The Roles of Corporate Governance in Bank Failures during the Recent Financial Crisis

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Abstract

This paper analyzes the roles of corporate governance in bank defaults during the recent financial crisis. We investigate the impact of bank ownership and management structures on the probability of default of US commercial banks. Our results show that defaults are strongly influenced by a bank's ownership structure: high shareholdings of lower-level management, such as vice presidents, increase default risk significantly. In contrast, shareholdings of outside directors and chief officers (managers with a "chief officer" position, such as the CEO, CFO, etc.) do not have a direct impact on the probability of failure. These findings suggest that high stakes in the bank induce lower-level management, which has direct influences on the bank's daily operations, to take high risks, which may eventually result in bank default. Our results further show that the probability of default specifically increases when incentives of chief officers and lower-level management are aligned. Some accounting variables, such as capital, earnings, and non-performing loans, also help predict bank default. However, other potential stability indicators, such as the management structure of the bank, indicators of market competition, subprime mortgage risks, state economic conditions, and regulatory influences, appear to be less decisive factors in predicting bank default.

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Why do banks fail? After every crisis, this question is asked by regulators, politicians, bank managers, customers, investors, and academics, hoping that an answer can help improve the stability of the financial system and/or prevent future crises. Although a broad body of research has been able to provide a number of answers to this question, many aspects remain unresolved. After all, the bank failures during the recent financial crisis of 2007-2010 have shown that the gained knowledge about bank defaults is apparently still not sufficient to prevent large numbers of banks from failing. Most studies of bank default have focused on the influence of accounting variables, such as capital ratios, non-performing loan ratios, and earnings with some success (e.g., Martin, 1977; Pettway and Sinkey, 1980; Lane, Looney, and Wansley, 1986; Espahbodi, 1991; Cole and Gunther, 1995, 1998; Helwege, 1996; Schaeck, 2008; Cole and White, 2012).

However, almost no research to date has empirically analyzed the influence corporate governance characteristics, such as ownership structure or management structure, have on a bank's probability of default (PD).[1] This is perhaps surprising for two reasons. The first is the calls for corporate governance-based mechanisms to control bank risk taking during and after the recent financial crisis (e.g., restrictions on compensation and perks under TARP, disclosure of compensation and advisory votes of shareholders about executive compensation under Dodd-Frank, guidance for compensation such as deferred compensation, alignment of compensation with performance and risk, disclosure of compensation, etc. by the G20, or more recent discussions in the UK regarding a lifetime ban from the financial services industry on directors of collapsed banks), which are largely without basis in the empirical literature on bank defaults. The second is the literature showing that governance mechanisms can have a very strong influence on bank performance in terms of risk taking (e.g., Saunders, Strock, and Travlos, 1990; Gorton and Rosen, 1995; Anderson and Fraser, 2000; Caprio, Laeven, and Levine, 2003; Laeven and Levine, 2009; Pathan, 2009, Fahlenbrach and Stulz, 2011, Beltratti and Stulz, 2012).

It is therefore the goal of this paper to analyze the roles of corporate governance, including both ownership structure and management structure, in bank defaults. The results are key to underpinning the recent calls for changes in corporate governance to control risk. As well, the results may add a new dimension to the extant literature on the effects of corporate governance

[1] An exception is Berger and Bouwman (2012), which controls for institutional block ownership, bank holding company membership, and foreign ownership in models of bank survival and market share. However, the paper does not focus on these variables, nor does it include the ownership of directors and different types of bank employees, which are the key corporate governance variables of interest here.

on bank performance. Although this body of research has clearly established the causalities between corporate governance and bank risk taking, no study has so far used corporate governance structures to help explain bank defaults or to distinguish default banks. Our paper attempts to fill this void.

To analyze the influence of corporate governance structures on bank defaults, we analyze a sample of US commercial banks during the period of 2007:Q1 to 2010:Q3, with overall 6,152 bank-quarter observations. We use five sets of explanatory variables in multivariate logit regression models of default. First, we include the impact of accounting variables on banks' probability of default (PD). These accounting variables are well represented in the established literature on bank default. Second, we employ various corporate governance indicators to measure banks' ownership structure and management structure. For ownership structure, we use the shareholdings of different categories of bank management, whether the bank received funds from the Troubled Asset Relief Program (TARP), whether the bank or its holding company is publicly traded, and whether the bank is in a multibank holding company. For management structure, we use the numbers of outside directors, chief officers, and other corporate insiders (all normalized by board size), the board size itself, and if the Chairman of a bank is also the CEO. For the purposes of this paper, we define "chief officers" as all bank managers with a "chief officer" position, such as the Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chief Lending Officer (CLO), or Chief Risk Officer (CRO). Third, we incorporate measures of market competition. We thereby account for the large literature on bank market power which is inconclusive on the effects of higher market power on bank stability, depending on whether the traditional "competition-fragility" view or the "competition-stability" view dominates, as discussed in Section II A. We also account for the bank's competitors' subprime loan exposure – a factor often cited as a major source of default risk in the recent crisis – which could help the bank by weakening or eliminating some of its competition. Fourth, we employ economic variables at the state level – GDP growth and the house price inflation – the latter of which is believed to have contributed to instability in the banking system due to banks being able to only partially recover collateral in defaulted mortgage loans. Finally, we account for potential differences among federal bank regulators.

Our results confirm the extant bank failure literature by finding that accounting variables such as the capital ratio, the return on assets, and the portion of non-performing loans, help predict bank

default. Our key new finding is that the ownership structure of a bank is also an important predictor of bank PD. Specifically, one bank ownership variable proves to be a significant predictor of bank failure: the shareholdings of other corporate insiders (lower-level management, such as vice presidents). Larger shareholdings of lower-level management significantly increase bank PD. Interestingly, the shareholdings of outside directors (directors without other direct management executive functions within the bank) and the shareholdings of chief officers have no direct impact on a bank's default probability. We offer two explanations for these perhaps unexpected findings. First, according to Merton (1977), shareholders of banks with deposit insurance have a moral hazard incentive to take on excessive risks because of the put option to return the assets of the bank to the insurer in the event of default. Lower-level managers with large shareholdings and direct influences on the bank's daily operations may take on more risk because of this moral hazard problem. Thus, they have the incentive and means to increase the risk of the bank. This problem may not apply as much to outside directors and chief officers because they enjoy a higher public visibility and are more likely to be vilified in the event of a default. This finding is supported by principal-agency models which show that career and reputation concerns play a major role in the decision-making of management (e.g.; Holmstrom and Ricart i Costa, 1986; Hirshleifer and Thakor, 1992). Alternatively, they might (also) not have fully understood all the risks in their bank's portfolios in the runup to the recent financial crisis (as e.g. stated in the UBS Shareholder Report 2010 on the bank's losses), and accordingly were rather unable to substantially influence the PD. Our second explanation is based on the body of literature analyzing the role of compensation-mechanisms for banks' risk-taking during the recent financial crisis. Building on Holmstrom (1990), Agarwal and Ben-David (2012) show that revenue-rewarding payment schemes caused excessive risk-taking of bank employees. To the degree that the (often share-based) compensation of these payment schemes handed out to employees translates into shareholdings in the bank, our results might capture the effect of how wrong employee incentives can cause bank failure. Our other corporate governance indicators for management structure do not appear to significantly influence bank default probabilities. Perhaps surprisingly, bank market power, competitors' subprime loan exposure, state-level house price inflation and income growth, and different primary federal regulators also have little or no influence on bank failure. These results are robust to different specifications, using variables at different time periods prior to default or at a fixed date prior to the crisis, excluding systemically important financial institutions (SIFIs), or multibank holding companies (MBHCs), or banks

which received TARP funds during the crisis, possible endogeneity issues of risk-taking and banks' ownership structures, as well as a possible sample selection bias caused by the types of banks for which corporate governance data are available.

In a further analysis, we test the hypothesis that the effect we find on bank risk taking is especially pronounced when the incentives of lower level management are aligned with chief officers, who are in charge of monitoring the bank's daily operations (e.g.; Holmstrom, 1999; Prendergast, 1999; Agarwal and Wang, 2009). Our results support this hypothesis.

The remainder of the paper is structured as follows. In Section I, we provide an overview of the relevant literature regarding corporate governance and bank stability. In Section II A, we describe the composition of our data set. Section II B contains the summary statistics on anecdotal evidence of the reasons behind bank failures during the financial crisis of 2007-2010. We describe the ownership and management structures of the banks in our sample in Section II C. Section II D contains summary statistics on the accounting, competition and economic data. Section III reports our main multivariate results, and in Section IV we develop and test the effects when incentives between different ownership groups are aligned. Section V concludes.

I. Literature Overview

Our paper builds upon and expands the existing literature in two closely connected areas of research: bank defaults and the influence of corporate governance structures on bank risk taking. The literature on bank default mostly focuses on testing a wide variety of bank accounting variables on banks' default probabilities in discriminant analyses and regressions of dependent binary default indicator variables. Examples that precede the recent financial crisis are Meyer and Pfifer (1970), Martin (1977), Whalen and Thomson (1988), Espahbodi (1991), Thomson (1991, 1992), Cole and Fenn (1995), Cole and Gunther (1995, 1998), Logan (2001), and Kolari, Glennon, Shin and Caputo (2002). The predominant findings are that the default probability increases for banks with low capitalization and other measures of poor performance. Following this body of research, there are only few papers to date analyzing the relevant drivers of bank default during the recent financial crisis: Torna (2010), Aubuchon and Wheelock (2010), Ng and Roychowdhury (2011), Berger and Bouwman (2012), and Cole and White (2012). Torna (2010)

focuses on the different roles that traditional and modern-day banking activities, such as investment banking and private equity-type business, have in the financial distress or failure of banks from 2007 to 2009 in the US. The paper shows that a stronger focus on these modern-day activities significantly increase a bank's PD. Aubuchon and Wheelock (2010) also focus on bank failures in the US, comparing the 2007-2010 period to the 1987-1992 period. They predominantly analyze the influence of local macroeconomic factors on banks' failure probability. Their study shows that banks are highly vulnerable to local economic shocks and that the majority of bank failures occurred in regions which suffered the strongest economic downturn and the highest distress in real estate markets in the US. Ng and Roychowdhury (2011) also analyze bank failures in the US in the crisis period 2007-2010. They focus on how so called "add-backs" of loan loss reserves to capital can trigger bank instability. They show that add-backs of loan loss reserves to regulatory capital increase banks' likelihood of failure. Berger and Bouwman (2012) focus on the effects of bank equity capital on survival and market share during both financial crises (including the recent crisis) and normal times. They find that capital helps small banks survive at all times, and is important to large and medium banks as well during banking crises. Finally, Cole and White (2012) perform a test of virtually all accounting-based variables and how these might add to bank PD, using logit regression models on US bank failures in 2009. Using the standard CAMEL approach, they find that banks with more capital, better asset quality, higher earnings and more liquidity are less likely to fail. Their results also show that bank PD is significantly increased by more real estate construction and development loans, commercial mortgages and multi-family mortgages. Although our paper is closely related to these studies – especially to the post-crisis research and in terms of sample selection, observation period, and methodology – we strongly expand the scope of the existing analyses to include corporate governance variables and other factors and are therefore able to substantially contribute to the understanding of bank failure reasons.

