

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

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**Abstract**

We examine how risk taking and firm value are related to independence and financial expertise of the board for a large sample of U.S. financial institutions both before and during the financial crisis. During the crisis, financial expertise is negatively related to both changes in Tobin's Q and cumulative stock returns. The effect is stronger for larger banks. Results on independence and performance during the crisis are mixed. However, independence is associated with a significantly higher probability of getting TARP funds, while financial expertise is not. In the run-up to the crisis, market-based measures of risk are negatively related to the percent of independent directors and positively related to financial expertise. Furthermore, both stock performance prior to the crisis and leverage are positively related to the financial expertise of the board. These associations are again primarily driven by large banks in our sample. Overall, our results are consistent with financial expertise being associated with more risk taking and higher firm value prior to the crisis and lower performance when the crisis hits.

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

JEL Classification: G20, G21, G24, G32

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## 1. Introduction

One of the main commentaries about the causes of the current financial crisis is that financial firms engaged in excessive risk taking. A failure of internal risk governance mechanisms has often been cited among the key contributing factors to the crisis (see for example Guerrero and Thal-Larsen (2008), Hashagen et al. (2009), Kilpatrick (2009), Strebel (2009), and Walker (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. 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.<sup>1</sup> 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.

Our paper puts to the test the conjecture that, because of their understanding of more complex financial instruments and transactions, more financial experts among independent board members leads to more efficient risk-taking behavior in financial institutions. The alternative hypothesis is that financial experts on the board recognize both the government guarantees offered to banks and the residual nature of shareholders' claims and hence encourage more risk-taking activities as they are beneficial from a shareholder's standpoint (e.g. Merton (1977), Keeley (1990)). Under this assumption, banks with more financial expertise might be more exposed when a crisis hits and hence fare worse.

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, and investment banks during the period from 2003 to 2008 that documents whether each independent director has financial expertise. Following 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,

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<sup>1</sup> See Appendix A for details.

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).

Over the period from 2003 to 2008, the percent of independent directors on the board increases from 72% in 2003 to almost 80% in 2008.<sup>2</sup> This high percentage of director independence is not surprising given the implementation of Sarbanes-Oxley (SOX) and listing requirements. During the same period, the average percent of financial experts among independent directors also increases from 22% in 2003 to 27% in 2008. These low levels of financial expertise among independent directors are in part driven by the fact that about a quarter of the financial institutions in the sample do not have a single financial expert among its independent directors. These results confirm that bank boards are mostly independent during our sample period but that financial expertise is often lacking among these independent directors.

In our main set of regressions, we examine how financial expertise and independence relate to various aspects of the financial crisis. Specifically, we examine the relations between these board variables and (1) stock performance during the 2007 to 2008 period; (2) changes in overall firm value (Tobin's Q) during the crisis; and (3) the probability of receiving TARP funds. We control for many other factors that could affect performance during the crisis. In recent years, many banks underwent a transformation from being straightforward financial intermediaries to becoming more complex actors in the financial system by engaging in many novel fee-based operations, proprietary trading, and increased use of derivatives and other off-balance sheet vehicles. With this in mind, we explicitly control for the reported existence of a CRO and/or a risk management committee separate from the audit and asset and liabilities management (ALM) committees in our regressions.<sup>3</sup> We also control for other firm characteristics such as bank size, exposure to real estate, leverage, type of financing, and board size.

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<sup>2</sup> In 2001, the year prior to the implementation of SOX, the percentage of independent directors was significantly lower at about 58%.

<sup>3</sup> 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

Our analysis of stock performance shows that financial expertise is negatively related to stock market performance during the 2007 to 2008 period. Interestingly, once we augment the set of controls to include exposure to real estate loans, deposit financing, and mortgage-backed securities, financial expertise is not statistically related to stock performance for the full sample. However, the relation remains statistically significant and negative for all sets of controls once we focus solely on large banks in our sample.<sup>4</sup> The analysis of changes in overall firm value over the same period shows results that are consistent and very similar to the stock performance results, whereby financial expertise is negatively related to changes in firm value during the crisis, especially for large banks. The relation between independence and stock performance is not consistent across specifications. Lastly, we find that the probability of receiving TARP funds is not statistically related to the financial expertise among independent directors. However, larger boards and more independent boards are associated with higher probabilities of receiving TARP funds.

Endogeneity concerns always exist in studies relating corporate governance aspects to firm performance (e.g. Hermalin and Weisbach (1998), Adams, Hermalin and Weisbach (2010)). We do not use an instrumental variable approach and there is not enough within-firm variation to implement a firm fixed-effect approach. Instead, we specify lagged independent variables, bank type fixed effects and year indicator variables similar to the main specifications of Coles, Daniel and Naveen (2008) and Linck, Netter and Yang (2008). Given the cross-sectional nature of our identification strategy, causal interpretations 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 led these financial institutions to take on more risks that were not rewarded when the crisis hit. We provide below some insights on this issue by examining whether the presence of

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bank holding companies and find that banks with the highest score in terms of risk management at the onset of the crisis fared better during the crisis.

<sup>4</sup> Our full sample consists of bank holding companies with total assets greater or equal to \$1Bn. Large banks in our sample are defined as having total assets greater than the median total assets in any given year. For the period between 2003 and 2008, the median value for total assets stands above \$3Bn dollars.

financial experts on boards is related to specific increases in risk exposures in the run up to the crisis and whether their presence had a positive or detrimental effect on stock performance prior the crisis.

Leading up to the recent financial crisis, banks chose to structure their balance sheets in such a way that might have made them more vulnerable to the crisis. For instance, many banks became more involved in real estate related activities which made them much more vulnerable to the real estate bubble. To examine the associations between board independence, financial expertise, and the extent of a bank's involvement in these activities, we focus on the commercial banks where detailed bank balance sheet data are available from the Commercial Bank Holding Company Database. We find that among large 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 both leverage and real estate exposures in the run-up to the crisis.

We then turn our analysis to market-based measures of risk-taking in the run-up to the crisis. Controlling for many bank characteristics such as firm size, board size and independence, risk management functions, and other determinants of total risk, we find that the fraction of independent directors with financial expertise is positively and significantly related to total firm risk. This effect is particularly strong among large financial institutions. 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.

Lastly, we relate financial expertise to stock performance in the year prior to the onset of the financial crisis. We find that financial expertise is 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 and resulted in lower values during 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.

Several recent papers examine the role of internal governance mechanisms going into the financial crisis (e.g. Adams (2009), 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 (2009), 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 and 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 in a broad sample of U.S. financial institutions.<sup>5</sup> In stable times, the presence of external financial experts on the board is associated with higher risk taking and performance. Since financial expertise on the board is related to more risk taking, it is not surprising that these banks suffer larger stock losses during the crisis.

Given the endogeneity concerns, we cannot fully dispel the argument that, without the presence of financial expertise, banks with a high appetite for risks would have performed even worse. Their presence, however, did not lead these banks to outperform their peers during the crisis. As such, our results challenge the popular view that more financial expertise on the boards of banks would unambiguously improve their risk profile. Our results are still consistent with the board acting to maximize shareholder value *ex ante*. In particular, the presence of financial experts among independent directors is related to more risk taking in the run-up to the crisis and this favorable attitude towards risk-taking was rewarded by the markets prior to the crisis. However, it also led to relative underperformance when the crisis hit.

