Distressed Banks, Debt Overhang, and Regulation

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ABSTRACT

Existing literature predicts that highly-levered distressed banks suffer from a debt overhang that leads them to take more risk and avoid actions that decrease their leverage. Using two distinct periods that include financial crises and are subject to different regulations (1985-1994, 2005-2014), we investigate whether these predictions are supported. We find that distressed banks reduce their leverage in various forms: increase their equity, reduce the size of their balance sheet, reduce the number of branches and employees. They also decrease observable measures of riskiness. The global financial crisis is associated with weaker deleveraging. We show that the deleveraging of distressed banks increases after the adoption of FDICIA and does not increase after the adoption of Dodd-Frank compared to the pre-global financial crisis period.

***Keywords**:* Banks, distress, debt overhang, deleveraging, leverage
JEL Classification: G11, G21, G33

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1. Introduction

There are at least two sets of theories in financial economics that predict that highly-levered banks will not decrease their leverage and will increase their risk. First, there are theories that argue that such behavior is optimal for highly-levered banks because they do not bear the full costs of financial distress as some of these costs are born by the deposit insurance fund (Merton, 1977) and, more generally, by taxpayers. For instance, these theories often argue that the largest banks are likely to be bailed out, so that their shareholders benefit from risk taking that turns out well but do not bear the full extent of the costs associated with risk taking that ends up with losses (e.g., Acharya, Cooley, Richardson, and Walter, 2010, Farhi and Tirole, 2012). Second, there are theories that take their inspiration from the agency theory of corporate finance of Jensen and Meckling (1976) and Myers (1977) which identifies a conflict of interest between shareholders and debtholders. According to this theory, as a firm becomes highly levered, its shareholders have incentives to take more risk, to avoid equity financing, and to reject positive net present value projects that require equity financing. Banks are typically highly levered, so that, with these theories, they are more prone to be in a situation where the interests of shareholders and debtholders diverge sharply.

In this paper, we investigate how well these theories predict the actual behavior of the most highly-levered banks, namely those that are distressed. We define distressed banks to be banks with leverage in the top decile and with a Z-score in the bottom decile. We find that these theories fail to predict the actual behavior of distressed banks. Our analysis shows that distressed banks, on average, take actions to reduce their observable leverage. In contrast to the predictions of theories that emphasize the importance of debt overhang, we find that distressed banks take steps to increase their equity. We discuss the potential factors that account for the failure of banking and corporate finance theories to predict bank behavior.

For most of our investigation, we use all banks with call reports and focus on two separate periods. The first period is 1985-1994 and the second is 2005-2014. These periods have in common that they

include a banking crisis: the Savings and Loan (S&L) crisis and the Global Financial Crisis (GFC), respectively. In periods of industry distress, reducing the size of a bank's balance sheet is likely to be more costly because many other banks are trying to do the same, so that the extent of deleveraging may be weaker during crisis periods (see Shleifer and Vishny, 1992, for the analysis of this mechanism generally). These periods differ in that the banking crises affect different types of banks: the first crisis mostly impacted Savings and Loan Associations while the second crisis impacted the entire banking system. These periods also differ in regulation. For the first period that we consider, banks did not have formal capital requirements of the type we are now familiar with, as the Basel Accord was concluded in 1989 and implemented in the 1990s in the U.S. Further, as a result of concerns about moral hazard following the S&L crisis, the U.S. tightened regulations substantially. The FDIC Improvement Act (FDICIA), adopted in 1991, introduced prompt corrective action (PCA) which was designed to resolve banks before they could engage in actions detrimental to the deposit insurance fund (DIF).

The theories we investigate predict the behavior of banks in financial distress. We test these theories by identifying banks in financial distress and assessing whether their behavior is consistent with the theoretical predictions. To do this, we need to select banks that are in financial distress. The literature has used various metrics to assess the financial solvency of banks. Two of the most common measures include leverage and some type of bank Z-score, known as "distance-to-default." In this paper, we define banks to be distressed if they have both high leverage and a low bank Z-score. Specifically, for each period, we flag the bank-quarters that are jointly in the bottom decile of the distribution (of the respective sample period) of both metrics to be distressed. Overall, 4.1% and 3.1% of bank-quarters are considered distressed in the first and second periods, respectively. We show that our approach selects banks that have a much higher probability of failure. A bank that is in the lowest decile of the distribution of the equity capital ratio and in the lowest decile of the Z-score is about

17.8% and 19.3% more likely to fail within three years during both periods, respectively (relative to an unconditional base rate of 2.0% and 1.7%, respectively).[1]

We then investigate the predictions of the theories concerning leverage. With these theories, distressed banks should not be taking active steps to reduce their leverage. Our first approach is to assess whether distress predicts an increase in leverage, which means a decrease in the equity-to-assets ratio. We find that it does not. On the contrary, the leverage of distressed banks decreases the year following the classification of a bank as distressed. Looking a year out following a quarter when a bank is financially distressed, we document that distressed banks increase their equity capital ratio by about 0.80 percentage points outside a crisis, but deleverage less during a crisis. This is an economically significant increase in equity capital which amounts to 54% and 30% of the standard deviation of annual equity capital changes in the respective periods. We find evidence that is supportive of the role of regulation in potentially causing banks to deleverage. Distressed bank deleveraging is much weaker before the passage of FDICIA in 1991 than following this event. The response of distressed banks is weaker by about a half during the GFC, compared to the period leading up to the crisis. In 2008-2009, some banks received government support through the Troubled Asset Relief Program (TARP), which increased their equity, while others did not. Distressed banks that received TARP funds increased their equity capital ratio by 85 basis points in contrast to the other banks that increased it by only 31 basis points. It is plausible that not being eligible for TARP made it difficult or impossible for a bank to raise equity, as not receiving TARP funds could have been interpreted as evidence that the government, which had access to internal data that was unlikely to be available to potential investors, thought the bank was not worth investing funds in.

[1] This is based on estimated likelihood of failure within 3 years for each of the two periods, all else equal. The base rate represents the mean failure rate for each of the two panels.

Next, we explore the actions that banks take to deleverage. Banks can deleverage by reducing assets and using the proceeds to pay back debt. Alternatively, they can raise new equity or retain more earnings by cutting dividends. We find that distressed banks use both approaches to deleverage. Specifically, we document that banks in financial distress shrink their assets (e.g., reduce the asset base, close branches, cut the employee workforce), reduce their liabilities (e.g., shrink deposits, reduce deposit rates), and increase their equity capital (e.g., add equity capital, cut dividends).

Moral hazard theories predict that distressed banks increase their risk. To test this prediction, we have to use observable risk measures, so that our tests are limited by the obvious difficulty that banks can take risks in ways that we cannot observe. Yet, we find that observable risk measures fall in the year after a bank is classified to be distressed: its Z-score increases, the non-performing loan (NPL) ratio decreases, earnings volatility decreases, and, in the second period, risk-weighted assets decline. Again, banks' behavior is consistent across the periods that we examine.

After presenting our main results, we address three important related topics. First, we measure whether t`he deleveraging of distressed banks changes over time in an attempt to shed some light on banks' response to regulation. As already discussed, FDICIA was adopted during our first period so that we can investigate whether distressed banks behave differently after the adoption of FDICIA. We find that they do. Surprisingly, however, the extent to which firms deleverage in the second period is lower than the extent to which they deleverage immediately after the adoption of FDICIA. The Dodd-Frank Act was adopted during our second period. We find no evidence that the deleveraging behavior of banks is greater after the adoption of the Act compared to the pre-GFC period. We note that the inference from the analysis is limited by the fact that regulation is endogenous and that other time-varying factors may affect banks' propensity to deleverage.

Second, we compare the deleveraging of distressed banks that are private to the deleveraging of distressed banks that are public. Existing literature argues that moral hazard incentives might be stronger for public banks (Falato and Scharfstein, 2016). The sample of public bank-quarters is less

than a tenth of the whole sample. There are material differences between private and public banks. The public banks are on average much larger than the private banks, so that they might benefit from public support that the private banks typically would not benefit from. In addition, public banks can raise funds in equity markets, so that they might be in a better position to deleverage. Despite the differences between the bank groups, we find little difference between the deleveraging of public and private banks with the indicator for distress we use throughout the paper. When we use a distress indicator based on the top decile of market leverage, our results are weaker, but this may be due to the fact that the frequency of distressed banks using this indicator variable is extremely high during the GFC.

Third, with the data available, we only observe distressed banks that are still alive. This raises the concern that our results are valid for the banks that survive, but that the banks that fail behave differently and choose to increase leverage and risk. Even if this were true, since most distressed banks do not fail, our results would still be representative of the actions of the typical distressed bank. However, we address the concern in two separate ways. First, our results hold when we examine the behavior of banks over a shorter horizon, where survivorship bias is minimal: one quarter instead of four quarters. Second, we examine the behavior of banks that fail in the quarters before they fail. We find that the banks that fail, on average, are banks that take actions similar to those taken by the banks that do not fail, in that they decrease assets, liabilities, and the number of employees. However, not surprisingly, the leverage of these banks increases sharply. This is because of large earnings losses that are not offset by new equity. While these banks cut dividends to zero, most of them do not raise new equity.

The fact that the data rejects the moral hazard theories of banks in distress suggests that existing models do not capture well the dynamics of distressed banks and the environment in which they operate. First, the theories that focus on the moral hazard and incentives of shareholders in banks assume that shareholders maximize the value of their equity. They further assume that creditors do not have claims redeemable at par and cannot run after learning about risk-taking but before the realization

of the risk. Yet, a large fraction of banks' liabilities are redeemable at or near par.[2] Further, maturities of debt claims shorten as banks become distressed. Because of the nature of bank debt claims, it is possible that a bank never benefits from taking more risk or from not reducing leverage because of a run on its liabilities.

Second, though existing theories mostly focus on the conflict between bank shareholders and debtholders, the agency literature also pays attention to the agency conflict between shareholders and managers. The interests of managers can differ from those of shareholders. For instance, managers can value investments in projects that reflect well on them in their community but may not be worthwhile for shareholders. Managers can also be more conservative than shareholders. Existing literature argues that leverage can reduce managerial rent seeking (e.g., Acharya, Mehran, and Thakor, 2016), but for this paper, managerial rent seeking can take the form of not taking actions that would benefit shareholders at the expense of debtholders. Existing evidence shows that shareholder-controlled banks take more risks than manager-controlled banks (Saunders, Stock, and Travlos, 1990). A potential explanation is that the value of the human capital of managers may be tied to the bank that they manage while shareholders can diversify their holdings. Lastly, regulators can prevent managers from working in the banking industry.

Third, laws and regulations constrain managers in their actions. Dewatripont and Tirole (2012) explicitly consider how regulation could prevent "banks in trouble from 'gambling for resurrection' by raising interest rates on deposits and attracting funds from depositors who 'count' on implicit or explicit support from the authorities." FDICIA was explicitly motivated by the belief that "gambling for resurrection" was an important factor in the S&L crisis and that therefore regulators had to constrain and seize banks before their incentives for "gambling for resurrection" became too important.

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[2] See Hanson, Shleifer, Stein, and Vishny (2015) for evidence on the importance of deposits for banks. They show that deposits have financed 80% of bank assets on average from 1896 to 2012.

Finally, in addition to the potential role of the maturity of liabilities, managerial risk aversion, and regulation in limiting the ability of distressed banks to increase leverage and risk, distressed banks could have valuable intangible assets that they seek to preserve, such as franchise value (Demsetz, Saidenberg, and Strahan, 1996), and that would be at risk with actions designed to increase bank leverage and risk. Traditional measures of distress and leverage that rely on book values would not account for such assets.

Our paper contributes to several strands of the literature. First, we contribute to the literature on risk-taking and deleveraging by banks in distress. The literature on risk-taking by banks has paid much attention to the relation between charter value and risk-taking (e.g., Keeley, 1990; Demsetz, Saidenberg, and Strahan, 1996) as well as to the relation between various dimensions of governance, including ownership concentration, and risk-taking (e.g., Demsetz, Saidenberg, and Strahan, 1997; Laeven and Levine, 2009). However, there is little evidence on the risk-taking choices of banks in distress and, especially, whether these banks take steps to deleverage. Despite the importance of these issues for understanding the incentives, operations, and risks of banks, there is only a small number of studies with conflicting results. Koudstaal and van Wijnbergen (2012) examine gambling for resurrection for U.S. public banks from 1993 to 2014 using data from Compustat, but they do not directly compare the behavior of distressed banks to other banks like we do and do not investigate the evolution of leverage for distressed banks. They conclude that "Banks whose share price has slumped tend to gamble for resurrection by increasing the riskiness of their asset portfolio." In contrast, Bidder, Krainer, and Shapiro (2017) find that banks that faced losses in the oil crisis of 2014 took steps to deleverage their balance sheets. Baldursson and Portes (2013) document that banks in Iceland refinanced loans to their owners and other big borrowers following the financial turmoil of August 2007, consistent with levering up behavior. Bonaccorsi di Patti and Kashyap (2017) analyze the fate of Italian banks that exhibit large drops in profitability and find that about one third of the banks recover. They show that the banks that recover are those that cut credit to their riskiest borrowers.

Acharya, Gujral, Kulkarni, and Shin (2011) argue that banks redistributed wealth away from creditors to shareholders with dividend payments during the crisis. Lastly, within the financial industry but outside banking, Kirti (2017) investigates risk-taking by insurance companies hit hard by the crisis and finds that they reduce risk.

Second, we contribute to the corporate finance literature on the behavior of firms in distress. Galai and Masulis (1976) and Jensen and Meckling (1976) provide early models where shareholders of firms in financial distress have incentives to increase the firm's risk. By doing so, shareholders benefit at the expense of the debtholders. Firms can increase risk by replacing safer projects with riskier projects. Myers (1977) started a closely-related literature finding that shareholders of highly-levered firms do not have incentives to reduce the risk of the firm by issuing equity and will even choose not to invest in profitable projects that would have to be financed with equity. Since these seminal contributions, a large theoretical literature explores the incentives of firms in distress to increase their risk (e.g., White, 1989; Rose-Ackerman, 1991; Adler, 1995; Eberhart and Senbet, 1993; Akerlof and Romer, 1993; Downs and Rocke, 1994; Colonnello, Curatola, and Hoang, 2017). Recently, Admati, DeMarzo, Hellwig, and Pfleiderer (2018) develop a model where, with debt in place, shareholders resist leverage decreases and, if forced to deleverage, would rather use asset sales. Their theory follows from the fact that, everything else equal, a decrease in leverage benefits existing debtholders. They conclude that resistance to deleveraging is especially strong for firms in distress.

Empirical evidence on the incentives of firms in distress is mixed, but the relevance of this evidence for banks is unclear as banks have a much different business model from typical firms. Eisenberg (2005) finds evidence supportive of the incentives of distressed firms to increase risk. In contrast, Gilje (2017) shows, in a setting where he can observe project risk directly, that firms approaching distress choose less risky projects. DeAngelo, Gonçalves, and Stulz (2018) document that following an episode of peak leverage firms deleverage sharply, so that after five or six years their leverage is typically quite low.

Third, we provide evidence on the predictions of the theoretical literature on risk taking by banks in distress (e.g., Kane, 1989; Corbett and Mitchell, 2000; Holmström and Tirole, 2000; Morrison and White, 2013; Boyd and Hakenes, 2014; Bruche and Llobet, 2014). Rochet (1992) and Hellmann, Murdock, and Stiglitz (2000) show that, under some conditions, more stringent capital requirements reduce banks' tendency to gamble for resurrection.

Fourth, we contribute to the literature on the impact of regulatory changes in affecting banks' actions while distressed. The second period we look at is one when FDICIA was fully in effect. FDICIA was adopted in part to prevent banks from levering up and gambling for resurrection by introducing early intervention (Benston and Kaufman, 1997). Existing empirical evidence finds that poorly capitalized banks experienced a reduction in risk following FDICIA (Akhigbe and Whyte, 2001). Our paper shows that distressed banks behave similarly under the pre-FDICIA and the post-FDICIA regimes in that they deleverage in both regimes, but that they deleverage more aggressively in the years immediately after the adoption of FDICIA. Furthermore, Laeven and Levine (2009) conduct a cross-country study of bank behavior and regulatory environment and find that the regulatory environment shapes banks' risk-taking behavior. In contrast, our study finds more limited differences in the behavior of distressed banks across different regulatory regimes within the U.S.

The study proceeds as follows. Section 2 describes the data used in the study, and introduces the variables that measure bank distress. In Section 3, we explore the variables that are best at predicting bank failure, and therefore are best suited to measure bank distress. In Section 4, we test whether distressed banks reduce their leverage. In Section 5, we analyze the balance sheet dynamics of distressed banks. Section 6 analyzes the evidence for whether distressed banks increase risk taking activities. Section 7 examines how deleveraging changes across time, how the actions of banks that fail differ from those of other banks, and of how the actions of public banks differ from those of private banks. Section 8 concludes.

2. Data and Variables

2.1. Data Sources

Our analysis is based on the Reports of Condition and Income ("Call Reports"). The Call Report data comprise an exhaustive set of mandatory filings by banks at a quarterly frequency. We include all the reporting commercial banks in our sample during two distinct periods: 1985-1994 and 2005-2014. These two periods include the two most recent banking crises to impact the U.S. banking system, i.e., the S&L crisis of the late 1980s and early 1990s and the GFC during 2008-2010. Our analysis is based on two separate unbalanced panels over these two distinct periods.[3] The 1985-1994 and 2005-2014 panels contain 15,915 and 8,131 unique banks corresponding to over 480,000 and over 260,000 bank-quarter observations, respectively.

As part of the analysis, we contrast bank behavior in normal times and crisis times. To construct an indicator of crisis periods, we plot the number of failed banks from 1980 to 2015 in Figure 1. The figure shows that during this period there are two waves of bank failures. We define our crisis variable as an indicator variable for the years 1988-1990 and 2009-2011. During these years, the largest number of banks failed in the respective periods we consider.[4]

We also use numerous financial and non-financial controls, including proxies for liquidity (core deposit ratio and loan to asset ratio), size (log assets), too-big-to-fail indicator (assets of $50 billion or more in 2010 dollars), multi-bank holding company affiliation, bank age (chartered within prior 5 years), and an indicator for metro headquarters location. Our tests further include logged per-capita income and the unemployment rate as well as state indicator variables.[5]

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[3] As part of our cleaning, we delete a few observations with implausible information: Missing or negative assets, missing or negative deposits, missing equity capital, missing common stock equity, observations with equity-to-assets ratio that are negative or greater than 50%.

[4] These periods witnessed 1,351 and 362 bank failures respectively.

[5] These indicators are based on the state where the charter is located; the overwhelming majority of banks operate in a single state.

2.2. Descriptive Statistics

Table 1 presents summary statistics for the variables used in our analyses. Panels A and B depict statistics for the 1985-1994 and 2005-2014 periods, respectively. Panels C and D show correlation tables for the two periods. Panels E and F compare key variables between distressed banks and non-distressed banks for the two periods (further discussed in Section 3). Panel G shows a correlation table for the different measures of bank financial distress. Since the call report data are relatively clean data we winsorize only the independent variables in our study at the 1% and 99%.[6] All variables are defined more precisely in Appendix A.

Panels A and B show that 0.5%, 1.3%, and 2.0% of banks fail within 1, 2, and 3 years respectively in the 1985-1994 period and 0.4%, 1.1%, and 1.7% in the 2005-2014 period; thus, unconditional failure probabilities are roughly similar. Because the Basel capital requirements are not in effect during most of our first period, we have to use a different measure of capitalization than the commonly-used Tier 1 ratio. We use the *Equity capital ratio*, which we define as equity over assets, where equity is the bank's book equity (which includes both common and preferred shares, as well as retained earnings). It is known from the literature that common shareholder equity is a better predictor of a bank's returns during the GFC than the more common risk-weighted measures (Demirguc-Kunt, Detragiache, and Merrouche, 2012). Further, stress tests in 2009 placed considerable emphasis on book equity. The median *Equity capital ratio* in the overall sample is 8.3% during the earlier period and it increases by 10.7 basis points per year (see *Change in equity capital ratio* variable); the corresponding numbers for the 2005-2014 period are 10.1% and 5.1 basis points. Thus the median bank increases capital in both periods but capital is substantially higher in the latter period, which is to be expected (see Flannery and Rangan, 2008).

[6] In Section 4, we discuss specifications of the main regressions with winsorized dependent variables as well, for robustness.

Our other key risk measure is the bank *Z-score* (Boyd and Runkle, 1993). A higher bank *Z-score* means that a bank is safer. This variable is often interpreted as a proxy for distance-to-default and is a commonly-used measure to proxy for bank risk.[7] We measure *Z-score* as the mean across four quarters of the return on assets (ROA) plus the equity capital ratio, all divided by the standard deviation of ROA.[8] The idea behind this definition is that this distress proxy measures the depth of a bank's equity capital, i.e., how many standard deviations of ROA losses would it take to exhaust the equity capital. The *Z-score* has a median of 93.2 and 160.5 in the two periods, respectively. On average, banks are therefore less at risk of distress in the more recent period we consider.

In terms of asset growth, we observe log assets to grow on average (and median) overall and for loans for both periods, but the median fixed assets decline somewhat. Deposits also tend to grow during both periods, whereas the median non-deposit liabilities decline in the latter period. All of these variables show substantial variation in their distribution; for example, the range of the log loan growth from the 10^{th} to the 90^{th} percentile is -0.06 to 0.23 for the first period and -0.09 to 0.20 for the second period. Other control variables summarized in Panels A and B also exhibit substantial variation.

Panels C and D document that the bivariate correlations of our explanatory variables are generally low. One exception is the correlation between deposits/liabilities and log assets which is -49% in the earlier period and -37% in the later period, indicating that larger banks rely more on non-deposit forms of debt.

3. Measuring Bank Financial Distress

A key component of our analysis is identifying banks that are in distress. To do so, we use two (imperfect) commonly-used proxies to categorize the level of financial distress: the *Equity capital ratio*

[7] See, for instance, Laeven and Levine (2009), and Berger, El Ghoul, Guedhami, and Roman (2013).
[8] We use four quarters of data in computing the standard deviation of ROA. Our Z-scores are measured using quarterly ROA rather than annualized quarterly ROA; the means and medians are therefore higher as a result. But the two measures are highly correlated (over 98%) and our inferences do not change depending on which version we use.

and the *Z-score*. Both measures rely on data that is available for all banks during both periods. The equity capital ratio is a measure of bank solvency used by academics, investors, and regulators. For example, Berger and Bouwman (2013) argue that higher capital buffers help banks survive during financial crises and are even more important for smaller banks that are less able to absorb external shocks. We define distressed banks as those with *Equity capital ratio* in the bottom decile of the distribution for that period (*Low equity capital ratio* indicator).[9] The 10th percentile cutoff for *Equity capital ratio* is 6.06% in the earlier period and 7.67% in the latter period.

Our second measure of distress is the bank *Z-score*, which captures the ability of earnings and capital levels to serve as a buffer. For our analysis, we transform this variable to percentiles within each observation period and define the *Low Z-score* indicator to denote whether the bank is in the bottom decile of the *Z-score* distribution in the observation period. The 10th percentile cutoff for *Z-score* is 18.3 in the earlier period and 31.6 in the latter period.

We also consider a third proxy for distress, which we label *Financial distress*. The banks flagged as in *Financial distress* during a period are the banks that are both in the bottom decile of the *Equity capital ratio* distribution and the bottom decile of the *Z-score* distribution during that period. The sample of banks that are flagged as in *Financial distress* includes about 4.1% of the bank-quarters in the period 1985-1994 and about 3.1% of the bank-quarters in the period 2005-2014.