Our most important contribution is the analysis of detailed ownership and management structure variables in the standard logit regression model of default. The distress of the banking system in the wake of the recent financial crisis has triggered a discussion about the role of corporate governance structures in the stability of financial institutions. Politicians (e.g., the Financial Crisis Inquiry Commission Report, 2011), think tanks (e.g. in the Squam Lake Working Group on Financial Regulation Report, February 2010), NPOs (such as in the OECD project report on

Corporate Governance and the Financial Crisis, 2009), and academic researchers (an overview of scholarly papers regarding corporate governance and the financial crisis is provided by e.g. Mehran, Morrisson and Shapiro, 2011) have recently not only intensely discussed, but also strongly acknowledged, the importance of corporate governance for bank stability. The discussions resulted in a number of actions from regulators addressing corporate governance in banks, such as restrictions on compensation and perks under TARP, various compensation guidelines set forth by the G20, or "clawback" clauses for executive compensation in addition to guidance for deferred compensation in Dodd-Frank. Banks even started to implement voluntary "clawback" clauses for bonus payments (such as Lloyds TSB) in addition to these mandatory clauses. However, the finding that corporate governance has implications for bank stability was already established long before the recent financial crisis. Several studies such as Saunders, Strock and Travlos (1990), Gorton and Rosen (1995), and Anderson and Fraser (2000) show that governance characteristics, such as shareholder composition, have substantial influence on banks' overall stability. Their findings support that bank managers' ownership is among the most important factors in determining bank risk taking. The general finding in all studies is that higher shareholdings of officers and directors induce a higher overall bank risk taking behavior. Saunders, Strock and Travlos (1990) show this for the 1979-1982 period in the US, and Anderson and Fraser (2000) confirm this for the 1987-1989 period. Although Gorton and Rosen (1995) obtain the same result for the 1984-1990 period, they additionally show that the relationship between managerial shareholdings and bank risk depends on the health of the banking system as a whole: it is strongly pronounced in periods of distress and might reverse in times of prosperity. Pathan (2009) provides empirical evidence for the period 1997-2004 that US bank holding companies assume higher risks if they have a stronger shareholder representation on the boards. Based on these findings, we have strong reason to believe that corporate governance structures might also have an influence on bank default probability.

In light of the recent financial crisis, some studies, such as Beltratti and Stulz (2012) and Erkens, Hung and Matos (2012), analyze bank ownership structures with special regard to bank risk.[2] Testing an international sample of large publicly traded banks, Beltratti and Stulz (2012) find that banks with better governance (in terms of more shareholder-friendly board structures) performed

[2] Another corporate governance-related body of research focuses on compensation structures in banks with special regard to risk. Among the most recent works on bank management compensation and risk taking behavior are Kirkpatrick (2009), Bebchuk and Spamann (2010), DeYoung, Peng, Yan (2010), Fahlenbrach and Stulz (2011), and Bhattacharyya and Purnanandam (2012).

significantly worse during the crisis than other banks and had higher overall stability risk than before the escalation of the crisis. Specifically, they find that banks with higher controlling shareholder ownership are riskier. This result is confirmed by Gropp and Köhler (2010). Erkens, Hung and Matos (2012) analyze the influence of board independence and institutional ownership on the stock performance of a sample of 296 financial firms (also including insurance companies) in over 30 countries over the period 2007-2008. They find that banks with more independent boards and greater institutional ownership have lower stock returns. Also testing an international sample, Laeven and Levine (2009) show that banks with a more diversified and outsider-controlled shareholder base have an overall lower risk structure than banks with a highly concentrated shareholder base in which most of the cash-flow rights pertain to one large (inside or outside) owner. Kirkpatrick (2008) also establishes that weak corporate governance in banks leads to inadequate risk management, especially insufficient risk monitoring through the board, a factor which contributed greatly to the bank instabilities during the crisis.[3]

Although the existing body of research has clearly established a connection between governance and bank risk taking behavior, none of the studies investigates the influence certain governance characteristics might have on bank default. The risk variables most often investigated are the stock price (e.g., Beltratti and Stulz, 2012), returns (e.g., Gropp and Köhler, 2010), lending behavior (e.g., Gorton and Rosen, 1995), or general stability indicators, such as the Z-score (e.g., Laeven and Levine, 2009). Standard governance proxy variables are managerial shareholdings (e.g., Anderson and Fraser, 2000), bank insider shareholdings (Gorton and Rosen, 1995), the ownership percentage of the single largest shareholder (Beltratti and Stulz, 2012), or the shareholder friendliness of the board (as developed by Aggarwal, Erel, Stulz, and Williamson, 2009, and used by e.g. Beltratti and Stulz, 2012).

Our paper offers three important contributions to the literature. We are the first paper to combine a range of these factors by investigating the influence the ownership and management structures in banks may have on their default probability. We are the first paper to differentiate between top- and lower-level shareholdings as well as between outside and inside director shareholdings. Finally, our paper is the first to analyze the influence of management structures on bank default probability.

[3] As noted above, Berger and Bouwman (2012) include institutional block ownership, bank holding company membership, and foreign ownership as control variables in models of bank survival and market share. They do not find strong, consistent results for any of these variables.

II. Data

A. Sample Selection

Our main data set is a collection of more than ten different data sets merged manually on the bank level. The data set is comprised of 85 US-based and -held commercial banks defaulting in the period 2007:Q1-2010:Q3, and a control sample of 256 US-based and -held commercial no default banks. To obtain this data set, we start with the population of US commercial banks using the FFIEC Call Report data set to collect bank balance sheet, income statement, and off-balance sheet data for each bank.[4] We include a control for systemically important financial institutions (SIFIs), commercial banks with at least $50 billion in total assets (as defined by Dodd-Frank). Note that none of these institutions failed during the crisis, perhaps because of the TARP bailout and/or extraordinary borrowing from the discount window.[5] These data are augmented by two additional data sets containing general economic indicators on the state level. The real estate price development is measured using the quarterly returns of the seasonally-adjusted Federal Housing Financing Agency (FHFA) house price inflation index for the state. The quarterly percentage change in state GDP is taken from the Bureau of Economic Analysis.

The fourth data set we use contains detailed information on the annual census-tract- or MSA (Metropolitan Statistical Area)-level mortgage lending in the United States. This data set is referred to as the "Home Mortgage Disclosure Act" or "HMDA" data set, obtained through the Federal Financial Institutions Examination Council (FFIEC). This data contains the total amount and volume of mortgage loans by year and census tract/MSA, both on an absolute level as well as broken down by borrower characteristics. We classify each mortgage granted to a borrower with an income of less than 50% of the median income in the respective census tract or MSA as "subprime." Although we acknowledge that borrowers falling into this income group might also be classified as "prime" borrowers in some cases, we believe it to be a fair assumption that mortgage borrowers of this category can be deemed as rather high-risk borrowers, and hence we group these as "subprime." We include the ratio of originated subprime mortgage loans to total

[4] Merged or acquired banks are treated as if the involved banks had been merged at the beginning of the observation period, by consolidating the banks' balance sheets. As a robustness check, we exclude all merged and acquired banks from our data set. Results remain unchanged.

[5] We also exclude all savings institutions with a thrift charter obtained through the Office of Thrift Supervision. This also includes all failed thrifts and thrift SIFIs (such as Washington Mutual and IndyMac). We do so for reasons of comparability and to obtain a homogenous sample of commercial bank failures only.

originated mortgage loans in our data set calculated on census tract or MSA level. We use the subprime variable and the Herfindahl Hirschman Index (HHI) of local market concentration as measures of competition. The HHI is based on the FDIC Summary of Deposits data on the branch level. We use each bank's share of deposits by branch in each rural county or MSA market for these calculations, and take weighted averages across markets for banks in multiple local markets using the proportions of total deposits as the weights.[6]

In a next step, we collect data on corporate governance, specifically, ownership and management measures. The information is taken from four sources: the Mergent Bank Database, the SEC annual bank reports publicly available through the SEC's EDGAR website, the FDIC Institutions data, and CRSP. The Mergent data base contains detailed ownership and management information for 495 US commercial banks (both stock-listed and private). We specifically use information on each bank's shareholders, their directors, and officers as well as on the other corporate insiders. To expand the sample, we complement the Mergent data base with the information given in the annual reports filed with the SEC of each bank with registered stock. In collecting the ownership data, we are not able to obtain any information on the amount of shares held in pension plans. As a consequence, we are not able to account for (bank employees') shareholdings as part of pension plans. The information on whether a bank is in a multibank holding company or not is taken from the FDIC Institutions data set, obtained through the official FDIC website. Public banks are all banks or banks in bank holding companies (BHCs) with SEC-registered shares over the observation period. We treat subsidiaries of multibank holding companies as public banks if their respective BHC is SEC-registered. Additional information on trading and stock-listing is obtained from CRSP. All banks without a stock listing and without a stock-listed BHC are treated as private banks. TARP banks are banks which received TARP funds at any time point until 2010:Q3.

In a last step, we have to determine which banks failed within our observation period. As we only focus on US commercial bank failures in the recent financial crisis, we use the FDIC Failed Institutions list as reported by the FDIC.[7] This list contains a detailed description of each failure of an FDIC-insured commercial bank or thrift, including the name of the bank, the exact date of failure (i.e., when the bank was put into FDIC conservatorship), its location, the estimated cost of

[6] We use total deposits in calculating the HHI because it is the only variable for which bank location is available.
[7] As obtained through the FDIC website: http://www.fdic.gov/bank/individual/failed/banklist.html

the failure to the FDIC, as well as information on the acquiring institution or liquidation of the failed bank. This list allows us to compile the data set of all failed institutions which are eligible for the analyses in our paper.