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<sup>5</sup> There is a concurrent study by Fernandes and Fich (2009) that examines 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 very different from ours. We conjecture that this is due to the different set of banks and controls they use and the differences in how financial expertise is measured at the board level.

The rest of the paper is organized as follows. In section 2, we discuss the importance and implications of the composition of the board of directors and how this may impact firm risk taking and performance. Section 3 describes the sample. Performance during the crisis and how it relates to board composition is examined in Section 4. Section 5 discusses results related to risk taking and board composition in the run-up to the crisis. Section 6 concludes.

## **2. Board Structure and Risk Taking**

Given the important financial intermediation role of banks in the economy, 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” (BIS, 2006). The “key characteristic of independence is the ability to exercise sound judgment after consideration of all relevant information and views without influence from management.” (BIS, 2006). The more complex and risky the transactions a bank undertakes to increase firm value are, the more important financial knowledge of the board becomes.

At least since Merton (1977), it is a well-known fact that deposit insurance has led shareholders to seek increased risk-taking activities in order to increase their residual claim on the firm. Furthermore, “too big to fail” considerations also provide implicit guarantees from the government in the form of potential bailouts if a given financial institution runs into trouble. 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.<sup>6</sup>

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 acting in the interest of regulators and depositors, board independence will be associated with less risk taking.<sup>7</sup>

For a given level of independence, a more financially knowledgeable board is better equipped to evaluate the risk taking activities of the bank. A better understanding of more complex investments might lead them to encourage risk taking activities if they believe that doing so will increase shareholder value. On the other hand, 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 risky bets that will not pay off or which are unsound for the financial stability of the bank.

Empirically, Güner, Malmendier and Tate (2008) show that within *non-financial* corporations, 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 board with more financial expertise have fewer restatements.

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

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

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<sup>6</sup> Leaven and Levine (2009) show that bank regulations and specific ownership structures matter across countries. We avoid this issue by focusing on U.S. financial institutions and introducing bank type fixed effects wherever possible to control for time-invariant unobserved variables, such as regulation over our relatively short-window of analysis.

<sup>7</sup> Pathan (2009) finds that board size and independence are negatively associated with total and idiosyncratic firm risk for a sample of US bank holding companies during the period from 1997 to 2004.



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 optimum risk taking level. Furthermore, a bank's size can affect its risk profile in several ways. For instance, larger bank holding companies (BHCs) tend to be better diversified and hence less vulnerable to shocks. However, larger BHCs might engage in riskier activities, such as off-balance sheet operations. To examine this issue further, our empirical design will also run each set of tests on the subset of large banks within our sample.

### **3. Description of the sample and board characteristics**

In this section, we first describe how we construct our sample. Second, we provide details on our independence and financial expertise variables and how they correlate with other firm and board level characteristics. Lastly, we review two risk management dimensions used as control variables in our tests.

#### *3.1 The sample*

Ideally, we want to have a large cross-section of 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 2003-2008 period. Furthermore, we eliminate small banks from our study by focusing only on those with more than \$1Bn 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, while S&L about 23% and investment banks 2%. The sample varies

from 252 firms in 2003 to 193 in 2008, with a maximum of 322 firms in 2007. We also require that firms have data on Compustat and CRSP over the sample period.<sup>8</sup>

Firm characteristics for year-end 2006 are reported in Table B of the Appendix. Summary statistics are shown for commercial banks, savings and loan, and investment banks separately. There is much heterogeneity across all firms pertaining to firm size, as measured by total assets, and performance, as measured by return on assets (ROA) and return on equity (ROE). The investment banks are much bigger than their counterparts and have higher profitability in 2006.<sup>9</sup>

### 3.2 *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)). Data on board size and board independence are taken from BoardEx which reports the disclosure made by firms along those dimensions.

Board size is the number of board of directors. Decision making costs are assumed to be lower in smaller boards than in larger boards. As such, smaller boards might be more effective monitors. If boards are acting in the interest of shareholders, then one may expect board size and risk to be inversely related. If, on the other hand, boards are more concerned with the interests of regulators, one may expect a negative relation between board size and risk. 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.

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<sup>8</sup> Depending on the specifications of our tests, the sample size is sometimes reduced further due to data availability issues on some balance sheet items or stock market data.

<sup>9</sup> All of our results hold when we restrict our sample to commercial banks only.

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

[Insert Table 1 here]

Panel A of Table 1 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 12.3 board members in 2003 to about 11.6 members in 2008. While not tabulated, commercial banks typically have larger boards than either savings and loan associations (S&Ls) or investment banks. The percent of independent directors has grown over the sample period. In 2003, 72% of the board is independent. In contrast, in 2008, independent directors make over 78% of the board.

### 3.3 *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, a non-bank 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). Figure 1 presents a pie graph summarizing the average composition of financial expertise over the sample period. As Figure 1 shows, about a third of independent directors hold finance related positions at non-financial firms and another 38% hold positions at non-bank financial institutions. Commercial bankers make up 12% of independent directors with financial expertise. Each category can include directors who have retired from their main reported occupation.

[Insert Figure 1 here]

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 1 summarizes the average level of financial expertise of the board across the sample. As with board independence, financial expertise increases over the sample period. On average, the fraction of financial experts among independent directors increases from 22% in 2003 to 27% in 2008. Overall, the statistics in Table 1 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 our sample of financial institutions. It is interesting to note that the spread is relatively significant between 0 and 1. Furthermore, the figure shows that there are more than 20% of banks with no financial experts among its independent directors.<sup>10</sup>

[Insert Figure 2 here]

In Panel B of Table 1, we present a correlation matrix for our proxies of board independence and financial expertise. 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, in terms of our board governance measures, it is noteworthy to mention the lack of correlation between our novel measure of financial expertise of the board and other board characteristics.

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<sup>10</sup> 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 hence not shown.

### *3.4 Risk management structures*

We measure risk monitoring at a financial institution 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 1 again, 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 large financial institutions.

## **4. Board characteristics and the crisis**

In this section of the paper, we examine the associations between independence, financial expertise of the board and performance during the crisis period (2007-2008). We first assess performance during the crisis by looking at stock returns. Second, we analyze changes in firm value, as proxied by Tobin's Q. Lastly, we estimate the probability of receiving money from the U.S. Treasury's Troubled Asset Relief Program (TARP).

### *4.1 Stock performance*

In this section, we examine stock performance as it relates to board composition and other firm characteristics. Table 2 present the regression coefficients of stock performance during the crisis period on firm and board characteristics. Stock performance is measured as the nominal cumulative stock return

from January 2007 to December 2008.<sup>11</sup> The set of firm and board characteristics used as controls in the regressions are measured at fiscal year-end 2006, except for the firms' cumulative stock return during 2006. Beta is computed using a market model with daily returns over 2006. The last three columns of Table 2 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 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 and finally a measure of exposure to mortgage-backed securities with the total amount of mortgage-backed securities held on the balance sheet relative to total assets.

