisis (in the last three columns). As panel A of Table V reports, firm characteristics, such as size and size squared, are related to total risk both leading up to and during the crisis.

Larger boards are associated with lower total risk while the existence of a corporate risk officer or a risk committee is not associated with total risk. A one member increase in board size is associated with a two basis point decrease in total risk. These decreases are economically small given that the average daily total risk for the sample of firms is equal to 2.25%. The

negative relation between risk and board size is similar to the results in Cheng (2008) for non-financial firms and Pathan (2009) for financial firms. The results related to board size are consistent with larger boards acting in the interest of other stakeholders, such as regulators, by lowering total risk. The results are also consistent with Cheng's (2008) argument that because of the compromises needed to reach decisions in larger boards, stock returns should be less variable for firms with larger boards.

From Panel A of Table V, we also see that more independent boards are associated with lower levels of total risk for the whole period and particularly during the crisis. This result suggests that more independent boards are also acting in the interest of other stakeholders, such as regulators who are concerned with the safety of the bank. The negative relation is also consistent with Cheng (2008) who argues that holding board size constant, independent directors might have more heterogeneous views than insider directors. These heterogeneous opinions might moderate board decisions and be associated with lower levels of risk. Lastly, controlling for board size, board independence, and other determinants of total risk, the fraction of independent directors who are financial experts is positively related to total firm risk, but statistically significant only for the full sample period.

In Panel B of Table V, we focus on the sample of large commercial banks. Firm size is negatively associated with total risk for the full sample period and during the run-up to the crisis; the same goes for board size. Size squared is significant for the full sample and the run up to the crisis, again consistent with the existence of a non-linear relation between risk taking and firm characteristics.

The negative association between board independence and total risk is not significant anymore but the positive association between financial expertise among independent directors

and total risk is now statistically significant also in the run-up to the crisis. This positive association is consistent with financial experts acting in the interest of shareholders, as shareholders benefit from more risk-taking given that their cost of capital does not reflect the riskiness of their assets (see Merton (1977)). This result is also more generally consistent with a more financially knowledgeable board having a better understanding of more complex investments and potentially encouraging bank management to increase their risk taking.

Overall, the results from Table V show that board independence is associated with lower risk taking, while financial expertise among independent directors is positively related to risk taking by banks in the run-up to the crisis. The latter result is primarily driven by large commercial banks.

IV.C Board composition and stock market performance in 2006

We have shown in previous sections that more financial expertise is related to lower performance during the crisis. We have also linked this result to higher risk taking levels for banks with more financial expertise during the run-up to the crisis. A natural question arises then as to whether this increased risk taking behavior led to higher stock performance in the run-up to the crisis. In this section, we analyze the factors that relate to bank stock performance during 2006, the year prior to the onset of the financial crisis. Results are shown in Table VI. As with previous computations, all variables are lagged by one year.

[Insert Table VI here]

Table VI shows the results for all commercial banks in the first three columns and for the subset of large banks in the last three columns. The model estimates differ considerably across the two subsamples. Among the control variables, beta is strongly and positively related to stock performance in the full sample. As expected, the relation is positive. It remains positive for the subset of large banks but is no longer statistically significant. The same pattern emerges for size and size squared.

Among our board governance variables, the percentage of independence among board members is never statistically significant. For the percentage of financial expertise among independent directors, the results depend on the set of financial institutions we examine. For the full sample of banks, the relationship is positive and marginally significant. For the subset of large banks, the relationship remains positive but is no longer statistically significant.

IV.D Board composition and stock market performance full period

Large commercial banks with more financial expertise among independent directors had average or slightly above-average performance in the year prior to the crisis and had significantly lower performance during the crisis. Higher levels of independent financial experts on the board are related to banks taking on risks that were not value destroying leading up to the crisis but these risks were penalized during the crisis. The next question we address is how well banks with more independence and financial experts perform over the full sample period. We run similar regressions to the ones in Table VI but examine performance from January 2004 through December 2008. Since board characteristics such as the financial expertise variable should be lagged in every specification, we measure them as of December 2003 and hold them constant over the entire performance measurement period.

[Insert Table VII here]

The results in Table VII are very different across the full sample of commercial banks and the subsample of large banks. Size is positive and significant for the full sample and not significant for large banks while size squared is significant and negative for all banks but not significant for large banks. Beta is significant for two specifications in the large commercial banks and otherwise insignificant. All other firm characteristics are not significant for either sample.

As shown in Table VII, the coefficient on board independence is negative and significant for the full sample, consistent with board independence being associated with poorer performance. In contrast, financial expertise among the independent directors is not significant for all commercial banks. Rather, financial expertise is related to poorer performance for the sample of large banks: The coefficient estimate on financial expertise is highly negative and significant for large commercial banks over the full sample period.

V. Interpretation of Results

Commercial banks with more independent boards and more financial expertise among independent directors perform worse and lose more firm value during the financial crisis. These results are driven by the large commercial banks. Furthermore, banks with more financial expertise took on more risk leading up to the crisis. One possible interpretation of our results is that financial experts among independent directors were more willing to endorse the risk taking profile taken by these banks in the run-up to the crisis. As these firms increased in size and

complexity, these financial experts provided the support and/or necessary encouragements to allow the banks to expand their risk taking activities. As a result, the large commercial banks with relatively more financial expertise were penalized more severely at the onset of the crisis.

V.A Risk taking, expertise and CEO power

Given the cross-sectional nature of our tests, one could argue for other channels explaining our results. A competing explanation for our findings is that strong CEOs who were more prone to risk taking hired independent financial experts to rubber stamp their intentions. If that were true, the CEO's desire to take on more risks is driving both an increase in risk taking (and a consequent poor performance during the crisis) and higher levels of financial expertise among independent directors. This rubber stamping from independent directors could give the illusion of independent expert verification, while in reality the powerful CEO would control the board's decisions. We set out to test this alternative explanation for our results in this section.

To run these tests, we define four proxies to capture CEO power relative to their boards. The first measure (Table VIII, Column 1) is an indicator variable that takes the value of one whenever the CEO has a dual role of CEO and Chairman of the board and zero otherwise. The dual role of a CEO has long been recognized as giving the CEO significant power over the board (e.g. Dahya et al. (2002)). The second measure is taken from Landier et al. (2007). They define a director to be "independent of the CEO" if his appointment to the board occurs prior to the appointment of the current CEO. A measure of board strength can be derived from the percentage of board members whose tenure on the board exceeds that of the current CEO. We rank all banks according to this measure and define a CEO strength indicator variable if the bank falls *below* the median in terms of this measure of board power

(Table VIII, Column 2). The other two measures are very closely related to the one just described. Instead of computing the percentage of all directors with tenure greater than the current CEO, we compute the percentage of *independent* directors with greater tenure and again define firms with powerful CEOs with an indicator variable that takes the value of one for all banks below the median of the commercial bank sample (Table VIII, Column 3). Lastly, we compute the percentage of *independent financial experts* whose tenure exceed that of the CEO and also define a CEO strength variable to take the value of one for all banks that fall below the median value according to that dimension (Table VIII, Column 4).

The correlation among these different measures of CEO strength is positive. Among the three measures based on relative seniority of board members to the CEO, correlations range between 0.80 and 0.44 and between these seniority-based measures and the dual role indicator variable, correlations vary between 0.23 and 0.16.

[Insert Table VIII here]

The results in Table VIII are qualitatively similar across the various measures of CEO power. The firm characteristic variables are not significant except for size squared for the first three measures of CEO power. As with the prior results, we see that large bank performance is significantly negatively related to real estate loan exposure.

Holding bank characteristics constant, independence and independent financial expertise is negatively related to performance. None of the CEO power variables are related to firm performance. To directly test whether the powerful CEOs are driving the negative relationship between financial expertise among independent directors and performance during the crisis, we

interact the proxies of CEO power with the variable measuring financial expertise of the board. If this interaction term is negative and statistically significant, it would lead us to conclude in favor of the rubber stamping hypothesis. However, the interaction term is not significant in all four specifications of CEO power. The interpretation of these finding is that powerful CEOs are not simply getting independent financial experts on the board to rubber stamp high risk taking objectives.

V.B TARP

One potentially confounding event that occurred during our sample period is the Troubled Asset Relief Program (TARP). Thus, we investigate the effects TARP might have had on the banks in our sample. During the financial crisis, the federal government provided funds to financials and other firms in order to alleviate the risk of systemic failure within the financial system. Though these firms were not in default, these funds were made available by the government to those that needed them. Many banks received money from the TARP.¹⁸ Although the great majority of the TARP funds were disbursed *after* the end of our sample period, the exercise is still relevant given the potential anticipation of TARP at the tail end of our sample.