To gather additional information on each failure, we use multiple sources. First, we employ the Material Loss Reports (MLRs) published by the FDIC as part of their bankruptcy procedure for all material bank failures.[8] In it, the FDIC provides a detailed report on the causes for the failure of the bank, whether or not the failure was caused by the bank's management and its (lack of) risk management, and whether or not the failure could have been anticipated by the regulatory and supervisory authorities of the bank. For failed institutions for which no MLR was published, we gather news wire articles, press releases or reports from newspapers located in each bank's local market. The information we take from these multiple sources is: the exact failure reason, whether or not bad risk management was among the causes for the failure, whether or not regulatory action had been taken against the failed bank (especially cease-and-desist orders), and whether or not the failure came as a surprise to the regulatory and supervisory authorities. We use one additional source to determine the surprise of each bank's failure: stability reports ("LACE Reports") published by Kroll Bond Ratings, an independent firm specialized in rating banks and other financial services firms. These reports contain a rating scheme for each bank (based on a number of standard rating indicators) ranging from A (best) to F (worst). As the ratings are published quarterly, we are able to determine whether or not a bank has a rating better than "F" in the quarter prior to failure. We deem any failure as "surprising" if either the MLR specifically states that it was surprising or the LACE report shows that the failed bank's rating was better than "F" in the quarter prior to failure.

This leaves us with a data set of 249 default banks and 4,021 non-default banks. All bank failures occur in the period 2007:Q1 to 2010:Q3. As corporate governance information cannot be obtained for all banks, we exclude all failed and non-failed banks from our subsample of banks with corporate governance data for which we cannot obtain reliable information on the desired ownership and management variables. Our final subsample of banks with corporate governance data consists of 85 default banks and 256 no default banks, recorded over the same period, for a

[8] The FDIC publishes Material Loss Reports for all bank defaults which result in a "material loss" to the FDIC insurance fund. On January 1st 2010, the threshold for a "material loss" to the FDIC fund was raised from $25 million to $200 million.

total of 5,905 bank-quarter observations. A detailed description of all of the explanatory variables used in the regressions is provided in Table 1.

(Table 1)

B. Anecdotal Evidence on Bank Defaults

We first investigate the causes of bank failures on an anecdotal level. We do so to better understand the different reasons for bank failures and to ensure that our sample of bank failures is not biased by e.g. too many cases of fraud or regulatory intervention. We draw on the aforementioned Material Loss Reports (MLRs) and news sources to determine that the reasons for bank failures can be clustered into six distinct groups: "General Crisis Related," "Liquidity Problems Only," "Loan Losses Only," joint "Liquidity Problems and Loan Losses," "Fraud," and "Other." The MLRs and other sources reporting on the failures mentioned these six groups of failure reasons almost exclusively. If MLRs and/or news reports do not contain a specific failure reason, but instead mention that the failure came as a result of the general economic conditions or the crisis, we label the failure as "General Crisis Related." As shown in Table 2, Panel A, we find that 95 out of 249 banks fall into this category. If it is explicitly mentioned that either only liquidity problems, or only loan losses, or a combination of both was the cause for the failure, we cluster the banks in the respective groups "Liquidity Problems Only," "Loan Losses Only," or "Liquidity Problems and Loan Losses." We find that only one bank was put into FDIC conservatorship as the result of liquidity problems only. In contrast, 106 banks' failures were triggered by loan losses only and 22 banks defaulted after the joint occurrence of both liquidity problems and loan losses. Finally, we find that 5 banks failed or were taken into FDIC conservatorship due to management fraud. For 20 banks, a specific failure reason could not be determined; we thus label their failure reason as "Other." These anecdotal results show that loan-induced losses played a dominant role for banks' stability during the recent financial crisis, as opposed to liquidity problems.

The FDIC also publishes the estimated cost of the failure to the FDIC insurance fund. We collect and report these numbers to show the economic importance and which failure types are the most costly. The overall estimated cost of all failures in our sample to the FDIC insurance fund amount to approximately $6.75 billion. In 2009 the fund incurred the highest cost with an estimate of

$2.66 billion from 119 failures; however, the highest insurance costs per institution were incurred in 2008, with only 20 failures resulting in an estimated cost of $2.61 billion. The 106 loan loss-induced failures are the most costly group with a total of $2.08 billion. Interestingly, defaults due to both loan and liquidity losses seem to be much more expensive per institution as compared with loan loss-only failures. Although the overall contribution of the insurance cost to the overall estimated FDIC losses of the loan and liquidity loss group is only slightly smaller with $2.03 billion, this group consists of only 22 banks, as compared to the 106 bank failures in the loan loss-only group.

(Table 2)

In a second step, we collect anecdotal evidence on the role of the banks' management and the regulatory agencies prior to bank failure. Specifically, we determine whether or not bad risk management contributed to the default. Whenever the MLRs, other official FDIC releases, or newspaper articles mention that the bank suffered from managers' bad risk management, we classify the respective bank as a "Bad Risk Management" bank prior to default. Panel B in Table 2 shows that this is the case for only 18% of all defaults. The fact that not even a fifth of all bank defaults during the recent financial crisis happened due to inadequate risk control systems (or failures thereof) calls for a detailed investigation of alternative reasons for bank failures, such as the banks' ownership and management structures. We also gather information on the actions taken by the regulatory and supervisory agencies prior to the default. Supervisory actions prior to default (especially cease-and-desist orders to prevent the bank from failing) are used in only 7.6% of all defaults. Based on the MLRs and the LACE ratings, we also find that only 13.6% of all bank failures came as a surprise and were neither anticipated by a rating agency nor by the supervisory authority. According to Panel B in Table 2, one explanation for this rather low percentage of surprises might be that most of the surprising failures occurred at the onset of the financial crisis, when market participants have not been able to predict the severity of the crisis, while in 2009 and 2010 more banks failed but this was expected more often. Taken together, Panel B in Table 2 shows that our sample of bank failures does not put too much weight on potentially distorting factors as for example regulatory intervention or fraud and emphasizes the requirement of an investigation of alternative reasons for bank failures, such as the banks' ownership and management structures.

C. Corporate Governance and Bank Defaults

Table 3 shows summary statistics of the ownership and management data of our sample banks. We report summary statistics for the total sample, as well as broken down by default and no default banks, bad risk management, banks subject to cease-and-desist orders prior to default, and surprising versus non-surprising failures. We define "Outside Directors" as members of a bank's board of directors, who do not perform any function other than being a board director in the respective bank. The literature on corporate governance also refers to this group as "independent directors." As noted above, we define "Chief Officers" as all bank managers with a "chief officer" position. "Other Corporate Insiders" are all bank employees holding lower-level management positions in a bank, such as vice presidents, treasurers, or department heads. Note that these "Other Corporate Insiders" are neither "Chief Officers" nor members of the bank's board of directors. The shareholdings are determined based on the Mergent data base or SEC filings. The data contain name, title, and the amount of shares held by each manager. The shareholding variables are normalized by the number of the bank's outstanding shares and the numbers of outside directors, chief officers and other employees are scaled by the board size.[9] As stated above, shareholdings which are part of employee pension plans are not included. Table 3 reports that, on average, default banks have higher shareholdings of outside directors and chief officers, and much higher shareholdings of other corporate insiders, as compared to no default banks. In terms of management structures, we find that default banks have smaller boards, fewer outside directors and more chief officers relative to their board size, and the Chairman is less often also the CEO than in no default banks.

(Table 3)

These values paint an interesting picture of the ownership and management characteristics of default and no default banks in our sample. Table 3 provides empirical evidence that default banks tend to be characterized by higher shareholdings of outside directors and chief officers and much larger shareholdings of lower level management. A tentative conclusion of these descriptive results could be that the incentives are set very differently in default and no default

[9] Note that the scaling with the board size does not imply that the sum of the three variables adds up to one because other corporate insiders are not members of the board while also chief officers are not always members of the board.

banks. In no default banks, fewer shares are held by chief officers, who are responsible for the continuation of bank's operations in the long term, or by outside directors, who are responsible for the oversight of these operations. Furthermore, outside directors and chief officers are publicly known figureheads of the banks. This might imply that their personal reputation is connected to the bank's performance and survival. This explanation is supported by research on principal-agency theory, showing that career and reputation concerns play a major role in the decision-making of management (e.g. Holmstrom and Ricart i Costa, 1986, or Hirshleifer and Thakor, 1992). In contrast, lower-level management, such as vice-presidents or treasurers, hold more than 50% of all shares in default banks. This group is neither publicly known nor held responsible in public for the failure of the bank, even though they may exert a tremendous amount of direct influence on the actual risk taking of the bank in its daily operations.[10] The position of lower level management is equivalent to equity holders in the classic Merton (1977) firm value model which states that shareholders of insured banks have a moral hazard incentive to increase variance of returns, since the assets of the bank can be put to the FDIC in the event of default. This incentive may be less for the outside directors and chief officers who are publicly known and vilified in the event of default as compared to opaque lower level management. However, Table 3 suggests that outside directors and chief officers behave less responsibly in terms of risk taking when they have large stakes in the bank. Other non-executive corporate insiders tend to also increase risk taking when they hold shares of the bank. We investigate this result in more detail in the next section in a multivariate setting.

We finally report information if the bank is publicly traded versus privately owned, if it received TARP funds during the crisis, and if it is organized in a multibank holding company as this also describes a bank's ownership structure. We also include these factors because publicly traded banks and banks in multibank holding companies might have access to additional capital markets besides only the bank's internal funds (or the internal funds of the holding company) which, especially in times of distress, might serve as a source of financial strength. TARP is a specific example of this notion. About 69% of all default and 44% of all no default banks in our sample were publicly traded over the observation period. The difference derives from the availability of

[10] We acknowledge that there are a few exceptions, such as Nick Leeson, Jérôme Kerviel, and Bruno Iksil, who became known to the public. However, individual traders have to severely cripple their financial institutions (with losses, only attributable to them, in the billions) before being in the news. Additionally, all of these now infamous cases were based on fraudulent risk taking, as opposed to risk taking within the allowed boundaries. The news on these tail events also supports the notion that lower-level employees may have a tremendous impact on bank risk.

governance data for banks. Banks with registered shares are more likely to publish governance data. As we specifically put in a lot of effort in obtaining data for default banks we do not only observe a rather high default rate in our data sample but also a higher fraction of public banks. Only 19% of the default banks and 12% of the no default banks were part of a multibank holding structure.

D. Summary Statistics of Accounting, Competition and Economic Variables

Table 4 provides summary statistics on the variables other than the corporate governance variables. It shows that default banks differ strongly from no default banks, especially in terms of general characteristics, business focus, and overall stability. As can be seen in the table, default banks are on average smaller than no default banks as measured by asset size, have a lower capital ratio, lower loan volume relative to their assets, stronger loan growth as well as weaker loan diversification as measured by the loan-concentration HHI. On the funding side, default banks rely more on brokered deposits and less on retail deposits than no default banks. Not surprising, default banks also perform worse in terms of overall stability than no default banks: they have a negative return on assets and a much higher non-performing loan ratio. Interestingly, default banks have a lower exposure to mortgage-backed securities (MBS) than no default banks. Note that default banks do not have any off-balance sheet derivative exposure (not shown in the table), which is why we exclude this factor in our regression analyses.