Table 1, Panels E and F, compare the *Equity capital ratio* and *Z-score* for banks that are classified as distressed by each of the three indicators that we use, for each of the periods. Naturally, flagging banks as distressed based on whether they are in the bottom decile of the *Equity capital ratio* creates a sharp difference in the *Equity capital ratio* between the distressed and non-distressed banks, but the difference in the *Z-score* between the two types of banks is weak. In a similar fashion, flagging the bottom decile of the *Z-score* results in a sharp difference in *Z-score*, and muted difference in the *Equity*

[9] We reach similar conclusions if we use the 5th percentile or the 15th percentile.

capital ratio. The reason is that the correlation between the two variables is relatively low as it is 0.23 for the first period and 0.35 for the second (Panel G).

We summarize the fraction of distressed banks by year for each of the two periods using all three distress indicators in Figure 2. The figure shows that in each period the proportion of banks with *Low equity capital ratio* is somewhat higher prior to the peak crisis periods of (1988-1990) and (2008-2010). Such an outcome may reflect that banks try to boost their capital ahead of the peak of a crisis, perhaps because the market demands it, but part of the explanation may also be that banks whose capital falls sharply during the crisis do not stay in the sample. We discuss this sample selection issue in Section 7.3. The fraction of banks with *Low Z-score* falls throughout most of the first period but has an inverted U-shape in the second period, peaking in the first quarter of 2010. The fraction of banks that have both a *Low Z-score* and *Low equity capital ratio* evolves similarly to the fraction of banks with *Low equity capital ratio* in the first period and to the fraction of banks with a *Low Z-score* in the second period.

As we would expect if our proxies for financial distress are useful for capturing banks in financial distress, the banks in our distressed bank samples differ substantially from the healthier banks. Panels E and F of Table 1 show how our key variables of interest differ between distressed and non-distressed banks. We find that distressed banks have lower growth of assets as well as of liabilities. Depending on the measure of distress, distressed banks are larger or smaller than non-distressed banks. Banks with assets greater than $50bn are more likely to be distressed than other banks in both periods when we use the equity/assets measure of distress but are less likely to be distressed when we use the other measures. The ratio of loans to assets is generally higher for distressed banks across distress measures. Distressed banks are more likely to be headquartered in metro areas and to be relatively young.

To verify that the distress measures indeed reflect financial distress, we correlate them with future failure. We would expect financially distressed banks to be more likely to fail than non-distressed banks if our measures distinguish between distressed banks and other banks. We test whether the banks

we consider to be financially distressed are more likely to fail. We adopt the FDIC definition of bank failure, which is a situation where a bank is unable to meet its obligations and is either taken over by the FDIC or acquired by another bank (according to the FDIC failed bank list).[10] Our dataset for this analysis is at the quarterly level; thus, each observation represents a bank in a specific quarter. The dependent variable is an indicator variable for whether the bank fails in future quarters (4, 8, 12 future quarters). The explanatory variables include *Low equity capital ratio*, *Low Z-score*, or *Financial distress*, bank characteristics, and fixed effects for state headquarters and calendar quarter. Table 2 reports estimates of the following model:

$$I(Failure\ within\ K\ Quarters)_{it} = a + bD_{it} + cX_{it} + Quarter\ FE_t + State\ FE_i + e_{it} \quad (1)$$

where D_{it} is the distress indicator. Bank characteristics (X) include logged assets, assets greater than $50 billion, an indicator whether the bank is part of a multibank holding company, the ratio of deposits-to-liabilities, the ratio of loans-to-assets, the ratio of core deposits-to-total deposits, an indicator whether the bank is headquartered in a metro area, an indicator whether the bank is less than 5 years old, and state-year level variables: logged per-capital income and the unemployment rate.

The regression results show that banks with *Low equity capital ratio* (Panel A) and banks with *Low Z-score* (Panel B) are more likely to fail. Focusing on the three-year horizon (Columns (3) and (6) in Panel A), banks with *Low equity capital ratio* are 8.7% and 6.3% more likely to fail in the next 3 years for the first period and the second period, respectively. A bank with a *Low Z-score* indicator has a higher likelihood of failure within three years of 9.4% and 7.6% for the first and second period, respectively (Columns (3) and (6) in Panel B).

[10] https://www.fdic.gov/bank/individual/failed/banklist.html

Next, we examine the predictive power of *Financial distress*, which is the interaction of *Low equity capital ratio* and *Low Z-score*. We repeat the regressions with this variable; the results are presented in Panel C of Table 2. Banks that are in the intersection of the deciles have a higher likelihood of failure by 17.8% and 19.3% for the two periods, respectively. This is a particularly large magnitude as it is roughly ten times the unconditional mean of bank failure of 2.0% in the first period and 1.7% in the second period. We also note a material increase in the R^2 of the regressions in Panel C, relative to those in Panels A and B. In Internet Appendix Table A1, we provide robustness analysis in which we include the *Crisis* interaction. *Crisis* is an indicator of the crisis period of 1988-1990 or 2009-2011 depending on the sample period. The results show that our three proxies for financial distress perform even better during a crisis period.

Among our three proxies for financial distress, the proxy that classifies as distressed banks those that are both in the lowest decile of the *Equity capital ratio* and of the *Z-score* distributions is the best predictor of bank failure. This is consistent with Panels E and F of Table 1, discussed earlier, which compare the means of key variables for distressed banks and non-distressed banks. The statistics in these panels show that the greatest difference in characteristics and behavior occur when using banks in the *Financial distress* sample. There is also economic intuition for why financially-distressed banks that are both in the lowest decile of the *Equity capital ratio* and the lowest decile of the *Z-score* are more likely to fail than banks that satisfy only one of the criteria. While the *Equity capital ratio* measures the leverage of the bank, banks differ in their asset composition and specifically in their asset volatility. A higher leverage would correspond to a higher probability of distress for a bank with volatile assets compared to a bank with more stable assets. *Z-score* measures the bank's earnings scaled by the volatility of earnings, and thus controls for the volatility of earnings, which is related to the riskiness of assets. In terms of the controls, we note expected signs for some key coefficients. Banks with higher loan growth and lower core deposits are more likely to fail. There is no consistent link between the other controls across periods and failure with the exception of the local economic condition

variables. While a positive relation between the probability of failure and the state unemployment rate is not surprising, it is surprising that the probability of failure is positively related to the log of state per capita income.

In conclusion, banks in the bottom deciles of the *Equity capital ratio* distribution or the *Z-score* distribution are more likely to fail, but the financial distress classification that requires banks to be in the bottom deciles of the distributions of both ratios results in a materially stronger predictor of failure and thus a better proxy for bank distress than each of the variables alone. For the rest of the analysis, we consider a bank to be in financial distress if both its *Equity capital ratio* and its *Z-score* are in the bottom deciles of their respective distributions. In the main body of the study we present analyses solely using the *Financial distress* indicator, and the corresponding analyses using *Low Equity capital ratio* and *Low Z-score* are provided in the Internet Appendix.

4. Do Banks Deleverage?

In this section, we investigate whether banks deleverage after they have reached a state of financial distress. Recall that debt overhang theories predict that banks do not decrease leverage when they suffer from a debt overhang (e.g., Admati, DeMarzo, Hellwig, and Pfleiderer, 2018). With these theories, distressed banks would not raise equity or decrease payouts. It is important to note that average quarterly net income-to-equity ratio of distressed banks is -7.2% in the first period and -7.1% in the second period (Table 4, Panels A and B). Consequently, banks would experience an increase in leverage unless they take active steps to offset the loss of equity due to their net income loss.

To test whether distressed banks deleverage, we measure the change in the *Equity capital ratio* four quarters ahead and regress it on the *Financial distress* indicator and controls. Our analysis is based on the following model where D_{it} denotes our distress indicator, *Crisis* is a crisis period indicator, and X_{it} denotes the controls:

$$\Delta Equity\ capital\ ratio\ (q, q+4)_{it} = a + bD_{it} + cD_{it}*Crisis_{it} + dX_{it} + Quarter\ FE_t + State\ FE_i + e_{it} \quad (2)$$

The estimated regressions are presented in Table 3. In addition to the distress variables, control variables, and fixed effects, we add a crisis-period interaction in all regressions (*Crisis*). Further, in Columns (5) and (6) we also add a *TARP* indicator variable for the 2005-2014 period for whether a bank received a TARP infusion within the prior year. In some of the specifications, we add a lagged version of the dependent variable to control for autocorrelation in the dependent variable. Also, we use Driscroll-Kray standard errors for results reported in Tables 3 to 6 as in Fahlenbrach, Prilmeier, and Stulz (2017) to deal with potential biases resulting from overlapping data.

The results in Table 3 show that, on average, distressed banks increase their equity capital ratio significantly by about 0.8 percentage points outside a crisis, but they deleverage less during a crisis This effect is of large magnitude relative to the average equity capital ratio of distressed banks of 4.3 percentage points in 1985-1994 and 5.7 percentage points in 2005-2014; see Table 1, Panels E and F. This is a very large increase in the equity capital ratio as it represents about 55% of a standard deviation of the changes in the *Equity capital ratio* in the first period (=0.8/1.46), and 44% of the standard deviation in the second period (=0.8/1.83) (see Table 1, Panels A and B).

Table 3 shows that the increase in the equity capital ratio did not change materially during the S&L crisis, relative to the period outside the crisis, however, it is dampened during the GFC relative to the surrounding years. During the GFC, the increase in the capital ratio is reduced by roughly half as it is lower by 0.5 percentage points. The slower increase in the capital ratio during the GFC is surprising, since at least some of the distressed banks received TARP infusions. Using the *TARP* indicator, we find that the TARP infusions offset the dampening of the increase in the equity capital ratio due to the GFC. In other words, TARP-supported distressed banks increased their equity capital ratio by 0.8 percentage points during the recent crisis, relative to non-TARP distressed banks which increased their capital ratio only by about 0.3 percentage points. The results are robust to the inclusion of the lagged

dependent variable (Columns (2), (4), and (6)). The positive association of lagged capital changes with current capital changes suggests, as we would expect, that banks gradually build up capital. Further research is required to understand better why the equity capital ratio did not increase for non-TARP distressed banks. It could well be that TARP banks were viewed as banks that the official sector wanted to keep alive, so that banks that did not receive TARP found it more difficult to raise equity (see further discussion in Section 5).

We conduct several robustness tests for these results. In Internet Appendix Table A2, we replace the *Financial distress* indicator with its components (*Low equity capital ratio* in Panel A, and *Low Z-score* in Panel B). The statistical significance is high when using the *Low equity capital ratio*, and weaker when the *Low Z-score* is used. We also present a set of results excluding the *Crisis* interaction (Panels C, D, and E). Again, the results remain statistically and economically significant. Moreover, since we keep our dependent variables unwinsorized, we offer also specifications in which the dependent variable, change in equity-to-assets, is winsorized at the 1% and 99% levels in Internet Appendix Table A2, Panels F, G, and H. Again, the results remain strong albeit slightly weaker in magnitude. Note that the standard deviation of the dependent variable declines from 1.49% and 1.83% (Table 1, Panels A and B), in the first and second periods respectively, to 1.18% and 1.32% (not reported). Hence, the economic significance of the distress variables remains virtually unchanged, except for a decline in the power of *Low Z-score*.

We examine the determinants of deleveraging by regressing the change in the equity to assets ratio on bank characteristics for the subsample of distressed banks. The results differ between the two periods. In both periods, larger banks deleverage less. However, in the second period, the indicator variable for the largest banks (banks with more than $50 billion in assets) is positive and economically large. Hence, in the second period, there is no evidence that potentially systemic banks deleverage less. In the first period, the banks with more deposits and more loans deleverage less. Banks in a metropolitan location deleverage less in the second period but not the first. Lastly, banks in states with

a higher unemployment rate deleverage less in the first period but not the second. The estimated regressions are shown in Internet Appendix Table A2, Panel I.

An important difference between the periods that we examine is that FDICIA applies throughout our second period. With FDICIA, banks that have low capital ratios are constrained in the actions they can take. For instance, banks that are undercapitalized cannot have brokered deposits and cannot pay dividends. They have to have in place a capital restoration plan. Hence, it could be that our results are driven by the banks for which prompt corrective action applies, i.e., the banks for which these restrictions apply. To examine this possibility, we re-estimate Table 3 eliminating the banks that are constrained by FDCIA and present the results in Internet Appendix Table A2, Panel J. Our inferences are unaffected when we eliminate these banks, so that our results are not driven by banks subjected to prompt corrective action.

5. How Do Banks Deleverage?

In Section 4, we showed that distressed banks deleverage. In this section, we investigate how they deleverage. Since our measure of leverage is equity over assets, banks can deleverage by reducing their assets and by increasing their equity. They can increase equity by raising new equity or by increasing their income and retaining more of it. DeAngelo, Gonçalves, and Stulz (2018) show that an important tool for deleveraging is retention of earnings, hence banks could deleverage by reducing their payouts.

We first examine summary statistics about the evolution of the capital accounts of banks. Table 4, Panels A and B, show how equity changes for distressed banks and other banks during the two periods we consider. In the first period, the increase in equity of distressed banks is large compared to the increase for non-distressed banks. In the second period, distressed banks and non-distressed banks increase equity quarter-by-quarter by the same percentage. However, equity falls for distressed banks because they are making losses as discussed earlier. In contrast, non-distressed banks are profitable, so that earnings that they do not distribute increase their ratio of equity to assets. Not surprisingly, non-

distressed banks distribute more than half of their earnings. The average dividend payments of distressed banks are extremely small but not zero. Distressed banks issue common stock and preferred stock. However, when a distressed bank is not a stand-alone bank, it will increase its equity through infusions from the parent and these infusions are the main source of equity increase for the distressed banks in both periods. Note that the debt overhang theories would predict that banks would not attempt to make up the equity loss from their net income loss. However, they do so and increase their equity on net.

Next, we turn to a regression analysis in which we test whether the main items in the assets, liabilities, and equity of banks evolve differently for banks in financial distress. We estimate regressions that are the same as the ones estimated in Table 3, except the dependent variables are outcome variables for banks that we consider to be helpful in assessing how banks deleverage. In the following regression, *D* denotes our distress indicator, *Crisis* is a crisis period indicator, and *X* denotes the controls. We also include a lagged dependent variable, to account for potential mean reversion (see further discussion below):

$$\Delta Balance\ Sheet\ Item\ (q, q+4)_{it} = a + bD_{it} + D_{it}*Crisis_{it} + X_{it} + Quarter\ FE_t + State\ FE_i + e_{it} \quad (3)$$

We present the results of the analysis in Table 4, Panels C and D, for periods 1985-1994 and 2005-2014, respectively. We find that distressed banks reduce both financial and physical assets. They reduce total assets, loans, and fixed assets. They also reduce the number of branches. It is therefore not surprising that employment shrinks as well. The magnitudes of the effects are large. In the first period we consider, distressed banks decrease the size of their total assets by 8.2%, their loan portfolio by 8.7%, their fixed assets by 6.6%, the number of their branches by 3.5%, and the number of their employees by 7.0% (Panel C). The magnitudes are similar in the later period. The decreases are even larger during the GFC. During the recent crisis, distressed banks reduce the size of their total assets by

11.2%, their loan portfolio by 9.3%, their fixed assets by 8.0%, the number of their branches by 5.8%, and the number of their employees by 7.3% (Panel D).

Turning to the liabilities, Table 4, Panel C, Columns (6) to (9) show that banks deleverage by reducing their liabilities: both deposits and other liabilities decline. We would expect banks intending to lever up to attract more deposits through a higher rate, so that they can take more risks and increase their leverage. As Benston and Kaufman (1997) discuss for the pre-FDICIA period, "zombie" S&Ls "were making profitability difficult for solvent institutions by paying higher-than-market interest rates to attract deposits and charging lower-than-market rates on their loans, in a strategy of levering up." Instead, in the 1985-1994 period, distressed banks, on average, reduce their deposit rates by 0.026% (Panel C, Column (7)) and the quantity of deposits by 9.2% (Panel C, Column (8)). The magnitudes for the later period, 2005-2014, are almost identical, with the exception that the decline in the quantity of deposits during the crisis is steeper by an additional 3.4%. This evidence is consistent with Ben-David, Palvia, and Spatt (2017) who find that deposit rates do not materially vary with the equity capital ratio. Instead, they document that banks use deposits as a tool to fund loan growth: they increase offered deposit rates to attract new deposits when the demand for loans is high. Thus, when distressed banks do not seek to make new loans, they also do not act to attract new deposits. Table 4, Panels C and D, Column (8) shows that other liabilities (e.g., long-term debt) of distressed banks decline by about 19.2% and 20.9%, per year, respectively in the first and the second periods we study. It is important to note that the decrease in interest rates on deposits is not due to economy-wide movements in interest rates. We control for such movements through the use of quarter fixed effects, so that all our results have to be interpreted as showing how distressed banks differ in their behavior from non-distressed banks within a quarter.

Lastly, we find that banks increase their equity capital through two channels: equity issuance and retention. If distressed banks intended to lever up, then banks would want to pay out funds to existing shareholders, which would make them riskier and increase shareholder wealth in case of bank failure.

Table 4, Panel C, Columns (10) and (11) show results that are inconsistent with this assertion. Specifically, they show that, on average, common stock increases by 1.7% and by 2.7%, and dividends are cut by 26.1% and 30.2%, in the two periods, respectively. These results are consistent with the findings of Dinger and Vallascas (2016), who document that, among publicly-traded banks, the likelihood of equity issuance is higher when the bank is poorly capitalized. However, while equity does not increase less during the S&L crisis, it does increase less during the GFC. Acharya, Gujral, Kulkani, and Shin (2011) argue that banks by paying large amounts in dividends during the crisis redistributed wealth away from creditors to shareholders. The distressed banks in our sample reduced dividend payments during the GFC.

We attempt to reconcile an apparent contradiction between Tables 3 and 4. In the previous section (Section 4), we found that distressed banks deleveraged less during the GFC because they issued less equity during the crisis (see results in Table 3, Columns (3) and (4)). In an apparent contrast, Table 4, Panel B, shows that both assets and liabilities of distressed banks shrank more during the GFC than outside of it. In fact, the two results are consistent with each other. Remember that banks deleverage more as their liabilities fall more in relation to their assets. Distressed banks deleveraged less during the GFC relative to distressed banks outside the crisis because of three reasons. First, distressed banks during the GFC reduced their liabilities by a smaller amount relative to the extent that they reduced their assets. To see this, compare the coefficients on the *Crisis* interaction in Column (1) to that in Column (6). Second, while distressed banks outside crisis periods deleverage themselves through equity issuance (Column (10)), distressed banks during the GFC did not issue equity. In fact, the coefficient on the *Crisis* interaction in Column (10) nullifies the coefficient on the *Financial distress* indicator. Third, some banks during the GFC received TARP funds and others did not. A plausible explanation for the lower equity raising during the crisis is that banks eligible for TARP funds were

banks that the government wanted to survive, so that distressed banks that did not receive TARP funds were considered likely to be closed by regulators.[11]

We also explore the impact on distressed banks of receiving TARP funds. Panel E of Table 4 shows that these banks do not behave materially differently with respect to the management of assets except that they decrease fixed assets less than non-TARP banks. Surprisingly, TARP banks offer higher deposit rates by 0.072%, but at the same time shrink their deposits even further, by an additional 3.0%. The increase in deposit rate does not necessarily mean attracting new deposits in order to invest in new risky projects. It can simply mean that these banks try to retain their current deposits and prevent a run. These banks also raise more equity. We observe no difference in the evolution of dividend payouts for these banks relative to other distressed banks. It should be noted, however, that in both periods regulators could order banks to stop paying dividends if they chose to do so. Across all the robustness tests, the picture is similar to the one arising from the main tests in Table 4: banks in distress shrink their assets, reduce their liabilities, and increase their equity.

We conduct several robustness tests for these results, presented in Internet Appendix Table A3. In Panels A and B, we rerun the analysis for 1985-1994, but replace the main distress variable to be the *Low equity capital ratio* and the *Low Z-score*, respectively. In Panels C and D, we repeat these tests for the period of 2005-2014. In Panels E, F, and G, we rerun the analysis for 1985-1994, but excluding the crisis indicator, for the three distress variables. In Panels H, I, and J, we present the analysis for 2005-2014, excluding the crisis indicator, for the three distress variables. In Panel K, we examine whether the decrease in dividends in the second period is due to FDCIA. We find that the decrease in dividends is similar when we exclude the banks constrained by FDICIA. Finally, there is a concern that our results are driven by regression to the mean and not by intentional deleveraging. In all the

[11] Internet Appendix Table A3, Panel K, shows that once we exclude bank-months that were impacted by regulatory action (PCA), distressed banks during the GFC issue equity as much as distressed banks outside the GFC.

regressions in Table 4, Panels C to E, we include the lagged dependent variable as a right-hand-side control, which should reduce or eliminate a regression to the mean bias. To provide further assurance that the results are not driven by regression to the mean, we reproduce the results of Table 4, Panel C, with the dependent variable being the deviation of the dependent variable from the 5-year average prior to the current quarter. Because of data availability, we can perform this analysis only for the second period. We present the analysis in Internet Appendix Table A3, Panel L. Doing so leads to even greater deleveraging than we find in Table 4.

Overall, our results show that banks deleverage throughout their balance sheets and take steps that are expected to decrease their costs, so that their losses fall. Contrary to the widespread narrative from the S&L crisis that distressed banks increase their deposit rates in order to attract deposits and invest them in risky assets, we find that deposits of distressed banks shrink and that the interest rate they pay falls. As banks reduce their assets, their demand for deposits falls and they offer lower rates. In addition, banks act to increase equity through cutting dividends and raising new equity.

6. Bank Distress and Risk Taking

Despite the results that, on average, distressed banks deleverage, it is still possible that they increase their asset risk which would be supportive of the moral hazard incentives theories. To investigate whether this is the case, we test whether indicators of risk taking change for distressed banks. Since we include both private and public banks in our sample, we can only use indicators that are available in call reports. Of course, our analysis can examine only observable measures of risk taking.

To investigate whether distressed banks increase risk taking, we consider how various measures of bank asset risk evolve for distressed banks. We consider four measures. The first is the logged *Z-score* which is a measure of distress risk. If banks take on riskier loans to gamble for resurrection, we expect loan performance to worsen and the ratio of performing loans to total loans, which we call the

performing loans ratio, to fall. The literature uses measures of earnings or cash flow volatility as proxies for risk (see, e.g., Minton and Schrand, 1999, Koudstaal and van Wijnbergen, 2012). Therefore, we expect the volatility of earnings to increase if banks take more risk. Lastly, for the 2005-2014 period, banks have capital requirements that required them to weight assets differently depending on their risk. As a result, the change in risk-weighted assets (RWAs) is a measure of the change in the risk of the assets. The lower this ratio, the safer the assets according to the regulatory risk-weights. In the following regression, *D* denotes our distress indicator, *Crisis* is a crisis period indicator, and X_4 denotes the controls:

$$\Delta Risk\ Measure\ (q,\ q+4)_{it} = a + bD_{it} + cD_{it}*Crisis_{it} + dX_{it} + Quarter\ FE_t + State\ FE_i + e_{it} \qquad (4)$$

In Table 5, we estimate our regressions with proxies for asset risk on the left-hand side. We find that the *log Z-score* increases for banks in distress, which means that these banks become less risky. Columns (1) to (3) provide regression estimates for the first period. In Column (1), the increase in the *log Z-score* is 0.839, reflecting an increase of 131 percent, so that the Z-score more than doubles. Admittedly, the *Z-score* of the distressed banks is low, as the average of the bottom decile of the *Z-score* for the first period is 7.35 (Table 1, Panel E). The ratio of performing loans to total loans increases substantially as well. Finally, Column (3) shows that there is a drop in earnings volatility of 0.329 for distressed banks. For all regressions, we have a *Crisis* interaction. The *Crisis* interaction is insignificant for all three regressions. Columns (4) to (6) are the regressions in Columns (1) to (3), estimated for the second period. The results for the coefficients on *Financial distress* are similar, except that the coefficient for the regression for the *Performing loans ratio* is insignificant. However, the *Crisis* interaction is significantly negative for the *Z-score* and for *Earnings volatility*. Column (7) uses as dependent variable the *Change in risk-weighted assets* (scaled by lagged assets). If risk-weights are good adjustments for risk, we would expect this ratio to fall when banks decrease their asset risk. We

see that the coefficient on *Financial distress* is negative and the interaction with the *Crisis* is negative as well.