[Insert Table 2 here]

Panel A of Table 2 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 but is significant only in two out of the six specifications.

Holding firm characteristics constant, board size and the percent of independent directors are 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 financial experts among independent directors is significantly negatively associated with stock performance during the crisis. The economic magnitudes are significant. For instance, from columns 2 and 3, we find that a one standard deviation change in financial expertise leads to a further 5% drop in returns during the crisis period, relative to an average drop of 40% within the sample. 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,

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<sup>11</sup>We require at least six months of valid monthly stock return data in order to compute the cumulative returns. Hence the sample includes banks that delist between June 2007 and December 2008, as long as they were trading since January 2007.

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 2 Panel A, independence is negatively associated with performance, while financial expertise is no longer related to worse performance during the crisis. However, exposure to real estate is strongly and negatively related to performance during the crisis. It suggests that financial expertise is potentially more present in banks that engaged in more real estate-related activities at the onset of distress.

As discussed in Section 2, there are reasons to believe that large institutions might behave differently from small institutions. To examine this issue further, we run the same set of regressions on a subset of banks with total assets above the median total asset value in the sample. Focusing on larger banks also reduces the heterogeneity within the sample being analyzed. The results are shown in Panel B of Table 2.

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, financial expertise is negative and significant in all specifications. Of significance, the negative association remains even when we specify the augmented set of controls in the regressions.

#### 4.2 *Firm value*

In this section, we examine changes in firm value during the crisis as it relates to board composition and firm characteristics. Table 3 presents the coefficients of regressions of 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. We use the same sets of controls as the ones used in Table 2.

[Insert Table 3 here]

Panel A shows the results for the full sample while Panel B focuses on the large financial institutions. The results are similar to those from the stock performance regressions. In terms of controls, the negative relationship between stock performance in 2006 and changes in firm value during the crisis is the most consistent results. Again, exposure to real estate as measured by the percentage of real estate loans on the balance sheet is negative throughout.

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 specifications used.

The results in Panel B of Table 3 show that, for large banks, financial expertise is strongly negatively correlated with changes in firm value in all specifications. 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 institutions. Interestingly, the negative relation between the level of financial expertise of independent directors and firm performance during the crisis is robust across all specifications for large banks. Taken together, these results are consistent with the idea that firms with more expertise among independent directors take on more risks and perform worse than other firms during the crisis. We will turn our investigation to this issue in the section 5 of the paper.

#### 4.3 *TARP funding*

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, which would have caused havoc on the U.S. economy. 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. 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.

[Insert Table 4 here]

Table 4 reports the marginal probabilities from logit regressions estimating the probability of receiving TARP funds. The dependent variable equals one if a firm receives TARP money and zero otherwise. The independent variables include the following firm characteristics as controls: *Log(total assets)*, *Log(total assets) squared*, *Equity capital ratio*, *ROA*. In addition to these firm characteristics, we include board size, indicator variables for the disclosure of a CRO and risk committee and, depending on the specification, board independence, and/or the percent of independent directors with financial expertise. All variables are measured at year-end 2006.

Not surprisingly, banks with lower equity capital ratios going into the crisis are more likely to receive TARP funding. As Table 4 reports, the marginal probabilities associated with firm size and ROA prior to the crisis are not statistically significant. Risk monitoring is also unrelated to the probability of receiving TARP funds.

Several of our variables relating to board composition are significantly related to the probability of receiving TARP funds. 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.

The results regarding TARP are hard to interpret. Receiving TARP funds could signal poor performance. But TARP funds could also be viewed as a unique opportunity for banks to raise relatively cheap funds at the height of the crisis. An alternative explanation could be that the government viewed

favorably firms with large, independent boards and where more likely to give TARP funds to banks with these characteristics. Lastly, several recent studies (e.g. Duchin and Sosyura (2009), and Li (2010)) show that political connectedness of the board influenced the probability of receiving TARP funds. Due to lack of data, we cannot control for these effects in our specifications.

## **5. Firm Risk and board composition**

In this section, we examine the associations between board characteristics and two groups of measures of risk in the run-up to the crisis. In section 5.1, we examine measures of balance sheet risk. In section 5.2, we focus on market-based measures of risk. In all regressions of section 5.1 and 5.2, we control for several firm and board characteristics, such as bank size measured as the log of total assets, equity capital ratio, board size and for whether a bank has a risk management committee or a chief risk officer. Since bank size can encompass many aspects of a bank's risk taking activities, we also control for bank size squared to reflect any other non-linear size related effects not accounted for by the other controls. As in the previous section, we also run every specification focusing solely on large financial institutions.

### *5.1. Board composition and Balance Sheet Risk*

In this section, we investigate the relation between board structure and balance sheet choices made by the bank in the run up to the crisis. For this analysis, we concentrate on the sub-sample of commercial banks in our sample due to data availability. 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 focus on two balance sheet choices: real estate related activity and bank leverage. We have shown in the previous section of the paper that the participation in real estate activities has a substantial negative impact on bank performance during the crisis. Additionally, bank leverage is examined through the lens of capital ratios since they are direct measures of the risks that management is willing to take.

Equity capital serves as a buffer to weather financial crises. Financial institutions have some flexibility in choosing the level of equity capital, as long as it is above the minimum regulatory levels. The higher the capital cushion, the safer the bank is. 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 5.

[Insert Table 5 here]

Panel A of Table 5 provides the results for Tier 1 capital ratio as the dependent variable.<sup>12</sup> Not surprisingly, lagged net interest margin, a measure of bank profitability, is consistently positively 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 seem to take on more risk. The other board governance variables are unrelated to the financial institutions' capital buffer.

Real estate played a pivotal role in the crisis and banks that were more engaged in this type of activity suffered relatively more during this crisis. Panel B of Table 5 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. Interestingly, none of the measures of independence or expertise seem to explain real estate exposure for banks. 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, Purnanandam (2010)).

Overall, board independence and board size are not important determinants for balance sheet financial choice for banks in our sample. Financial expertise is important for equity capital

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<sup>12</sup> 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.

among large banks but is not important for real estate investment. This 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.

## 5.2 *Independence, Financial Expertise and Market-based Risk*

We examine one measure of market-based risk taking: Total risk. Total risk is measured annually by the standard deviation of daily stock returns over the year. Figure 3 graphs the annual averages by financial institution type.

[Insert figure 3 here]

Across all types, total risk increased dramatically in the last two years of the sample period. Total risk for the full sample of firms averaged about 3.6% during the 2007 to 2008 period compared to 1.6% during the period from 2003 to 2006. The figure shows that there was a significant shift in the total risk during the crisis period for all financial institutions, which motivates a further examination of the factors that may have impacted the riskiness of financial firms.

Table 6 presents the OLS regression coefficients for panel regressions of total risk on firm and board characteristics. In addition to controlling for the risk monitoring function and bank characteristics described above, our three board characteristics are included. All independent variables are lagged. Year and three-digit SIC industry indicator variables are also included in the regressions but their coefficients are not reported. Due to the persistence found in our board characteristic, we estimate the panel regressions with standard errors corrected for heteroskedasticity using clustering at the firm level (see Hermalin and Weisbach (1998)).