(Table 4)

At the bottom of Table 4, we show summary statistics for the market competition and state economic condition variables. For market competition, we report the deposit-based HHI of market concentration and the subprime lending ratio of originated subprime mortgage loans to total originated mortgage loans on census tract or MSA level. The state economic condition variables include the house price inflation indicator, calculated using the average quarterly returns of the seasonally-adjusted Federal Housing Financing Agency (FHFA) house price inflation index for the bank's states, and the quarterly percentage changes in state GDP.[11]

[11] We use the state economic variables from the states in which the banks have deposits. For banks with branches in different states, we calculate the weighted exposure to each state through the FDIC Summary of Deposits data, as previously used for the HHI calculation, to obtain a weighted exposure to the state economic variables.

Comparing the values for default and no default banks, we find that default banks face slightly lower market concentration, competitors with lower subprime exposure, a steeper decrease in house price values and a slightly lower GDP growth than no default banks. We will forego a detailed analysis of these univariate statistics and instead rely on the multivariate regression results to interpret the variables' influence on bank defaults in greater detail.

III. Multivariate Analysis

A. Methodology

In this section, we investigate the possible influence factors have on bank failure in a multivariate logistic regression framework with an indicator variable for bank failure in the default quarter as dependent variable and a number of predictor variables. By choosing this model specification, we follow a broad body of literature having established this approach as standard procedure (e.g., Campbell, Hilscher, and Szilagyi, 2008), which was pioneered for banks by Martin (1977). We include a total of five sets of explanatory variables: accounting variables, corporate governance variables, market competition measures, state economic indicators, and bank regulator variables. We combine these sets of variables to test eleven different model specifications, in which each specification is comprised of either a different set of variables or a different subsample. As reported in Table 4, we have a main sample of 85 default banks and 256 no default banks for which we obtain corporate governance data of a bank's ownership and management structures. We test the contribution the different variable sets or combinations thereof have on the explanatory power of our model of bank default. We additionally test each model for three different time periods: the year immediately preceding the default, as well as two years prior to default. By also testing the time component, we follow a body of research (e.g., Cole and Gunther, 1998; Cole and White, 2012) which shows that the predictive power of binary regression models in the context of bank defaults varies over time. We additionally include regression models using variables only from 2006:Q4. This allows for a measurement of the effects with variables not having been influenced yet by any impact of the financial crisis. In running these tests, we are primarily interested in three questions: First, how do the different sets of variables and combinations thereof contribute to the overall explanatory power of the regression? Second, which variables are statistically significant in explaining bank failures?

Finally, at what point in time prior to the actual default date do sets of variables or individual variables have the largest explanatory power in predicting bank defaults?

The accounting variables include measures of the bank's size, return on assets, capitalization, loan portfolio composition, funding structure, securities business, and off-balance sheet activities. By doing so, we follow a large number of articles on bank default (e.g.; Lane, Looney, and Wansley, 1986; Whalen and Thomson, 1988; Espahbodi, 1991; Logan, 1991; Thomson, 1991; Cole and Gunther, 1995, 1998; Kolari et al., 2002; Schaeck, 2008; Cole and White, 2012) who show that accounting variables have significant explanatory power in predicting bank default. By including the log of total assets, the ratio of equity to assets, and the return on assets, we follow Cole and Gunther (1995, 1998), Molina (2002) and others who show that these variables can serve as valid indicators for size, capitalization, and profitability. To measure the composition and stability of the bank's loan portfolio, we include five accounting variables. We use the ratio of total loans to total assets, excluding construction and development (C&D) loans, as well as the ratio of C&D loans only to total assets. In doing so, we follow Cole and White (2012), who show that C&D loans have strong explanatory power in predicting bank defaults, especially in the recent financial crisis. We account for this finding by investigating the singular influence of C&D loans in a bank's overall loan portfolio on the likelihood of bank failure, as well as incorporating the ratio of the bank's remaining loans to its assets. We also include a loan concentration index, the growth of a bank's loan portfolio and the ratio of non-performing loans to total loans in the regressions to account for concentration and credit risk. Short-term funding and illiquidity risks are measured by the ratios of short-term deposits to assets and brokered deposits to assets, respectively. We additionally include the ratio of mortgage-backed securities (MBS) to assets. Finally, the ratio of unused commitments to assets is included as a measure for off-balance sheet risks. We do not include the off-balance sheet derivative exposure of the banks in our analyses as no default bank in our data sample has any exposure to these in any time period.

The corporate governance variables are taken from the set of measures introduced above. To account for the bank's ownership structure, we include the number of shares held by outside directors, chief officers, and other corporate insider shareholders (defined as in section II.C). Each of these variables is standardized by the number of shares outstanding of the respective bank. We also include a dummy variable indicating whether or not the bank received funds from the troubled asset relief program (TARP). In addition, we include dummy variables for whether a

bank is organized in a multibank holding company, and whether the bank or its BHC is a public bank in the sense of having registered shares with the SEC. As mentioned before, publicly traded banks and banks in multibank holding companies might have access to further capital markets which might serve as an additional source of financial strength.[12] By including these ownership variables in our multivariate regression framework, we account for the previous literature on the relationship between banks' ownership structures and bank stability, such as Saunders, Strock and Travlos (1990), Gorton and Rosen (1995), Anderson and Fraser (2000), Caprio, Laeven and Levine (2003), Laeven and Levine (2009), and Pathan (2009). We thereby moreover investigate if the stark differences in the descriptive statistics between default and no default banks in terms of ownership structure also hold in a multivariate setting. To further proxy for the bank's management structure, we include the number of outside directors, the number of chief officers, the number of other corporate insiders, all scaled by the bank's board size, to account for relative differences in management and oversight among banks.[13] We additionally employ (the logarithm of) the number of members of the board of directors ("Board Size") and an indicator variable if the CEO of the bank is also its Chairman. We are thereby the first to explicitly investigate the impact of a bank's management structure on bank default.

The set of variables on bank competition contains the Herfindahl Hirschman Index (HHI) of bank market power on MSA or rural county level, its squared value, as well as the ratio of originated subprime mortgage loans to total mortgage loans originated on census tract/MSA level. We use the HHI as a proxy for the competition a bank faces in its local market. To calculate the HHI, we define the deposits held by each bank's branches as the product market, the rural county level or MSA in which the bank's branches are located as the local market, and each quarter as the temporal market. Using the standard HHI calculation method, we sum up each bank's squared market share in each market and quarter. For banks which are active in multiple markets, we use the weighted average across each market to determine the HHI. A broad body of research has shown that competition is an important stability factor for banks. According to the literature, higher market power may result in either a higher or a lower probability of bank failure. In the traditional "competition-fragility" view, higher market power increases profit margins and results

[12] As a robustness check, we replace the multibank holding company (BHC) dummy with a dummy variable indicating whether or not the bank is part of any BHC structure, either single-bank or multibank. The results remain unchanged.

[13] As a robustness test, we also standardize the number of outside directors, chief officers, and other corporate insiders variables by the asset size of the bank. The results remain unchanged.

in greater franchise value with banks reducing risk taking to protect this value (e.g., Marcus, 1984; Keeley, 1990; Demsetz, Saidenberg, and Strahan, 1996; Hellmann, Murdock, and Stiglitz, 2000; Carletti and Hartmann, 2003; Jiménez, Lopez, and Saurina, 2007). Thus, a higher HHI may result in a lower probability of failure. In contrast, in the "competition-stability" view, more market power in the loan market may result in higher bank risk and a higher probability of failure as the higher interest rates charged to loan customers make it harder to repay loans and exacerbate moral hazard and adverse selection problems (e.g., Boyd and De Nicoló, 2005; Boyd, De Nicoló, and Jalal, 2006; De Nicoló and Loukoianova, 2007; Schaeck, Cihák, and Wolfe, 2009). Martinez-Miera and Repullo (2010) furthermore argue that this effect may be non-monotonic. We control for this possibility by also incorporating the squared value of local market power. Berger, Klapper, and Turk-Ariss (2009) argue that the effects of both views may be in place – banks with more market power may have riskier loan portfolios but less overall risk due to higher capital ratios or other risk-mitigating techniques – and find empirical evidence of these predictions. In addition to the HHI, we also include in our analyses the ratio of originated subprime mortgage loans to total mortgage loans originated to account for the particularities of the recent financial crisis. As is known now, the excessive origination of mortgages to borrowers with subprime creditworthiness led to high losses for banks in the recent financial crisis. Additionally, prior research establishes that real estate loans in general also played an important role for bank stability in earlier crises (e.g., Cole and Fenn, 1995). We include the average subprime mortgage loan ratio in a bank's census tract to measure the subprime risk exposure of the bank's local competitors. Based on the aforementioned literature and the characteristics of the recent financial crisis, we hypothesize that stronger subprime exposure of a bank's competitors could increase the competitors' risk structures and therefore also their default risk, which might have helped the observed banks survive the crisis by weakening their competitors.

The set of variables on state economic conditions contains the FHFA house price index to account for another real estate-related factor of the crisis: the decline in house prices. One of the alleged distress reasons for banks in the recent financial crisis was the strong decline in house prices since 2006. The fact that many banks could only partially recover collateral from defaulted mortgage loans because of depreciated property and estate prices is believed to also have caused instability in the banking system. We also include the annual percentage change in state GDP as a measure for the overall economic conditions.

Our fifth set of variables controls for potential differences in bank stability which could be explained by a bank's primary federal regulator. For this purpose, we measure the effects of OCC- and Fed-regulated banks with FDIC-regulated banks as the base case.

B. Results

Looking at the coefficients of the individual predictor variables, we find the differences in the accounting variables between default and no default banks in the descriptive statistics to be largely confirmed in our multivariate analysis. Across most model specifications in Table 5, the capital ratio and the return on assets have highly significant and negative influences on default probability: the lower the capital ratio and the return on assets, the higher is the default probability. The findings for these two variables are intuitive as they are the main ingredients of the bank's distance to default (e.g., Laeven and Levine, 2009; Houston et al., 2010). We also find the summary statistics for the NPL ratio to be confirmed in the regression models. The NPL ratio reveals a significantly positive influence on the default probability. Our descriptive statistics also show that default banks rely to a larger extent on wholesale funding in terms of brokered deposits as compared to no default banks. We do not find this to be a significant influence for bank PD in our multivariate analyses. However, the other main funding source, short-term deposits, exhibits significantly negative coefficients across most model specifications. This implies that more short-term deposits reduce bank default probability. Our results thus confirm the findings of Gatev, Schuermann and Strahan (2006) who show that transaction deposits are sticky and can accordingly be considered as a stable funding source for banks, increasing their stability. Finally, we also verify the importance of C&D loans on the probability of bank failure as shown by Cole and White (2012). Our results substantiate in most cases that a higher exposure to C&D loans increases a bank's default probability. We do not find asset size, loan exposure, loan portfolio concentration, or the amount of MBS to have any consistent or strong influence on a bank's default probability across different model specifications. The overall results with respect to the accounting variables are therefore largely in line with prior research.