The results in Table 5 suggest that distressed banks increase their distance-to-default (*Z-score*) and have lower earnings volatility in both sample periods. In the latter period, distressed banks reduce their risk-weighted assets ratio, suggesting reduced holdings of risky assets. The performing loans ratio increases for distressed banks for the first period but not for the second one.

For the GFC, it is important to assess whether derisking is different for the banks that receive TARP injections as there is evidence in the literature that these banks take on more risk (Black and Hazelwood, 2013). We estimate the regressions in Columns (4) to (7) adding an interaction with TARP, which is an indicator variable for the banks that receive TARP funding. The estimates in Columns (8) to (11) show that the distressed banks that received TARP injections increase their Z-score more than other distressed banks and reduce their earnings volatility more than other banks. However, these banks experience a decrease in their performing loans ratio compared to other banks.

We offer several robustness analyses. First, we present the results for the *Low equity capital ratio* and *Low Z-score* distress indicators with *Crisis* indicator interactions (Internet Appendix Table A4, Panels A and B), and for all three distress metrics without the interactions (Internet Appendix Table A4, Panels C, D, and E). The results broadly remain consistent across specifications. Then, to alleviate the concern that the results are driven by survival bias, we explore a one-quarter horizon instead of a four-quarter horizon for the three distress variables, in Internet Appendix Table A4, Panels F, G, and H. Again, the results broadly remain consistent. The only variable that appears to materially weaken is the *Performing loans ratio* in the 1985-1994 period (Panel H, Column (2)). In Internet Appendix Table A4, Panels I, J, and K, we also investigate how the risk metrics change in the five to nine quarters after a bank is considered distressed (the twelve months following the twelve months that we consider in most of our analyses). We see that banks derisk for both periods for all measures except for the *ΔRWA/Assets(q)* measure. However, in that case, we find that banks that received TARP funds do not

derisk. As earlier, we explore whether our results are explained by PCA banks in the post-FDICIA period in Internet Appendix Table A4, Panel L. We find that this is not the case. Our results hold if we drop all the banks constrained by PCA.

7. Extensions and Robustness

In this section, we address three important issues related to the results we have shown so far. First, we investigate whether the deleveraging behavior of banks differs after the adoption of FDICIA and Dodd-Frank. Second, we compare the deleveraging behavior of private and public banks since existing literature argue that moral hazard incentives are more important for public banks. Third, we assess the extent to which our results are affected by the fact that we only observe the banks that survive.

7.1. Did FDICIA and Dodd-Frank Change Distressed Banks' Deleveraging?

As already discussed, FDICIA was explicitly designed to reduce the relevance of the moral hazard incentives of banks. Dodd-Frank incorporates stress tests, so that banks that fail such tests are constrained and have incentives to deleverage. The regressions we estimated in earlier sections were not designed to allow us to evaluate whether the extent of deleveraging differs in different years, except for the height of the crisis period. We now show results that allow the extent of deleveraging to differ by year. Instead of having a financial distress indicator variable as in Table 3, we re-estimate the regressions in Table 3 interacting the financial distress indicator variable with yearly indicator variables. With this approach, the interaction of *Financial distress* with a year indicator variable shows how the extent of deleveraging in that year differs from the benchmark of other non-distressed banks within the same year (quarter fixed effects are included in the regression). We plot the coefficients in Figure 3.

Figure 3a shows the results for the first period. We find that the interaction coefficients range between 0.6 and 1.0 until 1991, the year of the adoption of FDICIA. After the adoption of FDICIA,

distressed banks increased their equity capital ratio compared to non-distressed banks by more than 50% more than they did prior to the adoption of FDICIA. This evidence is strongly consistent with the view that FDICIA improved the incentives on banks to build up their leverage to avoid situations where they would be seriously constrained by regulators or would lose control to regulators. Another way to put this is that FDICIA increased the costs on banks of having a low equity capital ratio.

Figure 3b shows estimates for the second period. It is important to note first that the results about higher deleveraging after FDICIA do not hold in the second period. It is not clear why distressed firms deleveraged less in the second period than they did immediately after the adoption of FDICIA. An investigation of this issue is left for further research. As already noticed in Section 3, deleveraging was lower during the GFC. The results in Columns (3) and (4) show that deleveraging was lower from 2008 to 2011. Also, a formal test of the difference of the coefficients presented in Figure 3b shows that the deleveraging in the years 2012 onwards is not statistically significantly higher than the deleveraging in the pre-crisis period (2005-2007).

7.2. Private Banks and Public Banks

So far, we have studied a sample that included both private and public banks. The advantage of doing so is that it allowed us to have an extremely large sample of banks. This is because there are many more private banks than public banks during the two periods we consider. However, there are reasons to think that the incentives and ability of public banks to deleverage may be different from those of private banks. Public banks have access to public markets to raise funds. Information about them is widely available, which should make it easier for them to raise funds compared to more opaque private banks. At the same time, however, public banks have shareholders who are likely to be more diversified than the owners of private banks. As a result, shareholders of public banks may encourage

managers to take more risk and may be less willing to take actions that could benefit debtholders.[12] Private banks are also more likely to be controlled by management, so that if management is more conservative than diversified shareholders, these banks may deleverage more aggressively.

In Table 6, we split the sample between public and private banks. We classify a bank as a public bank if it is owned by a bank holding company whose stock is publicly traded. We re-estimate the regressions of Table 3 for each type of banks. In the first period, distressed public banks deleverage somewhat less than private banks. In the second period, there is no difference between the groups. Note that the coefficients on the crisis interactions are statistically insignificant for public banks in both periods. In the first period, they are essentially zero, while in the second period their magnitude is similar to their magnitude for private banks. It follows that our conclusions about the deleveraging of banks hold for both public and private banks.

With public banks, we can compute an additional indicator of distress. Since we can compute the market value of equity for such banks, we can compute the ratio of the market value of equity to the value of the bank's assets. In other words, we can replace book value of equity with market value of equity. The difficulty with this approach is that, if we designate a bank to be distressed if its ratio of market value of equity to assets is in the bottom decile of the sample for a period, it turns out that a large fraction of banks is distressed during the crisis. We estimate the regressions of Table 3 with this new distress indicator. The results are shown in Internet Appendix Table A2, Panel K. We find that the coefficients on *Low market equity capital ratio* are positive and insignificant. The coefficients on the crisis interactions are negative and insignificant.

[12] Koudstaal and van Wijnbergen (2012) found results that are inconsistent with this channel. They examine the determinants of market-to-book ratio of U.S. public banks and show that it is negatively related to the volatility of ROA in general but unrelated to the volatility of ROA during the GFC.

7.3. Failed Banks and Potential Survivorship Bias

We only observe the evolution of leverage for banks that survive. For instance, in Table 3, a bank is in the sample that we use provided that it survives for one year after having been designated a distressed bank. Our empirical results might be contaminated by survival bias. Specifically, banks can fail during the year following the quarter when they are recorded as distressed banks. A concern is that bank failure could mechanically generate the deleveraging result, since the banks that survive necessarily perform better than the ones that fail. DeAngelo, Goncalves, and Stulz (2018) conduct an analysis of deleveraging for public non-financial firms and find that a substantial fraction of firms are delisted at or shortly after reaching peak leverage. These firms obviously cannot have had time to deleverage. If the same patterns were to hold for our sample, the deleveraging behavior we observe would be the behavior of the banks that survived and not that of the average distressed bank.

A first approach to investigate the relevance of this potential survivorship bias is to shorten the period over which we observe deleveraging. The reasoning is that if we shorten the period over which we observe deleveraging to one quarter from one year the fraction of firms that fail during the observation period falls and hence attrition becomes less important. Therefore, we re-estimate our regressions shortening the period of observation after a firm has been designated to be a distressed firm to one quarter. We report the results in Internet Appendix Table A2, Panels L, M, and N). The results are noisier but the magnitude of deleveraging is consistent with what we find for an observation period of four quarters (the one-quarter results need to be multiplied by four). This evidence suggests that the impact of the survival bias on our results is extremely limited. As discussed earlier, there are similar specifications for Table 5 in Internet Appendix Table 4, Panels F, G, and H.

Another approach to better understand the relation between bank failure and deleveraging is to investigate whether banks that fail behave differently during the quarters that they are in the sample. To do so, we estimate the regressions of Table 4 using quarterly data with interactions for banks that fail in future quarters. The interactions are constructed as follows. Consider a bank that is distressed at

t. We add to the regression an indicator variable that takes value one for the quarter in which the bank fails if it fails for quarters +2 to +16. These interactions estimate the extent to which the deleveraging of a distressed bank differs if it subsequently fails. We show the results in Internet Appendix Table A3, Panels M and N. The results are straightforward for the second period (Panel N). Banks that fail in the two years after their classification as distressed deleverage more than the banks that do not fail. The only variable for which it is not the case is the change in equity where the fact that a bank fails subsequently makes no difference. For the first period (Panel M), the results are similar except for two variables. First, banks that subsequently fail have higher deposit rates than distressed banks that do not fail. Second, banks that fail in the first two quarters subsequently to the quarter of observation decrease equity. Otherwise, banks that fail deleverage more than banks that do not fail in the first period as well.

8. Conclusion

In this paper, we investigate the predictions from moral hazard theories of banking according to which distressed firms do not take actions to decrease their leverage and to decrease their risk, but instead take on more risk. We conduct this investigation for two periods, each surrounding a financial crisis. The first period is 1985-1994 with the S&L crisis and the second period is 2005-2014 with the GFC. Having a financial crisis during a period allows us to evaluate whether moral hazard incentives play a different role during a crisis. The periods are separated by the implementation of important changes in regulation. First, in 1991, FDICIA was adopted. It was designed to make it less likely that distressed banks would choose to increase their risk and would avoid taking actions to deleverage. Second, in 2010, the Dodd-Frank Act was adopted and the Basel Accords were modified starting in 2009 to require banks to hold more capital. Despite these important changes in regulations that were aimed at protecting the insurance fund from actions by distressed banks, we find more similarities than differences in how banks respond to financial distress over the two periods.

Our evidence is inconsistent with the predictions of the moral hazard theories. We find that distressed banks on average deleverage and reduce their risk. During the GFC, there is some evidence that distressed banks appear to deleverage less and reduce their risk less, primarily because of lower equity issuance. Though we show that after the adoption of FDICIA in the first period, distressed banks deleverage more aggressively, we find that this benefit of FDICIA does not carry over to the second period and show that there is no evidence that the post-crisis changes in regulations, including the adoption of Dodd-Frank, had an impact on the actions of banks in financial distress.

An important caveat with our results is not unique to our paper. We can only observe the leverage and the risk we can measure. It is possible that distressed banks can increase their risk while decreasing observable risk metrics. However, banks would have to increase their risk in a way that is not picked up by our multiple risk metrics. Importantly, these risk increases would also be invisible to bank counterparties who otherwise might choose not to enter into business transactions with the bank.

Our results apply on average to distressed banks, so that it is certainly possible, even likely, that some distressed banks take more risk rather than take actions to deleverage. However, our evidence shows that this view is not helpful to understand the behavior of the average distressed bank. Many factors can drive banks to deleverage and reduce their risk. Distressed banks that take actions to increase their leverage even further might find it difficult to attract and keep customers and counterparties would be reluctant to deal with them. Irrespective of the regulatory regime, they would be under pressure from regulators. Managerial reputations would be endangered. As a result, commercial and market incentives as well as incentives on the part of managers may make it optimal for the typical distressed bank to deleverage rather than keep pushing its leverage up.

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Appendix A. Variable Definitions

Variable name	Definition	Source	Variables calculation
Variables of interest			
Equity capital ratio	Equity/Assets	FDIC	EQ/ASSET
Z-score	[Mean(ROA) + Mean(Equity capital ratio)] / Std. deviation of return on assets (ROA) (4 qtr)	FDIC	ROA=NETINC(qtr)/ASSET, Equity capital ratio=EQ/ASSET
Low equity capital ratio (1st decile)	Indicator variable to whether Equity capital ratio is in the 1st decile of bank-quarters		
Low Z-score (1st decile)	Indicator variable to whether Z-score is in the 1st decile of bank-quarters		
Financial distress	1st decile equity capital * 1st decile Z-score		
Crisis	An indicator variable for the years 1988-1990 and 2009-2011		
TARP	An indicator variable to whether the bank received TARP funds in the prior year		
Dependent variables			
Failure within k quarters	Indicator to whether bank was categorized as Failed (in qtrs q+1 to q+k)	FDIC	Failure as defined by FDIC
Change in equity capital ratio (q, q+k)	Equity capital ratio (q+k) - Equity capital ratio (q)		
Change in log assets (q, q+k)	log(Assets) (q+k) - log(Assets) (q)	FDIC	Change in log(ASSET)
Change in log loans (q, q+k)	log(Loans and leases) (q+k) - log(Loans and leases) (q)	FDIC	Change in log(LNLS)
Change in log fixed assets (q, q+k)	log(Fixed assets) (q+k) - log(Fixed assets) (q)	FDIC	Change in log(BKPREM)
Change in log #branches (q, q+k)	log(#branches) (q+k) - log(#branches) (q)	FDIC	Change in log(OFFSOD)
Change in log #employees (q, q+k)	log(#employees) (q+k) - log(#employees) (q)	FDIC	Change in log(NUMEMP)
Change in log liabilities (q, q+k)	log(Liabilities) (q+k) - log(Liabilities) (q)	FDIC	Change in log(LIAB)
Change in log deposit rate (q, q+k)	log(Interest expense/Avg deposits) (q+k) - log(Interest expense/Avg deposits) (q)	FDIC	Change in log(Annualized quarterly EINTEXP/Avg DEP)
Change in log deposits (q, q+k)	log(Deposits) (q+k) - log(Deposits) (q)	FDIC	Change in log(DEP)
Change in log other liabilities (q, q+k)	log(Other liabilities) (q+k) - log(Other liabilities) (q)	FDIC	Change in log(LIAB-DEP)
Change in log common stock (q, q+k)	log(Common stock) (q+k) - log(Common stock) (q)	FDIC	Change in log(EQCS)
Change in log dividends (q, q+k)	log(Dividends) (q+k) - log(Dividends) (q)	FDIC	Change in log(Annualized Quaretly EQCDIV)
Change in ROA (q, q+k)	Net income (qtr)/Total assets (q+k) - Net income (qtr)/Total assets (q)		
Change in Z-score (q, q+k)	Z-score (q+k) - Z-score (q)		NETINC/ASSET
Change in performing loan ratio (q, q+k)	log(Performing loans/Assets) (q+k) - log(Performing loans/Assets) (q)	FDIC	Change in (NCLNLS/ASSET)
Change in earnings volatility (q, q+k)	(4-qtr volatility of (Earnings/Assets)) (q+k) - (4-qtr volatility of (Earnings/Assets)) (q)	FDIC	Change in (Std Dev of ROA)
Change in RWA(q, q+k)/Assets (q)	(Risk weighted-assets (q+k) - Risk weighted-assets (q))/Assets (q)	FDIC	(Change in RWA)/Assets (q)
Control variables			
Log assets	Log(Assets)		Log(ASSET)
Assets > $50bn	Assets greater than $50bn in 2010/Q4 qtr dollars	FDIC	ASSET for consolidated bank or BHC parent > $50bn
Part of MHC	Indicator to whether parent is multibank holding company (MHC)	FDIC	HCTMULT
Deposits/Liabilities	Ratio of Deposits to Liabilities	FDIC	DEP/LIAB
Loans/Assets	Ratio of Loans to Assets	FDIC	LNLS/ASSET
Core deposit ratio	Ratio of Core deposits to Total deposits	FDIC	COREDEP/DEP
Metro location	Bank headquartered in a metropolitan statistical area (MSA)	FDIC	METRO
De novo bank	Indicator to whether the bank has a new charter from the last 5 years	FDIC	BNKAGE<=5
Charge-off rate	Charge-Offs divided by Loan and Leases	FDIC	DRLNLS/LNLS
Log state per-capita income	log(Per-capita income, state level) (q-1)	BLS	Seasonally Adj Per Cap Income
State unemployment rate	State unemployment rate (q-1)	BLS	Seasonally Adj Unemp Rate

Table 1. Summary Statistics

The table presents summary statistics for the samples used in the study. The data is a panel at the bank-quarter level. Panels A and B present descriptive statistics for the sample of bank-quarters of 1985-1994 and 2005-2014, respectively. Panels C and D present correlation tables for the sample of bank-quarters of 1985-1994 and 2005-2014, respectively. Panel E shows summary statistics of distress variables for bank-quarters defined as distressed and non-distressed by the different indicators. Panel F is a correlation table between variables measuring bank distress. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Summary Statistics for 1985-1994 Sample

Variable	N	Mean	St Dev	p1	p10	p50	p90	p99
Equity capital ratio (%)	487553	8.940	3.212	3.263	6.058	8.311	12.580	19.979
Z-score	487146	149.3	202.8	2.9	18.3	93.2	329.5	889.5
Financial distress indicator	487553	0.041	0.198	0.000	0.000	0.000	0.000	1.000
Market equity capital ratio (%)	63702	6.561	9.484	-21.230	0.027	7.800	13.611	18.034
Public Bank	494450	0.138	0.345	0.000	0.000	0.000	1.000	1.000
Crisis (1988-1990)	487553	0.303	0.460	0.000	0.000	0.000	1.000	1.000
Failure within 4 quarters	487553	0.005	0.069	0.000	0.000	0.000	0.000	0.000
Failure within 8 quarters	487553	0.013	0.114	0.000	0.000	0.000	0.000	1.000
Failure within 12 quarters	487553	0.020	0.142	0.000	0.000	0.000	0.000	1.000
Change in equity capital ratio (%) (q, q+4)	469782	-0.008	1.485	-4.766	-1.221	0.107	1.084	3.253
Change in log assets (q, q+4)	471216	0.065	0.173	-0.230	-0.046	0.048	0.181	0.605
Change in log loans (q, q+4)	471123	0.069	0.220	-0.351	-0.106	0.060	0.234	0.691
Change in log fixed assets (q, q+4)	469773	0.054	0.343	-0.511	-0.157	-0.025	0.355	1.430
Change in log #branches (q, q+4)	471135	0.037	0.185	-0.223	0.000	0.000	0.043	0.693
Change in log #employees (q, q+4)	471065	0.025	0.186	-0.336	-0.116	0.000	0.163	0.592
Change in log liabilities (q, q+4)	471208	0.065	0.191	-0.227	-0.052	0.047	0.188	0.630
Change in log deposit rate (q, q+4)	469719	-0.062	0.214	-0.517	-0.296	-0.065	0.167	0.411
Change in log deposits (q, q+4)	471148	0.064	0.195	-0.229	-0.052	0.046	0.187	0.640
Change in log other liabilities (q, q+4)	470750	0.058	0.671	-1.799	-0.566	0.016	0.750	2.239
Change in log common stock (q, q+4)	471076	0.020	0.240	-0.007	0.000	0.000	0.000	0.811
Change in log dividends (q, q+4)	467450	0.065	1.995	-6.217	-0.780	0.000	1.230	6.356
Change in log Z-score (q, q+4)	469035	0.050	1.078	-2.839	-1.260	0.067	1.342	2.711
Change in performing-loan ratio (%) (q, q+4)	471216	0.032	1.286	-4.138	-0.936	0.029	1.060	3.574
Change in earnings volatility (q, q+4)	471199	-0.001	0.430	-1.071	-0.200	-0.004	0.175	1.215
Log assets	487553	6.243	1.246	3.977	4.882	6.099	7.705	10.594
Assets > $50bn	487553	0.014	0.117	0.000	0.000	0.000	0.000	1.000
Part of MHC	487542	0.305	0.461	0.000	0.000	0.000	1.000	1.000
Deposits/Liabilities (%)	487553	96.71	6.49	72.03	92.84	98.54	99.39	99.73
Loans/Assets (%)	487459	53.88	15.12	15.80	33.34	55.26	71.89	85.07
Core deposit ratio (%)	487553	88.59	10.37	51.21	76.57	91.29	97.72	100.00
Metro location	487553	0.539	0.499	0.000	0.000	1.000	1.000	1.000
De novo bank	487542	0.067	0.249	0.000	0.000	0.000	0.000	1.000
Charge-off rate (%)	487532	0.664	18.041	0.000	0.000	0.204	1.515	5.922
Log state per-capita income	486923	9.755	0.184	9.347	9.525	9.759	9.988	10.142
State unemployment rate (%)	486923	6.322	1.697	2.700	4.300	6.200	8.500	11.500

Table 1. Summary Statistics (Cont.)

Panel B: Summary Statistics for 2005-2014 Sample

Variable	N	Mean	StDev	p1	p10	p50	p90	p99
Equity capital ratio (%)	260640	10.846	3.643	4.909	7.666	10.050	14.967	24.205
Z-score	260340	242.4	306.8	5.0	31.6	160.5	521.8	1379.7
Financial distress indicator	260640	0.031	0.173	0.000	0.000	0.000	0.000	1.000
Market equity capital ratio (%)	23085	11.7	10.0	-18.9	2.7	12.1	20.7	36.8
Public Bank	263535	0.089	0.285	0.000	0.000	0.000	0.000	1.000
Crisis (2009-2011)	260640	0.299	0.458	0.000	0.000	0.000	1.000	1.000
TARP	260640	0.012	0.110	0.000	0.000	0.000	0.000	1.000
Failure within 4 quarters	260640	0.004	0.067	0.000	0.000	0.000	0.000	0.000
Failure within 8 quarters	260640	0.011	0.104	0.000	0.000	0.000	0.000	1.000
Failure within 12 quarters	260640	0.017	0.130	0.000	0.000	0.000	0.000	1.000
Change in equity capital ratio (%) (q, q+4)	252508	-0.051	1.828	-5.976	-1.406	0.051	1.209	4.465
Change in log assets (q, q+4)	252737	0.059	0.149	-0.211	-0.050	0.042	0.178	0.559
Change in log loans (q, q+4)	252702	0.054	0.182	-0.281	-0.091	0.040	0.201	0.620
Change in log fixed assets (q, q+4)	251875	0.042	0.305	-0.480	-0.125	-0.024	0.283	1.259
Change in log #branches (q, q+4)	252650	0.028	0.159	-0.288	0.000	0.000	0.095	0.693
Change in log #employees (q, q+4)	252633	0.021	0.159	-0.288	-0.095	0.000	0.141	0.542
Change in log liabilities (q, q+4)	252734	0.059	0.159	-0.219	-0.057	0.041	0.185	0.593
Change in log deposit rate (q, q+4)	251768	-0.160	0.318	-0.816	-0.472	-0.211	0.279	0.573
Change in log deposits (q, q+4)	252723	0.063	0.181	-0.218	-0.054	0.043	0.190	0.610
Change in log other liabilities (q, q+4)	252701	0.015	0.798	-2.515	-0.668	-0.005	0.723	2.767
Change in log common stock (q, q+4)	250490	0.006	0.256	-0.005	0.000	0.000	0.000	0.405
Change in log dividends (q, q+4)	251706	-0.001	2.344	-7.468	-1.061	0.000	1.041	7.473
Change in log Z-score (q, q+4)	252160	-0.024	1.117	-3.064	-1.373	0.002	1.283	2.812
Change in performing-loan ratio (%) (q, q+4)	252737	-0.112	1.424	-5.167	-1.178	0.000	0.907	3.344
Change in earnings volatility (q, q+4)	252729	0.011	0.380	-0.936	-0.139	0.000	0.157	1.147
Change in RWA (q, q+4)/Assets (%) (q)	249808	5.224	24.718	-17.258	-5.241	2.820	15.416	57.557
Log assets	260640	7.390	1.333	4.929	5.913	7.241	8.941	11.845
Assets > $50bn	260640	0.009	0.092	0.000	0.000	0.000	0.000	0.000
Part of MHC	260622	0.185	0.389	0.000	0.000	0.000	1.000	1.000
Deposits/Liabilities (%)	260640	93.45	8.14	66.39	84.38	95.88	99.63	99.90
Loans/Assets (%)	260625	63.66	15.89	19.37	41.70	65.93	82.20	91.63
Core deposit ratio (%)	260640	85.68	12.04	45.20	71.12	88.15	97.78	100.00
Metro location	260640	0.533	0.499	0.000	0.000	1.000	1.000	1.000
De novo bank	260622	0.053	0.224	0.000	0.000	0.000	0.000	1.000
Charge-off rate (%)	260630	0.456	49.188	0.000	0.000	0.096	0.890	3.919
Log state per-capita income	260073	10.572	0.136	10.272	10.403	10.568	10.747	10.927
State unemployment rate (%)	260073	6.370	2.162	3.000	4.000	5.800	9.600	11.800

Table 1. Summary Statistics (Cont.)