We examine the marginal probabilities from logit regressions estimating the probability of receiving TARP funds. The dependent variable equals one if the bank receives TARP money and zero otherwise. The independent variables include many firm and board characteristics measured at year-end 2006. Not surprisingly, the results (not shown) imply that banks with

¹⁸ We obtain data on TARP recipients from <http://bailout.propublica.org/main/list/index>. This website reports the list of TARP recipients, the amount of TARP money committed, disbursed and returned. Using this website, we identify 160 of the sample firms which received TARP funds.

lower equity capital ratios going into the crisis are more likely to receive TARP funding. Additionally, larger boards and more independent boards are associated with increases in the likelihood of receiving TARP funds. The result for board size does not hold for the subset of large banks. Interestingly, financial expertise is never significant in explaining the probability of receiving TARP funds. These results suggest that TARP-related effects are not driving our main results.

VI. Robustness

In this section, we turn to other issues that may play a role in our results and provide a series of robustness tests for our main findings. Our robustness results are shown in Table IX and Table X. In these tables, we only present the variables associated with independence and financial expertise for brevity since the control variables used are the same as those presented throughout the paper.

VI.A All financial institutions

Our discussion has focused so far on commercial banks. In this section, we expand our results on independence and financial expertise to the full sample of financial institutions that includes all publicly traded commercial banks, savings and loan associations (S&Ls) and investment banks. The latter group has been at the center of the crisis and has potentially received the most attention from regulators, the media and researchers. In this extended sample, commercial banks still comprise 75% of all banks with S&Ls making up 23% and investment banks 2%.

[Insert Table IX here]

Selected regression results for the sample of all financial institutions are shown in Panel A and B of Table IX. The results show that financial expertise among independent directors is associated with worse performance during the crisis across all financial institutions (Panel A), which is consistent with our earlier results on commercial banks. As in the main section of our study, the results are stronger for the subset of large financial institutions. For the risk regressions (Panel B), the results show that the pre-crisis market-based measure of risk taking was significantly higher for banks that had more financial expertise among their independent directors, consistent again with our main sample of commercial banks. The results are also more significant for large financial institutions. Overall, we can conclude that our main results extend to the broader sample of banks that include commercial banks, S&Ls and investment banks.

VI.B Excluding the five largest U.S. commercial banks

Our main sample is comprised of all commercial banks with one billion dollars in total assets. As previously noted, there is still considerable heterogeneity in bank size among this sample. We have dealt with this heterogeneity parametrically by including linear and non-linear size controls in our regressions. This approach may still not capture differences between smaller commercial banks and the likes of Citigroup, Bank of America or JP Morgan Chase. The largest commercial banks differ in terms of risk taking behavior, market exposure and systemic risk. It is thus important to test the robustness of our results to the exclusion of this set of banks. Specifically, we exclude Citigroup, Bank of America, JP Morgan Chase, Wachovia, and Wells Fargo.

We run all of our tests (Tables II to VIII) on commercial banks excluding the largest U.S. commercial banks by total assets at year end 2006. Selected regression results for this sample are shown in Panel C and D of Table IX. Results in Panel C show that financial expertise among independent directors is associated with worse performance during the crisis for the subset of the large commercial banks. In this case, the set of large banks is comprised of banks above the median total assets at fiscal year-end 2006, excluding the five largest commercial banks. For the risk regressions (Panel D), the results show that the pre-crisis market-based measure of risk taking was significantly higher for large commercial banks that had more financial expertise among their independent directors, consistent again with our main sample of commercial banks. Overall, we can conclude that our main results extend to the sample of commercial banks that excludes the largest publicly-traded banks.

VI.C Other measures of expertise and independence

In this section, we investigate the impact of using other definitions of independence and financial expertise. Thus far, the definitions of independence are taken from those issued by the exchanges which are in accordance with federal mandates issued through Sarbanes-Oxley. We also follow the definition of financial expertise used in the prior literature.

Table X gives the results for the main set of regressions when examining alternate definitions of both independence and financial expertise. Our alternate measure of board independence in Panel A, called *%Truly Indep*, takes into consideration outside relationships between the current CEO and independent directors. Using the Boardex database, we identify independent directors who have a prior or existing relationship with the CEO beyond that of being on the same board. These external ties might include social (e.g. charities), educational or

other business relationship. An independent director is considered “truly independent” if he/she has no relationship with the President/CEO other than being currently on the same bank board (see Fracassi and Tate (2010) for a similar construct). As a consequence, our financial expertise measure is also modified and becomes the percentage of “truly independent financial experts” computed from the pool of truly independent directors. In terms of financial expertise, we compute all of our main findings using a stricter definition by considering independent directors to be experts only if they hold executive positions within financial institutions (SIC codes 6000-6999). Results are shown in Panel B of Table X.

[Insert Table X here]

Since all of our main results are driven by the large commercial banks, we concentrate on this subset when examining alternative specifications of independence and expertise. In Panel A, the “truly independent” measure of independence yields qualitatively similar results to our base measure of independence. Large commercial banks with more independent boards did not perform any worse than other banks while those with more financial expertise among independent directors performed worse during the crisis. Banks with more “truly independent” boards took on less risk leading up to the crisis while banks with more financial expertise among truly independent directors took on more risk using the alternative measure.

Finally, in Panel B of Table X we use the more restrictive definition of financial expertise where we define an independent director as a financial expert only if he has an executive position within a financial institution (SIC code 6000-6999). With this definition, we see that the crisis results hold, especially with the augmented set of controls. Furthermore, the total risk results are

more significant when financial expertise is defined in this manner. The Tier-1 capital ratios results are, however, no longer statistically significant. Overall, the main results of the effect of independence and financial expertise among independent directors is robust across several alternative definitions of these variables.

VI.D Other measures of risk

There are many activities that a bank can undertake to increase its risk profile in the run-up to the crisis. We have shown that higher levels of financial expertise among independent directors were associated with lower Tier-1 capital and were not associated with higher levels of real estate lending activities. We examined several other measures of bank activities, such as the amount of non-deposit short-term financing, and the exposure to on- and off-balance sheet asset backed securities related activities. In these regressions (not shown for brevity), the levels of independence and financial expertise are not associated with any of these variables.

VII. Conclusion

During the most recent financial crisis, banks and other financial institutions have been accused of engaging in excessive risk taking. Because boards are ultimately legally responsible for all major operating and financial decisions made by the firm, the recent crisis has been viewed by many as a general failure of board governance in the banking sector.

The composition of the board of directors should be a reliable proxy of how well the board can process information provided by insiders and advise as well as monitor the bank's risk taking practices in the best interests of its shareholders. This paper examines how board independence and the percentage of financial experts among independent directors relate to risk

taking and performance of commercial banks during the period from 2003 to 2008, which includes the most recent financial crisis.

This study highlights the fact that larger and more independent boards are associated with lower levels of risk taking. We also document, on average, low levels of financial expertise among independent directors. Although many calls for reforms pinpoint the lack of financial expertise of the board as a reason behind the crisis, we show that during the crisis both stock performance and changes in firm value are worse for large banks with more financial expertise among its independent directors.

To explain this result, we investigate the behavior of banks leading up to the crisis. Interestingly, we find that the level of financial expertise among independent directors is positively related to risk taking both before and during the financial crisis using market-based risk measures. We also show that board independence and expertise are not related to increased real estate exposure at the onset of the crisis but are related to financing decisions; namely, more financial expertise is linked to lower Tier-1 capital ratios at the beginning of the crisis. These results are driven by large banks in our sample. Lastly, there is weak evidence that the higher risk taking levels of commercial banks with more independent financial expertise is related to better stock performance in the year prior to the crisis. However, the stock performance over the full sample period is significantly worse for banks with more financial expertise among their independent directors. Our results are robust to alternative measures of independence and financial expertise as well as including S&Ls and investment banks in the sample and excluding the largest U.S. banks from our sample.

Overall, our results challenge the regulators' view that more financial expertise on the boards of banks would unambiguously lower their risk profile. In particular, the presence of

financial experts among independent directors is related to more risk taking in the run-up to the crisis. This favorable attitude towards risk-taking was not penalized by the markets prior to the crisis but led to significant underperformance when the crisis hit. For the large commercial banks, more financial experts among independent directors led to significant underperformance. We do not find evidence for a reverse causality channel explanation of our results, whereby a powerful CEO would choose a higher risk profile and select independent financial experts to rubber stamp his strategy.