(Table 5)

We observe several findings in our multivariate analyses regarding the corporate governance variables. First, only one out of the six ownership variables shows a persistently strong influence

on the default probability across all model specifications and time periods prior to default. Table 5 reveals that the shares held by other corporate insiders has a highly significant and positive influence on a bank's probability to fail. This implies a lower bank default probability if other inside shareholders own lower stakes in the bank. This finding is consistent with our descriptive statistics above. As mentioned before, outside directors or chief officers have a high public visibility with their personal reputation at risk, especially in case of a bank default. Alternatively, perhaps they did not fully understand all the risks in their portfolios in the recent financial crisis (as e.g. remarked in the UBS Shareholder Report on the banks' losses), so they were unable to influence the PD very much. Our multivariate results confirm that high shareholdings of both outside directors and chief officers have no direct impact on bank survival. In contrast, if the bank is to a large extent owned by lower-level managers who in general are anonymous, but have direct influence on the bank's daily operations, the probability of bank default increases significantly. Finally, the slightly negative influence of the TARP-dummy on bank instability suggests that obtaining TARP funding either protected banks or that only high-quality banks received TARP funding in the first place.

As mentioned before, lower-level management has a moral hazard incentive to increase the risk of the bank. If it assumes high risks which prove to be successful, the value of the bank strongly increases and thereby also the personal wealth of lower-level management due to its high positions in the bank's stock. If, on the other hand, the high risks result in large losses, lower-level managers may lose their jobs. But as the cause (or more specifically, the employees and their actions) remains in most cases unknown to the general public, the chances to quickly find another comparable employment are high. This implies that they have unlimited upside but only limited downside risk. Accordingly, our descriptive as well as our multivariate results suggest that other corporate insiders tend to increase risk taking when they have large stakes in the bank. This finding is important for bank management as well as regulators: it argues for discouraging lower-level management from holding large stakes in the bank.

In contrast to the strong results for the corporate governance ownership variables, the corporate governance management variables do not have substantial explanatory power for bank defaults. None of our five main management variables – the number of outside directors, the number of chief officers, the number of other corporate insiders, the board size, and whether the bank's CEO is also its Chairman – seems to have a substantial influence on a bank's default probability.

We only find weak significance for some of these variables scattered in different model specifications. Accordingly, we conclude that the management structure of a given bank is not decisive for its overall stability.

Looking at the last three sets of variables, we first find that the local market power of the bank seems to have only a weakly positive influence on bank stability. Secondly, we observe that high exposures of the bank's competitors to subprime mortgage loans have positive effects for the bank under analysis. This is intuitive as these direct competitors, who are located in the same census tract or MSA, might suffer from high loan default rates due to a high subprime exposure and compete less aggressively in the market. Thirdly, we find that the OCC-regulator dummy seems to have a slight positive influence on bank instability, suggesting that being under OCC supervision tends to increase banks' default probability. Finally, turning to our two state economic indicators, we find that they seem to influence bank default probability at least to some degree. The house price inflation has a negative effect, mostly two years before default, while the GDP growth variable shows significantly negative values mostly in the year before default. These results suggest that declining real estate prices and negative GDP growth increase the chances for a bank to default.

We finally investigate our results in several robustness tests in Table 6. We exclude systemically important financial institutions (SIFIs) as these may exhibit very different business models as well as a substantially different degree of government support. We also exclude multibank holding companies due to the aforementioned internal capital markets. Furthermore, we exclude banks which received TARP funds during the crisis as they exhibit government involvement during our observation period. Our results remain consistent in all subsamples.

(Table 6)

The last set of robustness tests uses further information. In model IV of Table 6 we incorporate all banks irrespective of corporate governance information to observe the consistency of variables between samples. This results in a sample of approximately 2,000 banks. We also incorporate a Heckman Selection model of bank default using a two-stage probit regression setup. The goal of the Heckman Selection model is to validate the results of the regular logit regression model by accounting for possible selection biases due to different availability of corporate governance data. By including this model, we follow Cole, McKenzie, and White (1995), who show that it can

serve as a valid control tool for binary regression models testing bank defaults. Our main concern is that only specific types of banks with specific ownership and management structures report their corporate governance data, so that our analysis would suffer from a non-random subsample of banks. We account for this possibility by including a number of instrumental variables in the selection equation of the model. These are the size of the bank and its squared value to account for nonlinearities in size because very large banks may have a much higher probability to publish corporate governance data. We also use the indicator variable for whether banks are publicly traded as an instrument because, as mentioned before, banks with registered shares are required by the SEC to publish their corporate governance structure. Furthermore, we include in the first stage if banks are organized in a multibank holding companies as banks in large BHCs might have a higher probability of publishing their corporate governance data. In addition, data on banks' ownership and management structures are only disclosed at the holding company level.[14] Furthermore, we include the individual fractions of a bank's loan portfolio (real estate, agricultural, commercial, and individual loans) in our set of instruments to account for banks' different foci in business. We also include the cumulative operating income of the bank from 2004:Q1 to 2006:Q4 as banks with high profits and accordingly many good news might also have a higher likelihood to publish further information such as governance structures. One reason might be to attract further talent. The requirements to report corporate governance data may also differ by regulatory authorities. We therefore use regulatory indicator variables to distinguish between potential differences in the disclosure of corporate governance data by OCC-, FED-, and FDIC-regulated banks. Finally, in model VI of Table 6 we incorporate past accounting variables of the bank. These are the quarterly average from 2004:Q1 until 2006:Q4 of asset growth, change in capital ratio, growth of total loans excluding C&D loans, growth of C&D loans, change in loan concentration, short-term deposits growth, brokered deposits growth, return on assets, non-performing loans growth, mortgage-backed securities growth, and unused commitments growth. The reason to include these is to test if past accounting information is sufficient to explain future bank defaults or if further data, such as ownership structures, are required to better explain bank defaults. Note that we cannot include the regression for 2006:Q4 due to insufficient observations. The results confirm our previous findings. We find the same patterns of significance and

[14] We also repeat all tests clustering banks at the holding company level to eliminate that results are driven by spurious significances due to repeated observations. All findings remain the same. The exclusion of all banks in multibank holding companies also does not change the results qualitatively.

direction of influence for our variables also when the Heckman correction or additional banks or variables are incorporated. Furthermore, selection biases are rejected in Wald tests in all cases.

IV. Alignment of Incentives between Chief Officers and Lower Level Management

Our results suggest that bank PD increases, the higher the shareholdings of lower level management. In a further analysis, we test the hypothesis that this effect on bank risk taking is especially pronounced when the incentives of lower level management are aligned with chief officers, who are in charge of monitoring the bank's daily operations (e.g.; Holmstrom, 1999; Prendergast, 1999; Agarwal and Wang, 2009). We therefore subdivide banks by low and high shareholdings of chief officers using thresholds of 5% and 10% of their holdings. Low Incentive Alignment is a dummy variable which is 1 when the shareholdings of chief officers are below the threshold and High Incentive Alignment is a dummy variable which is 1 when the shareholdings of chief officers are above the threshold. Table 7 shows the results.

(Table 7)

Table 7 reveals that bank PD increases especially in banks in which both lower level management as well as chief officers have rather large shareholdings. These results suggest that the alignment of interests between top- and lower-level management leads to excessive risk-taking, endangering a bank's stability. Apparently, we find that the public vilification effect of top-level management in case of default might be muted if their interests are stronger aligned with lower-level management. The reputational concerns might be replaced by short-term monetary incentives, fostered by banks' risk-rewarding incentive systems.

V. Conclusion

This paper analyzes the role of corporate governance in bank defaults during the recent financial crisis. To do so, it examines the ownership and management structures of default and no default commercial banks in the US. Using a combination of accounting variables, corporate governance structure, and several bank-external control variables (subprime risk, house price development,

competition, economic, and regulatory indicators), we can help explain bank defaults in advance. The results show that the overall explanatory power of regressions used to explain bank defaults can be strongly increased by including ownership indicators in addition to usual accounting indicators. Our findings also illustrate that a bank's ownership structure plays a substantial role in explaining default likelihood: banks are more likely to default if they have more shareholdings of other corporate insiders. We offer explanations for these perhaps unexpected findings. Lower-level managers with large shares may take on more risk because of the moral hazard problem. Outside directors and chief officers are vilified in the event of a default, so that the moral hazard problem may not apply as much to them. Additionally, they might not have fully understood all the risks in their bank's portfolios in the recent financial crisis limiting their ability to influence bank PD very much.

The study therefore offers important policy implications which might assist regulators, supervisors, and other market participants in anticipating and preventing future banking crises. In addition to accounting variables indicating bank stability, such as capitalization, profitability, and nonperforming loans, strong emphasis should be given to the analysis of the bank's corporate governance, especially the ownership structure.

With regard to stability, our results suggest that other employees should only hold minimal stakes in the banks. Our study has also strong implications with respect to bonus payment programs involving stock. Based on our findings, banks or bank regulators should reduce the amount of stock or stock options given out to lower-level managers, such as vice-presidents or department heads, to increase bank stability. One first step in the right direction might also be deferred compensation, introduced in banks after the current financial crisis. Our results therefore support the recent efforts of various bank regulations and regulators (such as Dodd-Frank, the G-20, the FDIC, and the Federal Reserve) to impose stricter rules on bank compensation systems.

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Table 1 Description of Variables

The table shows descriptions of virtually all variables used in the analyses together with their units of measurement. All financial variables are measured in real terms with 2005 as the base year using the consumer price index (CPI).

Variable Name	Unit	Description
Accounting Variables		
log(Assets)	Log ($ Thd.)	Natural logarithm of total assets in $ thousand as reported on the balance sheet.
Capital Ratio	%	Ratio of equity capital to total assets as reported on the balance sheet.
Total Loans excl. C&D/Assets	%	Ratio of the total volume of all outstanding loans excluding construction and development (C&D) loans to total assets as reported on the balance sheet.
Construction & Development (C&D) Loans/Assets	%	Ratio of the total volume of all construction & development (C&D) loans to total assets as reported on the balance sheet.
Loan Concentration	Index	Herfindahl-Hirschman Index (HHI) of bank level loan portfolio concentration. It is calculated by summing the squared percentage of each loan category to the bank's total loans, and ranges from 0 to 1.
ST Deposits/Assets	%	Ratio of short-term deposits (transaction and demand deposits) to total assets as reported on the balance sheet.
Brokered Deposits/Assets	%	Ratio of brokered deposits to total assets as reported on the balance sheet.
Return on Assets	%	Ratio of net income as reported on the profit and loss account to total assets as reported on the balance sheet.
Non-perform. Loans/Assets	%	Ratio of all non-performing loans (all loans 90 days past due plus all loans charged-off) to total assets as reported on the balance sheet.
Loan Growth	%	Quarterly growth in the total volume of deflated outstanding loans as reported on the balance sheet.
MBS/Assets	%	Ratio of mortgage-backed securities (MBS) to total assets as reported on the balance sheet.
Unused Commitm./Assets	%	Ratio of all unused loan commitments as reported in the bank's off-balance sheet statement to total assets as reported on the balance sheet.
Corporate Governance Variables		
Ownership Variables		
Shares Outside Directors/Shares	%	Ratio of the number of shares held by outside (non-affiliate) directors of the bank to the bank's total number of shares outstanding.
Shares Chief Officers/Shares	%	Ratio of the number of shares held by chief officers of the bank to the bank's total number of shares outstanding.
Shares Other Corp. Insiders/Shares	%	Ratio of the number of shares held by other corporate insiders of the bank to the bank's total number of shares outstanding.
TARP	Dummy	Dummy variable indicating whether the bank received and holds TARP funds.