Panel C: Correlation Table for 1985-1994 Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Log assets	1.00												
(2) Assets > $50bn	0.21	1.00											
(3) Part of multibank holding company	0.32	0.09	1.00										
(4) Deposits/liabilities	-0.49	-0.22	-0.24	1.00									
(5) Loans/assets	0.21	0.03	0.14	-0.12	1.00								
(6) Core deposit ratio	-0.17	-0.10	-0.04	0.17	-0.15	1.00							
(7) Metro location	0.30	0.06	0.12	-0.17	0.21	-0.18	1.00						
(8) De novo bank	-0.10	0.00	-0.03	0.00	0.13	-0.29	0.16	1.00					
(9) Charge-off rate	-0.06	0.01	-0.02	-0.01	0.05	-0.11	-0.01	0.02	1.00				
(10) Log state per-capita income	-0.05	-0.01	-0.02	-0.02	-0.03	0.06	-0.14	-0.05	0.00	1.00			
(11) State unemployment rate	0.07	-0.01	0.01	0.04	-0.03	-0.20	0.09	0.05	0.14	-0.07	1.00		
(12) Change in log state per-capita income	0.00	0.00	-0.01	-0.01	0.01	0.01	-0.03	-0.01	-0.02	0.21	-0.06	1.00	
(13) Change in state unemployment rate	0.01	0.01	0.01	0.00	0.06	-0.08	0.02	0.03	-0.02	-0.01	-0.13	0.04	1.00

Panel D: Correlation Table for 2005-2014 Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Log assets	1.00												
(2) Assets > $50bn	0.24	1.00											
(3) Part of multibank holding company	0.12	0.16	1.00										
(4) Deposits/liabilities	-0.37	-0.15	-0.13	1.00									
(5) Loans/assets	0.19	-0.01	0.02	-0.16	1.00								
(6) Core deposit ratio	-0.13	-0.08	-0.03	0.21	-0.23	1.00							
(7) Metro location	0.31	0.08	0.02	-0.11	0.16	-0.12	1.00						
(8) De novo bank	-0.05	0.00	-0.03	0.01	0.10	-0.17	0.17	1.00					
(9) Charge-off rate	0.12	0.08	0.02	-0.05	0.07	-0.04	0.10	0.00	1.00				
(10) Log state per-capita income	-0.05	0.01	-0.01	-0.04	-0.02	0.05	-0.14	-0.05	-0.03	1.00			
(11) State unemployment rate	0.16	0.02	-0.06	0.05	0.02	0.08	0.12	0.08	0.26	-0.18	1.00		
(12) Change in log state per-capita income	-0.02	0.01	0.00	-0.01	0.00	0.02	-0.03	-0.01	-0.01	0.18	-0.06	1.00	
(13) Change in state unemployment rate	0.00	0.00	0.03	-0.12	0.10	-0.27	0.02	0.07	0.01	-0.01	-0.08	-0.04	1.00

Table 1. Summary Statistics (Cont.)

Panel E: Summary Statistics for Distressed and Non-Distressed Banks, 1985-1994

Classification variable:	Low equity capital ratio (1st decile) (q)			Low Z-score (1st decile) (q)			Financial distress (q)		
	Distressed	Non-distressed	t-test	Distressed	Non-distressed	t-test	Distressed	Non-distressed	t-test
Observations:	48,756	438,797		48,715	438,431		20,193	466,953	
Equity capital ratio	4.970	9.381	***	6.729	9.182	***	4.287	9.138	***
Z-score	76.049	157.459	***	9.868	164.836	***	7.354	155.479	***
Log assets	6.826	6.179	***	5.872	6.285	***	6.167	6.247	***
Assets > $50bn	0.035	0.012	***	0.013	0.014	**	0.015	0.014	
Part of MHC	0.431	0.291	***	0.241	0.313	***	0.281	0.307	***
Deposits/Liabilities	94.905	96.911	***	96.999	96.684	***	96.816	96.711	**
Loans/Assets	58.663	53.349	***	56.820	53.554	***	59.286	53.647	***
Core deposit ratio	84.574	89.035	***	86.051	88.878	***	84.520	88.772	***
Metro location	0.739	0.516	***	0.577	0.534	***	0.665	0.533	***
De novo bank	0.085	0.065	***	0.108	0.062	***	0.111	0.064	***

Panel F: Summary Statistics for Distressed and Non-Distressed Banks, 2004-2015

Classification variable:	Low equity capital ratio (1st decile) (q)			Low Z-score (1st decile) (q)			Financial distress (q)		
	Distressed	Non-distressed	t-test	Distressed	Non-distressed	t-test	Distressed	Non-distressed	t-test
Observations:	26,064	234,576		26,034	234,306		8,049	252,291	
Equity capital ratio	6.577	11.320	***	9.169	11.010	***	5.656	10.991	***
Z-score	147.764	252.889	***	16.996	267.412	***	12.256	249.712	***
Log assets	7.627	7.364	***	7.431	7.387	***	7.571	7.386	***
Assets > $50bn	0.011	0.008	***	0.010	0.008	*	0.006	0.009	***
Part of MHC	0.220	0.182	***	0.161	0.188	***	0.128	0.187	***
Deposits/Liabilities	91.391	93.674	***	93.186	93.480	***	92.844	93.470	***
Loans/Assets	63.649	63.665		66.668	63.331	***	67.240	63.551	***
Core deposit ratio	84.261	85.840	***	85.014	85.773	***	85.890	85.691	
Metro location	0.640	0.521	***	0.681	0.516	***	0.746	0.525	***
De novo bank	0.033	0.055	***	0.081	0.049	***	0.054	0.052	

Panel G: Correlations between Bank Distress Indicators

	1985-1994			2005-2014		
	(1)	(2)	(3)	(1)	(2)	(3)
(1) Low equity capital ratio (1st decile)	1.00			1.00		
(2) Low Z-score (1st decile)	0.35	1.00		0.23	1.00	
(3) Financial distress	0.62	0.62	1.00	0.54	0.54	1.00

Table 2. Bank Distress Indicators and Future Failure

The table explores the ability of our indicators of bank financial distress to predict bank failure. Bank failure is defined using the FDIC failed bank list. The data is a panel at the bank-quarter level. In Panel A, bank distress is proxied by *Low equity capital ratio*, an indicator for whether the bank's *Equity capital ratio* is in the bottom decile of the distribution of the *Equity capital ratio*. In Panel B, bank distressed is proxied by *Low Z-score*, an indicator for whether the bank's *Z-score* is in the bottom decile of the distribution of the *Z-score*. In Panel C, *Financial distress* is an indicator for whether the bank's *Equity capital ratio* is in the bottom decile of the distribution of the *Equity capital ratio* and *Z-score* is at the bottom decile of the distribution of *Z-score*. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Distress Measured by *Low Equity Capital Ratio*

Sample period:	1985-1994			2005-2014		
Dependent variable:	Failure within…			Failure within…		
	4 quarters	8 quarters	12 quarters	4 quarters	8 quarters	12 quarters
	(1)	(2)	(3)	(4)	(5)	(6)
Low equity capital ratio (q-1)	0.034***	0.074***	0.087***	0.034***	0.056***	0.063***
	(26.36)	(27.55)	(25.63)	(18.29)	(16.84)	(15.34)
Log assets (q-1)	-0.002***	-0.005***	-0.006***	0.000	0.001*	0.002**
	(-12.70)	(-11.85)	(-10.07)	(1.09)	(1.68)	(2.03)
Assets > $50bn (q-1)	-0.003***	-0.006***	-0.008***	0.009*	0.012	0.015
	(-3.96)	(-3.38)	(-3.04)	(1.86)	(1.25)	(1.04)
Part of MHC (q-1)	-0.002***	-0.005***	-0.007***	-0.002***	-0.006***	-0.009***
	(-5.21)	(-6.15)	(-5.32)	(-3.94)	(-4.43)	(-4.87)
Deposits/Liabilities (%) (q-1)	0.000***	0.000***	0.000***	0.000	-0.000	-0.000
	(2.87)	(5.57)	(6.08)	(0.42)	(-0.81)	(-1.08)
Loans/Assets (%) (q-1)	0.000***	0.001***	0.001***	0.000***	0.000***	0.000***
	(13.57)	(18.62)	(20.83)	(5.37)	(7.62)	(8.21)
Core deposit ratio (%) (q-1)	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***	-0.001***
	(-7.51)	(-10.87)	(-12.20)	(-3.15)	(-3.48)	(-4.94)
Metro location (q-1)	0.000	0.002**	0.003***	0.001***	0.004***	0.006***
	(0.85)	(2.11)	(2.82)	(3.21)	(3.70)	(4.03)
De novo bank (q-1)	-0.000	0.006**	0.014***	-0.001	0.002	0.005
	(-0.20)	(2.49)	(3.72)	(-0.59)	(0.45)	(1.04)
Log state per-capita income (q-1)	0.015*	0.125***	0.372***	-0.002	0.026**	0.090***
	(1.65)	(5.80)	(12.13)	(-0.24)	(1.98)	(4.85)
State unemployment rate (q-1)	0.003***	0.009***	0.013***	0.003***	0.004***	0.002**
	(13.39)	(16.32)	(17.27)	(7.15)	(5.34)	(2.18)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486829	486829	486829	260058	260058	260058
R^2	0.033	0.077	0.105	0.038	0.058	0.068

Table 2. Bank Distress Variables and Future Failure (Cont.)

Panel B: Distress Measured by *Low Z-score*

Sample period:	1985-1994			2005-2014		
Dependent variable:	Failure within…			Failure within…		
	4 quarters	8 quarters	12 quarters	4 quarters	8 quarters	12 quarters
	(1)	(2)	(3)	(4)	(5)	(6)
Low Z-score (q-1)	0.035***	0.078***	0.094***	0.036***	0.065***	0.076***
	(27.90)	(29.68)	(28.41)	(19.46)	(18.72)	(17.54)
Log assets (q-1)	-0.000***	-0.001**	-0.001**	0.001***	0.002***	0.003***
	(-2.68)	(-2.32)	(-2.32)	(3.57)	(3.67)	(3.55)
Assets > $50bn (q-1)	-0.003***	-0.007***	-0.009***	0.006	0.007	0.009
	(-5.61)	(-4.70)	(-4.04)	(1.23)	(0.71)	(0.62)
Part of MHC (q-1)	-0.001	-0.002***	-0.004***	-0.001***	-0.004***	-0.008***
	(-1.47)	(-2.82)	(-2.70)	(-2.83)	(-3.62)	(-4.27)
Deposits/Liabilities (%) (q-1)	0.000**	0.000***	0.000***	-0.000	-0.000*	-0.000*
	(2.21)	(4.92)	(5.53)	(-1.00)	(-1.78)	(-1.82)
Loans/Assets (%) (q-1)	0.000***	0.001***	0.001***	0.000**	0.000***	0.000***
	(12.55)	(17.78)	(20.14)	(2.03)	(5.09)	(6.32)
Core deposit ratio (%) (q-1)	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***	-0.000***
	(-7.71)	(-11.08)	(-12.38)	(-2.79)	(-3.20)	(-4.73)
Metro location (q-1)	0.001**	0.003***	0.004***	0.001**	0.003***	0.005***
	(2.35)	(3.47)	(3.87)	(2.17)	(2.67)	(3.22)
De novo bank (q-1)	-0.001	0.005**	0.012***	-0.002	-0.001	0.003
	(-0.80)	(2.02)	(3.39)	(-1.63)	(-0.23)	(0.59)
Log state per-capita income (q-1)	-0.010	0.072***	0.310***	0.009	0.046***	0.113***
	(-1.09)	(3.38)	(10.24)	(1.42)	(3.55)	(6.13)
State unemployment rate (q-1)	0.002***	0.006***	0.010***	0.002***	0.002***	0.000
	(8.41)	(11.68)	(13.15)	(4.97)	(3.18)	(0.24)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486426	486426	486426	259758	259758	259758
R^2	0.034	0.082	0.111	0.039	0.065	0.076

Table 2. Bank Distress Variables and Future Failure (Cont.)

Panel C: Distress Measured by *Financial Distress*

Sample period:	1985-1994			2005-2014		
Dependent variable:	Failure within…			Failure within…		
	4 quarters	8 quarters	12 quarters	4 quarters	8 quarters	12 quarters
	(1)	(2)	(3)	(4)	(5)	(6)
Financial distress (q-1)	0.073***	0.154***	0.178***	0.108***	0.174***	0.193***
	(26.61)	(28.60)	(27.60)	(18.95)	(18.21)	(17.44)
Log assets (q-1)	-0.001***	-0.002***	-0.003***	0.001***	0.002***	0.003***
	(-6.66)	(-6.20)	(-5.51)	(3.16)	(3.23)	(3.16)
Assets > $50bn (q-1)	-0.002***	-0.004**	-0.005**	0.008	0.010	0.012
	(-3.12)	(-2.53)	(-2.25)	(1.64)	(1.05)	(0.89)
Part of MHC (q-1)	-0.001*	-0.003***	-0.004***	-0.001	-0.003***	-0.007***
	(-1.74)	(-3.17)	(-3.02)	(-1.56)	(-2.89)	(-3.80)
Deposits/Liabilities (%) (q-1)	0.000	0.000***	0.000***	-0.000	-0.000	-0.000*
	(1.31)	(4.05)	(4.78)	(-0.57)	(-1.55)	(-1.67)
Loans/Assets (%) (q-1)	0.000***	0.001***	0.001***	0.000*	0.000***	0.000***
	(11.00)	(16.90)	(19.73)	(1.83)	(5.30)	(6.58)
Core deposit ratio (%) (q-1)	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***	-0.001***
	(-7.97)	(-11.46)	(-12.74)	(-3.42)	(-3.73)	(-5.18)
Metro location (q-1)	0.000	0.002***	0.004***	0.000	0.002**	0.004***
	(1.32)	(2.69)	(3.32)	(0.68)	(2.06)	(2.94)
De novo bank (q-1)	-0.000	0.005**	0.013***	0.000	0.003	0.007
	(-0.47)	(2.32)	(3.62)	(0.18)	(0.96)	(1.44)
Log state per-capita income (q-1)	0.004	0.101***	0.343***	0.018***	0.057***	0.125***
	(0.42)	(4.83)	(11.49)	(2.80)	(4.56)	(6.87)
State unemployment rate (q-1)	0.002***	0.007***	0.010***	0.001***	0.002***	-0.000
	(9.21)	(12.72)	(14.23)	(3.92)	(2.68)	(-0.14)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486426	486426	486426	259758	259758	259758
R^2	0.055	0.112	0.134	0.090	0.113	0.110

Table 3. Do Distressed Banks Deleverage?

The table explores whether distressed banks deleverage. The dependent variable is the change in *Equity capital ratio* over the four quarters following the distress quarter. The data is a panel at the bank-quarter level. *Financial distress* denotes a bank that is both in the bottom decile of the distribution of the *Equity capital ratio* and in the bottom decile of the *Z-score* distribution. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Dependent variable:	Change in equity capital ratio (%) (q, q+4)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Financial distress (q-1)	0.818***	0.870***	0.798***	0.819***	0.798***	0.819***
	(6.70)	(7.37)	(13.98)	(16.40)	(13.99)	(16.41)
× Crisis (q-1)	-0.185	-0.190	-0.507***	-0.494***	-0.525***	-0.512***
	(-1.16)	(-1.23)	(-4.47)	(-4.15)	(-4.74)	(-4.45)
× TARP (q-1)					0.518***	0.546***
					(3.87)	(3.97)
Change in equity capital ratio (%) (q-4, q)		0.046***		0.026		0.026
		(4.27)		(1.51)		(1.51)
Log assets (q-1)	0.101***	0.094***	0.075***	0.066***	0.075***	0.066***
	(9.30)	(9.37)	(4.27)	(4.46)	(4.27)	(4.43)
Assets > $50bn (q-1)	-0.028	-0.030	-0.171	-0.159	-0.173*	-0.161
	(-0.25)	(-0.27)	(-1.69)	(-1.59)	(-1.72)	(-1.61)
Part of MHC (q-1)	-0.063***	-0.060***	0.027	0.027	0.027	0.027
	(-3.28)	(-3.13)	(1.06)	(1.09)	(1.06)	(1.09)
Deposits/Liabilities (%) (q-1)	-0.007*	-0.007*	-0.005*	-0.005*	-0.004*	-0.005*
	(-2.00)	(-2.02)	(-1.77)	(-1.93)	(-1.77)	(-1.93)
Loans/Assets (%) (q-1)	-0.008***	-0.009***	-0.001	-0.002	-0.001	-0.002
	(-4.65)	(-4.82)	(-0.54)	(-0.70)	(-0.53)	(-0.69)
Core deposit ratio (%) (q-1)	0.006***	0.005***	0.002**	0.002	0.002**	0.002
	(4.99)	(4.13)	(2.31)	(1.60)	(2.32)	(1.60)
Metro location (q-1)	-0.069***	-0.062***	-0.048	-0.041	-0.048	-0.041
	(-6.07)	(-5.63)	(-1.38)	(-1.22)	(-1.37)	(-1.22)
De novo bank (q-1)	-0.910***	-0.774***	-1.354***	-1.113***	-1.354***	-1.113***
	(-27.37)	(-27.84)	(-5.17)	(-5.50)	(-5.17)	(-5.51)
TARP (q-1)					-0.006	-0.031
					(-0.18)	(-0.90)
Log state per-capita income (q-1)	-1.528**	-1.461**	0.834	0.877	0.832	0.879
	(-2.29)	(-2.25)	(1.18)	(1.28)	(1.18)	(1.28)
State unemployment rate (q-1)	-0.068***	-0.068***	-0.002	-0.004	-0.002	-0.003
	(-4.55)	(-4.73)	(-0.05)	(-0.09)	(-0.05)	(-0.09)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	468728	468395	251668	251275	251668	251275
R^2	0.081	0.083	0.064	0.058	0.064	0.059

Table 4. How Do Distressed Banks Deleverage?

The table explores how balance sheet items evolved for distressed banks in the four quarters following distress quarters. The data is a panel at the bank-quarter level. Panels A and B show the quarter-on-quarter changes in equity components for distressed banks and non-distressed banks for the 1985-1994 and 2005-2014 periods, respectively. Panel C presents regressions for the period of 1985-1994. Panel D presents regressions for the period of 2005-2014. Panel E presents regressions for the period of 2005-2014, with TARP interaction. The dependent variables are different balance sheet items. *Financial distress* denotes a bank that is both in the bottom decile of the distribution of the *Equity capital ratio* and in the bottom decile of the *Z-score* distribution. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Quarterly Changes in Equity Accounts: 1985-1994

	Distressed banks (N = 18752)					Non-distressed banks (N = 452503)				
Variable	Mean	St Dev	p10	p50	p90	Mean	St Dev	p10	p50	p90
Change in equity (q,q+1)/Equity (q)	0.162	3.288	-0.247	0.012	0.226	0.021	0.434	-0.029	0.020	0.050
Net income (q+1)/Equity (q)	-0.072	0.832	-0.318	0.000	0.095	0.024	0.061	-0.002	0.030	0.054
Dividends (q+1)/Equity (q)	0.003	0.050	0.000	0.000	0.000	0.013	0.040	0.000	0.000	0.036
Change in common & pref stock (q,q+1)/Equity (q)	0.040	1.256	0.000	0.000	0.000	0.002	0.120	0.000	0.000	0.000
Other changes in equity (q,q+1)/Equity (q)	0.197	3.351	-0.002	0.000	0.151	0.008	0.348	-0.005	0.000	0.003

Panel B: Quarterly Changes in Equity Accounts: 2005-2014

	Distressed banks (N = 7478)					Non-distressed banks (N = 250822)				
Variable	Mean	St Dev	p10	p50	p90	Mean	St Dev	p10	p50	p90
Change in equity (q,q+1)/Equity (q)	0.019	0.657	-0.229	-0.011	0.137	0.019	0.206	-0.030	0.014	0.052
Net income (q+1)/Equity (q)	-0.071	0.201	-0.261	-0.025	0.045	0.019	0.042	-0.003	0.022	0.047
Dividends (q+1)/Equity (q)	0.002	0.016	0.000	0.000	0.000	0.013	0.027	0.000	0.001	0.035
Accounting corrections (q+1)/Equity (q)	0.000	0.031	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000
Other comprehansive income (q+1)/Equity (q)	0.004	0.068	-0.031	0.000	0.038	0.000	0.023	-0.018	0.000	0.020
BHC transactions (q+1)/Equity (q)	0.045	0.359	0.000	0.000	0.059	0.004	0.049	0.000	0.000	0.000
Net stock change (q+1)/Equity (q)	0.030	0.341	0.000	0.000	0.001	0.003	0.109	0.000	0.000	0.000
Treasury transactions (q+1)/Equity (q)	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000
Change due to mergers (q+1)/Equity (q)	0.008	0.355	0.000	0.000	0.000	0.005	0.153	0.000	0.000	0.000

Table 4. How Do Distressed Banks Deleverage? (Cont.)