Our results could be explained by the fact that independent financial experts, with a fiduciary duty to shareholders, understand the residual nature of the equity claims and will generally favor more risk taking. Another explanation could be that external financial experts are more willing to let their bank participate in more risk-taking activities due to their familiarity and understanding of complex financial instruments. We leave the task of testing these different conjectures for future research.

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Table I: Summary statistics

This table shows summary statistics for board governance and other bank characteristics for our sample of U.S. publicly-traded commercial banks with total assets greater than \$1 billion from 2003 to 2008. Panel A presents yearly statistics on key board governance dimensions. Board size is the number of directors on the board. %independent is the percent of directors that are not employed or affiliated with the firm. These two variables are computed using the Boardex database. % fin expert among independent directors is the percent of independent directors who are financial experts. Following Güner et al. (2008), a director is classified as a financial expert if he or she works at a financial institution or nonbank finance company, if he or she holds a finance-related position (e.g. chief financial officer (CFO), accountant, treasurer, VP finance) of a non-financial firm, or holds an academic position in a related field (e.g. professor of finance, economics or accounting), or works as a hedge fund or private equity fund manager, or venture capitalist (Professional investor). The data on financial expertise of each director were provided by a combination of Boardex data and hand-collected data from annual proxy statements. Panel B presents the proportion of directors in different board committees by director type. The committees are defined in the following respective categories: Audit, Compensation, Nominating, Governance, Risk Management, Executive, and Other. We also included a “No committee” category for directors who are on no committees. The data were compiled from the the Boardex database using all director-year observations from 2003-2008. We computed the proportions for three types of directors: 1) Independent directors who are financial experts; 2) Independent directors who are not financial experts and; 3) Insiders (non-independent) directors. A director can be on multiple committees and there are many cases where one committee will have multiple roles (e.g. Compensation and Nominating committee). In the proportion computations, we divide by the total number of director role-year observations to have the proportions add up to 100%. Panel C presents the correlation matrix between our board characteristics and several other bank characteristics. Log(assets) is the natural logarithm of total book assets. Equity capital ratio is defined as total book equity divided by total assets. We also computed dummy variables for institutions that disclose having a risk management committee (Has Risk Comm.) or chief risk officer (CRO) in annual 10-K filings or proxy statements during the sample period. These data were compiled by hand-collecting all the information on CRO and other similarly-defined risk management executive positions and (non-ALM) risk committees within a financial institution, as disclosed by the firm’s 10-K and DEF 14-A (proxy statement) each year.

Panel A: Yearly summary statistics (mean) on board characteristics

Year	Number of obs.	Board size	%Independent	%Fin. expert. among independent directors
2003	182	13.3	73%	21%
2004	200	13.1	76%	23%
2005	206	12.6	77%	24%
2006	203	12.6	77%	25%
2007	196	12.5	77%	26%
2008	119	12.4	78%	27%

Panel B: Committee role for different types of directors

Committee	Independent directors with financial expertise	Independent directors without financial expertise	Insiders
Audit	26.72%	19.99%	3.06%
Compensation	17.51%	20.50%	5.02%
Nominating	16.79%	18.37%	3.65%
Governance	14.22%	15.69%	3.22%
Risk Management	3.68%	3.47%	4.04%
Executive	8.52%	8.87%	25.52%
Other	9.65%	9.03%	15.84%
No committee	2.92%	4.08%	39.65%

Panel C: Correlation matrix among board and risk governance and bank characteristics

	Log(Asset)	Equity capital ratio	CRO	Risk committee	Board size	%Independent directors
Log(Asset)	1.00					
Equity capital ratio	-0.11	1.00				
CRO	0.35	0.02	1.00			
Risk committee	0.47	-0.10	0.32	1.00		
Board size	0.31	0.05	0.12	0.12	1.00	
%Independent directors	0.08	0.05	0.20	0.17	0.01	1.00
%Fin expert among indep. directors	-0.10	-0.02	-0.01	-0.03	-0.14	-0.03

Table II: Stock performance during the crisis

This table presents OLS regression coefficients of firm stock performance on firm and board characteristics and risk monitoring functions. Panel A reports the results for all commercial banks. Panel B reports the results for large commercial banks. A bank is defined as large if its book value of total assets is greater than that of the median firm in the sample for 2006. Stock performance is measured as the nominal cumulative stock return from January 2007 to December 2008. $\text{Log}(\text{assets})$ is the natural logarithm of total book assets. Equity capital ratio is defined as total book equity divided by total assets. Beta is computed as the market beta estimated from a market model in which the daily stock returns are explained by the value-weighted market return and the return on the three-month Treasury bill. Stock ret 2006 is the nominal cumulative stock return over 2006. All board and risk monitoring variables are defined in Table I. Data on loans, deposits, real estate loans, and mortgage-backed securities are from the FED FRY-9C Call Report forms filed by Bank Holding Companies (BHCs). Real estate loans are computed as all loans secured by real estate relative to total assets. MBS are mortgage-backed securities held-to-maturity, available-for-sale and held for trading relative to total assets. Short-term financing is non-deposit short-term financing to total asset. Off-Balance sheet activities is the off balance sheet securitized assets (home equity, credit card, auto loans, etc.) to total assets. All variables are taken as of the fiscal year end 2006. Robust standard errors corrected for heteroskedasticity are reported in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

Panel A: All commercial banks

	(1)	(2)	(3)	(4)	(5)	(6)
Log(assets)	0.256	0.271	0.271	0.169	0.172	0.190
	[0.181]	[0.181]	[0.181]	[0.182]	[0.189]	[0.187]
Log(assets) ²	-0.014	-0.015	-0.015	-0.012	-0.012	-0.013
	[0.009]	[0.009]	[0.009]	[0.010]	[0.010]	[0.010]
Equity capital ratio	-1.433	-1.621	-1.547	-0.052	-0.170	-0.190
	[1.092]	[1.099]	[1.078]	[1.044]	[1.058]	[1.050]
Beta	0.153***	0.152***	0.153***	0.142***	0.142***	0.142***
	[0.040]	[0.039]	[0.039]	[0.035]	[0.035]	[0.035]
Stock ret 2006	-0.074	-0.034	-0.031	-0.033	-0.004	-0.005
	[0.172]	[0.171]	[0.170]	[0.143]	[0.145]	[0.142]
Board Size	0.011	0.011	0.010	0.007	0.007	0.007
	[0.008]	[0.008]	[0.008]	[0.007]	[0.007]	[0.007]
Has CRO	0.089	0.083	0.100*	0.106*	0.096*	0.112**
	[0.058]	[0.059]	[0.058]	[0.055]	[0.057]	[0.056]
Has Risk Comm.	-0.059	-0.061	-0.056	-0.042	-0.043	-0.041
	[0.083]	[0.082]	[0.081]	[0.078]	[0.079]	[0.077]
Total loans				-0.088	-0.188	-0.038
				[0.415]	[0.407]	[0.420]
Deposits				0.436	0.431	0.381
				[0.537]	[0.517]	[0.536]
Real estate loans				-0.849***	-0.747***	-0.880***
				[0.256]	[0.258]	[0.261]
MBS				0.479	0.466	0.438
				[0.403]	[0.384]	[0.408]
Short-term financing				0.800	0.949	0.773
				[0.840]	[0.828]	[0.851]
Off-balance sheet				0.480	0.443	0.505
				[0.493]	[0.496]	[0.487]
% Independent directors	-0.487**		-0.500**	-0.510**		-0.529**
	[0.237]		[0.234]	[0.228]		[0.227]
%Fin expert among independent directors		-0.196	-0.205		-0.122	-0.142
		[0.134]	[0.128]		[0.127]	[0.122]
Observations	198	198	198	198	198	198
Adjusted R-squared	0.066	0.055	0.074	0.229	0.210	0.231