Public Bank	Dummy	Dummy variable indicating whether the bank is traded publicly at the stock market. Subsidiaries of publicly traded bank holding companies are considered to be public. Banks with private placements of shares with a CUSIP number, banks without a stock exchange listing, and banks whose bank holding company is not listed at a US stock exchange are not treated as public. The data on trading and listing are derived from CRSP.
Multibank Holding Company	Dummy	Dummy variable indicating whether the bank is a subsidiary of a bank holding company with more than 1 bank.
Management Variables		
Outside Directors/Board	Ratio	Ratio of the number of outside directors (non-affiliate directors, i.e. members of the board of directors excluding chief officers and all other corporate insiders) to the board size (the number of members of the board of directors).
Chief Officers/Board	Ratio	Ratio of the number of chief officers (members of the executive board) to the board size (the number of members of the board of directors).
Other Corporate Insiders/Board	Ratio	Ratio of the number of of other corporate insiders of a bank (presidents, vice presidents, treasurer etc., i.e. all employees of the bank except chief officers and board members) to the board size (the number of members of the board of directors).
log(Board Size)	Log	Natural logarithm of the number of members of the board of directors.
Chairman is CEO	Dummy	Dummy variable indicating whether the Chairman of the Board of Directors is also the Chief Executive Officer (CEO) of the same bank.
Market Competition Variables		
Local Market Power	Index	Herfindahl-Hirschman Index (HHI) of market concentration based on the bank's weighted deposits in the Metropolitan Statistical Areas (MSA) or rural counties in which it operates, and ranges from 0 to 1.
(Local Market Power)^2	Index^2	The squared value of "Local Market Power."
Competitors' Subprime Exposure	%	The ratio of originated subprime loans to total originated loans in the bank's local markets. It is used in the analyses as the annual average from 2004 – 2008 in the respective bank's census tract weighted by the bank's deposits in each census tract employing data of the Home Mortgage Disclosure Act (HMDA).
State-Level Economic Variables		
House Price Inflation	%	Quarterly inflation rate of the seasonally-adjusted Federal Housing Finance Agency's (FHFA) house price index in the bank's state.
%-Change in GDP	%	Quarterly percentage change in the Gross Domestic Product (GDP) in the bank's state proxied by the quarterly state personal income provided by the Bureau of Economic Analysis.
Primary Federal Regulator Variables		
OCC	Dummy	Dummy variable indicating whether the bank has a national bank charter, so the bank's primary federal regulator is the OCC.
FED	Dummy	Dummy variable indicating whether the bank is a state-chartered Federal Reserve member, so the Federal Reserve is the bank's primary federal regulator.

Table 2 Bank Default Characteristics and Loss to FDIC fund

The table shows the characteristics of commercial default banks in the US over the time period 2007:Q1 – 2010:Q3 aggregated over years. In Panel A, the number of default banks and the corresponding total loss to the FDIC insurance fund in $ million in current year dollars (estimated through the FDIC at the time of default) in the parentheses below is provided by default reason. The respective reason was identified via official press releases and loss reports of regulatory agencies, newspaper articles, and wire news. Fraud refers to any kind of illegal wrongdoing of the management; general crisis related means that it was mentioned that the financial crisis was the main reason for the failure. Panel B shows the percentage of banks with bad risk management, to which a cease-and-desist order had been issued before failure by the respective regulatory agency, and where the default was surprising. "Bad Risk Management" is used as stated by the FDIC after having taken the bank into conservatorship and examining the failure in the Material Loss Report (MLR). For the identification of a cease-and-desist order prior to default we employ the MLR and/or the FDIC press releases of the bank failure. A bank default is defined as "surprising" when it was not anticipated by the bank regulators or the clients. Whether or not a bank failure was "surprising" is taken from two different sources. First, the MLRs in which the FDIC states whether or not it could have anticipated the failure at prior examinations. The second source is LACE bank ratings during the quarters leading up to the failure. These derive from LACE Financial, an independent (often uncompensated) boutique credit-ratings firm specialized in rating banks and other financial services firms. It was founded in 1984 and acquired by Kroll BondRatings in August 2010. If the assigned LACE rating is not F (worst) in the quarter before failure, the failure is deemed "surprising."

Panel A	2007	2008	2009	2010:Q1-Q3	Total
General Crisis Related	- -	2 ($42)	35 ($521)	58 ($205)	95 ($768)
Liquidity Problems Only	- -	- -	1 ($12)	- -	1 ($12)
Loan Losses Only	1 ($110)	12 ($758)	51 ($703)	42 ($510)	106 ($2,081)
Liquidity Problems and Loan Losses	- -	3 ($939)	16 ($593)	3 ($501)	22 ($2,033)
Fraud	- -	1 ($0)	2 ($87)	2 ($77)	5 ($164)
Other	1 ($16)	2 ($874)	14 ($753)	3 ($48)	20 ($1,691)
Total	2 ($126)	20 ($2,613)	119 ($2,668)	108 ($1,341)	249 ($6,748)

Panel B	2007	2008	2009	2010:Q1-Q3	Total
Bad Risk Management	50.00%	5.00%	27.73%	9.26%	18.07%
Cease-and-Desist Order before Failure	0.00%	15.00%	8.40%	5.56%	7.63%
Failure Surprising	0.00%	35.00%	17.65%	5.56%	13.65%

Table 3 Corporate Governance Variables

The table shows descriptive statistics of corporate governance variables for all banks and subdivided by no default and default banks. The table is based on the subset of 6,152 observations for the 341 banks for which we have corporate governance data. The shares outside directors, shares executive officers, and shares other corporate insiders variables are standardized by the bank's number of outstanding shares (Shares). The number of outside directors, number of executive officers, and number of other corporate insiders variables are normalized by the bank's board size (Board). All employees of the bank except executive officers and board members are deemed other corporate insiders, executive officers are the members of the executive board, and outside directors are members of the board of directors excluding officers and all other corporate insiders.

	Total	No Default	Default
Ownership Variables			
Shares Outside Directors/Shares	0.097	0.076	0.159
Shares Chief Officers/Shares	0.027	0.019	0.053
Shares Other Corp. Insiders/Shares	0.063	0.029	0.166
TARP	0.296	0.379	0.047
Public Bank	0.501	0.438	0.694
Multibank Holding Company	0.135	0.117	0.188
Management Variables			
Outside Directors/Board	0.884	0.886	0.879
Chief Officers/Board	0.379	0.331	0.524
Other Corporate Insiders/Board	1.563	1.560	1.571
log(Board Size)	2.487	2.550	2.297
Chairman is CEO	0.739	0.781	0.612

Table 4 Descriptive Statistics of Banks

The table provides in Panel A descriptive statistics of quarterly data of bank-specific variables over the time period 2006:Q1 – 2010:Q3. The variables are described in Table 1. For each variable, we report its mean and standard deviation in parentheses below. SIFIs (systemically important financial institutions) are defined as banks with assets larger $50bn. in at least one quarter in our time period. The statistical significance of differences is determined via a t-test for unpaired data with unequal variance and indicated by * = 10% level, ** = 5% level and *** = 1% level.

Panel A	Total (n = 6,152)	No Default (n = 4,617)	Default (n = 1,288)
Number of Banks	341	256	85
Accounting Variables			
Total Assets ($-Thd.)	8,867,470 (76,700,000)	11,000,000 (86,100,000)	990,464 (1,726,073)
Total Assets ($-Thd.) excluding SIFIs	1,729,611 (3,263,528)	1,935,810 (3,549,197)	990,464 (1,726,073)
Capital Ratio	9.563% (0.032)	9.777% (0.026)	8.757% (0.047)
Total Loans excl. C&D/Assets	58.977% (0.122)	61.057% (0.107)	51.119% (0.143)
Construction & Development (C&D) Loans/Assets	11.364% (0.115)	7.420% (0.063)	26.259% (0.142)
Loan Concentration	0.653 (0.155)	0.626 (0.152)	0.753 (0.122)
ST Deposits/Assets	12.092% (0.090)	12.511% (0.094)	10.515% (0.070)
Brokered Deposits/Assets	4.407% (0.079)	3.108% (0.050)	9.310% (0.133)
Return on Assets	0.187% (0.014)	0.427% (0.008)	-0.718% (0.025)
Non-perform. Loans/Assets	1.709% (0.029)	1.180% (0.016)	3.707% (0.051)
Loan Growth	1.585% (0.065)	1.511% (0.059)	1.865% (0.081)
MBS/Assets	7.718% (0.077)	8.457% (0.081)	4.939% (0.052)
Unused Commitm./Assets	24.056% (0.281)	24.141% (0.197)	23.736% (0.482)
Market Competition Variables			
Local Market Power	13.612% (0.069)	13.823% (0.066)	12.804% (0.080)
Comps.' Subprime Exposure	4.571% (0.035)	4.751% (0.036)	3.889% (0.031)
State-Level Economic Variables			
House Price Inflation	-0.665% (0.021)	-0.502% (0.018)	-1.282% (0.027)
%-Change in GDP	0.836% (0.012)	0.837% (0.011)	0.830% (0.012)
Primary Federal Regulator			
OCC	27.259% (0.445)	28.516% (0.452)	22.516% (0.418)
FED	19.490% (0.396)	19.922% (0.399)	17.857% (0.383)

Table 5 Regression Results

This table reports in Model I to XI results from logit regressions of bankruptcy indicators on predictor variables. The shares outside directors, shares executive officers, and shares other corporate insiders variables are standardized by the bank's number of outstanding shares (Shares). The number of outside directors, number of executive officers, and number of other corporate insiders variables are normalized by the bank's board size (Board). The remaining variables are defined as in Table 1. Robust standard errors are employed and clustered at the bank level. The statistical significance of results is indicated by * = 10% level, ** = 5% level and *** = 1% level.