Panel C: 1985-1994

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial distress (q-1)	-0.082***	-0.087***	-0.066***	-0.035***	-0.070***	-0.094***	-0.026***	-0.092***	-0.192***	0.017*	-0.261***
	(-15.98)	(-14.56)	(-8.95)	(-8.00)	(-20.19)	(-13.76)	(-6.86)	(-13.19)	(-7.15)	(1.81)	(-14.20)
× Crisis (q-1)	0.001	-0.008	-0.002	0.000	0.005	0.007	-0.006	0.007	0.026	-0.009	-0.069
	(0.09)	(-0.62)	(-0.19)	(0.09)	(0.73)	(0.77)	(-0.67)	(0.75)	(0.78)	(-0.96)	(-1.47)
Lagged dependent variable (q-4,q)	0.124***	0.156***	0.032***	0.002	0.000	0.119***	-0.166***	0.107***	-0.228***	-0.045***	-0.374***
	(17.75)	(18.17)	(7.45)	(0.64)	(0.05)	(18.96)	(-9.05)	(10.91)	(-14.56)	(-6.35)	(-75.48)
Log assets (q-1)	-0.007***	-0.005***	-0.000	0.005***	-0.004***	-0.006***	-0.001	-0.011***	0.031***	0.001	0.021
	(-10.75)	(-5.25)	(-0.18)	(9.23)	(-4.65)	(-8.30)	(-0.64)	(-7.73)	(5.82)	(1.31)	(0.95)
Assets > $50bn (q-1)	-0.001	-0.001	-0.026***	-0.017*	-0.023**	-0.007	0.009	-0.029***	0.070	0.018	0.131
	(-0.11)	(-0.13)	(-3.54)	(-1.97)	(-2.41)	(-0.70)	(0.35)	(-3.05)	(1.54)	(1.18)	(0.59)
Part of MHC (q-1)	0.015***	0.019***	0.006***	0.015***	-0.004	0.013***	0.007***	0.010***	0.051***	0.008***	-0.014
	(11.09)	(9.63)	(3.22)	(6.51)	(-1.19)	(8.38)	(3.97)	(7.07)	(7.57)	(3.03)	(-0.49)
Deposits/Liabilities (%) (q-1)	0.000	0.000	0.000	0.000	-0.000	0.001	0.001	-0.002***	0.015***	-0.000	0.000
	(0.83)	(0.01)	(0.72)	(0.09)	(-1.34)	(1.54)	(0.72)	(-5.33)	(14.23)	(-1.64)	(0.21)
Loans/Assets (%) (q-1)	0.001***	-0.001***	0.000***	0.000***	0.000***	0.001***	0.000***	0.001***	-0.000	0.000	-0.003***
	(4.82)	(-21.74)	(4.12)	(4.44)	(4.14)	(5.96)	(3.05)	(6.62)	(-0.08)	(0.70)	(-4.16)
Core deposit ratio (%) (q-1)	0.000***	0.000	-0.000**	-0.000**	-0.000**	0.000***	-0.001*	0.001***	-0.002***	0.000	0.004***
	(2.94)	(1.03)	(-2.60)	(-2.24)	(-2.68)	(2.86)	(-1.89)	(6.12)	(-9.34)	(0.85)	(4.18)
Metro location (q-1)	0.016***	0.019***	0.012***	0.010***	0.009***	0.015***	-0.000	0.016***	0.028***	0.003	-0.010
	(8.93)	(5.89)	(4.70)	(11.87)	(7.91)	(8.51)	(-0.00)	(9.92)	(5.44)	(1.70)	(-0.82)
De novo bank (q-1)	0.053***	0.057***	0.028***	0.035***	0.077***	0.061***	-0.010**	0.063***	0.197***	-0.001	0.232***
	(16.71)	(14.03)	(3.79)	(7.62)	(30.78)	(18.72)	(-2.40)	(14.65)	(20.79)	(-0.43)	(9.68)
Log deposit rate (q-1)								0.007			
								(1.19)			
Charge-off rate (q+4)	-0.001***	-0.002***									
	(-7.59)	(-3.60)									
Log state per-capita income (q-1)	-0.352***	-0.499***	-0.384***	-0.240***	-0.428***	-0.335***	-0.076	-0.319***	-0.815***	0.043	-1.940***
	(-3.35)	(-3.35)	(-4.17)	(-3.80)	(-3.59)	(-3.22)	(-0.83)	(-3.02)	(-4.78)	(0.92)	(-3.15)
State unemployment rate (q-1)	-0.014***	-0.028***	-0.018***	-0.005***	-0.012***	-0.014***	-0.006***	-0.013***	-0.033***	-0.004***	-0.050**
	(-9.46)	(-9.96)	(-7.86)	(-4.70)	(-8.16)	(-8.68)	(-2.94)	(-9.91)	(-5.98)	(-4.22)	(-2.42)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	470055	469992	468419	469893	469956	470133	454183	469335	468385	469962	464286
R^2	0.078	0.107	0.012	0.017	0.028	0.063	0.591	0.064	0.104	0.012	0.136

Table 4. How Do Distressed Banks Deleverage? (Cont.)

Panel D: 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial distress (q-1)	-0.077***	-0.078***	-0.073***	-0.050***	-0.056***	-0.095***	-0.027***	-0.093***	-0.209***	0.027*	-0.302***
	(-15.31)	(-12.04)	(-5.44)	(-8.44)	(-19.89)	(-17.35)	(-2.88)	(-19.09)	(-12.96)	(1.82)	(-4.55)
× Crisis (q-1)	-0.035***	-0.016**	-0.006	-0.008	-0.018***	-0.033***	-0.007	-0.034***	-0.030	-0.031**	-0.130
	(-4.50)	(-2.60)	(-0.49)	(-1.41)	(-4.10)	(-4.15)	(-0.57)	(-4.81)	(-1.44)	(-2.09)	(-1.28)
Lagged dependent variable (q-4,q)	0.178***	0.200***	0.068***	0.013***	0.031***	0.173***	0.054*	0.139***	-0.194***	-0.037***	-0.364***
	(23.08)	(13.64)	(8.90)	(3.08)	(3.44)	(23.78)	(1.81)	(9.49)	(-16.38)	(-3.77)	(-28.59)
Log assets (q-1)	-0.002	0.003*	0.001	0.003***	0.003***	-0.002	-0.005**	-0.007***	0.026***	-0.001	-0.001
	(-1.40)	(1.88)	(0.33)	(4.18)	(3.27)	(-1.42)	(-2.22)	(-3.06)	(3.77)	(-0.92)	(-0.01)
Assets > $50bn (q-1)	0.007	-0.012	-0.005	-0.045***	-0.025**	0.007	-0.095**	0.054	0.015	-0.008	-0.112
	(0.45)	(-0.78)	(-0.22)	(-3.54)	(-2.12)	(0.47)	(-2.28)	(1.58)	(0.26)	(-0.57)	(-0.35)
Part of MHC (q-1)	0.018***	0.017***	0.024***	0.022***	0.015***	0.016***	-0.006	0.014***	0.012	0.009***	-0.014
	(10.94)	(7.28)	(11.96)	(11.45)	(13.81)	(9.19)	(-0.94)	(7.53)	(1.46)	(2.81)	(-0.44)
Deposits/Liabilities (%) (q-1)	0.000	0.000	-0.000**	-0.000	-0.000	0.000*	0.003***	-0.003***	0.014***	0.000	0.002**
	(1.08)	(0.85)	(-2.27)	(-1.41)	(-1.15)	(1.83)	(4.03)	(-5.91)	(12.84)	(1.08)	(2.34)
Loans/Assets (%) (q-1)	0.001***	-0.001***	0.000***	0.000***	0.000***	0.001***	0.001**	0.001***	0.000	0.000**	0.001
	(4.79)	(-3.90)	(3.08)	(3.45)	(3.67)	(4.72)	(2.67)	(3.33)	(0.23)	(2.71)	(0.56)
Core deposit ratio (%) (q-1)	-0.000	-0.000***	-0.001***	-0.000***	-0.000***	-0.000	-0.000	0.000	-0.002***	0.000	-0.002
	(-0.95)	(-3.57)	(-2.75)	(-4.01)	(-3.39)	(-0.04)	(-1.12)	(0.14)	(-6.17)	(0.35)	(-1.30)
Metro location (q-1)	0.002	0.007***	0.003	0.002	0.002*	0.001	-0.000	-0.001	0.017	-0.001	-0.017
	(1.04)	(2.96)	(1.08)	(1.35)	(1.85)	(0.56)	(-0.04)	(-0.47)	(1.54)	(-0.94)	(-1.06)
De novo bank (q-1)	0.080***	0.087***	0.040***	0.073***	0.086***	0.087***	-0.009	0.095***	0.429***	0.015***	0.344***
	(9.51)	(7.97)	(3.84)	(7.84)	(7.82)	(8.75)	(-0.86)	(11.85)	(7.27)	(3.00)	(3.34)
Log deposit rate (q-1)								0.009			
								(0.87)			
Charge-off rate (q+4)	-0.011***	-0.024***									
	(-2.86)	(-4.58)									
Log state per-capita income (q-1)	-0.034	0.042	0.089***	-0.001	-0.007	-0.044	0.112**	-0.054	0.439***	-0.031	-1.122*
	(-0.94)	(1.19)	(2.92)	(-0.09)	(-0.23)	(-1.27)	(2.18)	(-1.19)	(2.89)	(-0.70)	(-1.85)
State unemployment rate (q-1)	-0.007***	-0.006***	-0.010***	-0.007***	-0.003*	-0.008***	-0.008***	-0.006***	-0.038***	-0.002***	-0.058***
	(-4.32)	(-4.83)	(-9.07)	(-6.72)	(-1.73)	(-5.12)	(-2.76)	(-3.24)	(-5.67)	(-3.08)	(-3.99)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	251854	251829	250951	251548	251782	251885	250166	251486	251833	249568	250402
R^2	0.149	0.197	0.026	0.036	0.041	0.127	0.603	0.105	0.108	0.004	0.140

Table 4. How Do Distressed Banks Deleverage? (Cont.)

Panel E: 2005-2014, with TARP Interaction

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial distress (q-1)	-0.077***	-0.078***	-0.073***	-0.050***	-0.056***	-0.095***	-0.027***	-0.093***	-0.209***	0.027*	-0.302***
	(-15.33)	(-12.04)	(-5.44)	(-8.44)	(-19.85)	(-17.35)	(-2.89)	(-19.10)	(-12.99)	(1.81)	(-4.54)
× Crisis	-0.035***	-0.017**	-0.007	-0.008	-0.017***	-0.033***	-0.009	-0.034***	-0.039**	-0.032**	-0.139
	(-4.51)	(-2.60)	(-0.57)	(-1.43)	(-4.07)	(-4.17)	(-0.75)	(-4.82)	(-2.10)	(-2.17)	(-1.38)
× TARP	-0.002	0.006	0.027*	0.001	-0.010	-0.009	0.072***	-0.030**	0.226***	0.023**	0.160
	(-0.17)	(0.34)	(1.82)	(0.25)	(-1.26)	(-0.63)	(3.22)	(-2.18)	(7.56)	(2.43)	(0.64)
Lagged dependent variable (q-4,q)	0.178***	0.200***	0.068***	0.013***	0.031***	0.173***	0.054*	0.139***	-0.194***	-0.037***	-0.364***
	(23.05)	(13.64)	(8.90)	(3.08)	(3.44)	(23.77)	(1.80)	(9.52)	(-16.45)	(-3.78)	(-28.66)
Log assets (q-1)	-0.002	0.003*	0.001	0.003***	0.003***	-0.002	-0.005**	-0.007***	0.026***	-0.001	0.001
	(-1.33)	(1.94)	(0.34)	(4.14)	(3.14)	(-1.37)	(-2.14)	(-3.06)	(3.79)	(-0.90)	(0.02)
Assets > $50bn (q-1)	0.007	-0.012	-0.005	-0.045***	-0.025**	0.008	-0.095**	0.055	0.015	-0.008	-0.106
	(0.48)	(-0.77)	(-0.22)	(-3.55)	(-2.15)	(0.50)	(-2.27)	(1.58)	(0.27)	(-0.58)	(-0.33)
Part of MHC (q-1)	0.018***	0.017***	0.024***	0.022***	0.015***	0.016***	-0.006	0.014***	0.012	0.009***	-0.013
	(11.03)	(7.37)	(12.00)	(11.49)	(13.91)	(9.38)	(-0.92)	(7.52)	(1.50)	(2.82)	(-0.38)
Deposits/Liabilities (%) (q-1)	0.000	0.000	-0.000**	-0.000	-0.000	0.000*	0.003***	-0.003***	0.014***	0.000	0.002**
	(1.07)	(0.85)	(-2.27)	(-1.41)	(-1.15)	(1.83)	(4.01)	(-5.91)	(12.81)	(1.08)	(2.33)
Loans/Assets (%) (q-1)	0.001***	-0.001***	0.000***	0.000***	0.000***	0.001***	0.001**	0.001***	0.000	0.000**	0.001
	(4.81)	(-3.90)	(3.08)	(3.45)	(3.65)	(4.74)	(2.69)	(3.34)	(0.24)	(2.72)	(0.58)
Core deposit ratio (%) (q-1)	-0.000	-0.000***	-0.001***	-0.000***	-0.000***	-0.000	-0.000	0.000	-0.002***	0.000	-0.002
	(-0.95)	(-3.58)	(-2.75)	(-4.01)	(-3.38)	(-0.05)	(-1.12)	(0.14)	(-6.20)	(0.35)	(-1.31)
Metro location (q-1)	0.002	0.007***	0.003	0.002	0.002*	0.001	-0.000	-0.001	0.017	-0.001	-0.016
	(1.08)	(2.99)	(1.08)	(1.34)	(1.83)	(0.60)	(-0.01)	(-0.45)	(1.57)	(-0.92)	(-1.00)
De novo bank (q-1)	0.080***	0.087***	0.040***	0.073***	0.086***	0.087***	-0.009	0.095***	0.429***	0.015***	0.344***
	(9.49)	(7.97)	(3.84)	(7.84)	(7.83)	(8.74)	(-0.86)	(11.84)	(7.26)	(3.00)	(3.35)
TARP (q-1)	-0.017***	-0.009*	-0.003	0.000	0.008***	-0.017***	-0.022**	-0.012*	-0.063***	-0.003	-0.234**
	(-4.02)	(-2.03)	(-0.73)	(0.32)	(3.42)	(-4.45)	(-2.61)	(-1.93)	(-4.63)	(-0.61)	(-2.13)
Log deposit rate (q-1)								0.010			
								(0.87)			
Charge-off rate (q+4)	-0.011***	-0.024***									
	(-2.86)	(-4.58)									
Log state per-capita income (q-1)	-0.032	0.043	0.089***	-0.001	-0.008	-0.042	0.114**	-0.053	0.444***	-0.031	-1.098*
	(-0.90)	(1.22)	(2.92)	(-0.09)	(-0.26)	(-1.22)	(2.21)	(-1.16)	(2.90)	(-0.70)	(-1.82)
State unemployment rate (q-1)	-0.007***	-0.006***	-0.010***	-0.007***	-0.003*	-0.008***	-0.008***	-0.006***	-0.037***	-0.002***	-0.056***
	(-4.19)	(-4.78)	(-9.03)	(-6.75)	(-1.78)	(-4.97)	(-2.74)	(-3.21)	(-5.59)	(-2.98)	(-4.01)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	251854	251829	250951	251548	251782	251885	250166	251486	251833	249568	250402
R^2	0.149	0.197	0.027	0.037	0.042	0.127	0.603	0.105	0.108	0.005	0.141

Table 5. Risk Taking by Distressed Banks

The table explores how banks' risk profiles change following distress quarters. The data is a panel at the bank-quarter level. The dependent variables are measures of risk: *log Z-score*, performing loans ratio, earnings volatility, and risk-weighted-assets ratio. *Financial distress* denotes a bank that is both in the bottom decile of the distribution of the *Equity capital ratio* and in the bottom decile of the *Z-score* distribution. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Sample period:	1985-1994			2005-2014				2005-2014			
Dependent variable:	Change in… (q, q+4)			Change in… (q, q+4)				Change in… (q, q+4)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial distress (q-1)	0.839***	0.504***	-0.329***	0.841***	0.242	-0.236***	-7.061***	0.841***	0.242	-0.236***	-7.065***
	(15.93)	(6.45)	(-38.80)	(13.75)	(0.92)	(-10.90)	(-8.87)	(13.74)	(0.92)	(-10.88)	(-8.87)
× Crisis (q-1)	0.086	-0.045	-0.013	-0.349***	-0.298	-0.090***	-2.624***	-0.359***	-0.281	-0.076***	-2.718***
	(1.16)	(-0.71)	(-0.75)	(-4.62)	(-0.90)	(-3.44)	(-3.67)	(-4.67)	(-0.86)	(-2.91)	(-3.82)
× TARP (q-1)								0.363**	-0.557*	-0.449***	1.667
								(2.44)	(-1.98)	(-5.58)	(1.28)
Log assets (q-1)	-0.016**	-0.008	0.006***	-0.002	-0.030	0.002	0.048	-0.003	-0.029	0.003	0.067
	(-2.30)	(-1.38)	(3.71)	(-0.14)	(-1.21)	(0.84)	(0.18)	(-0.20)	(-1.15)	(1.03)	(0.26)
Assets > $50bn (q-1)	0.112***	0.153***	-0.029**	0.109	0.281*	-0.015	-2.162	0.103	0.288*	-0.011	-2.081
	(2.88)	(3.90)	(-2.47)	(1.10)	(1.97)	(-0.34)	(-1.15)	(1.08)	(2.00)	(-0.27)	(-1.08)
Part of MHC (q-1)	0.008	0.017	-0.008*	0.013	0.010	-0.002	2.796***	0.012	0.011	-0.002	2.816***
	(0.99)	(0.83)	(-1.76)	(1.33)	(1.06)	(-0.48)	(18.85)	(1.18)	(1.23)	(-0.38)	(18.49)
Deposits/Liabilities (%) (q-1)	0.001	-0.001**	-0.000	0.003**	0.002***	-0.001*	-0.016	0.003**	0.002***	-0.001*	-0.017
	(1.31)	(-2.51)	(-0.93)	(2.65)	(2.95)	(-1.81)	(-0.98)	(2.69)	(2.90)	(-1.86)	(-1.02)
Loans/Assets (%) (q-1)	-0.005***	-0.005***	0.002***	-0.002*	-0.005*	0.001**	0.044*	-0.002*	-0.005*	0.001**	0.044*
	(-4.91)	(-4.31)	(5.18)	(-1.93)	(-2.04)	(2.35)	(1.95)	(-1.93)	(-2.03)	(2.34)	(1.98)
Core deposit ratio (%) (q-1)	0.006***	0.011***	-0.002***	0.001**	0.005***	-0.000	-0.053***	0.001**	0.005***	-0.000	-0.053***
	(4.92)	(4.62)	(-2.76)	(2.13)	(7.40)	(-1.59)	(-3.50)	(2.16)	(7.39)	(-1.61)	(-3.53)
Metro location (q-1)	-0.019	-0.022	0.005	-0.023*	-0.031	0.009	0.632**	-0.024*	-0.030	0.009	0.642**
	(-1.57)	(-0.90)	(1.25)	(-1.93)	(-0.82)	(1.69)	(2.27)	(-1.94)	(-0.81)	(1.69)	(2.34)
De novo bank (q-1)	-0.035**	-0.183***	0.010	0.054	-0.216***	-0.017	14.288***	0.054	-0.216***	-0.017	14.284***
	(-2.51)	(-9.11)	(1.42)	(0.97)	(-3.72)	(-1.62)	(11.06)	(0.98)	(-3.69)	(-1.61)	(11.04)
TARP (q-1)								0.151***	-0.163*	-0.058***	-2.981***
								(3.20)	(-1.97)	(-2.83)	(-5.94)
Log state per-capita income (q-1)	-1.644***	-4.226***	0.465***	-0.338	-2.720***	0.124	6.976*	-0.355	-2.701***	0.132	7.266**
	(-3.12)	(-3.51)	(3.24)	(-0.70)	(-3.05)	(1.03)	(1.98)	(-0.74)	(-3.03)	(1.09)	(2.05)
State unemployment rate (q-1)	-0.029***	-0.025	0.012***	0.004	-0.008	0.000	-0.984***	0.003	-0.007	0.001	-0.963***
	(-2.81)	(-0.98)	(3.67)	(0.21)	(-0.27)	(0.09)	(-6.44)	(0.15)	(-0.23)	(0.17)	(-6.03)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	468337	470142	470127	251607	251889	251881	248988	251607	252181	252173	249274
R^2	0.039	0.040	0.031	0.056	0.081	0.033	0.045	0.056	0.081	0.034	0.045

Table 6. Deleveraging by Public versus Private Banks

The table explores whether distressed banks deleverage, by whether the bank is publicly- or privately held. The dependent variable is the change in *Equity capital ratio* over the four quarters following the distress quarter. The data is a panel at the bank-quarter level. *Financial distress* denotes a bank that is both in the bottom decile of the distribution of the *Equity capital ratio* and in the bottom decile of the *Z-score* distribution. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Dependent variable:	Change in equity capital ratio (%) (q, q+4)											
Sample period:	1985-1994				2005-2014							
Bank type:	Private Banks		Public Banks		Private Banks				Public Banks			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Financial distress (q-1)	0.718***	0.814***	0.581***	0.586***	0.580***	0.628***	0.579***	0.628***	0.650***	0.628***	0.650***	0.627***
	(6.61)	(7.82)	(7.51)	(7.49)	(11.92)	(15.40)	(11.91)	(15.40)	(2.96)	(3.01)	(2.96)	(3.00)
× Crisis (q-1)	-0.170	-0.176	0.013	0.011	-0.541***	-0.507***	-0.550***	-0.517***	-0.524*	-0.542*	-0.601**	-0.620**
	(-1.18)	(-1.29)	(0.11)	(0.10)	(-5.09)	(-4.70)	(-5.21)	(-4.85)	(-1.94)	(-1.83)	(-2.21)	(-2.09)
× TARP (q-1)							0.423***	0.474***			0.637*	0.643*
							(5.03)	(5.53)			(1.92)	(1.95)
Change in equity capital ratio (%) (q-4, q)		0.076***		0.005		0.054***		0.054***		-0.015		-0.015
		(8.15)		(0.49)		(3.35)		(3.34)		(-0.76)		(-0.79)
Log assets (q-1)	0.124***	0.114***	0.055***	0.053***	0.083***	0.076***	0.083***	0.076***	0.062***	0.061***	0.060***	0.059***
	(12.80)	(12.65)	(3.65)	(3.53)	(5.15)	(5.38)	(5.13)	(5.34)	(3.71)	(3.57)	(3.61)	(3.45)
Assets > $50bn (q-1)	-0.351**	-0.369**	0.040	0.040	-0.361**	-0.345**	-0.363**	-0.347**	-0.128	-0.119	-0.134	-0.125
	(-2.27)	(-2.56)	(0.75)	(0.77)	(-2.44)	(-2.34)	(-2.44)	(-2.35)	(-1.43)	(-1.26)	(-1.54)	(-1.37)
Part of MHC (q-1)	-0.053***	-0.049***	0.045	0.046	0.048***	0.046***	0.048***	0.047***	0.107	0.107	0.105	0.105
	(-3.13)	(-2.89)	(1.09)	(1.12)	(2.99)	(2.89)	(2.97)	(2.86)	(1.32)	(1.31)	(1.30)	(1.29)
Deposits/Liabilities (%) (q-1)	-0.004**	-0.004**	-0.004	-0.004	-0.005*	-0.005*	-0.005*	-0.005*	-0.013***	-0.013***	-0.013***	-0.013***
	(-2.25)	(-2.59)	(-1.57)	(-1.67)	(-1.88)	(-1.96)	(-1.88)	(-1.96)	(-3.38)	(-3.29)	(-3.38)	(-3.30)
Loans/Assets (%) (q-1)	-0.009***	-0.009***	-0.002	-0.002*	-0.002	-0.002	-0.002	-0.002	-0.000	-0.000	-0.000	-0.000
	(-5.51)	(-5.71)	(-1.58)	(-1.74)	(-0.82)	(-1.00)	(-0.82)	(-1.00)	(-0.02)	(-0.05)	(-0.02)	(-0.05)
Core deposit ratio (%) (q-1)	0.007***	0.006***	0.007***	0.007***	0.001	0.001	0.001	0.001	0.004***	0.004***	0.004***	0.004***
	(4.99)	(3.90)	(4.70)	(4.47)	(1.35)	(0.77)	(1.34)	(0.74)	(3.21)	(3.30)	(3.21)	(3.31)
Metro location (q-1)	-0.060***	-0.053***	-0.095***	-0.093***	-0.048*	-0.043*	-0.048*	-0.043*	-0.074*	-0.073*	-0.074*	-0.073*
	(-7.25)	(-6.70)	(-4.30)	(-4.27)	(-1.83)	(-1.74)	(-1.82)	(-1.73)	(-1.95)	(-1.95)	(-1.92)	(-1.91)
De novo bank (q-1)	-0.824***	-0.663***	-0.379***	-0.367***	-1.106***	-0.895***	-1.106***	-0.894***	-0.998***	-0.950***	-0.988***	-0.940***
	(-27.95)	(-24.05)	(-4.80)	(-5.24)	(-6.49)	(-6.81)	(-6.49)	(-6.80)	(-4.46)	(-4.47)	(-4.34)	(-4.35)
TARP (q-1)							-0.077*	-0.118**			0.220***	0.221***
							(-1.89)	(-2.67)			(2.90)	(2.83)
Log state per-capita income (q-1)	-1.297**	-1.253**	-0.731	-0.718	0.653	0.705	0.656	0.710	0.206	0.175	0.107	0.075
	(-2.21)	(-2.19)	(-1.16)	(-1.18)	(1.22)	(1.37)	(1.23)	(1.39)	(0.13)	(0.11)	(0.07)	(0.05)
State unemployment rate (q-1)	-0.072***	-0.071***	-0.024	-0.023	-0.007	-0.006	-0.007	-0.006	-0.083*	-0.086*	-0.086*	-0.089*
	(-5.09)	(-5.27)	(-1.25)	(-1.24)	(-0.21)	(-0.20)	(-0.21)	(-0.18)	(-1.91)	(-2.00)	(-1.94)	(-2.02)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	408894	408592	59952	59921	230799	230435	230799	230435	20900	20871	20900	20871
R^2	0.117	0.122	0.065	0.065	0.089	0.086	0.089	0.087	0.086	0.083	0.088	0.084

Figure 1. Bank Failures over Time and Crisis Periods

The chart presents the number of bank failures over time (all bars). The yellow bars (with dark frame) represent the years we define as crisis years.