[Insert Table 6 here]

Panel A provides the results for all financial institutions. 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 6 reports, firms with higher lagged equity capital ratios have lower levels of total risk, although this result is only statistically significant during the crisis. This result highlights again the potential benefits of having a high enough equity capital buffer going into a crisis. Other firm characteristics, such as size and size squared, are not related to total risk in a systematic manner.

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 in firms with larger boards.

From Panel A of Table 6, we also see that more independent boards are associated with lower levels of total risk. 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.

Controlling for board size, board independence, and other determinants of total risk, the fraction of independent directors who are financial experts is positively and significantly related to total firm risk.

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)). A more financially knowledgeable board has a better understanding of more complex investments and may encourage bank management to increase their risk taking.

In Panel A of Table 6, we also report regression results for the full period and crisis period. The results related to independence and financial expertise for both periods are consistent with the pre-crisis results. For example, over the full period, the results continue to show that independence is related to lower total risk and financial expertise is related to higher total risk.

In Panel B of Table 6, we focus on the sample of large financial institutions. Firm size is negatively associated with total risk but only statistically significant in the run-up period; the same goes for board size. Equity capital is now even more strongly inversely related to our market-based measure of risk. The negative association between board independence and total risk is weaker and significant at the 10% level only in one specification but the positive association of financial expertise among independent directors on total risk is more significant among this subset of large firms.

Overall, the results from Table 6 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 financial institutions.

### *5.3 Independence, Financial Expertise 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 7. As with previous computations, all variables are lagged.

[Insert Table 7 here]

Table 7 shows the results for all financial institutions in the first three columns and for the subset of large ones 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 not statistically significant anymore. The same pattern emerges for equity capital and size.

Among our board governance variables, 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 look at. For the full sample of banks, the relationship is positive and highly significant. For the subset of large banks, the relationship remains positive but is no longer statistically significant.

The stock market performance results for 2006 are consistent with boards of financial institutions with more financial experts taking on more risk in the run-up to the crisis; leading to higher stock performance prior to the onset of distress, only to have lower performance during the crisis period.

## **6. Conclusion**

During the recent financial crisis, banks and other financial institutions were accused of being engaged in excessive risk taking. Because boards are ultimately legally responsible for all fundamental operating and financial decisions made by the firm, the current 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 financial institutions 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 do find on average low levels of financial expertise among independent directors. Although many calls for reforms (see for example Kirkpatrick (2009) and Walker (2009)) 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 financial institutions with more financial expertise among its independent directors.

To explain this result, we investigate the behavior of these banks in the run-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 shows that board independence and expertise are not related to increased real estate exposure at the onset of the crisis but are related to balance sheet financing decisions; namely, more financial expertise is linked to lower Tier 1 capital ratios at the onset of the crisis. These results are more pronounced for large banks in our sample. Lastly, the higher risk taking of financial firms with more independent financial expertise is related to better stock performance in the year prior to the crisis.

Overall, our results challenge the popular view that more financial expertise on the boards of banks would unambiguously improve 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 rewarded by the markets prior to the crisis but led to underperformance when the crisis hit. It still needs to be shown whether banks are better off with more financial expertise on their board when netting both the pre-crisis period and crisis period. We leave this endeavor for future research.



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Table 1: Summary statistics

This table shows summary statistics for board governance and other bank characteristics for our sample of U.S. publicly-traded financial institutions 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. Pct 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 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.

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

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Year	Number of obs.	Board size	%Independent	%Fin. expert. among independent directors
2003	252	12.32	72%	22%
2004	277	12.24	75	24%
2005	295	11.84	76	25%
2006	314	11.75	76	25%
2007	322	11.56	76	26%
2008	193	11.63	78	27%

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Panel B: 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	0.36	0.04	1.00			
Risk committee	0.43	0.00	0.35	1.00		
Board size	0.35	0.20	0.06	0.09	1.00	
%Independent directors	0.14	-0.03	0.16	0.16	-0.03	1.00
%Fin expert among ind. directors	-0.13	-0.08	0.05	0.01	-0.14	0.01

Table 2: Stock performance during crisis

The 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 financial institutions. Panel B reports the results for large financial institutions. An 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. Stock performance is first 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. The measure is computed yearly, using daily returns. All board and risk monitoring variables are defined in Table 1. Data on loans, deposits, real estate loans, and mortgage back 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. MBS are mortgage-backed securities held-to-maturity and available-for-sale. All variables (except for Stock ret 2006) are taken as of the fiscal year end 2006. Three-digit SIC industry indicator variables are also included in the regressions but the coefficients are not reported. Robust standard errors corrected for heteroskedasticity are reported in brackets. \*\*\*, \*\* and \* denote respectively significance at the 1%, 5% and 10% levels.

Panel A: All financial institutions

	(1)	(2)	(3)	(4)	(5)	(6)
Log(assets)	0.215 [0.171]	0.269 [0.173]	0.267 [0.174]	0.112 [0.195]	0.145 [0.195]	0.141 [0.198]
Log(assets) <sup>2</sup>	-0.012 [0.009]	-0.015 [0.009]	-0.015 [0.009]	-0.008 [0.010]	-0.010 [0.010]	-0.010 [0.011]
Equity capital ratio	1.400 [0.890]	1.237 [0.885]	1.269 [0.886]	-0.151 [1.140]	-0.197 [1.169]	-0.211 [1.138]
Beta	0.140*** [0.042]	0.133*** [0.041]	0.134*** [0.042]	0.159*** [0.038]	0.149*** [0.038]	0.156*** [0.038]
Stock ret 2006	-0.181 [0.156]	-0.112 [0.156]	-0.115 [0.156]	-0.116 [0.146]	-0.058 [0.146]	-0.084 [0.141]
Board Size	0.012 [0.008]	0.010 [0.008]	0.010 [0.008]	0.010 [0.007]	0.010 [0.008]	0.009 [0.007]
Has CRO	0.053 [0.060]	0.064 [0.059]	0.068 [0.060]	0.099* [0.059]	0.086 [0.060]	0.104* [0.060]
Has Risk Comm.	-0.086 [0.083]	-0.097 [0.079]	-0.093 [0.079]	-0.079 [0.080]	-0.096 [0.079]	-0.082 [0.079]
Total loans/ assets				0.046 [0.454]	-0.037 [0.449]	0.110 [0.462]
Deposits/ assets				0.143 [0.438]	0.050 [0.423]	0.102 [0.432]
Real estate loans/assets				-0.929*** [0.291]	-0.855*** [0.299]	-0.968*** [0.299]
MBS/assets				0.657 [0.429]	0.632 [0.414]	0.622 [0.437]
% Independent directors	-0.051 [0.242]		-0.088 [0.236]	-0.510** [0.244]		-0.529** [0.242]
%Fin expert among independent directors		-0.278** [0.116]	-0.281** [0.115]		-0.128 [0.127]	-0.149 [0.122]
Observations	213	213	213	175	175	175
Adjusted R-squared	0.092	0.115	0.112	0.218	0.199	0.220