Panel B: Large commercial banks

	(1)	(2)	(3)	(4)	(5)	(6)
Log(assets)	0.592	0.609	0.641	0.400	0.406	0.502
	[0.413]	[0.415]	[0.424]	[0.372]	[0.386]	[0.382]
Log(assets) ²	-0.029	-0.031	-0.032	-0.023	-0.024	-0.029
	[0.019]	[0.019]	[0.020]	[0.018]	[0.018]	[0.018]
Equity capital ratio	-0.871	-1.663	-1.280	0.739	-0.111	0.248
	[1.514]	[1.554]	[1.558]	[1.510]	[1.497]	[1.459]
Beta	0.235*	0.213	0.237*	0.181	0.157	0.187
	[0.131]	[0.129]	[0.135]	[0.112]	[0.111]	[0.114]
Stock ret 2006	0.033	0.090	0.078	0.106	0.174	0.133
	[0.311]	[0.317]	[0.314]	[0.290]	[0.281]	[0.286]
Board Size	0.006	0.010	0.008	0.005	0.009	0.006
	[0.013]	[0.013]	[0.013]	[0.012]	[0.012]	[0.012]
Has CRO	0.090	0.092	0.115	0.071	0.070	0.090
	[0.075]	[0.073]	[0.072]	[0.072]	[0.071]	[0.069]
Has Risk Comm.	-0.122	-0.129	-0.130	-0.078	-0.086	-0.091
	[0.084]	[0.081]	[0.081]	[0.076]	[0.074]	[0.074]
Total loans				0.054	-0.099	0.124
				[0.625]	[0.601]	[0.627]
Deposits				-0.129	-0.121	-0.266
				[0.724]	[0.645]	[0.666]
Real estate loans				-1.244**	-1.010**	-1.283***
				[0.498]	[0.442]	[0.476]
MBS				0.443	0.547	0.373
				[0.528]	[0.525]	[0.566]
Short-term financing				-0.559	-0.479	-0.792
				[1.049]	[0.994]	[1.035]
Off-balance sheet				0.423	0.398	0.551
				[0.518]	[0.493]	[0.510]
% Independent directors	-0.625*		-0.571*	-0.753**		-0.755**
	[0.331]		[0.326]	[0.326]		[0.319]
%Fin expert among independent directors		-0.497**	-0.480***		-0.422**	-0.423***
		[0.190]	[0.181]		[0.166]	[0.155]
Observations	101	101	101	101	101	101
Adjusted R-squared	0.033	0.077	0.095	0.217	0.229	0.264

Table III: Change in firm value during the crisis

This table presents OLS regression coefficients of Tobin's Q (as proxied by market-to-book ratios) regressions on firm and board characteristics and risk monitoring functions for the full sample of commercial banks. Panel A reports the results for all financial institutions. Panel B reports the results for large financial institutions. A financial institution is defined as large if its book value of total assets is greater than that of the median firm in the sample for 2006. $\text{Log}(\text{assets})$ is the natural logarithm of total book assets. Equity capital ratio is defined as total book equity divided by total assets. Beta is computed as the market beta estimated from a market model in which the daily stock returns are explained by the value-weighted market return and the return on the three-month Treasury bill. Stock ret 2006 is the nominal cumulative stock return over 2006. All board and risk monitoring variables are defined in Table I. Data on loans, deposits, residential real estate loans, and mortgage-backed securities are from the FED FRY-9C Call Report forms filed by Bank Holding Companies (BHCs). Real estate loans are computed as all loans secured by real estate relative to total assets. MBS are mortgage-backed securities held-to-maturity, available-for-sale and held for trading relative to total assets. Short-term financing is non-deposit short-term financing to total asset. Off-Balance sheet activities is the off balance sheet securitized assets (home equity, credit card, auto loans, etc.) to total assets. All variables are taken as of the fiscal year end 2006. Robust standard errors corrected for heteroskedasticity are reported in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

Panel A: All commercial banks

	(1)	(2)	(3)	(4)	(5)	(6)
Log(assets)	0.003	0.006	0.012	0.007	0.013	0.013
	[0.030]	[0.030]	[0.031]	[0.032]	[0.032]	[0.032]
Log(assets) ²	-0.000	-0.001	-0.001	-0.001	-0.002	-0.002
	[0.002]	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]
Equity capital ratio	-0.124	-0.132	-0.220	-0.022	-0.046	-0.040
	[0.272]	[0.267]	[0.163]	[0.260]	[0.249]	[0.250]
Beta	0.006	0.006	0.011	0.007	0.007	0.007
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Stock ret 2006	-0.099***	-0.095***	-0.107***	-0.080***	-0.077***	-0.077***
	[0.026]	[0.026]	[0.025]	[0.023]	[0.022]	[0.023]
Board Size	0.002	0.002	0.002*	0.002*	0.002*	0.002*
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Has CRO	0.004	0.006	0.005	0.007	0.008	0.009
	[0.010]	[0.010]	[0.010]	[0.009]	[0.009]	[0.010]
Has Risk Comm.	-0.005	-0.004	-0.004	-0.003	-0.003	-0.003
	[0.012]	[0.011]	[0.011]	[0.010]	[0.010]	[0.010]
Total loans				-0.118**	-0.114**	-0.112**
				[0.046]	[0.044]	[0.044]
Deposits				-0.106	-0.115	-0.117
				[0.081]	[0.083]	[0.083]
Real estate loans				-0.123***	-0.125***	-0.129***
				[0.035]	[0.034]	[0.035]
MBS				-0.049	-0.055	-0.058
				[0.064]	[0.066]	[0.067]
Short-term financing				-0.007	-0.019	-0.022
				[0.133]	[0.131]	[0.132]
Off-balance sheet				0.083**	0.085**	0.087**
				[0.041]	[0.041]	[0.041]
% Independent directors	0.007		0.024	-0.022		-0.022
	[0.045]		[0.047]	[0.038]		[0.038]
%Fin expert among independent directors		-0.022	-0.038*		-0.024	-0.024
		[0.018]	[0.021]		[0.017]	[0.017]
Observations	109	109	109	109	109	109
Adjusted R-squared	0.069	0.078	0.137	0.345	0.354	0.349

Panel B: Large commercial banks

	(1)	(2)	(3)	(4)	(5)	(6)
Log(assets)	-0.006	-0.019	-0.015	-0.091	-0.084	-0.094
	[0.071]	[0.074]	[0.072]	[0.078]	[0.072]	[0.077]
Log(assets) ²	-0.000	0.001	0.000	0.003	0.003	0.003
	[0.003]	[0.003]	[0.003]	[0.004]	[0.003]	[0.004]
Equity capital ratio	-0.196	-0.207	-0.220	0.043	-0.039	0.005
	[0.390]	[0.371]	[0.378]	[0.329]	[0.330]	[0.313]
Beta	-0.002	-0.005	-0.004	-0.033	-0.029	-0.035
	[0.025]	[0.025]	[0.025]	[0.024]	[0.023]	[0.023]
Stock ret 2006	-0.103*	-0.094*	-0.096*	-0.059	-0.061*	-0.057
	[0.051]	[0.048]	[0.049]	[0.037]	[0.036]	[0.036]
Board Size	0.000	-0.000	0.000	0.000	0.001	0.000
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Has CRO	-0.006	-0.003	-0.003	-0.004	-0.004	-0.001
	[0.014]	[0.013]	[0.014]	[0.011]	[0.011]	[0.011]
Has Risk Comm.	-0.006	-0.004	-0.005	0.012	0.010	0.012
	[0.014]	[0.014]	[0.014]	[0.012]	[0.012]	[0.012]
Total loans				-0.091	-0.108	-0.089
				[0.075]	[0.069]	[0.071]
Deposits				-0.142	-0.126	-0.146
				[0.116]	[0.114]	[0.118]
Real estate loans				-0.168**	-0.145**	-0.177***
				[0.065]	[0.059]	[0.065]
MBS				-0.182*	-0.157	-0.189*
				[0.100]	[0.093]	[0.100]
Short-term financing				0.132	0.097	0.076
				[0.152]	[0.155]	[0.157]
Off-balance sheet				0.045	0.047	0.064
				[0.042]	[0.042]	[0.045]
% Independent directors	0.031		0.024	-0.058		-0.071
	[0.073]		[0.075]	[0.062]		[0.063]
%Fin expert among independent directors		-0.046**	-0.046**		-0.036	-0.040*
		[0.021]	[0.021]		[0.022]	[0.023]
Observations	54	54	54	54	54	54
Adjusted R-squared	-0.039	-0.003	-0.024	0.339	0.351	0.354

Table IV: Balance sheet risk and board characteristics in 2006

This table presents OLS regression coefficients for cross-sectional regressions in 2006 for Tier 1 capital ratios and real estate exposure on firm and board characteristics. Real estate loans are computed as all loans secured by real estate relative to total assets. Data on real estate loans and Tier-1 capital ratios are from the FED FRY-9C Call Report forms filed by Bank Holding Companies (BHCs). Net interest margin is a measure of bank profitability used as a control for the Tier 1 capital ratio regressions. We also define an indicator variable for whether banks have a long-term credit rating in the real estate regressions. All other board and risk monitoring variables are defined in Table I. All independent variables are measured at year-end 2005. A commercial bank is defined as large if the book value of total assets is greater than the median total asset number for the sample of commercial banks at year-end 2005. Robust standard errors corrected for heteroskedasticity are reported in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