	I			II			III		
	Default in		2006:Q4	Default in		2006:Q4	Default in		2006:Q4
	1 Year	2 Years		1 Year	2 Years		1 Year	2 Years	
Accounting Variables									
log(Assets)	-0.323**	-0.214*	-0.453**	-0.310	-0.160	-0.405	-0.344	-0.114	-0.373
Capital Ratio	-30.897***	4.426	7.273	-31.969***	5.956**	2.240	-30.729**	5.882**	-1.224
Total Loans excl. C&D/Assets	2.781	4.231**	3.502	2.007	2.994*	2.856	-1.474	2.696	4.091
C&D Loans/Assets	8.054***	11.106***	20.053***	5.443***	9.045***	19.860***	2.162	10.485***	24.729***
Loan Concentration	-0.589	0.889	3.984**	-0.605	0.303	4.461**	-0.586	-1.258	4.431*
ST Deposits/Assets	-6.593**	-3.759**	-2.713	-6.897***	-4.306**	-2.952	-8.859***	-3.161	0.631
Brokered Deposits/Assets	1.590	-2.45E-04	0.452	1.577	0.355	-0.979	2.955*	0.280	-1.170
Return on Assets	-26.435***	-22.834***	-56.894*	-28.863***	-20.382***	-90.173**	-31.388***	-18.522**	-132.185**
Non-perform. Loans/Assets	13.813**	6.904	66.215*	20.663***	14.352**	88.564*	20.706***	16.568**	149.205**
Loan Growth	-13.841***	1.348	3.850**	-13.469***	0.119	4.085*	-15.471***	-0.281	5.661*
MBS/Assets	3.624	2.796	6.297*	3.272	2.644	2.222	-0.463	1.174	-1.454
Unused Commitm./Assets	-2.923*	-1.331	1.281***	-2.704*	-0.905	2.205	-3.915*	-3.687**	3.396
Corporate Governance Variables									
Ownership Variables									
Shares Outside Directors/Shares				-1.832	0.225	1.388	-2.680**	0.032	1.773
Shares Chief Officers/Shares				1.824	2.435	4.330	2.627**	2.456	5.328*
Shares Other Corp. Insiders/Shares				2.070**	2.661***	5.231***	2.304***	1.844**	3.616***
TARP				-1.072			-1.315*		
Public Bank				1.683***	1.584***	1.867***	1.016**	1.167**	1.949***
Multibank Holding Company				0.474	0.220	0.616	0.470	0.495	1.710
Management Variables									
Outside Directors/Board				-0.035	-0.456	1.378	-0.725	-1.010	-0.949
Chief Officers/Board				-0.448	0.061	4.674**	-0.410	-0.094	5.260**
Other Corporate Insiders/Board				0.560	-0.114	-0.988	0.944*	0.140	-0.754
log(Board Size)				-1.004**	-0.676*	-0.128	-0.700	-0.749*	0.114
Chairman is CEO				-0.879**	-0.635**	-0.697	-0.863**	-0.641**	-0.819
Market Competition Variables									
Local Market Power							-11.735**	-10.230*	-25.680*
(Local Market Power)^2							14.592	14.670	49.959**
Comps.' Subprime Exposure							-17.980***	-12.947**	-23.454*
Constant	0.643	-6.224***	-3.878	2.440	-4.545*	-6.313	7.601*	-1.486	-4.539
Observations	5,804	5,467	340	5,804	5,467	340	4,582	4,315	268
Number of Defaults	83	85	85	83	85	85	66	67	67
McFadden's adjusted Pseudo R-squared	36.6%	19.1%	47.1%	40.7%	22.1%	55.1%	41.0%	21.6%	54.9%

Table 5 cont. Regression Results

	IV			V			VI		
	Default in		2006:Q4	Default in		2006:Q4	Default in		2006:Q4
	1 Year	2 Years		1 Year	2 Years		1 Year	2 Years	
Accounting Variables									
log(Assets)	-0.397**	-0.186	-0.367	-0.297	-0.145	-0.409	-0.372	-0.087	-0.279
Capital Ratio	-33.548***	4.212	4.132	-32.319***	5.743**	1.284	-33.180***	3.243	-0.689
Total Loans excl. C&D/Assets	0.829	1.178	2.801	2.044	2.887*	2.496	-3.134	0.579	1.375
C&D Loans/Assets	5.183**	8.811***	20.909***	5.452***	8.914***	19.876***	1.542	9.387***	23.391***
Loan Concentration	-0.780	-0.362	4.484**	-0.534	0.533	4.570**	0.671	-0.763	4.857**
ST Deposits/Assets	-6.530***	-3.710*	-2.025	-7.281***	-5.075***	-3.329	-9.120***	-3.700	-0.859
Brokered Deposits/Assets	1.272	1.079	-0.926	1.754	0.510	-1.043	3.883**	1.829	1.055
Return on Assets	-24.123***	-19.708**	-105.857**	-29.159***	-20.287***	-97.562**	-28.714***	-18.717**	-151.455**
Non-perform. Loans/Assets	18.592***	6.689	93.601*	20.482***	14.101**	88.524*	19.804***	8.453	157.627**
Loan Growth	-11.867***	1.246	4.158**	-13.045***	0.019	3.628	-12.406**	0.924	5.784*
MBS/Assets	2.756	2.377	1.286	3.416	2.323	1.863	-0.825	0.203	-6.222
Unused Commitm./Assets	-2.307	-2.595	1.381	-2.878*	-0.826	2.134	-3.861**	-4.554**	3.052
Corporate Governance Variables									
Ownership Variables									
Shares Outside Directors/Shares	-1.571	0.416	1.548	-1.790	0.221	1.239	-2.734**	0.058	1.788
Shares Chief Officers/Shares	1.372	2.480	3.797	1.326	2.199*	4.277	0.955	2.156	3.763
Shares Other Corp. Insiders/Shares	2.209***	2.799***	5.211***	2.104**	2.672***	5.425***	2.657***	2.209**	3.975***
TARP	-1.028			-1.108			-1.570**		
Public Bank	1.484***	1.473***	1.905***	1.647***	1.557***	1.886***	0.582	1.175**	1.856***
Multibank Holding Company	0.469	0.116	0.814	0.554	0.339	0.670	0.683	0.586	2.101*
Management Variables									
Outside Directors/Board	-0.073	-0.917	1.701	0.137	-0.294	1.421	-1.000	-1.267	-0.443
Chief Officers/Board	-0.395	0.079	4.579**	-0.382	0.154	5.045**	-0.429	-0.011	6.196***
Other Corporate Insiders/Board	0.642	0.116	-0.933	0.480	-0.213	-1.296	1.096	0.218	-1.009
log(Board Size)	-0.755*	-0.383	-0.189	-1.157**	-0.837**	-0.094	-0.749	-0.713	0.006
Chairman is CEO	-0.793**	-0.488	-0.636	-0.860**	-0.614**	-0.651	-0.664*	-0.528	-0.765
Market Competition Variables									
Local Market Power							-12.001*	-5.605	-30.385*
(Local Market Power)^2							13.342	7.529	58.597**
Comps.' Subprime Exposure							-18.091***	-5.217	-24.775*
State-Level Economic Variables									
House Price Inflation	-11.423*	-35.880***	-33.618*				-3.510	-38.616***	-23.542
%-Change in GDP	-53.582***	7.595	59.306				-68.755***	8.359	38.871
Primary Federal Regulator Variables									
OCC				0.461	0.517*	0.471	1.114***	0.933**	1.618**
FED				0.094	0.173	0.582	0.345	-0.009	0.138
Constant	3.919	-3.443	-7.775*	2.444	-4.527**	-5.933	8.453*	-2.080	-4.178
Observations	5,804	5,467	340	5,804	5,467	340	4,582	4,315	268
Number of Defaults	83	85	85	83	85	85	66	67	67
McFadden's adjusted Pseudo R-squared	43.4%	28.3%	54.8%	40.4%	21.9%	54.3%	44.3%	28.0%	53.5%

Table 6 Robustness

This table reports in all but in model V results from logit regressions of bankruptcy indicators on predictor variables. The variables are defined as in Table 1. Robust standard errors are employed and clustered at the bank level. The statistical significance of results is indicated by * = 10% level, ** = 5% level and *** = 1% level. The last three columns show results of a probit regression model with sample selection following Heckman (1979) and include standard errors derived via the Huber (1967) – White (1980) sandwich estimator, clustered at the bank level. The selection equation is $Corporate\ Governance\ Data\ available = \alpha + \beta_1 * ln(Assets) + \beta_2 * (ln(Assets))^2 + \beta_3 * Real\ Estate\ Loans + \beta_5 * Cumulative\ Operating\ Income\ from\ 2004{:}Q1\text{-}2006{:}Q4 + \beta_5 * Agricultural\ Loans + \beta_6 * Commercial\ Loans + \beta_7 * Individual\ Loans + \beta_8 * Public\ Bank + \beta_9 * Multibank\ Holding\ Company + \beta_{10} * OCC + \beta_{11} * FED$, where the operating income and the loan variables are employed relative to a bank's total assets and total loans, respectively. We also report the results for the Wald test of no sample selection bias, i.e. the p-value for the null of no correlation between the errors of the selection equation and the regression model. In model VI we include (coefficients not shown) the quarterly average from 2004:Q1 until 2006:Q4 of asset growth, change in capital ratio, growth of total loans excluding C&D loans, growth of C&D loans, change in loan concentration, short-term deposits growth, brokered deposits growth, return on assets, non-performing loans growth, mortgage-backed securities growth, and unused commitments growth.