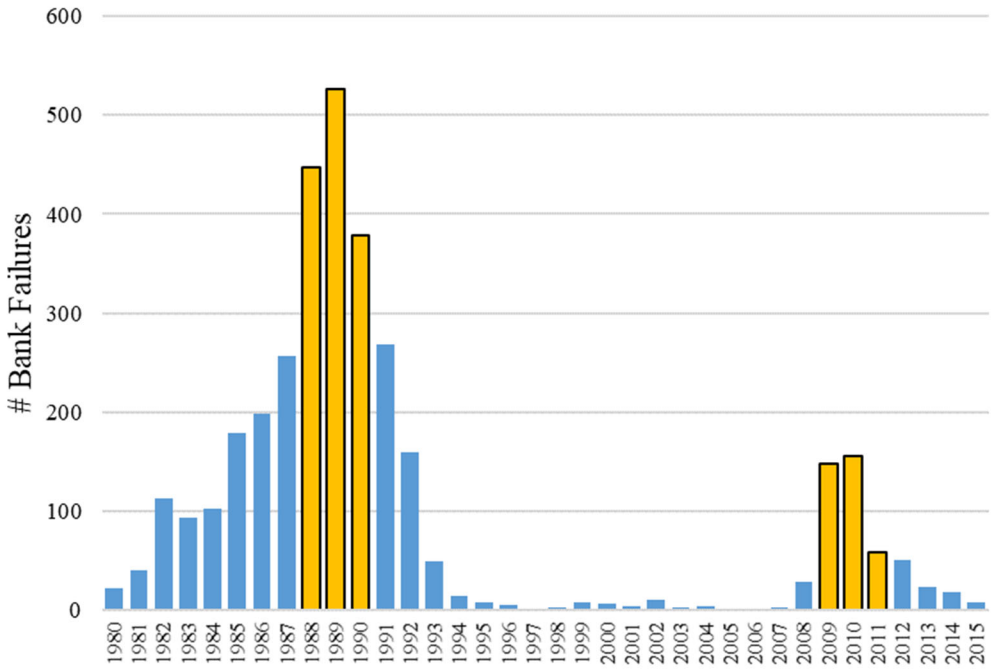


Figure 2. Distressed Banks over Time

The chart presents the fraction of distressed banks over time. Our indicators of financial distress are banks in the bottom decile of the *Equity capital ratio*, in the bottom decile of the *Z-score*, and banks that are in the bottom decile of both the *Equity capital ratio* and the *Z-score* (*Financial distress* indicator).

Figure 2a. Fraction of Distressed Banks, by Distress Measure (1985-1994)

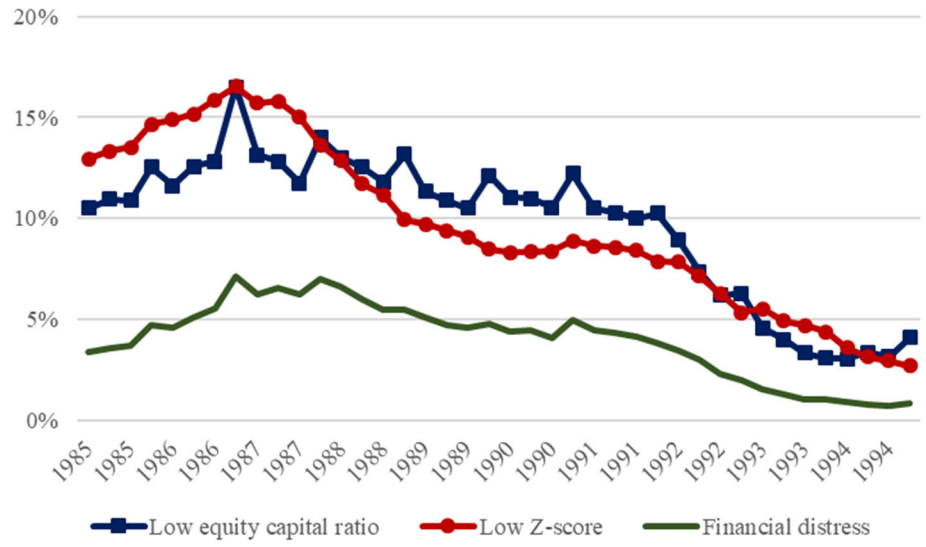


Figure 2b. Fraction of Distressed Banks, by Distress Measure (2005-2014)

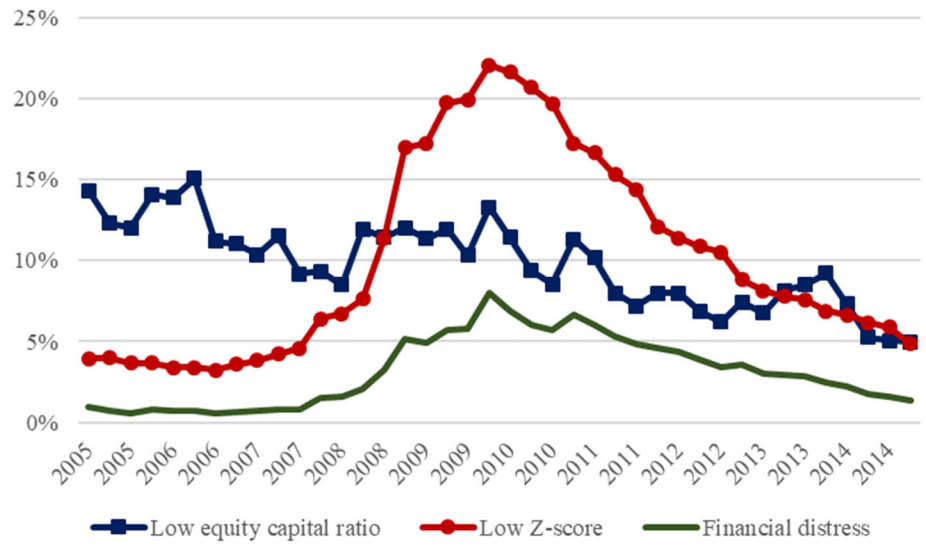


Figure 3. Deleveraging by Distressed Banks over Time

The chart presents the coefficients b_t from the regression:

$$\Delta Equity\ capital\ ratio\ (q, q+4)_{it} = a + b_t D_{it} * I(Year)_t + cX_{it} + Quarter\ FE_t + State\ FE_i + e_{it}$$

where D_{it} is a distress indicator (defined as bank-quarter in the bottom decile of equity capital ratio and in the bottom decile of Z-Score), and $I(Year)_t$ represents year dummies. X_{it} represents bank-quarter and state-quarter controls, including lagged $\Delta Equity\ capital\ ratio\ (q, q+4)_{it}$. In addition, there are quarter and state fixed effects. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. The dashed red line represents the passage of FDICIA (December 1991) in Figure 3a and Dodd-Frank Act (July 2010) in Figure 3b.

Figure 3a. Fraction of Distressed Banks, by Distress Measure (1985-1994)

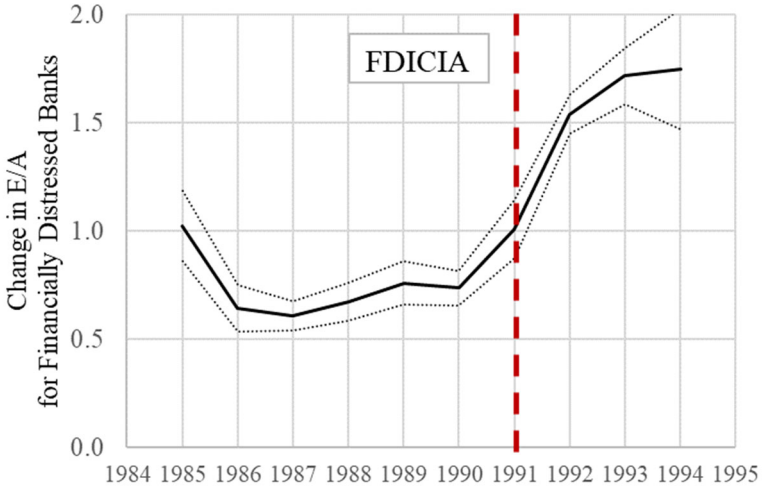
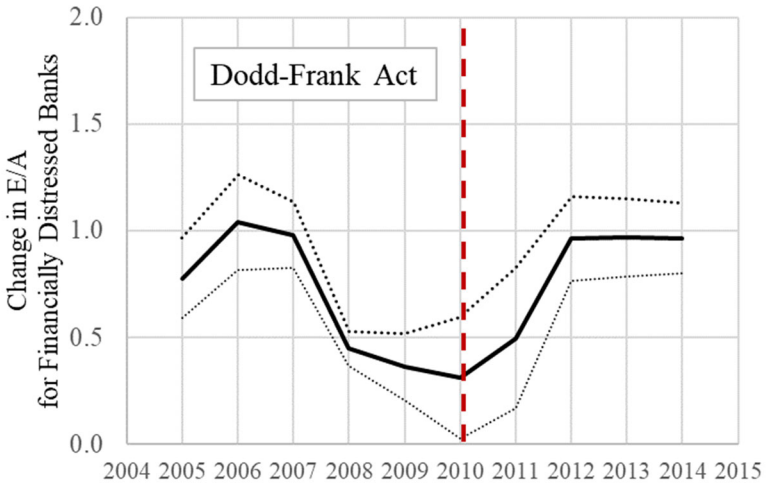


Figure 3b. Fraction of Distressed Banks, by Distress Measure (2005-2014)



Distressed Banks, Debt Overhang, and Regulation

Itzhak Ben-David, Ajay A. Palvia, and René M. Stulz*

Internet Appendix

Internet Appendix Table A1. Additional Specifications of Table 2

The table presents additional variations to the main analysis presented in Table 2: exploring the ability of measures of bank distress to predict bank failure. Bank failure is defined using the FDIC failed bank list. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Distress Measured as *Low Equity Capital Ratio*, with a *Crisis* Interaction

Sample period:	1985-1994			2005-2014		
Dependent variable:	Failure within…			Failure within…		
	4 quarters	8 quarters	12 quarters	4 quarters	8 quarters	12 quarters
	(1)	(2)	(3)	(4)	(5)	(6)
Low equity capital ratio (1st decile) (q-1)	0.032***	0.068***	0.081***	0.017***	0.029***	0.032***
	(20.79)	(23.04)	(22.45)	(11.25)	(10.88)	(9.29)
× Crisis (q-1)	0.007***	0.018***	0.017***	0.057***	0.091***	0.102***
	(2.86)	(3.87)	(3.03)	(11.64)	(11.60)	(11.58)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486829	486829	486829	260058	260058	260058
R^2	0.033	0.078	0.105	0.052	0.072	0.079

Panel B: Distress Measured as Low *Z-score*, with a *Crisis* Interaction

Sample period:	1985-1994			2005-2014		
Dependent variable:	Failure within…			Failure within…		
	4 quarters	8 quarters	12 quarters	4 quarters	8 quarters	12 quarters
	(1)	(2)	(3)	(4)	(5)	(6)
Low Z-score (1st decile) (q-1)	0.031***	0.068***	0.085***	0.028***	0.057***	0.068***
	(21.87)	(24.20)	(24.77)	(12.26)	(13.85)	(13.52)
× Crisis (q-1)	0.011***	0.032***	0.028***	0.015***	0.016***	0.017***
	(4.11)	(5.74)	(4.46)	(4.17)	(2.84)	(2.69)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486426	486426	486426	259758	259758	259758
R^2	0.034	0.083	0.112	0.040	0.066	0.076

Internet Appendix Table A1. Additional Specifications of Table 2 (Cont.)

Panel C: Distress Measured as *Financial Distress*, with a *Crisis* Interaction

Sample period:	1985-1994			2005-2014		
Dependent variable:	Failure within…			Failure within…		
	4 quarters	8 quarters	12 quarters	4 quarters	8 quarters	12 quarters
	(1)	(2)	(3)	(4)	(5)	(6)
Financial distress (q-1)	0.070***	0.143***	0.169***	0.084***	0.136***	0.149***
	(20.63)	(23.33)	(23.68)	(11.72)	(12.15)	(11.71)
× Crisis (q-1)	0.009	0.031***	0.025**	0.042***	0.066***	0.078***
	(1.63)	(3.20)	(2.33)	(4.15)	(4.41)	(4.83)
Bank-quarter and state-quarter contro	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486426	486426	486426	259758	259758	259758
R^2	0.055	0.112	0.135	0.093	0.116	0.113

Internet Appendix Table A2. Additional Specifications of Table 3

The table presents additional variations to the main analysis presented in Table 3: exploring whether distressed banks deleverage. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Distress Measured as *Low Equity Capital Ratio*, with *Crisis* Interaction

Dependent variable:	Change in equity capital ratio (%) (q, q+4)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Low equity capital ratio (q-1)	0.651***	0.676***	0.618***	0.615***	0.618***	0.615***
	(11.28)	(12.50)	(8.53)	(8.21)	(8.53)	(8.22)
× Crisis (q-1)	-0.068	-0.079	-0.157	-0.141	-0.173*	-0.159*
	(-0.84)	(-1.01)	(-1.51)	(-1.48)	(-1.73)	(-1.75)
× TARP (q-1)					0.477***	0.494***
					(4.78)	(5.14)
Change in equity capital ratio (%) (q-4, q)		0.043***		0.025		0.025
		(4.00)		(1.40)		(1.40)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	469080	468554	251954	251320	251668	251275
R^2	0.085	0.087	0.075	0.064	0.075	0.064

Panel B: Distress Measured as Low *Z-score*, with *Crisis* Interaction

Dependent variable:	Change in equity capital ratio (%) (q, q+4)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Low Z-score (q-1)	0.233**	0.254***	0.154	0.160*	0.155	0.160*
	(2.68)	(3.07)	(1.59)	(1.71)	(1.59)	(1.71)
× Crisis (q-1)	0.048	0.052	-0.005	-0.013	0.008	-0.002
	(0.43)	(0.48)	(-0.04)	(-0.11)	(0.07)	(-0.02)
× TARP (q-1)					-0.215*	-0.179
					(-1.82)	(-1.59)
Change in equity capital ratio (%) (q-4, q)		0.040***		0.023		0.023
		(3.81)		(1.36)		(1.36)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	468728	468395	251668	251275	251668	251275
R^2	0.075	0.076	0.062	0.056	0.062	0.056

Internet Appendix Table A2. Additional Specifications of Table 3 (Cont.)

Panel C: Distress Measured as *Low Equity Capital Ratio*, without *Crisis* Interaction

Dependent variable:	Change in equity capital ratio (%) (q, q+4)			
Sample period:	1985-1994		2005-2014	
	(1)	(2)	(3)	(4)
Low equity capital ratio (q-1)	0.627***	0.648***	0.572***	0.574***
	(22.18)	(24.18)	(9.19)	(8.78)
Change in equity capital ratio (%) (q-4, q)		0.043***		0.025
		(3.99)		(1.43)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
N	469080	468554	251954	251320
R^2	0.085	0.087	0.075	0.064

Panel D: Distress Measured as *Low Z-score*, without *Crisis* Interaction

Dependent variable:	Change in equity capital ratio (%) (q, q+4)			
Sample period:	1985-1994		2005-2014	
	(1)	(2)	(3)	(4)
Low Z-score (q-1)	0.247***	0.269***	0.152***	0.153***
	(4.35)	(4.99)	(3.27)	(3.57)
Change in equity capital ratio (%) (q-4, q)		0.040***		0.023
		(3.81)		(1.37)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
N	468728	468395	251668	251275
R^2	0.075	0.076	0.062	0.056

Internet Appendix Table A2. Additional Specifications of Table 3 (Cont.)

Panel E: Distress Measured as *Financial Distress*, without *Crisis* Interaction

Dependent variable:	Change in equity capital ratio (%) (q, q+4)			
Sample period:	1985-1994		2005-2014	
	(1)	(2)	(3)	(4)
Financial distress (q-1)	0.751***	0.801***	0.519***	0.548***
	(11.65)	(12.42)	(4.90)	(5.48)
Change in equity capital ratio (%) (q-4, q)		0.046***		0.027
		(4.27)		(1.56)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
N	468728	468395	251668	251275
R^2	0.081	0.083	0.063	0.058

Panel F: Distress Measured as *Low Equity Capital Ratio*; Dependent Variable is Winsorized

Dependent variable:	Change in equity capital ratio (%) (q, q+4)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Low equity capital ratio (q-1)	0.597***	0.643***	0.535***	0.554***	0.536***	0.554***
	(11.18)	(12.90)	(10.15)	(9.76)	(10.15)	(9.76)
× Crisis (q-1)	-0.056	-0.067	-0.224**	-0.191**	-0.239***	-0.207**
	(-0.75)	(-0.95)	(-2.50)	(-2.27)	(-2.84)	(-2.65)
× TARP (q-1)					0.469***	0.498***
					(3.80)	(4.19)
Change in equity capital ratio (%) (q-4, q)		0.071***		0.054***		0.054***
		(7.93)		(3.30)		(3.30)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	469202	468675	251986	251351	251986	251351
R^2	0.115	0.119	0.098	0.092	0.098	0.092

Internet Appendix Table A2. Additional Specifications of Table 3 (Cont.)

Panel G: Distress Measured as *Low Z-score*; Dependent Variable is Winsorized

Dependent variable:	Change in equity capital ratio (%) (q, q+4)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Low Z-score (q-1)	0.172**	0.209***	0.078	0.088	0.078	0.088
	(2.31)	(2.89)	(0.91)	(1.09)	(0.91)	(1.09)
× Crisis (q-1)	0.062	0.069	-0.022	-0.010	-0.015	-0.005
	(0.64)	(0.75)	(-0.22)	(-0.10)	(-0.15)	(-0.05)
× TARP (q-1)					-0.127*	-0.090
					(-1.74)	(-1.29)
Change in equity capital ratio (%) (q-4, q)		0.060***		0.044***		0.044***
		(6.23)		(2.75)		(2.75)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	468846	468513	251699	251306	251699	251306
R^2	0.099	0.102	0.084	0.080	0.084	0.080

Panel H: Distress Measured as *Financial Distress*; Dependent Variable is Winsorized

Dependent variable:	Change in equity capital ratio (%) (q, q+4)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Financial distress (q-1)	0.688***	0.775***	0.580***	0.623***	0.580***	0.623***
	(6.42)	(7.53)	(10.70)	(14.30)	(10.70)	(14.30)
× Crisis (q-1)	-0.149	-0.157	-0.529***	-0.496***	-0.547***	-0.516***
	(-1.06)	(-1.18)	(-5.05)	(-4.54)	(-5.42)	(-4.93)
× TARP (q-1)					0.543***	0.585***
					(3.62)	(3.89)
Change in equity capital ratio (%) (q-4, q)		0.071***		0.047***		0.047***
		(7.55)		(2.91)		(2.91)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	468846	468513	251699	251306	251699	251306
R^2	0.107	0.111	0.086	0.082	0.086	0.082

Internet Appendix Table A2. Additional Specifications of Table 3 (Cont.)

Panel I: Characteristics of Distressed Banks that Increase Their Equity Capital Ratio

Dependent variable:	Change in equity capital ratio (t, t+4)					
Sample period:	1985-1994			2005-2014		
Distressed banks defined by:	Low equity capital ratio	Low Z-score	Financial distress	Low equity capital ratio	Low Z-score	Financial distress
	(1)	(2)	(3)	(4)	(5)	(6)
Log assets (q-1)	-0.130***	0.097***	-0.124***	-0.082**	0.034	-0.151*
	(-12.40)	(5.02)	(-5.48)	(-2.74)	(1.58)	(-1.87)
Assets > $50bn (q-1)	0.022	0.358	-0.061	0.492*	0.453	1.083*
	(0.16)	(1.41)	(-0.21)	(1.77)	(0.97)	(1.85)
Part of MHC (q-1)	-0.039	-0.035	-0.004	0.123	0.209*	0.473*
	(-0.91)	(-0.57)	(-0.05)	(1.08)	(1.76)	(1.87)
Deposits/Liabilities (q-1)	-0.010***	-0.022*	-0.025***	-0.005	-0.002	-0.003
	(-3.74)	(-1.94)	(-2.94)	(-1.41)	(-0.31)	(-0.34)
Loans/Assets (q-1)	-0.013***	-0.015***	-0.023***	-0.005	-0.005	-0.014
	(-6.43)	(-4.90)	(-10.30)	(-1.27)	(-1.11)	(-1.49)
Core deposit ratio (q-1)	0.002	0.011***	0.005*	0.003	0.005	0.004
	(0.90)	(4.59)	(1.91)	(1.59)	(1.34)	(0.76)
Metro location (q-1)	0.058	-0.035	0.126	0.027	-0.160**	-0.105*
	(1.42)	(-0.94)	(1.56)	(0.52)	(-2.08)	(-1.84)
De novo bank (q-1)	0.038	-0.506***	0.022	0.466***	-0.418*	0.783***
	(0.63)	(-8.58)	(0.17)	(3.10)	(-1.92)	(2.90)
TARP (q-1)				0.414***	-0.085	0.255
				(3.87)	(-0.98)	(1.57)
Real estate loan share (q-1)	-0.005***	0.002	-0.005	0.001	0.001	-0.000
	(-3.47)	(1.02)	(-1.70)	(0.33)	(0.20)	(-0.10)
Commercial/industrial loan share (q-1)	-0.003*	-0.004***	-0.003	0.005*	-0.002	0.004
	(-1.99)	(-3.07)	(-1.14)	(1.97)	(-0.65)	(0.57)
Unused commitments/assets (q-1)	0.001	-0.002**	0.000	-0.000	0.000	-0.001
	(1.23)	(-2.48)	(0.16)	(-0.16)	(1.38)	(-1.20)
Trading assets/assets (q-1)	-0.005	-0.011	0.009	-0.009	0.049*	0.030
	(-0.36)	(-0.93)	(0.52)	(-0.98)	(1.77)	(0.55)
Log state per-capita income (q-1)	-0.710	-0.917	0.223	-1.691	-2.238	-0.894
	(-0.69)	(-0.62)	(0.13)	(-1.18)	(-1.09)	(-0.30)
State unemployment rate (q-1)	-0.106***	-0.168***	-0.200***	-0.151***	-0.025	-0.119
	(-5.73)	(-5.35)	(-7.69)	(-3.74)	(-0.40)	(-1.49)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	43151	43567	16511	23881	23630	6623
R^2	0.094	0.079	0.136	0.042	0.044	0.088

Internet Appendix Table A2. Additional Specifications of Table 3 (Cont.)