Panel B: Large financial institutions

	(1)	(2)	(3)	(4)	(5)	(6)
Log(assets)	-0.000	0.161	0.150	0.173	0.249	0.272
	[0.381]	[0.384]	[0.388]	[0.414]	[0.428]	[0.425]
Log(assets) <sup>2</sup>	-0.002	-0.010	-0.010	-0.012	-0.016	-0.017
	[0.018]	[0.018]	[0.018]	[0.020]	[0.021]	[0.021]
Equity capital ratio	2.008	1.650	1.746	-0.066	-0.670	-0.124
	[1.511]	[1.532]	[1.541]	[1.790]	[1.814]	[1.775]
Beta	0.059	0.078	0.079	0.200	0.182	0.203
	[0.120]	[0.121]	[0.122]	[0.120]	[0.123]	[0.125]
Stock ret 2006	-0.162	-0.096	-0.099	0.042	0.090	0.041
	[0.273]	[0.269]	[0.270]	[0.270]	[0.273]	[0.270]
Board Size	0.012	0.013	0.013	0.012	0.015	0.012
	[0.014]	[0.014]	[0.014]	[0.013]	[0.013]	[0.013]
Has CRO	0.026	0.042	0.046	0.083	0.081	0.095
	[0.077]	[0.072]	[0.074]	[0.083]	[0.082]	[0.080]
Has Risk Comm.	-0.103	-0.123	-0.120	-0.053	-0.075	-0.065
	[0.089]	[0.084]	[0.085]	[0.084]	[0.082]	[0.083]
Total loans/ assets				-0.022	-0.089	0.132
				[0.638]	[0.619]	[0.640]
Deposits/ assets				0.088	0.093	0.058
				[0.602]	[0.570]	[0.583]
Real estate loans/assets				-1.059**	-0.928**	-1.155**
				[0.506]	[0.449]	[0.494]
MBS/assets				0.348	0.398	0.293
				[0.537]	[0.547]	[0.566]
% Independent directors	-0.110		-0.105	-0.638*		-0.630*
	[0.317]		[0.295]	[0.329]		[0.318]
%Fin expert among independent directors		-0.478***	-0.478***		-0.381**	-0.377**
		[0.152]	[0.152]		[0.182]	[0.171]
Observations	114	114	114	91	91	91
Adjusted R-squared	0.074	0.144	0.136	0.191	0.199	0.223



Table 3: Change in firm value during the crisis

The 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 banks. Panel A reports the results for all financial institutions. Panel B reports the results for large financial institutions. An 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 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. The measure is computed yearly, using daily returns. All board and risk monitoring variables are defined in Table 1. Data on loans, deposits, residential real estate loans, and mortgage back 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. MBS are mortgage-backed securities held-to-maturity and available-for-sale. All variables (except for Stock ret 2006) are taken as of the fiscal year end 2006. Three-digit SIC industry indicator variables are also included in the regressions but the coefficients are not reported. 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 financial institutions

	(1)	(2)	(3)	(4)	(5)	(6)
Log(assets)	0.005	0.012	0.012	-0.032	-0.026	-0.027
	[0.031]	[0.031]	[0.031]	[0.031]	[0.031]	[0.032]
Log(assets) <sup>2</sup>	-0.000	-0.001	-0.001	0.001	0.001	0.001
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Equity capital ratio	-0.195	-0.210	-0.220	-0.107	-0.103	-0.094
	[0.158]	[0.158]	[0.163]	[0.197]	[0.193]	[0.194]
Beta	0.010	0.011	0.011	0.011*	0.011*	0.011*
	[0.007]	[0.007]	[0.007]	[0.006]	[0.007]	[0.006]
Stock ret 2006	-0.111***	-0.109***	-0.107***	-0.093***	-0.091***	-0.091***
	[0.025]	[0.026]	[0.025]	[0.022]	[0.021]	[0.021]
Board Size	0.003*	0.002*	0.002*	0.003**	0.003**	0.003**
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Has CRO	0.002	0.005	0.005	0.002	0.003	0.004
	[0.010]	[0.010]	[0.010]	[0.009]	[0.009]	[0.010]
Has Risk Comm.	-0.004	-0.003	-0.004	0.003	0.002	0.003
	[0.012]	[0.011]	[0.011]	[0.010]	[0.010]	[0.010]
Total loans/ assets				-0.119**	-0.112**	-0.109**
				[0.050]	[0.047]	[0.047]
Deposits/ assets				-0.037	-0.042	-0.043
				[0.065]	[0.066]	[0.066]
Real estate loans/assets				-0.116***	-0.119***	-0.124***
				[0.031]	[0.031]	[0.032]
MBS/assets				0.023	0.019	0.017
				[0.066]	[0.067]	[0.068]
% Independent directors	0.031		0.024	-0.029		-0.029
	[0.047]		[0.047]	[0.041]		[0.041]
%Fin expert among independent directors		-0.039*	-0.038*		-0.023	-0.023
		[0.021]	[0.021]		[0.018]	[0.018]
Observations	109	109	109	98	98	98
Adjusted R-squared	0.117	0.143	0.137	0.385	0.391	0.388

Panel B: Large financial institutions

	(1)	(2)	(3)	(4)	(5)	(6)
Log(assets)	0.048	0.020	0.039	-0.050	-0.055	-0.054
	[0.074]	[0.074]	[0.069]	[0.072]	[0.072]	[0.073]
Log(assets) <sup>2</sup>	-0.002	-0.001	-0.002	0.002	0.002	0.002
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Equity capital ratio	-0.456	-0.383	-0.470	-0.527*	-0.463*	-0.470
	[0.310]	[0.275]	[0.323]	[0.304]	[0.264]	[0.286]
Beta	0.010	0.007	0.011	0.009	0.006	0.007
	[0.022]	[0.020]	[0.023]	[0.021]	[0.018]	[0.020]
Stock ret 2006	-0.081	-0.085*	-0.086	-0.075*	-0.075**	-0.075**
	[0.052]	[0.050]	[0.052]	[0.039]	[0.033]	[0.034]
Board Size	0.002	0.001	0.002	0.003	0.002	0.002
	[0.003]	[0.003]	[0.003]	[0.002]	[0.002]	[0.002]
Has CRO	-0.006	0.002	-0.002	-0.006	-0.003	-0.003
	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]
Has Risk Comm.	-0.008	-0.004	-0.007	0.008	0.011	0.011
	[0.014]	[0.014]	[0.013]	[0.011]	[0.010]	[0.010]
Total loans/ assets				-0.148	-0.127	-0.129
				[0.105]	[0.083]	[0.096]
Deposits/ assets				0.028	0.042	0.044
				[0.088]	[0.080]	[0.088]
Real estate loans/assets				-0.108*	-0.129***	-0.126**
				[0.061]	[0.045]	[0.057]
MBS/assets				-0.014	-0.019	-0.017
				[0.094]	[0.097]	[0.094]
% Independent directors	0.129		0.095	0.022		0.005
	[0.077]		[0.077]	[0.059]		[0.060]
%Fin expert among independent directors		-0.078***	-0.068**		-0.048**	-0.048**
		[0.028]	[0.027]		[0.018]	[0.019]
Observations	53	53	53	48	48	48
Adjusted R-squared	0.063	0.125	0.142	0.441	0.488	0.472