Panel A: Tier-1 capital ratio

	All commercial banks			Large commercial banks		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(assets)	0.997	0.957	0.996	-0.826	-0.968	-0.966
	[0.945]	[0.971]	[0.953]	[1.419]	[1.412]	[1.418]
Log(assets) ²	-0.080*	-0.081*	-0.081*	0.007	0.011	0.011
	[0.047]	[0.048]	[0.048]	[0.067]	[0.066]	[0.067]
Net interest margin	-0.502*	-0.520**	-0.509*	-0.590*	-0.648*	-0.648*
	[0.265]	[0.263]	[0.268]	[0.343]	[0.345]	[0.346]
Board Size	0.028	0.030	0.022	-0.024	-0.025	-0.026
	[0.049]	[0.051]	[0.050]	[0.068]	[0.066]	[0.067]
Has CRO	0.260	0.292	0.314	0.342	0.419	0.420
	[0.404]	[0.418]	[0.417]	[0.450]	[0.455]	[0.457]
Has Risk Comm.	-0.600	-0.594	-0.551	-0.708	-0.704	-0.702
	[0.430]	[0.429]	[0.441]	[0.483]	[0.484]	[0.486]
%Independent	-1.895		-1.980	-0.086		-0.055
	[1.884]		[1.895]	[1.790]		[1.750]
%Fin expert among independent		-0.995	-1.045		-1.574*	-1.574*
		[0.819]	[0.828]		[0.866]	[0.869]
Observations	192	192	192	105	105	105
Adjusted R-squared	0.119	0.118	0.122	0.185	0.208	0.200

Panel B: Residential Real Estate Loans

	All commercial banks			Large commercial banks		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(assets)	-0.101	-0.101	-0.100	-0.204	-0.207	-0.200
	[0.071]	[0.070]	[0.071]	[0.143]	[0.138]	[0.143]
Log(assets) ²	0.003	0.003	0.003	0.008	0.008	0.008
	[0.004]	[0.004]	[0.004]	[0.007]	[0.007]	[0.007]
Has a long-term credit rating	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Board Size	0.002	0.003	0.002	0.003	0.004	0.003
	[0.003]	[0.003]	[0.003]	[0.004]	[0.004]	[0.004]
Has CRO	0.010	0.006	0.008	0.002	-0.003	-0.001
	[0.028]	[0.029]	[0.029]	[0.036]	[0.037]	[0.037]
Has Risk Comm.	0.025	0.020	0.023	0.034	0.027	0.033
	[0.030]	[0.030]	[0.031]	[0.035]	[0.034]	[0.035]
%Independent	-0.120		-0.118	-0.239		-0.244*
	[0.099]		[0.099]	[0.148]		[0.146]
%Fin expert among independent		0.037	0.035		0.050	0.056
		[0.058]	[0.058]		[0.078]	[0.080]
Observations	193	193	193	106	106	106
Adjusted R-squared	0.166	0.161	0.164	0.148	0.127	0.145

Table V: Total risk and board characteristics

This table presents OLS regression coefficients for panel regressions of market-based measures of risk-taking activities on firm and board characteristics. Total risk is the annual standard deviation of daily stock returns. All independent variables are defined in Table I and lagged by one year in the econometric specification. Panel A provides the results for the estimation on the full panel of banks over the entire period and the two sub periods, defined as the pre-crisis period (2003-2006) and the crisis period (2007-2008). Panel B provides the results for the same set of regressions estimated on the subset of large commercial banks. A commercial bank is defined as large for a given year if the book value of its total assets is greater than the median total asset number for the sample of commercial bank during that year. The standard deviation of the error term is estimated using clustering at the firm level. Standard errors are given in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

Panel A: All commercial banks

	Full period			Pre-Crisis period			Crisis period		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Log(assets)	0.022 [0.186]	0.012 [0.189]	0.019 [0.184]	-0.440*** [0.137]	-0.445*** [0.139]	-0.438*** [0.138]	0.787* [0.410]	0.809* [0.417]	0.769* [0.409]
Log(assets) ²	-0.004 [0.009]	-0.004 [0.009]	-0.004 [0.009]	0.016** [0.007]	0.017** [0.007]	0.016** [0.007]	-0.038* [0.020]	-0.039* [0.021]	-0.037* [0.020]
Equity capital ratio	1.577 [1.277]	1.888 [1.315]	1.739 [1.312]	0.821 [1.090]	1.093 [1.127]	0.994 [1.100]	2.845 [2.634]	2.611 [2.647]	2.830 [2.698]
Board Size	-0.023*** [0.008]	-0.021*** [0.007]	-0.022*** [0.007]	-0.015*** [0.005]	-0.015*** [0.005]	-0.015*** [0.005]	-0.040* [0.021]	-0.036* [0.021]	-0.038* [0.021]
Has CRO	0.001 [0.061]	-0.022 [0.060]	-0.010 [0.061]	-0.016 [0.047]	-0.027 [0.045]	-0.025 [0.045]	0.036 [0.131]	-0.006 [0.132]	0.027 [0.132]
Has Risk Comm.	0.058 [0.077]	0.040 [0.075]	0.050 [0.075]	-0.001 [0.047]	-0.013 [0.045]	-0.009 [0.047]	0.075 [0.172]	0.055 [0.173]	0.077 [0.169]
%Independent	-0.501** [0.206]		-0.506** [0.203]	-0.150 [0.153]		-0.159 [0.151]	-1.053** [0.488]		-1.029** [0.483]
%Fin expert among independent directors		0.242* [0.137]	0.245* [0.139]		0.150 [0.103]	0.154 [0.103]		0.316 [0.283]	0.290 [0.284]
Observations	889	889	889	578	578	578	311	311	311
Adjusted R-squared	0.779	0.778	0.780	0.322	0.325	0.326	0.697	0.694	0.697

Panel B: Large commercial banks

	Full period			Pre-Crisis period			Crisis period		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Log(assets)	-0.847*** [0.265]	-0.820*** [0.254]	-0.831*** [0.253]	-0.881*** [0.199]	-0.870*** [0.195]	-0.865*** [0.199]	-0.967 [0.798]	-0.823 [0.771]	-0.946 [0.781]
Log(assets) ²	0.037*** [0.013]	0.036*** [0.012]	0.036*** [0.012]	0.037*** [0.010]	0.037*** [0.009]	0.037*** [0.010]	0.045 [0.038]	0.038 [0.037]	0.044 [0.037]
Equity capital ratio	-0.360 [1.673]	-0.013 [1.735]	-0.103 [1.723]	-0.888 [1.629]	-0.363 [1.717]	-0.514 [1.605]	1.374 [3.403]	0.976 [3.385]	1.404 [3.553]
Board Size	-0.018** [0.008]	-0.016** [0.008]	-0.017** [0.008]	-0.013** [0.006]	-0.012** [0.006]	-0.013** [0.006]	-0.037 [0.029]	-0.032 [0.027]	-0.036 [0.029]
Has CRO	0.028 [0.067]	0.010 [0.067]	0.021 [0.067]	0.007 [0.052]	-0.009 [0.050]	-0.003 [0.050]	0.073 [0.156]	0.040 [0.156]	0.069 [0.156]
Has Risk Comm.	0.106 [0.068]	0.094 [0.064]	0.098 [0.065]	0.000 [0.046]	-0.012 [0.043]	-0.010 [0.045]	0.286 [0.177]	0.269 [0.175]	0.281 [0.174]
%Independent	-0.361 [0.247]		-0.409 [0.248]	-0.178 [0.190]		-0.236 [0.182]	-0.936 [0.758]		-0.930 [0.763]
%Fin expert among independent		0.245 [0.167]	0.272 [0.172]		0.246** [0.112]	0.268** [0.111]		0.272 [0.419]	0.266 [0.429]
Observations	523	523	523	362	362	362	161	161	161
Adjusted R-squared	0.819	0.819	0.820	0.335	0.348	0.352	0.707	0.705	0.706

Table VI: Stock performance in 2006

This table presents OLS regression coefficients of firm stock performance in 2006 (measured as the nominal cumulative stock return over 2006) on firm and board characteristics and risk monitoring functions. A commercial bank is defined as large if its book value of total assets is greater than the median total asset number for the sample of commercial banks in 2005. $\text{Log}(\text{Assets})$ is the natural logarithm of total assets. Equity capital ratio is defined as total book equity divided by total assets. Beta is computed as the market beta estimated from a market model in which the daily stock returns are explained by the value-weighted market return and the return on the three-month Treasury bill. All board and risk monitoring variables are defined in Table I. All independent variables are taken as of the fiscal year end 2005. Robust standard errors corrected for heteroskedasticity are reported in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