Panel J: Distress Measured as *Financial Distress*; PCA Banks Excluded

Dependent variable:	Change in equity capital ratio (%) (q, q+1)					
Sample period:	2005-2014					
Distress indicator:	Low equity capital ratio (q-1)		Low Z-score (q-1)		Financial distress (q-1)	
	(1)	(2)	(3)	(4)	(5)	(6)
Distress indicator (q-1)	0.181***	0.177***	0.046*	0.049	0.209***	0.196***
	(12.08)	(10.72)	(1.79)	(1.67)	(6.25)	(6.03)
× Crisis (q-1)	0.025	0.024	-0.005	-0.005	-0.063	-0.065
	(0.92)	(0.84)	(-0.15)	(-0.14)	(-1.50)	(-1.47)
× TARP (q-1)	0.240***	0.233***	-0.063***	-0.077***	0.256***	0.234**
	(4.45)	(4.09)	(-3.01)	(-3.44)	(3.15)	(2.73)
Change in equity capital ratio (%) (q-4, q)		-0.029		-0.056***		-0.055***
		(-1.40)		(-3.42)		(-3.38)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	253921	253921	253627	253627	253627	253627
R^2	0.050	0.051	0.045	0.048	0.046	0.049

Internet Appendix Table A2. Additional Specifications of Table 3 (Cont.)

Panel K: Distress Measured as *Low Market Equity Capital Ratio*

Dependent variable:	Change in equity capital ratio (%) (q, q+4)					
Sample period:	1985-1994		2005-2014			
	(1)	(2)	(3)	(4)	(5)	(6)
Low market equity capital ratio (1st decile) (q-1)	0.027	0.027	0.067	0.054	0.066	0.053
	(0.83)	(0.82)	(0.82)	(0.67)	(0.79)	(0.64)
× Crisis (q-1)	-0.105	-0.109	-0.386**	-0.407**	-0.355*	-0.383*
	(-1.09)	(-1.13)	(-2.28)	(-2.32)	(-1.86)	(-1.90)
× TARP (q-1)					-0.057	-0.028
					(-0.27)	(-0.13)
Change in equity capital ratio (%) (q-4, q)		-0.017*		-0.023		-0.023
		(-1.75)		(-1.27)		(-1.30)
Log assets (q-1)	0.056***	0.054***	0.060***	0.057***	0.059***	0.055***
	(4.06)	(3.86)	(3.61)	(3.41)	(3.46)	(3.26)
Assets > $50bn (q-1)	0.045	0.048	-0.121	-0.098	-0.124	-0.101
	(0.84)	(0.89)	(-1.21)	(-0.92)	(-1.26)	(-0.96)
Part of MHC (q-1)	0.021	0.024	0.091	0.089	0.090	0.089
	(0.83)	(0.90)	(1.11)	(1.09)	(1.11)	(1.09)
Deposits/Liabilities (%) (q-1)	-0.005*	-0.005*	-0.014***	-0.014***	-0.014***	-0.014***
	(-1.72)	(-1.85)	(-3.40)	(-3.24)	(-3.41)	(-3.24)
Loans/Assets (%) (q-1)	-0.002	-0.002*	-0.000	-0.000	-0.000	-0.000
	(-1.68)	(-1.74)	(-0.16)	(-0.21)	(-0.17)	(-0.22)
Core deposit ratio (%) (q-1)	0.006***	0.006***	0.004***	0.004***	0.004***	0.004***
	(3.79)	(3.65)	(3.16)	(3.24)	(3.19)	(3.29)
Metro location (q-1)	-0.095***	-0.093***	-0.078*	-0.072*	-0.078*	-0.073*
	(-3.96)	(-3.80)	(-1.82)	(-1.75)	(-1.81)	(-1.74)
De novo bank (q-1)	-0.294***	-0.306***	-1.018***	-0.950***	-1.011***	-0.944***
	(-5.05)	(-5.68)	(-4.12)	(-4.14)	(-4.04)	(-4.06)
TARP (q-1)					0.236***	0.231***
					(3.38)	(3.13)
Log state per-capita income (q-1)	-0.363	-0.371	0.253	0.191	0.170	0.107
	(-0.52)	(-0.55)	(0.16)	(0.12)	(0.11)	(0.07)
State unemployment rate (q-1)	-0.017	-0.016	-0.073*	-0.077*	-0.077*	-0.081*
	(-0.84)	(-0.81)	(-1.80)	(-1.92)	(-1.87)	(-1.98)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	55570	55504	20596	20548	20596	20548
R^2	0.055	0.055	0.091	0.086	0.091	0.086

Internet Appendix Table A2. Additional Specifications of Table 3 (Cont.)

Panel L: Distress Measured as *Low Equity Capital Ratio*; 1-Quarter Horizon

Dependent variable:	Change in equity capital ratio (%) (q, q+1)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Low equity capital ratio (1st decile) (q-1)	0.190***	0.166***	0.191***	0.186***	0.191***	0.186***
	(10.52)	(8.59)	(14.84)	(12.82)	(14.84)	(12.82)
× Crisis (q-1)	-0.030	-0.024	-0.102***	-0.108***	-0.112***	-0.118***
	(-1.13)	(-0.89)	(-5.19)	(-4.89)	(-6.66)	(-6.30)
× TARP (q-1)					0.274***	0.268***
					(4.51)	(4.12)
Change in equity capital ratio (%) (q-4, q)		-0.081***		-0.027		-0.027
		(-13.39)		(-1.34)		(-1.34)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486829	486829	260058	260058	260058	260058
R^2	0.061	0.067	0.046	0.047	0.047	0.047

Panel M: Distress Measured as *Low Z-score*; 1-Quarter Horizon

Dependent variable:	Change in equity capital ratio (%) (q, q+1)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Low Z-score (1st decile) (q-1)	0.043**	0.030	0.063**	0.062**	0.063**	0.062**
	(2.17)	(1.26)	(2.46)	(2.13)	(2.46)	(2.13)
× Crisis (q-1)	-0.011	-0.013	-0.071*	-0.077*	-0.069*	-0.075*
	(-0.39)	(-0.40)	(-2.04)	(-1.97)	(-2.01)	(-1.94)
× TARP (q-1)					-0.036	-0.045*
					(-1.63)	(-1.90)
Change in equity capital ratio (%) (q-4, q)		-0.092***		-0.054***		-0.054***
		(-15.81)		(-3.33)		(-3.33)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486426	486426	259758	259758	259758	259758
R^2	0.058	0.066	0.042	0.045	0.042	0.045

Internet Appendix Table A2. Additional Specifications of Table 3 (Cont.)

Panel N: Distress Measured as *Financial Distress*; 1-Quarter Horizon

Dependent variable:	Change in equity capital ratio (%) (q, q+1)					
Sample period:	1985-1994		2005-2014		2005-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Financial distress (q-1)	0.179***	0.136***	0.192***	0.172***	0.192***	0.172***
	(4.88)	(3.52)	(5.05)	(4.57)	(5.04)	(4.56)
× Crisis (q-1)	-0.062	-0.052	-0.220***	-0.233***	-0.230***	-0.242***
	(-1.33)	(-1.05)	(-5.20)	(-4.99)	(-5.26)	(-5.10)
× TARP (q-1)					0.274***	0.254***
					(3.38)	(2.89)
Change in equity capital ratio (%) (q-4, q)		-0.090***		-0.053***		-0.053***
		(-15.39)		(-3.32)		(-3.31)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	486426	486426	259758	259758	259758	259758
R^2	0.059	0.067	0.042	0.045	0.042	0.045

Internet Appendix Table A3. Additional Specifications of Table 4

The table presents additional variations to the main analysis presented in Table 4: exploring how the balance sheet items of banks in distress change over time. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Distress Measured as *Low Equity Capital Ratio*, with *Crisis* Interaction; 1985-1994

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low equity capital ratio (1st decile) (q-1)	-0.033***	-0.022***	St Dev	-0.019***	-0.024***	-0.043***	-0.010*	-0.041***	-0.059***	0.016***	-0.247***
	(-12.31)	(-4.38)	(-5.42)	(-13.26)	(-5.07)	(-19.65)	(-1.93)	(-21.39)	(-5.80)	(2.85)	(-7.86)
× Crisis (q-1)	-0.016**	-0.024**	-0.022***	-0.008***	-0.009	-0.011*	-0.011	-0.010	-0.042**	-0.005	-0.054
	(-2.57)	(-2.35)	(-4.08)	(-3.12)	(-1.09)	(-1.79)	(-1.00)	(-1.67)	(-2.16)	(-0.92)	(-0.88)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	470419	470337	468768	470261	470316	470501	454498	469679	468744	470326	464651
R^2	0.075	0.102	0.011	0.017	0.026	0.059	0.590	0.061	0.102	0.012	0.136

Panel B: Distress Measured as *Low Z-score*, with *Crisis* Interaction; 1985-1994

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low Z-score (1st decile) (q-1)	-0.054***	-0.066***	-0.052***	-0.022***	-0.045***	-0.059***	-0.019***	-0.060***	-0.108***	0.004	-0.141***
	(-19.15)	(-14.99)	(-12.52)	(-10.10)	(-25.44)	(-12.87)	(-7.27)	(-16.73)	(-6.17)	(1.12)	(-7.45)
× Crisis (q-1)	-0.008	-0.012	-0.004	-0.007**	-0.009	-0.007	-0.008	-0.000	-0.009	-0.003	-0.079*
	(-1.61)	(-1.57)	(-0.45)	(-2.71)	(-1.64)	(-1.10)	(-1.24)	(-0.08)	(-0.35)	(-0.53)	(-1.93)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	470055	469992	468419	469893	469956	470133	454183	469335	468385	469962	464286
R^2	0.079	0.110	0.013	0.017	0.029	0.063	0.591	0.064	0.103	0.011	0.135

Internet Appendix Table A3. Additional Specifications of Table 4 (Cont.)

Panel C: Distress Measured as *Low Equity Capital Ratio*, with *Crisis* Interaction; 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low equity capital ratio (1st decile) (q-1)	-0.024***	-0.014*	-0.018**	-0.013***	-0.009**	-0.032***	-0.012***	-0.032***	-0.055**	0.008*	-0.187***
	(-3.68)	(-2.03)	(-2.13)	(-2.75)	(-2.27)	(-3.97)	(-4.74)	(-4.35)	(-2.50)	(1.85)	(-8.08)
× Crisis (q-1)	-0.047***	-0.038***	-0.023**	-0.020***	-0.031***	-0.051***	-0.015***	-0.046***	-0.073**	-0.002	-0.136**
	(-6.24)	(-4.90)	(-2.45)	(-3.42)	(-6.18)	(-5.69)	(-4.53)	(-5.93)	(-2.44)	(-0.19)	(-2.44)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	252146	252102	251234	251835	252071	252177	250387	251772	252125	249850	250691
R^2	0.149	0.194	0.025	0.035	0.039	0.130	0.602	0.106	0.106	0.005	0.140

Panel D: Distress Measured as *Low Z-score*, with *Crisis* Interaction; 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low Z-score (1st decile) (q-1)	-0.035***	-0.036***	-0.040***	-0.028***	-0.035***	-0.044***	-0.008*	-0.045***	-0.101***	0.007	-0.241**
	(-6.68)	(-7.30)	(-6.39)	(-8.33)	(-5.58)	(-7.62)	(-1.71)	(-9.54)	(-4.23)	(1.66)	(-2.70)
× Crisis (q-1)	-0.034***	-0.025***	-0.006	-0.007	-0.006	-0.035***	-0.019***	-0.037***	-0.078***	-0.012**	-0.101
	(-4.50)	(-3.72)	(-0.87)	(-1.31)	(-0.74)	(-4.12)	(-3.05)	(-4.87)	(-2.78)	(-2.07)	(-0.90)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	251854	251829	250951	251548	251782	251885	250166	251486	251833	249568	250402
R^2	0.149	0.197	0.026	0.036	0.041	0.127	0.603	0.106	0.108	0.004	0.141

Panel E: Distress Measured as *Low Equity Capital Ratio*, without *Crisis* Interaction; 1985-1994

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low equity capital ratio (1st decile) (q-1)	-0.039***	-0.031***	-0.025***	-0.021***	-0.027***	-0.047***	-0.014***	-0.044***	-0.074***	0.014***	-0.266***
	(-14.46)	(-7.97)	(-11.00)	(-11.95)	(-9.10)	(-18.05)	(-4.52)	(-14.92)	(-7.57)	(3.53)	(-14.73)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	470419	470337	468768	470261	470316	470501	454498	469679	468744	470326	464651
R^2	0.074	0.102	0.011	0.017	0.026	0.059	0.590	0.061	0.102	0.012	0.136

Internet Appendix Table A3. Additional Specifications of Table 4 (Cont.)

Panel F: Distress Measured as *Low Z-score*, without *Crisis* Interaction; 1985-1994

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low Z-score (1st decile) (q-1)	-0.082***	-0.090***	-0.067***	-0.035***	-0.068***	-0.061***	-0.028***	-0.089***	-0.182***	0.014*	-0.286***
	(-19.66)	(-12.42)	(-11.05)	(-11.75)	(-23.39)	(-14.87)	(-10.26)	(-15.64)	(-8.35)	(2.04)	(-15.87)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	470055	469992	468419	469893	469956	470133	454183	469335	468385	469962	464286
R^2	0.079	0.110	0.013	0.017	0.029	0.063	0.591	0.064	0.103	0.011	0.135

Panel G: Distress Measured as *Financial Distress*, without *Crisis* Interaction; 1985-1994

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial Distress	-0.056***	-0.069***	-0.053***	-0.024***	-0.048***	-0.091***	-0.022***	-0.060***	-0.111***	0.003	-0.164***
	(-18.27)	(-13.55)	(-15.94)	(-10.48)	(-16.18)	(-17.08)	(-10.28)	(-18.34)	(-6.83)	(1.16)	(-8.74)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	470055	469992	468419	469893	469956	470133	454183	469335	468385	469962	464286
R^2	0.078	0.107	0.012	0.017	0.028	0.063	0.591	0.064	0.104	0.012	0.136

Panel H: Distress Measured as *Low Equity Capital Ratio*, without *Crisis* Interaction; 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low equity capital ratio (1st decile) (q-1	-0.038***	-0.025***	-0.025***	-0.019***	-0.018***	-0.047***	-0.016***	-0.046***	-0.076***	0.007*	-0.226***
	(-4.25)	(-3.11)	(-3.22)	(-3.68)	(-3.04)	(-4.52)	(-5.71)	(-4.60)	(-3.40)	(1.74)	(-7.95)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	252146	252102	251234	251835	252071	252177	250387	251772	252125	249850	250691
R^2	0.147	0.193	0.025	0.035	0.038	0.128	0.602	0.105	0.106	0.005	0.140

Internet Appendix Table A3. Additional Specifications of Table 4 (Cont.)

Panel I: Distress Measured as *Low Z-score*, without *Crisis* Interaction; 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low Z-score (1st decile) (q-1)	-0.052***	-0.049***	-0.043***	-0.032***	-0.038***	-0.061***	-0.018***	-0.064***	-0.140***	0.001	-0.292***
	(-10.06)	(-13.09)	(-12.81)	(-12.74)	(-14.81)	(-10.35)	(-5.32)	(-8.48)	(-9.67)	(0.33)	(-8.32)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	251854	251829	250951	251548	251782	251885	250166	251486	251833	249568	250402
R^2	0.147	0.197	0.026	0.036	0.041	0.126	0.603	0.105	0.108	0.004	0.141

Panel J: Distress Measured as *Financial Distress*, without *Crisis* Interaction; 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial Distress	-0.096***	-0.087***	-0.076***	-0.055***	-0.066***	-0.113***	-0.031***	-0.112***	-0.226***	0.010	-0.373***
	(-17.30)	(-16.86)	(-8.72)	(-12.74)	(-14.65)	(-19.11)	(-6.41)	(-15.13)	(-15.48)	(0.90)	(-11.51)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	251854	251829	250951	251548	251782	251885	250166	251486	251833	249568	250402
R^2	0.148	0.197	0.026	0.036	0.041	0.127	0.603	0.105	0.108	0.004	0.140

Panel K: Distress Measured as *Financial Distress*, PCA Banks Excluded; 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial distress (q-1)	-0.063***	-0.057***	-0.058***	-0.035***	-0.039***	-0.076***	-0.074***	-0.032***	-0.160***	0.019	-0.363***
	(-10.65)	(-9.05)	(-5.18)	(-5.00)	(-7.71)	(-11.71)	(-13.33)	(-3.48)	(-7.18)	(1.66)	(-3.76)
× Crisis	-0.025***	-0.009	0.003	-0.002	-0.006	-0.024***	-0.014	-0.009	-0.002	-0.006	-0.159
	(-3.13)	(-1.27)	(0.22)	(-0.31)	(-1.03)	(-2.76)	(-1.48)	(-1.02)	(-0.10)	(-0.47)	(-1.31)
× TARP	-0.012	-0.008	0.040**	-0.026***	-0.026*	-0.020	-0.058***	0.071***	0.174***	-0.010	0.375
	(-0.82)	(-0.46)	(2.46)	(-3.44)	(-1.80)	(-1.36)	(-2.92)	(3.88)	(5.29)	(-0.69)	(1.21)
Bank-quarter and state-quarter contro	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	246944	246919	246041	246640	246872	245300	246588	245300	246922	244715	245506
R^2	0.136	0.185	0.025	0.034	0.039	0.605	0.098	0.605	0.107	0.005	0.141

Internet Appendix Table A3. Additional Specifications of Table 4 (Cont.)

Panel L: Dependent Variable is Deviation from Past 5-Year Average; 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees	Log liabilities	Log deposit rate	Log deposits	Log other liabilities	Log common stock	Log dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial distress (q-1)	-0.214***	-0.266***	-0.176***	-0.112***	-0.141***	-0.212***	-0.202***	-0.034***	-0.416***	0.004	-0.848***
	(-3.62)	(-4.32)	(-4.02)	(-4.21)	(-5.38)	(-3.61)	(-3.58)	(-3.71)	(-6.33)	(0.18)	(-9.28)
× Crisis	-0.010	0.022	0.025	0.027	-0.025	0.001	0.000	0.030**	0.037	-0.017	-0.527***
	(-0.16)	(0.36)	(0.52)	(0.92)	(-0.97)	(0.02)	(0.01)	(2.69)	(0.45)	(-0.67)	(-3.24)
× TARP	0.067*	0.117***	0.063**	0.054**	0.077***	0.058*	0.038	0.013	0.186***	0.029	0.174
	(1.92)	(3.02)	(2.22)	(2.37)	(4.09)	(1.74)	(1.00)	(0.63)	(2.94)	(1.40)	(0.48)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	239203	238994	238015	237919	239123	239231	238805	231880	239082	236842	229737
R^2	0.174	0.226	0.068	0.094	0.118	0.150	0.138	0.792	0.144	0.020	0.056

Internet Appendix Table A3. Additional Specifications of Table 4 (Cont.)

Panel M: Distress Measured as *Financial Distress*, with *Future Failure* Controls; 1985-1994