Table 4: Probability of receiving TARP money

This table presents the marginal probabilities from logit regressions of the probability of receiving TARP money as a function of firm and board characteristics and proxies for risk monitoring functions. An institution is defined as large if the book value of total assets is greater than that of the median firm in the sample at year-end 2006. ROA is return on assets. All other independent variables are defined in Table 1. All variables are taken as of the fiscal year end 2006. Three-digit SIC industry indicator variables are also included in the regressions but the coefficients are not reported. Robust standard errors corrected for heteroskedasticity are reported in brackets. \*\*\*, \*\* and \* denote respectively significance at the 1%, 5% and 10% levels

	All Financial Institutions			Large Financial Institutions		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(Market cap)	0.0159 [0.260]	-0.0575 [0.257]	-0.0221 [0.262]	0.0728 [0.507]	-0.133 [0.504]	0.0110 [0.513]
Log(Market cap) <sup>2</sup>	-0.000133 [0.0137]	0.00361 [0.0135]	0.00188 [0.0138]	-0.00141 [0.0246]	0.00897 [0.0244]	0.00180 [0.0249]
Equity capital ratio	-3.270** [1.282]	-2.910** [1.306]	-3.154** [1.296]	-3.106 [1.993]	-2.262 [2.094]	-2.855 [2.053]
ROA	0.758 [8.820]	1.597 [8.549]	1.229 [8.833]	1.485 [13.16]	4.457 [12.04]	3.278 [13.11]
Board Size	0.0250** [0.0126]	0.0256** [0.0129]	0.0271** [0.0129]	0.00691 [0.0195]	0.00327 [0.0194]	0.00885 [0.0204]
Has CRO	-0.0696 [0.0783]	-0.0473 [0.0800]	-0.0772 [0.0786]	-0.184* [0.0977]	-0.143 [0.102]	-0.199** [0.0989]
Has Risk Comm.	0.0737 [0.104]	0.104 [0.105]	0.0843 [0.106]	0.110 [0.118]	0.153 [0.113]	0.136 [0.121]
%Independent	0.658** [0.329]		0.691** [0.333]	1.196** [0.495]		1.182** [0.503]
%Fin expert among independent directors		0.206 [0.164]	0.231 [0.163]		0.325 [0.227]	0.314 [0.224]
Observations	279	279	279	141	141	141

Table 5: Balance sheet risk and board characteristics in 2006

The 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. 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. All other board and risk monitoring variables are defined in Table 1. All independent variables are measured at year-end 2005. 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: Tier 1 capital ratio

	All financial institutions			Large financial institutions		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(assets)	1.128 [0.957]	1.098 [0.983]	1.142 [0.963]	-0.508 [1.463]	-0.612 [1.440]	-0.605 [1.446]
Log(assets) <sup>2</sup>	-0.086* [0.048]	-0.087* [0.048]	-0.088* [0.048]	-0.007 [0.069]	-0.006 [0.068]	-0.006 [0.068]
Net interest margin	-0.492* [0.263]	-0.511* [0.261]	-0.500* [0.266]	-0.591* [0.336]	-0.655* [0.339]	-0.656* [0.341]
Board Size	0.025 [0.050]	0.026 [0.052]	0.018 [0.051]	-0.034 [0.071]	-0.037 [0.068]	-0.038 [0.069]
Has CRO	0.298 [0.410]	0.337 [0.426]	0.362 [0.425]	0.421 [0.461]	0.522 [0.466]	0.523 [0.468]
Has Risk Comm.	-0.676 [0.441]	-0.673 [0.439]	-0.633 [0.451]	-0.796 [0.506]	-0.809 [0.503]	-0.806 [0.505]
%Independent	-1.891 [1.885]		-1.987 [1.895]	-0.192 [1.795]		-0.177 [1.753]
%Fin expert among independent		-1.070 [0.820]	-1.123 [0.828]		-1.757** [0.836]	-1.757** [0.839]
Observations	192	192	192	104	104	104
Adjusted R-squared	0.117	0.117	0.121	0.188	0.217	0.209

Panel B: Residential Real Estate Loans

	All financial institutions			Large financial institutions		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(assets)	-0.094*	-0.094*	-0.094*	-0.103	-0.100	-0.101
	[0.053]	[0.053]	[0.053]	[0.104]	[0.102]	[0.104]
Log(assets) <sup>2</sup>	0.004	0.004	0.004	0.005	0.005	0.005
	[0.003]	[0.003]	[0.003]	[0.005]	[0.005]	[0.005]
Has a long-term credit rating	0.004	0.003	0.003	0.017	0.014	0.016
	[0.027]	[0.026]	[0.027]	[0.030]	[0.028]	[0.030]
Board Size	0.005**	0.005**	0.005**	0.001	0.001	0.001
	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.003]
Has CRO	0.048**	0.049**	0.049**	0.028	0.029	0.029
	[0.019]	[0.020]	[0.020]	[0.021]	[0.020]	[0.021]
Has Risk Comm.	0.048**	0.049**	0.048**	0.059**	0.058**	0.059**
	[0.023]	[0.023]	[0.023]	[0.023]	[0.022]	[0.023]
%Independent	0.018		0.017	-0.025		-0.024
	[0.073]		[0.073]	[0.086]		[0.087]
%Fin expert among independent		-0.018	-0.018		-0.015	-0.014
		[0.037]	[0.037]		[0.048]	[0.048]
Observations	193	193	193	105	105	105
Adjusted R-squared	0.092	0.096	0.091	0.105	0.105	0.096

Table 6: Total risk and board characteristics

The 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 1 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 financial institutions. An institution is defined as large if the book value of total assets is greater than that of the median firm in the sample at year-end 2006. 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.

	Full period			Pre-Crisis period			Crisis period		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Log(assets)	0.095 [0.271]	0.066 [0.266]	0.046 [0.265]	-0.290** [0.131]	-0.290** [0.132]	-0.297** [0.130]	0.519 [0.617]	0.394 [0.596]	0.359 [0.595]
Log(assets) <sup>2</sup>	-0.005 [0.014]	-0.004 [0.014]	-0.003 [0.014]	0.009 [0.007]	0.009 [0.007]	0.010 [0.007]	-0.017 [0.033]	-0.011 [0.032]	-0.009 [0.032]
Equity capital ratio	-2.179 [1.363]	-2.135 [1.380]	-2.035 [1.362]	-0.167 [0.847]	-0.118 [0.877]	-0.085 [0.857]	-5.290** [2.261]	-5.371** [2.291]	-5.168** [2.292]
Board Size	-0.026*** [0.008]	-0.023*** [0.008]	-0.024*** [0.008]	-0.019*** [0.005]	-0.017*** [0.005]	-0.018*** [0.005]	-0.044** [0.020]	-0.039* [0.021]	-0.039* [0.021]
Has CRO	0.040 [0.066]	0.015 [0.067]	0.034 [0.067]	-0.037 [0.041]	-0.049 [0.040]	-0.041 [0.040]	0.114 [0.145]	0.082 [0.145]	0.113 [0.146]
Has Risk Comm.	0.004 [0.097]	-0.012 [0.094]	0.002 [0.093]	-0.013 [0.042]	-0.025 [0.039]	-0.020 [0.041]	-0.058 [0.223]	-0.050 [0.219]	-0.020 [0.216]
%Independent	-0.446** [0.215]		-0.475** [0.220]	-0.233* [0.129]		-0.200 [0.133]	-0.592 [0.564]		-0.761 [0.588]
%Fin expert among independent directors		0.380** [0.190]	0.373* [0.191]		0.161* [0.092]	0.159* [0.093]		0.756* [0.452]	0.742 [0.454]
Observations	1268	1266	1266	801	800	800	467	466	466
Adjusted R-squared	0.623	0.625	0.626	0.265	0.264	0.266	0.500	0.505	0.505