	All commercial banks			Large commercial banks		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(Assets)	-0.196*** [0.066]	-0.196*** [0.065]	-0.197*** [0.065]	-0.088 [0.124]	-0.069 [0.121]	-0.078 [0.122]
Log(Assets) ²	0.010*** [0.003]	0.010*** [0.003]	0.010*** [0.003]	0.005 [0.006]	0.004 [0.006]	0.005 [0.006]
Equity capital ratio	0.681 [0.541]	0.800 [0.520]	0.802 [0.523]	-0.601 [0.571]	-0.494 [0.595]	-0.529 [0.584]
Beta	0.045** [0.021]	0.044** [0.021]	0.044** [0.021]	0.043 [0.041]	0.049 [0.040]	0.044 [0.040]
Board Size	0.004 [0.003]	0.004 [0.003]	0.005 [0.003]	0.012*** [0.003]	0.011*** [0.003]	0.012*** [0.003]
Has CRO	0.018 [0.028]	0.011 [0.029]	0.011 [0.029]	0.021 [0.026]	0.019 [0.026]	0.018 [0.027]
Has Risk Comm.	-0.042 [0.027]	-0.046 [0.028]	-0.047* [0.028]	-0.062** [0.024]	-0.059** [0.024]	-0.062** [0.024]
% independent	0.028 [0.106]		0.041 [0.101]	0.129 [0.117]		0.127 [0.117]
%Fin expert among independent		0.128* [0.070]	0.130* [0.070]		0.044 [0.075]	0.043 [0.074]
Observations	197	197	197	102	102	102
Adjusted R-squared	0.035	0.060	0.056	0.126	0.120	0.121

Table VII: Stock performance over the entire sample period

This table presents OLS regression coefficients of firm stock performance over the entire sample period on firm and board characteristics and risk monitoring functions. Panel A reports the results for all commercial banks. Panel B reports the results for large commercial banks. A bank is defined as large if its book value of total assets is greater than the median total asset number for the sample of commercial banks for 2003. Stock performance is measured as the nominal cumulative stock return from January 2004 to December 2008. $\text{Log}(\text{assets})$ is the natural logarithm of total book assets. Equity capital ratio is defined as total book equity divided by total assets. Beta is computed as the market beta estimated from a market model in which the daily stock returns are explained by the value-weighted market return and the return on the three-month Treasury bill. All board and risk monitoring variables are defined in Table I. All variables are taken as of the fiscal year end 2003. Robust standard errors corrected for heteroskedasticity are reported in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

	All commercial banks			Large commercial banks		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(Assets)	0.707*	0.689*	0.689*	0.546	0.577	0.544
	[0.390]	[0.389]	[0.388]	[0.593]	[0.533]	[0.550]
Log(Assets) ²	-0.036*	-0.036*	-0.036*	-0.029	-0.033	-0.031
	[0.020]	[0.019]	[0.019]	[0.029]	[0.026]	[0.027]
Equity capital ratio	-1.292	-0.840	-1.520	-1.428	-2.611	-2.819
	[2.386]	[2.422]	[2.472]	[2.687]	[2.566]	[2.612]
Beta	0.262	0.285	0.284	0.279	0.419**	0.422**
	[0.195]	[0.201]	[0.207]	[0.204]	[0.194]	[0.199]
Board Size	0.009	0.009	0.009	0.010	0.010	0.010
	[0.015]	[0.015]	[0.015]	[0.016]	[0.016]	[0.016]
Has CRO	-0.027	-0.054	-0.025	0.024	0.046	0.054
	[0.117]	[0.117]	[0.118]	[0.130]	[0.127]	[0.130]
Has Risk Comm.	-0.255**	-0.264**	-0.247*	-0.189	-0.151	-0.142
	[0.124]	[0.129]	[0.128]	[0.134]	[0.133]	[0.133]
% independent	-0.597**		-0.574*	-0.462*		-0.254
	[0.275]		[0.292]	[0.273]		[0.280]
%Fin expert among independent		-0.189	-0.115		-0.826***	-0.772***
		[0.315]	[0.318]		[0.253]	[0.267]
Observations	100	100	100	80	80	80
Adjusted R-squared	0.053	0.028	0.044	0.005	0.075	0.068

Table VIII: Stock performance during the crisis and CEO power

This table presents OLS regression coefficients of firm stock performance during the crisis on firm and board characteristics and risk monitoring functions for a sample of large commercial banks. A bank is defined as large if its book value of total assets is greater than the median total asset number for the sample of commercial banks in 2006. Stock performance is measured as the nominal cumulative stock return from January 2007 to December 2008. $\text{Log}(\text{assets})$ is the natural logarithm of total book assets. Equity capital ratio is defined as total book equity divided by total assets. Beta is computed as the market beta estimated from a market model in which the stock returns are explained by the value-weighted market return and the return on the three-month Treasury bill. Stock ret 2006 is the nominal cumulative stock return over 2006. All board and risk monitoring variables are defined in Table I. Data on loans, deposits, real estate loans, and mortgage backed securities are from the FED FRY-9C Call Report forms filed by Bank Holding Companies (BHCs). Real estate loans are computed as all loans secured by real estate relative to total assets. MBS are mortgage-backed securities held-to-maturity, available-for-sale, and held for trading relative to total assets. Short-term financing is non-deposit short-term financing to total asset. Off-Balance sheet activities is the off balance sheet securitized assets (home equity, credit card, auto loans, etc.) to total assets. In regression (1) the proxy for CEO power is an indicator variable equal to one if the CEO is also the Chairman of the Board and zero otherwise. In regression (2) the proxy for CEO power is the percentage of board members whose tenure on the board exceeds that of the current CEO so the indicator variable is equal to one if the bank falls below the median on this measure of relative CEO tenure. In regression (3) the proxy for CEO power is the percentage of independent directors with greater tenure and the indicator variable we derive from this measure takes the value of one for all firms below the median of the commercial bank sample. In regression (4) the proxy for CEO power is the percentage of independent financial experts whose tenure exceeds that of the CEO and we also derive a CEO strength variable from it that takes the value of one for all banks that fall below the median value on that dimension. All variables are taken as of the fiscal year end 2006. Robust standard errors corrected for heteroskedasticity are reported in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

	(1)	(2)	(3)	(4)
Log(assets)	0.530	0.572	0.619	0.531
	[0.390]	[0.383]	[0.384]	[0.389]
Log(assets) ²	-0.031*	-0.032*	-0.034*	-0.030
	[0.018]	[0.018]	[0.018]	[0.018]
Equity capital ratio	0.199	0.197	0.130	0.159
	[1.473]	[1.410]	[1.404]	[1.434]
Beta	0.167	0.183	0.184	0.169
	[0.120]	[0.118]	[0.118]	[0.126]
Stock ret 2006	0.160	0.194	0.201	0.219
	[0.271]	[0.291]	[0.290]	[0.299]
Board Size	0.006	0.006	0.006	0.006
	[0.011]	[0.011]	[0.011]	[0.011]
Has CRO	0.081	0.098	0.092	0.104
	[0.074]	[0.070]	[0.071]	[0.073]
Has Risk Comm.	-0.092	-0.130	-0.135*	-0.114
	[0.078]	[0.081]	[0.079]	[0.077]
Total loans	-0.015	0.013	0.011	-0.020
	[0.594]	[0.629]	[0.625]	[0.671]
Deposits	-0.581	-0.455	-0.483	-0.403
	[0.701]	[0.685]	[0.682]	[0.695]
Real estate loans	-1.321***	-1.224**	-1.216**	-1.230**
	[0.482]	[0.488]	[0.489]	[0.480]
MBS	0.470	0.560	0.548	0.518
	[0.545]	[0.598]	[0.583]	[0.609]
Short-term financing	-1.636	-1.311	-1.394	-1.269
	[1.057]	[1.086]	[1.085]	[1.195]
Off-balance sheet	0.629	0.592	0.590	0.605
	[0.516]	[0.491]	[0.482]	[0.525]
% Independent directors	-0.842**	-0.820**	-0.775**	-0.823**
	[0.323]	[0.341]	[0.349]	[0.335]
%Fin expert among independent directors	-0.169	-0.634**	-0.731**	-0.451
	[0.317]	[0.302]	[0.325]	[0.276]
CEO power proxy	0.183	-0.062	-0.094	0.007
	[0.118]	[0.108]	[0.103]	[0.122]
CEO power proxy * %Fin exp	-0.410	0.300	0.432	0.051
	[0.356]	[0.343]	[0.354]	[0.415]
Observations	98	98	98	98
Adjusted R-squared	0.277	0.260	0.266	0.254