Panel A	I. Excluding SIFIs			II. Excluding Multibank Holding Companies			III. Excluding Banks which received TARP		
	Default in		2006:Q4	Default in		2006:Q4	Default in		2006:Q4
	1 Year	2 Years		1 Year	2 Years		1 Year	2 Years	
Accounting Variables									
log(Assets)	-0.342	-0.048	-0.099	-0.469	-0.044	-0.729	-0.415	-0.063	-0.676*
Capital Ratio	-33.229***	3.662	-0.991	-58.410***	-8.206	-31.538*	-36.093***	5.833	-21.799
Total Loans excl. C&D/Assets	-3.503	0.514	1.515	-1.713	1.022	0.485	-2.894	0.311	7.019
C&D Loans/Assets	1.284	9.323***	23.684***	2.367	9.722***	28.300***	1.712	9.006***	37.274***
Loan Concentration	0.577	-0.843	5.665**	-0.160	-0.842	3.197	0.196	-2.089	4.006
ST Deposits/Assets	-8.918***	-3.641	0.458	-12.086***	-4.966*	-3.037	-10.244***	-3.825*	2.558
Brokered Deposits/Assets	3.923**	1.862	-0.696	5.469**	1.706	-4.115	3.357	2.299	-1.481
Return on Assets	-28.290***	-18.323**	-171.344**	-34.234***	-24.878**	-140.337	-26.203***	-29.283***	-187.130**
Non-perform. Loans/Assets	19.562***	8.469	174.912**	19.483***	8.562	303.703***	20.100***	10.150	159.936
Loan Growth	-12.746**	0.914	10.949***	-12.660**	2.747	14.273***	-12.484**	1.964	12.125*
MBS/Assets	-1.100	0.178	-7.464	-0.821	-3.199	4.664	-0.915	0.434	-2.882
Unused Commitm./Assets	-3.758**	-4.551**	3.872*	-4.270*	-3.541*	6.182***	-4.491**	-4.618**	4.977
Corporate Governance Variables									
Ownership Variables									
Shares Outside Directors/Shares	-2.661**	0.073	2.127	-3.613**	-0.276	-0.089	-2.874**	-0.576	0.977
Shares Chief Officers/Shares	0.864	2.090	4.024	1.156	2.726	5.434**	1.109	1.320	0.173
Shares Other Corp. Insiders/Shares	2.678***	2.222**	4.073***	4.102***	1.925*	3.523**	2.444***	2.366***	4.372***
TARP	-1.527**			-2.166**					
Public Bank	0.588	1.181**	1.812***	0.431	0.916	1.463	0.535	0.726	1.937*
Multibank Holding Company	0.731	0.592	2.459*				0.821	0.246	2.965
Management Variables									
Outside Directors/Board	-1.035	-1.223	-0.387	-1.776	-2.031	1.025	-1.504	-1.451	2.696
Chief Officers/Board	-0.453	0.004	7.451***	-0.863	-0.044	12.247***	-0.821	-0.034	13.852***
Other Corporate Insiders/Board	1.102*	0.207	-1.193	1.602	0.183	-4.973***	1.439**	0.282	-0.957
log(Board Size)	-0.756	-0.737	0.291	-0.595	-0.769	-0.637	-0.536	-0.367	1.933
Chairman is CEO	-0.657*	-0.524	-0.802	-0.593	-0.874**	-1.647**	-0.522	-0.470	0.403
Market Competition Variables									
Local Market Power	-12.633**	-6.028	-32.951*	-10.805	-3.267	-71.619***	-11.723*	-5.027	-37.977
(Local Market Power)^2	14.320	8.079	63.714**	9.760	5.187	179.415***	13.982	5.659	71.919*
Comps.' Subprime Exposure	-18.200***	-4.836	-27.881*	-21.007***	-11.896	-47.281*	-17.291	-8.066	-29.042
State-Level Economic Variables									
House Price Inflation	-3.629	-38.606**	-12.456	-1.586	-37.809***	7.122**	-1.713	-42.988***	-17.224
%-Change in GDP	-68.984***	8.396	28.053	-75.195***	9.577	-19.234	-63.081***	3.865	37.592
Primary Federal Regulator Variables									
OCC	1.104***	0.955**	1.606*	1.140**	1.096**	1.538**	1.176***	1.149***	1.540
FED	0.377	0.009	0.402	-0.060	-0.112	-0.083	0.492	-0.546	-0.096
Constant	8.462*	-2.495	-8.080	11.437**	-0.522	12.477	9.228*	-1.418	-12.056
Observations	4,360	4,093	256	3,973	3,762	230	3,040	2,785	185
Number of Defaults	66	67	67	52	53	53	63	64	64
McFadden's adjusted Pseudo R-squared	43.8%	27.3%	53.3%	45.0%	26.8%	53.3%	41.0%	25.3%	51.6%

Table 6 cont. Robustness

Panel A cont.	IV. All Commercial Banks			V. Heckman Selection Model 2nd Stage			VI. Including Accounting Information from 2004:Q1-2006:Q4	
	Default in		2006:Q4	Default in		2006:Q4	Default in	
	1 Year	2 Years		1 Year	2 Years		1 Year	2 Years
Accounting Variables								
log(Assets)	-0.489***	-0.344***	-0.316***	-0.046	-0.081	-0.246	-0.387	-0.136
Capital Ratio	-43.752***	-8.532***	-2.637	-13.887**	1.580	-0.932	-35.713***	1.779
Total Loans excl. C&D/Assets	1.115	1.197	2.032	-1.431	0.600	1.419	-3.421	1.076
C&D Loans/Assets	7.906***	9.635***	15.371***	1.050	4.719***	11.871***	1.149	8.547***
Loan Concentration	-0.184	-0.185	0.231	-0.133	-0.417	2.306**	0.921	-0.695
ST Deposits/Assets	-8.760***	-9.224***	-8.225***	-5.004***	-1.820**	0.310	-11.187***	-5.343**
Brokered Deposits/Assets	1.020	0.048	-3.015*	1.878*	0.490	-0.356	3.195	1.450
Return on Assets	-17.828**	-13.257**	-66.828***	-12.187	-9.717**	-77.440***	-26.441***	-17.732*
Non-perform. Loans/Assets	13.933***	1.828	10.656	8.082*	4.283	80.461***	20.216***	8.546
Loan Growth	-3.107	2.601***	5.495***	-5.050*	0.510	3.086**	-15.382***	0.515
MBS/Assets	-0.508	-1.488	-0.779	-0.124	0.130	-1.878	-1.201	0.231
Unused Commitm./Assets	0.562**	0.205**	0.470***	-1.843*	-1.784**	1.483	-4.497*	-3.821**
Corporate Governance Variables								
Ownership Variables								
Shares Outside Directors/Shares				-1.286***	-0.077	0.671	-3.438**	-0.336
Shares Chief Officers/Shares				0.107	0.937	1.820	0.970	2.277
Shares Other Corp. Insiders/Shares				0.871*	0.885**	2.023**	2.124**	2.209**
TARP				-0.710**			-1.785**	
Public Bank				1.265***	0.358	-0.063	0.468	1.163**
Multibank Holding Company				0.200	0.239	0.870	0.764	0.430
Management Variables								
Outside Directors/Board				-0.111	-0.591	-0.064	0.030	-1.884
Chief Officers/Board				-0.130	0.041	3.368***	-0.113	0.135
Other Corporate Insiders/Board				0.378	0.100	-0.808	1.092	0.455
log(Board Size)				-0.481***	-0.223	0.108	-0.930	-0.589
Chairman is CEO				-0.333*	-0.286*	-0.378	-0.529	-0.473
Market Competition Variables								
Local Market Power	-3.693	-3.616	-5.486*	-4.834**	-3.201	-13.471**	-10.172	-4.108
(Local Market Power)^2	6.719	7.260	10.856**	4.499	4.948	26.717**	11.631	7.102
Comps.' Subprime Exposure	-9.241***	-4.359*	-10.720***	-7.557***	-1.383	-10.876*	-18.801***	-4.008
State-Level Economic Variables								
House Price Inflation	-11.989***	-33.609***	-14.778	-3.168	-18.234***	-9.474	-0.236	-41.843***
%-Change in GDP	-53.651***	21.732***	-23.619	-32.376***	4.140	20.039	-70.768***	6.046
Primary Federal Regulator Variables								
OCC	0.586**	0.579***	0.496*	0.514***	0.363**	0.609	1.156***	1.080**
FED	0.237	0.186	0.047	0.105	-0.043	0.124	0.447	0.033
Constant	4.381**	-1.096**	1.312	1.394	-0.886	-0.231	9.016*	-2.230
Observations	39,274	38,576	2,154	78,586	78,319	4,198	4,582	4,315
Censored Observations				74,004	74,004	3,930		
Uncensored Observations				4,582	4,315	268		
Number of Defaults	174	174	167	83	85	85	66	67
	McFadden's adj. Pseudo R-squared:			Wald test of indep. eqns. (rho = 0):			McFadden's adj. Pseudo R-squared:	
	40.5%	28.2%	41.4%	63.65%	85.24%	38.80%	43.1%	26.2%

Table 7 Regression Results controlling for the Incentive Alignment between Chief Officers and Other Corporate Insiders

This table reports results from logit regressions of bankruptcy indicators on predictor variables. Low Incentive Alignment with Chief Officers is a dummy variable which is 1 when the shares executive officers are larger than 5% (10%) of all shares outstanding of the bank. The remaining variables are defined as in Table 1. Robust standard errors are employed and clustered at the bank level. The statistical significance of results is indicated by * = 10% level, ** = 5% level and *** = 1%.

	Base Model			Chief Officers' Holdings Threshold 5%			Chief Officers' Holdings Threshold 10%		
	Default in		2006:Q4	Default in		2006:Q4	Default in		2006:Q4
	1 Year	2 Years		1 Year	2 Years		1 Year	2 Years	
Corporate Governance Variables									
Ownership Variables									
Low Incentive Alignment				0.915*	-0.085	-0.176	1.012	0.470	1.111
Shares Other Corp. Insiders/Shares	3.272***	2.095**	4.165***						
* Low Incentive Alignment with Chief Officers				2.360*	1.649*	1.235	2.910***	0.938	0.943
* High Incentive Alignment with Chief Officers				4.745***	2.759***	16.126***	4.888***	5.193***	22.408***
TARP	-1.368**			-1.453**			-1.418**		
Public Bank	0.935*	1.097**	1.680**	0.945*	1.160**	2.109***	0.883*	1.201**	2.134***
Multibank Holding Company	0.779	0.545	1.965*	0.762	0.652	1.939	0.663	0.449	1.906
Management Variables									
Outside Directors/Board	-2.176	-0.999	1.141	-1.435	-0.927	1.728	-1.569	0.599	2.284
Chief Officers/Board	-0.557	0.064	7.351***	-0.475	0.098	5.437**	-0.442	0.675	5.771**
Other Corporate Insiders/Board	1.110*	0.143	-1.512	1.290*	0.192	-0.441	1.104	-0.062	-0.529
log(Board Size)	-0.767	-0.797	-0.202	-0.967*	-0.821	-0.630	-0.824	-0.997*	-0.739
Chairman is CEO	-0.439	-0.567*	-0.891	-0.417	-0.450	-0.307	-0.449	-0.435	-0.252
Accounting Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Competition Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Level Economic Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Primary Federal Regulator Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	7.501*	-1.812	-4.527	6.138	-1.956	-5.608	5.564	-4.984	-7.882
Observations	4,582	4,315	268	4,582	4,315	268	4,582	4,315	268
Number of Defaults	66	67	67	66	67	67	66	67	67
Wald Test for Equality of Interaction Terms (p-value)				0.000	0.047	0.005	0.000	0.000	0.008
McFadden's adjusted Pseudo R-squared	44.0%	28.4%	54.1%	44.0%	28.0%	54.3%	43.7%	29.2%	54.5%