Panel B Large financial institutions

	Full period			Pre-Crisis period			Crisis period		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Log(assets)	-0.134 [0.414]	-0.252 [0.400]	-0.283 [0.402]	-0.355** [0.179]	-0.360** [0.178]	-0.392** [0.174]	-0.063 [0.852]	-0.461 [0.817]	-0.469 [0.814]
Log(assets) <sup>2</sup>	0.006 [0.020]	0.012 [0.020]	0.013 [0.020]	0.013 [0.009]	0.013 [0.009]	0.015* [0.008]	0.010 [0.043]	0.031 [0.041]	0.031 [0.041]
Equity capital ratio	-6.707*** [1.844]	-6.385*** [1.815]	-6.277*** [1.822]	-2.294** [1.128]	-2.149* [1.161]	-2.074* [1.142]	-13.231*** [4.109]	-12.466*** [4.102]	-12.415*** [4.090]
Board Size	-0.017* [0.010]	-0.015 [0.010]	-0.015 [0.010]	-0.017** [0.007]	-0.015** [0.006]	-0.016** [0.006]	-0.030 [0.031]	-0.022 [0.032]	-0.023 [0.032]
Has CRO	0.055 [0.083]	0.046 [0.083]	0.058 [0.082]	-0.003 [0.046]	-0.014 [0.045]	-0.003 [0.045]	0.118 [0.207]	0.124 [0.203]	0.128 [0.202]
Has Risk Comm.	0.028 [0.107]	0.022 [0.104]	0.028 [0.103]	-0.017 [0.041]	-0.029 [0.038]	-0.024 [0.040]	0.061 [0.284]	0.111 [0.272]	0.114 [0.270]
%Independent	-0.138 [0.287]		-0.303 [0.284]	-0.234 [0.153]		-0.271* [0.150]	0.225 [0.790]		-0.107 [0.945]
%Fin expert among independent		0.545** [0.253]	0.555** [0.255]		0.273** [0.113]	0.285** [0.115]		1.214* [0.688]	1.216* [0.692]
Observations	762	761	761	507	507	507	255	254	254
Adjusted R-squared	0.621	0.626	0.626	0.247	0.264	0.270	0.466	0.476	0.474



Table 7: Stock performance in 2006

The 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. An 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 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. The measure is computed yearly, using daily returns. All board and risk monitoring variables are defined in Table 1. All independent variables are taken as of the fiscal year end 2005. Three-digit SIC industry indicator variables are also included in the regressions but the coefficients are not reported. Robust standard errors corrected for heteroskedasticity are reported in brackets. \*\*\*, \*\* and \* denote respectively significance at the 1%, 5% and 10% levels.

	All financial institutions			Large financial institutions		
	(1)	(2)	(3)	(1)	(2)	(3)
Log(Assets)	-0.265*** [0.074]	-0.270*** [0.071]	-0.269*** [0.071]	-0.196 [0.128]	-0.207 [0.131]	-0.194 [0.126]
Log(Assets) <sup>2</sup>	0.014*** [0.004]	0.014*** [0.004]	0.014*** [0.004]	0.010* [0.006]	0.011* [0.006]	0.010* [0.006]
Equity capital ratio	0.603* [0.308]	0.744** [0.301]	0.753** [0.301]	-0.637 [0.457]	-0.456 [0.432]	-0.563 [0.456]
Beta	0.060*** [0.020]	0.058*** [0.021]	0.059*** [0.021]	0.015 [0.040]	0.013 [0.040]	0.012 [0.040]
Board Size	0.004 [0.004]	0.004 [0.003]	0.004 [0.004]	0.013*** [0.003]	0.012*** [0.003]	0.013*** [0.003]
Has CRO	-0.013 [0.027]	-0.020 [0.026]	-0.019 [0.026]	-0.013 [0.024]	-0.013 [0.024]	-0.015 [0.024]
Has Risk Comm.	-0.001 [0.027]	-0.005 [0.028]	-0.003 [0.028]	-0.022 [0.026]	-0.018 [0.026]	-0.022 [0.026]
% independent	-0.090 [0.100]		-0.058 [0.096]	0.115 [0.117]		0.121 [0.115]
%Fin expert among independent		0.137** [0.060]	0.133** [0.060]		0.054 [0.063]	0.057 [0.062]
Observations	213	213	213	113	113	113
Adjusted R-squared	0.051	0.078	0.075	0.138	0.138	0.138

Figure 1: Composition of financial expertise

This figure provides the composition of financial expertise among independent directors of the board. 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*).

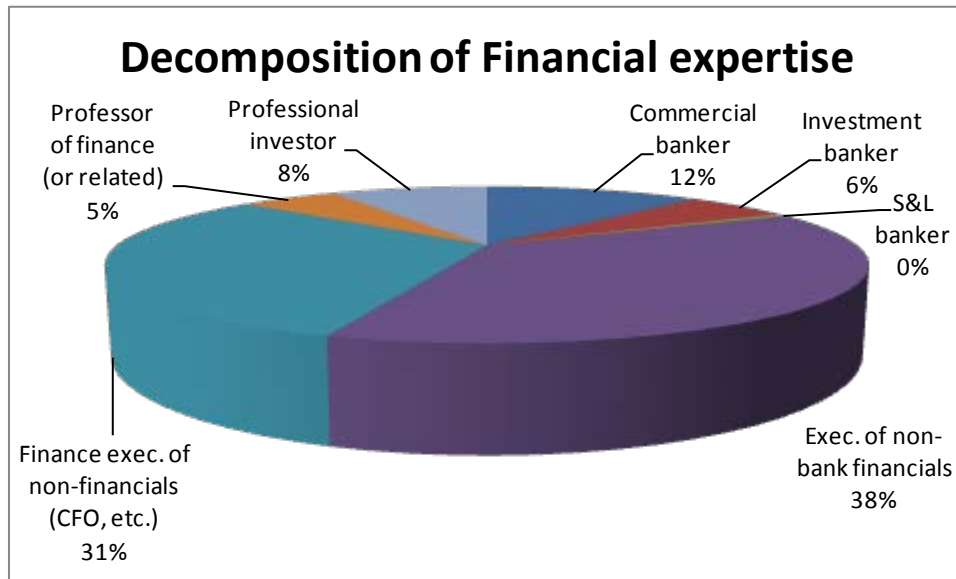


Figure 2: Distribution of financial expertise across sample banks

This figure provides the distribution of independent directors with financial expertise across all financial institutions 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*).