Table IV: Sample-related robustness tests

Panel A estimates the same first three “performance during crisis” regressions of Table II (Panel A and B) on the extended sample of all publicly-traded commercial banks, savings and loan associations (S&Ls) and investment banks. A bank-type constant is added to each specification. Panel B estimates the same three “pre-crisis market-based risk” regressions of Table V (Panel A and B) on the extended sample of all publicly-traded commercial banks, savings and loan associations (S&Ls) and investment banks. A bank-type indicator variable is added to each specification. Panel C and D estimates the same performance during crisis and pre-crisis market-based risk regressions on the sample of publicly-traded commercial banks, excluding the five largest commercial banks (Citigroup, Bank of America, JP Morgan Chase, Wachovia, and Wells Fargo). Robust standard errors corrected for heteroskedasticity are reported in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

Panel A: Crisis results on broader set of financial institutions – Performance

	All Financial Institutions			Large Financial Institutions		
	(1)	(2)	(3)	(1)	(2)	(3)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Pct independent	-0.094 [0.206]		-0.123 [0.203]	-0.302 [0.299]		-0.290 [0.282]
Pct indep fin experts		-0.207* [0.114]	-0.211* [0.114]		-0.389** [0.154]	-0.387** [0.154]
Observations	272	272	272	137	137	137
Adjusted R-squared	0.060	0.072	0.069	0.072	0.110	0.108

Panel B: Pre-crisis results on broader set of financial institutions - Total risk

	All financial Institutions			Large Financial Institutions		
	(1)	(2)	(3)	(1)	(2)	(3)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Pct independent	-0.231* [0.128]		-0.198 [0.132]	-0.246 [0.152]		-0.288* [0.150]
Pct indep fin experts		0.171* [0.094]	0.169* [0.095]		0.299** [0.119]	0.313** [0.121]
Observations	813	812	812	509	509	509
Adjusted R-squared	0.270	0.269	0.272	0.246	0.267	0.274

Panel C: Crisis results on commercial banks excluding largest banks – Performance

	All Commercial Banks			Large Commercial Banks		
	(1)	(2)	(3)	(1)	(2)	(3)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Pct independent	-0.508** [0.239]		-0.523** [0.235]	-0.614* [0.329]		-0.553* [0.323]
Pct indep fin experts		-0.207 [0.135]	-0.218* [0.129]		-0.511*** [0.192]	-0.493*** [0.183]
Observations	194	194	194	99	99	99
Adjusted R-squared	0.071	0.060	0.081	0.053	0.102	0.119

Panel D: Pre-crisis results on commercial banks excluding largest banks - Total risk

	All Commercial Banks			Large Commercial Banks		
	(1)	(2)	(3)	(1)	(2)	(3)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Pct independent	-0.146 [0.160]		-0.155 [0.157]	-0.244 [0.188]		-0.292 [0.182]
Pct indep fin experts		0.170 [0.106]	0.173 [0.106]		0.222* [0.115]	0.246** [0.114]
Observations	562	562	562	352	352	352
Adjusted R-squared	0.298	0.302	0.303	0.344	0.351	0.359

Table X: Robustness of board characteristics definitions

Each panel of this table replicates the performance in crisis regressions (Table II) and the market-based and balance sheet-based measures of risk taking in the run-up to the crisis (Table IV and V) for the sample of large commercial banks using alternate definitions for board independence and financial expertise. In Panel A, we use a more restrictive definition of independence. Among the declared independent board members, we compute the percentage of independent directors on the board who do not have any present or past social or economic ties with the current CEOs beyond being on the same bank board. This variable is computed using Boardex database and matching up a given director with the current CEO against all education-related, charity-related and business-related institutions. In Panel B, we use a more restrictive definition of financial expertise relative to Guner et al. (2008). Specifically, an independent director is defined as a financial expert only if he is an executive within the financial industry (SIC code between 6000 and 6999). Robust standard errors corrected for heteroskedasticity are reported in brackets. ***, ** and * denote respectively significance at the 1%, 5% and 10% levels.

Panel A: More restrictive definition of independence

Crisis regressions: Large commercial banks

	Base controls			Augmented set of controls		
	(1)	(2)	(3)	(1)	(2)	(3)
Pct truly indep	-0.081 [0.139]		-0.030 [0.135]	-0.068 [0.132]		-0.032 [0.132]
Pct truly indep fin exp		-0.417*** [0.145]	-0.412*** [0.147]		-0.356** [0.138]	-0.352** [0.141]
Observations	101	101	101	101	101	101
Adjusted R-squared	0.004	0.076	0.067	0.175	0.229	0.220

Total risk in pre-crisis: Large commercial banks

	(1)	(2)	(3)
Controls	Yes	Yes	Yes
Pct truly indep	-0.212*** [0.074]		-0.248*** [0.076]
Pct truly indep fin exp		0.108 [0.084]	0.180** [0.089]
Observations	362	362	362
Adjusted R-squared	0.354	0.336	0.363

Balance sheet Tier 1 capital: Large commercial banks

	(1)	(2)	(3)
Controls	Yes	Yes	Yes
Pct truly indep	-1.444** [0.686]		-1.350* [0.701]
Pct truly indep fin exp		-0.867 [0.793]	-0.572 [0.697]
Observations	105	105	105
Adjusted R-squared	0.224	0.195	0.220

Panel B: More restrictive definition of financial expertise

Crisis regressions: Large commercial banks

	Base controls			Augmented set of controls		
	(1)	(2)	(3)	(1)	(2)	(3)
Pct independent	-0.625*		-0.591*	-0.753**		-0.758**
	[0.331]		[0.341]	[0.326]		[0.331]
Pct indep fin exp		-0.369	-0.347		-0.338*	-0.343**
		[0.226]	[0.212]		[0.172]	[0.156]
Observations	101	101	101	101	101	101
Adjusted R-squared	0.033	0.030	0.049	0.217	0.198	0.234

Total risk in pre-crisis: Large commercial banks

	(1)	(2)	(3)
Controls	Yes	Yes	Yes
Pct independent	-0.178		-0.244
	[0.190]		[0.183]
Pct indep fin exp		0.308**	0.336**
		[0.142]	[0.145]
Observations	362	362	362
Adjusted R-squared	0.335	0.350	0.355

Balance sheet Tier 1 capital: Large commercial banks

	(1)	(2)	(3)
Controls	Yes	Yes	Yes
Pct independent	-0.086		-0.028
	[1.790]		[1.794]
Pct indep fin exp		-1.161	-1.160
		[0.991]	[0.995]
Observations	105	105	105
Adjusted R-squared	0.185	0.195	0.186

Figure 1: Composition of financial expertise

This figure provides the average composition of financial expertise among independent directors of the board for publicly traded commercial banks with total assets greater than \$1Bn over the period 2003-2008. Following Güner et al. (2008), a director is classified as a financial expert if he or she works at a financial institution (*Commercial banker, Investment banker or S&L banker*), a non-bank finance company (*Exec. Of non-bank financials*), or if he or she holds a finance-related position (e.g. chief financial officer (CFO), accountant, treasurer, VP finance) of a non-financial firm (*Finance exec. of non-financials*), holds an academic position in a related field (e.g. *Professor of finance, economics or accounting*), or works as a hedge fund or private equity fund manager, or venture capitalist (*Professional investor*).

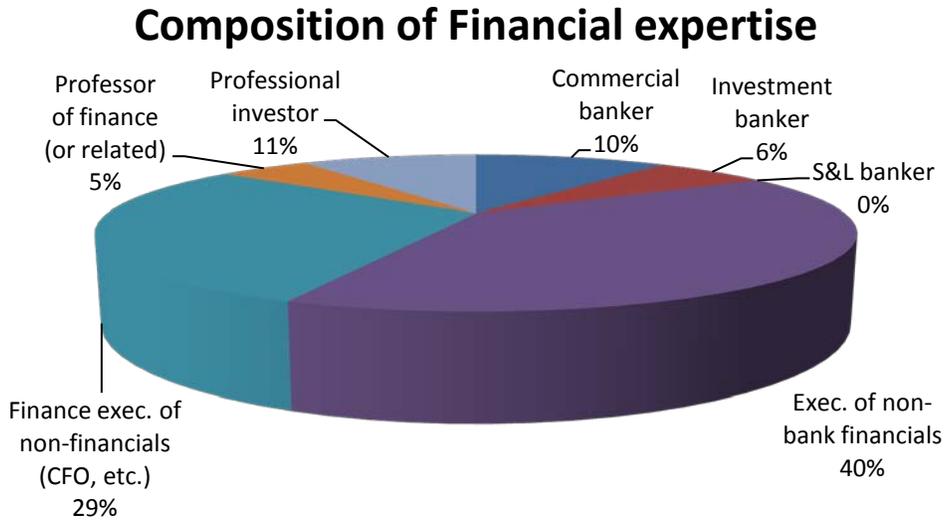
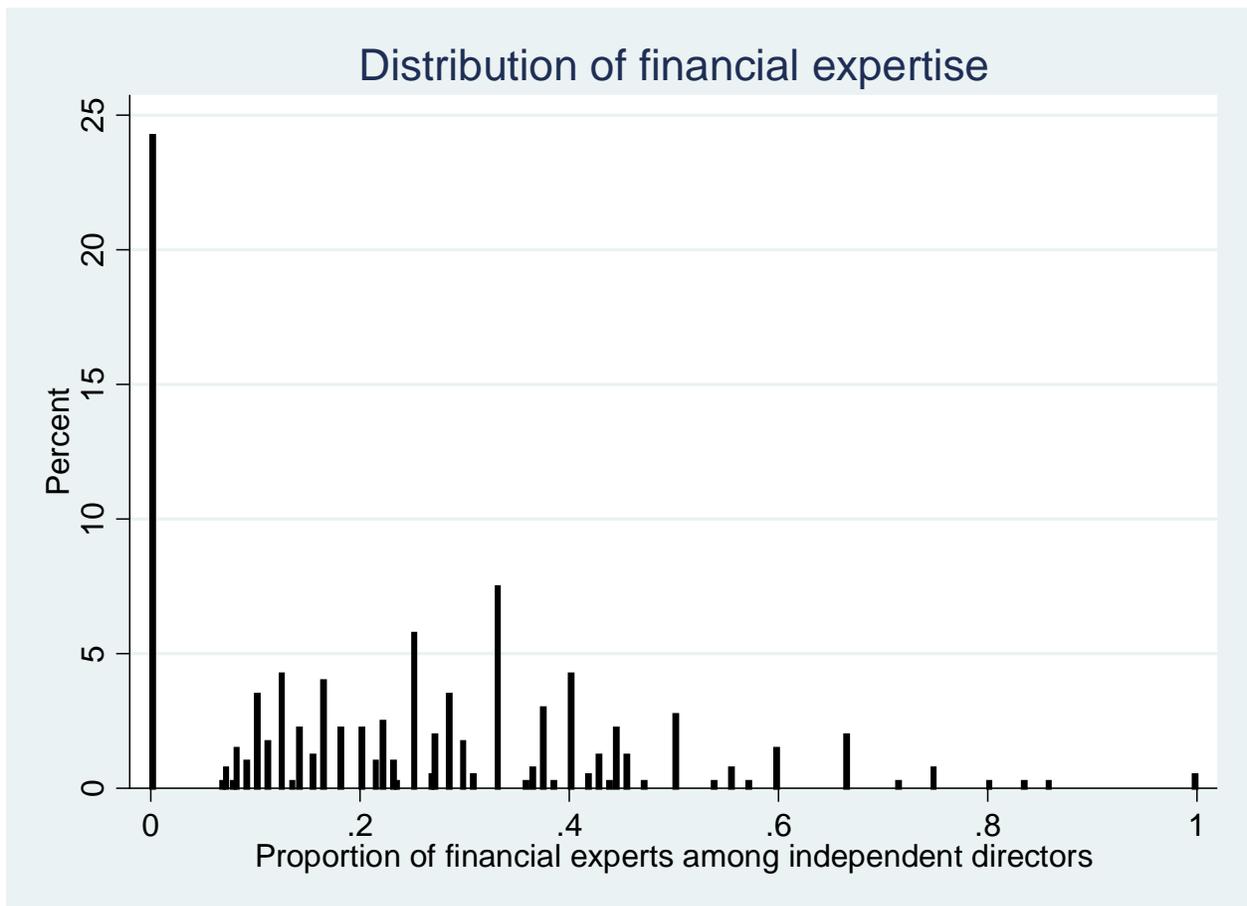


Figure 2: Distribution of financial expertise among commercial banks

This figure provides the distribution of independent directors with financial expertise across all commercial banks with total assets greater than \$1Bn in 2006. Following Güner et al. (2008), a director is classified as a financial expert if he or she works at a financial institution (*Commercial banker, Investment banker or S&L banker*), a non-bank finance company (*Exec. Of non-bank financials*), or if he or she holds a finance-related position (e.g. chief financial officer (CFO), accountant, treasurer, VP finance) of a non-financial firm (*Finance exec. of non-financials*), holds an academic position in a related field (e.g. *Professor of finance, economics or accounting*), or works as a hedge fund or private equity fund manager, or venture capitalist (*Professional investor*).



Appendix

Appendix A: Board of JP Morgan Chase at the onset of the financial crisis (2006)

Insiders:

1. James Dimon, President and CEO of JP Morgan Chase
2. William Harrison, Chairman and past CEO of JP Morgan Chase
3. Robert Lipp, Senior Advisor to JP Morgan Chase

Outsiders (independent directors):

1. John Biggs, Former Chairman and CEO of TIAA-CREF, retirement funds (financial expert*)
2. Crandall Bowles, Chairman and CEO of Springs Industries, window manufacturer
3. Stephen Burke, President of Comcast Cable Communications Inc., cable television
4. James Crown, President of H. Crown and Company, diversified investments (financial expert*)
5. Ellen Futter, President and Trustee of the American Museum of Natural History
6. William Gray III, Chairman of the Amani Group, consulting and advisory
7. Laban Jackson, Chairman and CEO of Clear Creek Properties Inc., real estate development
8. John Kessler, owner of John W. Kessler Company, real estate development
9. Richard Manoogian, Chairman and CEO of Masco Corporation, diversified manufacturer
10. David Noval, Chairman and CEO of Yum! Brands, Inc, franchised restaurants
11. Lee Raymond, Retired Chairman and CEO of Exxon Mobil Corp, oil and gas
12. William Weldon, Chairman and CEO of Johnson & Johnson, healthcare products

*: Both directors are considered financial experts according to our definition as they are executives of non-bank financial institutions.

Appendix B: Bank Characteristics

This table provides the firm characteristics for our sample of U.S. financial institutions at the end of 2006. Panel A provides summary statistics for the sample combining commercial banks, investment banks and savings and loan associations (S&L). Panels B, C and D provides summary statistics for each bank type separately. Total assets is given as of fiscal year-end 2006. ROA is the return on assets and ROE the return on equity for the corresponding fiscal year. M/B is the ratio of the market value of assets divided by the book value of assets at fiscal year-end 2006, where the market value of assets is computed as the sum of book value of asset and market value of equity, minus the book value of equity. Equity capital ratio is book equity to total assets at fiscal year-end 2006. The variables are computed using Compustat source. The sample of commercial banks used for most tests in the study is reduced by about 10% once data availability from call reports is imposed.

Panel A: Full sample				
Variables	N	median	mean	stdev
Total assets	292	2,911	44,230	194,899
ROA	284	0.01	0.012	0.009
ROE	284	0.059	0.059	0.022
M/B	284	1.084	1.091	0.059
Equity capital ratio	284	0.091	0.096	0.041
Panel B: Commercial banks				
Variables	N	median	mean	stdev
Total assets	225	2,850	37,736	190,506
ROA	219	0.011	0.011	0.004
ROE	219	0.059	0.059	0.016
M/B	219	1.093	1.098	0.051
Equity capital ratio	219	0.091	0.092	0.023
Panel C: Savings&Loans				
Variables	N	median	mean	stdev
Total assets	60	2,839	12,509	45,623
ROA	58	0.007	0.009	0.013
ROE	58	0.054	0.053	0.035
M/B	58	1.047	1.068	0.079
Equity capital ratio	58	0.096	0.11	0.054
Panel D: Investment banks				
Variables	N	median	mean	stdev
Total assets	7	503,545	524,839	431,026
ROA	7	0.049	0.047	0.012
ROE	7	0.094	0.091	0.023
M/B	7	1.053	1.057	0.029
Equity capital ratio	7	0.039	0.11	0.173