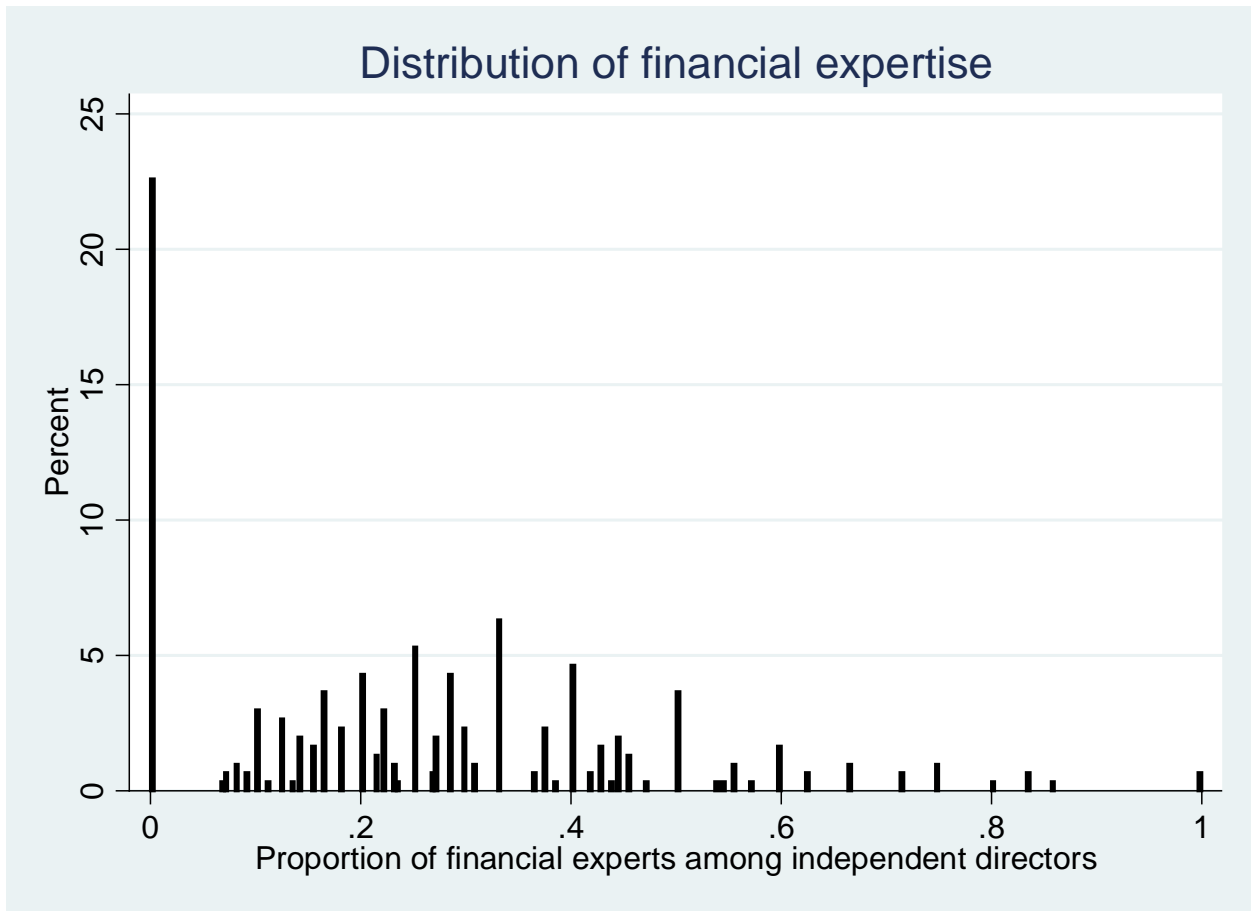
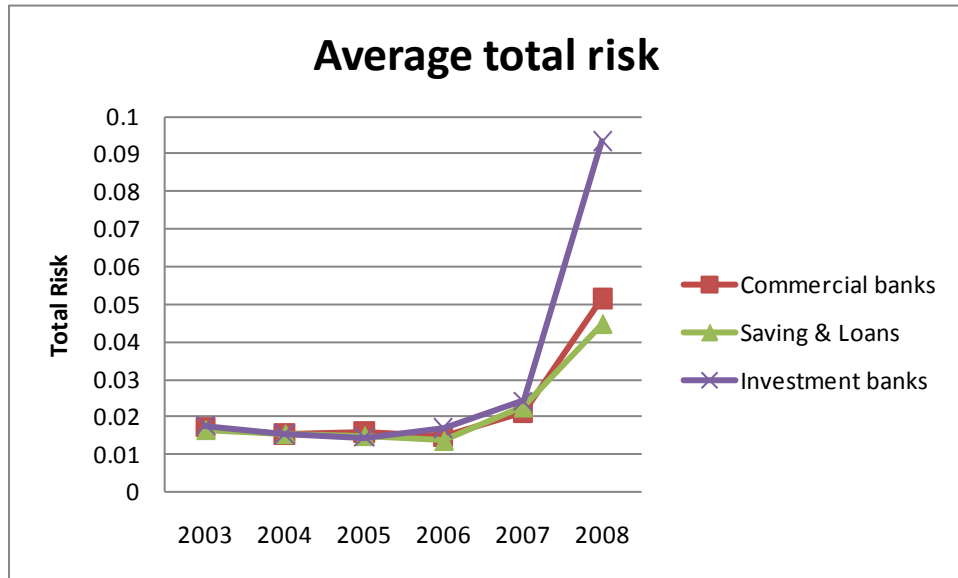


Figure 3: Risk measures by bank type

This figure plots the annual averages of a market-based measure of bank risk taking by financial institution type. Total risk is computed yearly as the standard deviation of daily stock returns. For the graph, it is then averaged across all financial institutions of a given type. The financial institution type is given by the following classification: CB: Commercial Banks, S&L: Savings & Loan associations, IB: Investment banks.



## 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 the final sample of U.S. financial institutions at the end of 2006. Market capitalization is given as of fiscal year-end 2006. ROA is the return on assets for 2006. ROE is the return on equity for 2006. M/B is the ratio of the market value of assets divided by the book value of assets, 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.

Panel A: Full sample				
Variables	N	median	mean	Stdev
Total assets	290	2,874	37,919	162,764
ROA	282	0.01	0.012	0.009
ROE	282	0.059	0.059	0.022
M/B	282	1.084	1.091	0.059
Equity capital ratio	282	0.091	0.097	0.041
Panel B: Commercial banks				
Variables	N	median	mean	Stdev
Total assets	223	2,829	29,472	145,571
ROA	217	0.011	0.011	0.004
ROE	217	0.059	0.059	0.016
M/B	217	1.093	1.098	0.051
Equity capital ratio	217	0.091	0.093	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