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log Assets	Log Loans	Log Fixed Assets	Log #Branches	Log #Employees	Log liabilities	Log Deposit Rate	Log Deposits	Log Other Liab	Log Common Shares	Log Dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial distress (q-1)	-0.030***	-0.027***	-0.014***	-0.008***	-0.021***	-0.033***	-0.032***	-0.012***	-0.053***	0.005*	-0.169***
	(-16.18)	(-14.02)	(-11.26)	(-8.98)	(-18.60)	(-16.68)	(-13.73)	(-10.92)	(-7.38)	(1.72)	(-5.45)
Failed in 2 quarters	-0.050***	-0.039***	-0.017**	-0.007***	-0.028***	-0.034***	-0.035***	0.007	-0.050*	-0.032***	-0.113
	(-20.11)	(-9.95)	(-2.30)	(-4.32)	(-8.35)	(-16.37)	(-15.38)	(1.65)	(-2.00)	(-3.32)	(-1.46)
Failed in 3 quarters	0.012***	0.017***	-0.002	0.006	0.010**	0.007**	0.007**	0.004	0.039	0.029***	0.007
	(5.31)	(5.02)	(-0.23)	(1.32)	(2.17)	(2.62)	(2.18)	(1.04)	(1.27)	(2.98)	(0.08)
Failed in 4 quarters	0.011***	0.008**	0.012*	0.002	0.004	0.008**	0.009***	-0.004	-0.015	-0.007	0.016
	(3.96)	(2.32)	(1.88)	(0.85)	(0.90)	(2.65)	(2.89)	(-1.41)	(-0.72)	(-1.42)	(0.29)
Failed in 5 quarters	0.000	-0.002	-0.003	-0.005*	-0.003	0.000	0.001	-0.005*	0.020	0.005	-0.031
	(0.09)	(-0.56)	(-0.39)	(-1.83)	(-0.86)	(0.04)	(0.23)	(-1.91)	(0.98)	(1.07)	(-0.70)
Failed in 6 quarters	0.007***	0.010***	0.008	0.002	0.017***	0.005*	0.006*	0.007*	-0.000	0.003	-0.053
	(2.80)	(2.86)	(0.93)	(0.66)	(4.98)	(2.02)	(1.85)	(1.94)	(-0.01)	(0.49)	(-0.84)
Failed in 7 quarters	0.004	0.004	-0.003	-0.000	-0.011**	0.002	0.004	0.007*	-0.014	-0.006	-0.010
	(0.96)	(0.84)	(-0.32)	(-0.08)	(-2.08)	(0.59)	(1.02)	(1.91)	(-0.77)	(-1.19)	(-0.17)
Failed in 8 quarters	0.003	-0.001	-0.005	-0.003	-0.001	0.002	0.001	-0.016***	-0.024	0.003	0.011
	(0.64)	(-0.31)	(-0.46)	(-0.77)	(-0.48)	(0.48)	(0.26)	(-3.22)	(-0.84)	(0.50)	(0.16)
Failed in 9 quarters	-0.000	0.007*	0.013	0.000	0.008**	-0.001	-0.002	0.006*	0.055**	0.009	0.118
	(-0.06)	(1.95)	(1.62)	(0.15)	(2.05)	(-0.20)	(-0.35)	(1.87)	(2.43)	(1.53)	(1.24)
Failed in 10 quarters	0.008**	0.002	-0.022**	0.003	-0.002	0.008**	0.008***	-0.004	-0.027	-0.012**	-0.073
	(2.59)	(0.29)	(-2.65)	(1.12)	(-0.31)	(2.49)	(2.99)	(-0.92)	(-1.36)	(-2.35)	(-0.64)
Failed in 11 quarters	0.004	0.007	0.017	0.005	0.002	0.004	0.004	0.007	0.011	0.013	0.018
	(0.64)	(0.90)	(1.42)	(0.62)	(0.53)	(0.61)	(0.68)	(1.06)	(0.46)	(0.93)	(0.35)
Failed in 12 quarters	-0.005	-0.006	0.004	-0.005	0.003	-0.005	-0.005	-0.004	0.011	-0.006	0.176**
	(-0.92)	(-0.72)	(0.39)	(-0.69)	(0.42)	(-0.89)	(-0.95)	(-0.67)	(0.43)	(-0.43)	(2.15)
Failed in 13 quarters	-0.010**	-0.001	-0.002	-0.008	-0.013***	-0.012***	-0.014***	0.001	0.028	0.017	-0.048
	(-2.69)	(-0.13)	(-0.21)	(-1.55)	(-3.15)	(-2.99)	(-2.75)	(0.24)	(0.90)	(1.35)	(-0.53)
Failed in 14 quarters	0.011	0.010	0.021**	0.010	0.013*	0.012	0.015	0.000	-0.052**	-0.026	-0.185**
	(1.27)	(1.22)	(2.74)	(1.49)	(1.90)	(1.29)	(1.50)	(0.04)	(-2.10)	(-1.56)	(-2.53)
Failed in 15 quarters	-0.000	0.002	-0.032***	-0.005	0.005	-0.003	-0.005	-0.005	0.030	0.016	0.279***
	(-0.06)	(0.36)	(-5.15)	(-1.27)	(1.16)	(-0.40)	(-0.61)	(-1.19)	(0.72)	(1.16)	(3.64)
Failed in 16 quarters	0.006**	-0.010**	0.014***	0.004	-0.001	0.008**	0.007***	-0.001	0.005	-0.004	-0.116
	(2.07)	(-2.37)	(4.19)	(1.48)	(-0.21)	(2.39)	(2.81)	(-0.17)	(0.13)	(-0.66)	(-1.61)
Lagged dependent variable (q-4,q)	-0.048***	0.142***	0.174***	-0.006	-0.156***	-0.057***	-0.067***	-0.428***	-0.343***	-0.210***	-0.643***
	(-6.05)	(10.93)	(12.87)	(-0.72)	(-15.66)	(-6.62)	(-8.79)	(-10.52)	(-52.52)	(-5.28)	(-69.62)
Log assets (q-1)	-0.001***	-0.000	0.000	0.001***	-0.000	-0.001***	-0.003***	-0.004***	0.029***	0.000	0.008
	(-5.02)	(-0.24)	(0.43)	(7.71)	(-0.70)	(-3.91)	(-7.93)	(-7.53)	(13.30)	(1.62)	(1.10)
Assets > $50bn (q-1)	-0.000	-0.005*	-0.004**	-0.003	-0.007***	-0.001	-0.007***	-0.000	0.047***	0.002	0.035
	(-0.04)	(-1.85)	(-2.64)	(-1.67)	(-3.35)	(-0.24)	(-2.77)	(-0.03)	(4.38)	(0.52)	(0.49)
Part of MHC (q-1)	0.003***	0.005***	0.002***	0.003***	-0.003***	0.002***	0.001***	0.003***	0.024***	0.002**	-0.011
	(7.00)	(8.84)	(3.29)	(5.34)	(-3.52)	(4.55)	(2.88)	(5.54)	(9.10)	(2.20)	(-0.44)
Deposits/Liabilities (%) (q-1)	0.000**	0.000***	0.000	-0.000***	-0.000	0.000**	-0.001***	-0.001***	0.016***	-0.000	0.002
	(2.37)	(3.13)	(0.40)	(-3.23)	(-0.97)	(2.67)	(-5.96)	(-3.30)	(24.62)	(-1.10)	(1.50)
Loans/Assets (%) (q-1)	0.000***	-0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	-0.000*	0.000	-0.000
	(10.84)	(-15.43)	(3.15)	(4.65)	(7.46)	(11.86)	(14.49)	(4.99)	(-1.93)	(0.75)	(-0.15)
Core deposit ratio (%) (q-1)	-0.000	-0.000**	-0.000***	-0.000**	-0.000***	-0.000	0.000*	-0.000	-0.002***	-0.000	0.001**
	(-1.05)	(-2.31)	(-4.20)	(-2.68)	(-4.01)	(-1.29)	(1.82)	(-1.53)	(-12.38)	(-0.47)	(2.08)
Metro location (q-1)	0.004***	0.005***	0.003***	0.002***	0.002***	0.004***	0.004***	-0.000	0.011***	0.001	-0.005
	(6.78)	(6.12)	(4.10)	(8.48)	(6.30)	(5.64)	(6.52)	(-0.35)	(3.89)	(1.24)	(-0.57)
De novo bank (q-1)	0.022***	0.025***	0.009***	0.008***	0.024***	0.026***	0.025***	-0.006***	0.061***	0.001	0.085***
	(18.09)	(19.79)	(4.87)	(6.89)	(28.40)	(18.91)	(14.00)	(-3.52)	(15.45)	(0.87)	(3.06)
Log deposit rate (q-1)							0.007**				
							(2.59)				
Charge-off rate (q+4)	-0.000***	-0.001***									
	(-3.39)	(-4.77)									
Log state per-capita income (q-1)	-0.101***	-0.088**	-0.082***	-0.064***	-0.107***	-0.103***	-0.105***	-0.037	-0.152	0.012	-0.557
	(-3.20)	(-2.29)	(-3.72)	(-4.25)	(-4.07)	(-2.98)	(-3.14)	(-1.12)	(-1.38)	(0.94)	(-1.53)
State unemployment rate (q-1)	-0.005***	-0.007***	-0.004***	-0.001***	-0.004***	-0.005***	-0.005***	-0.002**	-0.010***	-0.001***	-0.020
	(-8.35)	(-9.21)	(-5.65)	(-4.04)	(-6.58)	(-8.29)	(-8.37)	(-2.12)	(-3.88)	(-4.15)	(-1.61)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	487215	487215	485859	487238	487139	487255	486438	485372	486515	487118	480824
R^2	0.046	0.059	0.015	0.005	0.020	0.032	0.033	0.201	0.143	0.003	0.437

Internet Appendix Table A3. Additional Specifications of Table 4 (Cont.)

Panel N: Distress Measured as *Financial Distress*, with *Future Failure* Controls; 2005-2014

Dependent variable:	Assets					Liabilities				Equity	
	Change in… (q, q+4)					Change in… (q, q+4)				Change in… (q, q+4)	
	Log Assets	Log Loans	Log Fixed Assets	Log #Branches	Log #Employees	Log liabilities	Log Deposit Rate	Log Deposits	Log Other Liab	Log Common Shares	Log Dividends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Financial distress (q-1)	-0.029***	-0.016***	-0.018***	-0.014***	-0.022***	-0.037***	-0.035***	-0.006***	-0.072***	0.001	-0.175***
	(-9.47)	(-4.19)	(-8.93)	(-9.87)	(-10.86)	(-15.95)	(-17.29)	(-2.94)	(-8.37)	(0.24)	(-4.62)
Failed in 2 quarters	-0.022***	-0.005	-0.024***	-0.005	-0.031***	-0.012***	-0.014***	0.009*	-0.067***	-0.022	-0.035
	(-4.33)	(-0.96)	(-4.20)	(-0.94)	(-4.37)	(-3.84)	(-6.90)	(2.01)	(-2.75)	(-1.49)	(-0.37)
Failed in 3 quarters	0.003	-0.010	0.018***	-0.005	0.006	0.000	0.005	-0.002	0.041	0.017	-0.175*
	(0.54)	(-1.65)	(3.14)	(-0.94)	(0.94)	(0.09)	(1.02)	(-0.31)	(1.19)	(1.06)	(-2.01)
Failed in 4 quarters	0.004	0.002	-0.016**	0.003	-0.006	0.002	0.002	-0.004	-0.010	-0.000	-0.031
	(1.08)	(0.45)	(-2.06)	(0.63)	(-1.00)	(0.35)	(0.46)	(-0.89)	(-0.50)	(-0.07)	(-0.37)
Failed in 5 quarters	0.004	0.002	0.012	0.003	0.009	0.004	-0.000	0.010***	0.012	-0.006	-0.121**
	(1.06)	(0.55)	(1.56)	(0.50)	(1.67)	(0.95)	(-0.04)	(2.94)	(0.50)	(-0.82)	(-2.54)
Failed in 6 quarters	0.006	0.006	0.001	-0.001	0.005	0.004	0.002	0.002	0.011	0.017	-0.049
	(0.98)	(1.12)	(0.18)	(-0.16)	(0.74)	(0.65)	(0.52)	(0.53)	(0.44)	(1.17)	(-0.61)
Failed in 7 quarters	-0.002	0.000	0.001	0.001	0.001	-0.003	-0.007	-0.002	0.024	-0.012	0.306*
	(-0.34)	(0.09)	(0.13)	(0.12)	(0.08)	(-0.51)	(-1.42)	(-0.41)	(0.68)	(-1.49)	(1.96)
Failed in 8 quarters	0.011	0.019	0.024	0.001	0.020**	0.011	0.016*	-0.008*	0.035	0.005	0.245**
	(1.58)	(1.37)	(1.41)	(0.18)	(2.10)	(1.47)	(1.97)	(-2.01)	(0.91)	(1.01)	(2.13)
Failed in 9 quarters	-0.006*	-0.017*	-0.012	0.000	-0.016	-0.008**	-0.010	0.006	-0.042	-0.002	-0.249*
	(-1.93)	(-1.73)	(-0.75)	(0.04)	(-1.56)	(-2.35)	(-1.45)	(0.65)	(-1.13)	(-0.35)	(-2.05)
Failed in 10 quarters	0.001	0.009**	-0.015*	-0.011*	0.012*	-0.000	-0.001	-0.006	0.008	-0.018	-0.261**
	(0.33)	(2.34)	(-1.72)	(-1.89)	(1.91)	(-0.03)	(-0.30)	(-1.14)	(0.27)	(-0.98)	(-2.25)
Failed in 11 quarters	0.012	0.001	0.033	0.022***	0.013	0.011	0.008	0.006	0.017	0.020	0.409*
	(1.39)	(0.19)	(1.64)	(2.94)	(1.56)	(1.27)	(0.98)	(0.83)	(0.83)	(0.99)	(2.01)
Failed in 12 quarters	-0.005	-0.003	-0.027	-0.004	-0.011	-0.008	-0.000	-0.008*	-0.025	0.004	0.061
	(-0.62)	(-0.42)	(-1.49)	(-0.62)	(-1.27)	(-0.80)	(-0.07)	(-1.91)	(-0.80)	(0.21)	(0.72)
Failed in 13 quarters	0.004	0.001	0.017**	-0.004	-0.001	0.007	0.008	-0.001	0.013	-0.011	-0.114
	(0.97)	(0.12)	(2.25)	(-0.58)	(-0.22)	(1.24)	(1.34)	(-0.39)	(0.50)	(-0.77)	(-0.74)
Failed in 14 quarters	0.000	0.001	-0.004	-0.003	0.008*	-0.000	-0.001	-0.005	0.013	0.006	0.096
	(0.08)	(0.22)	(-0.47)	(-0.72)	(1.98)	(-0.02)	(-0.10)	(-0.78)	(0.46)	(0.39)	(0.84)
Failed in 15 quarters	0.012	0.008	0.017	0.010	0.008	0.012	0.013*	0.017	0.043	0.019	-0.061
	(1.68)	(1.55)	(1.59)	(1.24)	(1.10)	(1.66)	(1.75)	(1.43)	(1.11)	(1.13)	(-0.63)
Failed in 16 quarters	-0.010**	-0.003	-0.015	-0.000	-0.009	-0.011**	-0.008*	-0.010	-0.061*	-0.015	-0.007
	(-2.70)	(-0.79)	(-1.62)	(-0.02)	(-1.60)	(-2.60)	(-1.87)	(-1.31)	(-1.91)	(-1.51)	(-0.07)
Lagged dependent variable (q-4,q)	0.006	0.167***	0.231***	0.003	-0.088***	0.000	-0.025	-0.021	-0.323***	-0.262***	-0.586***
	(0.39)	(8.39)	(23.75)	(0.72)	(-12.17)	(0.02)	(-1.42)	(-0.82)	(-21.66)	(-3.02)	(-46.29)
Log assets (q-1)	0.000	0.002***	-0.000	0.001***	0.001***	-0.000	-0.002***	-0.004***	0.017***	-0.000	0.003
	(0.05)	(7.67)	(-0.34)	(4.29)	(6.85)	(-0.97)	(-3.38)	(-4.69)	(5.89)	(-0.24)	(0.18)
Assets > $50bn (q-1)	0.000	-0.007	0.000	-0.011**	-0.009**	-0.000	0.014	-0.028**	-0.010	-0.003	-0.036
	(0.10)	(-1.30)	(0.04)	(-2.42)	(-2.14)	(-0.03)	(1.43)	(-2.28)	(-0.47)	(-0.72)	(-0.27)
Part of MHC (q-1)	0.005***	0.004***	0.006***	0.005***	0.003***	0.004***	0.003***	0.003	0.006	0.002***	-0.008
	(10.32)	(5.76)	(7.42)	(7.77)	(7.35)	(6.69)	(5.38)	(1.46)	(1.55)	(3.47)	(-0.51)
Deposits/Liabilities (%) (q-1)	0.000	0.000***	-0.000***	-0.000***	-0.000	0.000	-0.001***	-0.000	0.009***	0.000	0.001*
	(1.45)	(6.10)	(-2.78)	(-4.66)	(-1.22)	(1.46)	(-6.48)	(-1.49)	(11.79)	(0.82)	(1.73)
Loans/Assets (%) (q-1)	0.000***	-0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	-0.000	0.000*	0.001
	(6.17)	(-3.88)	(3.17)	(3.82)	(4.14)	(6.34)	(4.73)	(3.12)	(-0.14)	(1.96)	(0.80)
Core deposit ratio (%) (q-1)	-0.000**	-0.000***	-0.000***	-0.000***	-0.000***	-0.000**	-0.000	-0.000*	-0.001***	0.000	-0.001
	(-2.64)	(-8.81)	(-2.97)	(-5.39)	(-5.11)	(-2.09)	(-0.13)	(-1.90)	(-5.52)	(1.25)	(-0.82)
Metro location (q-1)	0.001	0.002***	0.001	0.000	0.001	0.000	-0.000	-0.000	0.006	-0.000	-0.001
	(0.85)	(3.83)	(1.27)	(0.70)	(1.65)	(0.32)	(-0.31)	(-0.12)	(1.47)	(-0.19)	(-0.15)
De novo bank (q-1)	0.036***	0.038***	0.012***	0.019***	0.028***	0.042***	0.043***	-0.003	0.122***	0.004***	0.107**
	(11.87)	(12.18)	(5.48)	(8.19)	(7.71)	(11.11)	(11.67)	(-0.98)	(6.02)	(3.60)	(2.63)
TARP (q-1)	-0.003*	-0.001	-0.003***	-0.002**	-0.001	-0.005***	0.000	-0.013***	-0.021*	-0.005**	-0.058
	(-2.00)	(-0.49)	(-3.31)	(-2.63)	(-1.29)	(-3.20)	(0.01)	(-4.79)	(-1.80)	(-2.61)	(-0.85)
Log deposit rate (q-1)							0.004				
							(0.88)				
Charge-off rate (q+4)	-0.005**	-0.014***									
	(-2.46)	(-6.66)									
Log state per-capita income (q-1)	0.010	0.006	0.019**	-0.004	-0.006	0.012	0.013	0.010	0.025	-0.017	-0.448*
	(0.83)	(0.45)	(2.58)	(-0.94)	(-0.86)	(0.86)	(0.82)	(0.77)	(0.21)	(-1.48)	(-1.73)
State unemployment rate (q-1)	-0.002**	-0.001***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002*	-0.003**	-0.011***	-0.000	-0.025***
	(-2.72)	(-3.48)	(-6.33)	(-6.78)	(-3.81)	(-2.97)	(-1.98)	(-2.36)	(-2.88)	(-1.23)	(-2.84)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	259889	259889	259090	259885	259810	259904	259432	258447	259870	257676	258290
R^2	0.057	0.112	0.029	0.011	0.020	0.041	0.039	0.302	0.111	0.001	0.340

Internet Appendix Table A4. Additional Specifications of Table 5

The table presents additional variations to the main analysis presented in Table 5: exploring whether distress banks increase their risk-taking activities. Standard errors are clustered by bank and adjusted using the Driscoll-Kraay (1998) procedure for overlapping data. *t*-statistics are presented in parentheses. Variable definitions are provided in Appendix A. *, **, *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Distress Measured as *Low Equity Capital Ratio*; with *Crisis* Interaction

Sample period:	1985-1994			2005-2014				2005-2014			
Dependent variable:	Change in… (q, q+4)			Change in… (q, q+4)				Change in… (q, q+4)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low equity capital ratio (q-1)	0.230***	0.236***	-0.103***	0.042	0.075	-0.019*	-1.910***	0.042	0.074	-0.020*	-1.919***
	(9.88)	(6.96)	(-9.88)	(1.40)	(1.35)	(-1.72)	(-3.16)	(1.41)	(1.34)	(-1.74)	(-3.18)
× Crisis (q-1)	0.029	-0.040	-0.002	0.118***	-0.127	-0.124***	-3.326***	0.114**	-0.122	-0.117***	-3.432***
	(0.60)	(-0.90)	(-0.25)	(2.77)	(-0.87)	(-6.93)	(-4.93)	(2.56)	(-0.83)	(-6.16)	(-5.05)
× TARP (q-1)								0.177*	-0.212	-0.217***	1.940
								(1.98)	(-1.01)	(-10.17)	(1.20)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	468337	470510	470493	251607	251889	252173	249274	251607	252181	252173	249274
R^2	0.021	0.037	0.014	0.047	0.081	0.022	0.043	0.048	0.081	0.023	0.044

Panel B: Distress Measured as *Low Z-score*; with *Crisis* Interaction

Sample period:	1985-1994			2005-2014				2005-2014			
Dependent variable:	Change in… (q, q+4)			Change in… (q, q+4)				Change in… (q, q+4)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Low Z-score (q-1)	1.014***	0.362***	-0.409***	1.247***	0.150	-0.358***	-3.399***	1.247***	0.150	-0.358***	-3.399***
	(17.43)	(7.95)	(-34.16)	(18.74)	(0.86)	(-18.75)	(-5.92)	(18.74)	(0.86)	(-18.77)	(-5.91)
× Crisis (q-1)	0.086	0.032	-0.011	-0.265***	0.062	-0.024	-3.492***	-0.288***	0.082	-0.006	-3.522***
	(1.19)	(0.62)	(-0.65)	(-3.13)	(0.27)	(-0.95)	(-4.03)	(-3.22)	(0.36)	(-0.22)	(-4.05)
× TARP (q-1)								0.358***	-0.266	-0.294***	1.374***
								(6.17)	(-1.63)	(-5.37)	(3.97)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	468337	470510	470493	251607	251889	251881	248988	251607	251889	251881	248988
R^2	0.021	0.037	0.014	0.126	0.082	0.094	0.046	0.126	0.082	0.096	0.046

Internet Appendix Table A4. Additional Specifications of Table 5 (Cont.)

Panel C: Distress Measured as *Low Equity Capital Ratio*; without *Crisis* Interaction

Sample period:	1985-1994			2005-2014			
Dependent variable:	Change in… (q, q+4)			Change in… (q, q+4)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Low equity capital ratio (q-1)	0.240***	0.222***	-0.104***	0.077**	0.036	-0.056**	-2.885***
	(14.81)	(6.35)	(-10.08)	(2.55)	(0.59)	(-2.50)	(-4.11)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	468337	470510	470493	251607	252181	252173	249274
R^2	0.021	0.037	0.014	0.047	0.081	0.021	0.043

Panel D: Distress Measured as *Low Z-score*; without *Crisis* Interaction

Sample period:	1985-1994			2005-2014			
Dependent variable:	Change in… (q, q+4)			Change in… (q, q+4)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Low Z-score (q-1)	1.039***	0.371***	-0.413***	1.111***	0.183*	-0.370***	-5.153***
	(24.40)	(10.53)	(-48.53)	(19.98)	(1.72)	(-43.14)	(-8.91)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	468337	470142	470127	251607	251889	251881	248988
R^2	0.090	0.042	0.087	0.124	0.082	0.094	0.046

Internet Appendix Table A4. Additional Specifications of Table 5 (Cont.)

Panel E: Distress Measured as *Financial Distress*, without *Crisis* Interaction

Sample period:	1985-1994			2005-2014			
Dependent variable:	Change in… (q, q+4)			Change in… (q, q+4)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Financial distress (q-1)	0.870***	0.488***	-0.334***	0.649***	0.078	-0.286***	-8.506***
	(25.97)	(7.30)	(-32.67)	(8.72)	(0.42)	(-12.65)	(-15.38)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	468337	470142	470127	251607	251889	251881	248988
R^2	0.038	0.040	0.031	0.055	0.080	0.032	0.044

Panel F: Distress Measured as *Low Equity Capital Ratio*; 1-Quarter Horizon

Sample period:	1985-1994			2005-2014			
Dependent variable:	Change in… (q, q+1)			Change in… (q, q+1)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Low equity capital ratio (q-1)	0.077***	0.006	-0.064***	0.147***	-0.060	-0.048***	-2.260***
	(3.61)	(0.15)	(-9.83)	(5.52)	(-0.48)	(-3.98)	(-10.58)
× Crisis (q-1)	0.046	0.038	-0.027**	-0.146***	-0.151	-0.009	-0.782**
	(1.55)	(0.79)	(-2.57)	(-3.72)	(-1.03)	(-0.56)	(-2.73)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	486197	486426	486425	259740	259758	259758	257085
R^2	0.007	0.015	0.008	0.015	0.022	0.011	0.011

Internet Appendix Table A4. Additional Specifications of Table 5 (Cont.)

Panel G: Distress Measured as *Low Z-score*; 1-Quarter Horizon

Sample period:	1985-1994			2005-2014			
Dependent variable:	Change in… (q, q+1)			Change in… (q, q+1)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Low Z-score (q-1)	-0.008	0.012	-0.019***	-0.007	-0.003	-0.004	-0.678***
	(-0.96)	(0.77)	(-4.75)	(-0.85)	(-0.15)	(-1.28)	(-3.67)
× Crisis (q-1)	0.015	0.014	-0.010*	-0.024	-0.121**	-0.020**	-1.043***
	(1.02)	(0.62)	(-1.96)	(-1.42)	(-2.23)	(-2.56)	(-4.72)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	486197	486829	486827	259740	260058	260058	257381
R^2	0.006	0.015	0.004	0.015	0.022	0.009	0.011

Panel H: Distress Measured as *Financial Distress*; 1-Quarter Horizon

Sample period:	1985-1994			2005-2014			
Dependent variable:	Change in… (q, q+1)			Change in… (q, q+1)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Financial distress (q-1)	0.217***	0.040	-0.103***	0.293***	-0.024	-0.084***	-1.183***
	(9.66)	(1.63)	(-14.57)	(8.73)	(-0.33)	(-5.42)	(-7.29)
× Crisis (q-1)	0.013	0.015	-0.014	-0.073	-0.023	-0.011	-0.819***
	(0.42)	(0.43)	(-1.37)	(-1.62)	(-0.27)	(-0.62)	(-3.45)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	486197	486426	486425	259740	259758	259758	257085
R^2	0.018	0.016	0.027	0.029	0.021	0.027	0.011

Internet Appendix Table A4. Additional Specifications of Table 5 (Cont.)

Panel I: Distress Measured as *Low Equity Capital Ratio*; 8-Quarters Horizon

Sample period:	1985-1994			2005-2014				2005-2014			
Dependent variable:	Change in… (q, q+8)			Change in… (q, q+8)				Change in… (q, q+8)			
	Log Z-score	Performing-loan ratio	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(4)	(5)	(6)	(7)
Low equity capital ratio (q-1)	0.483***	0.592***	-0.157***	0.126***	0.214**	-0.032***	-3.037***	0.127***	0.214**	-0.032***	-3.050***
	(10.76)	(9.46)	(-7.77)	(3.82)	(2.48)	(-3.19)	(-3.27)	(3.86)	(2.48)	(-3.21)	(-3.29)
× Crisis (q-1)	0.031	-0.143**	-0.011	0.252***	0.186	-0.144***	-4.951***	0.258***	0.212	-0.140***	-5.143***
	(0.42)	(-2.68)	(-0.95)	(3.27)	(0.97)	(-5.58)	(-3.93)	(3.34)	(1.13)	(-5.19)	(-4.30)
× TARP (q-1)								-0.069	-0.734***	-0.125***	4.210
								(-1.00)	(-3.52)	(-4.17)	(1.64)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	444902	447357	447336	241048	241673	241662	228739	241048	241673	241662	228739
R^2	0.045	0.063	0.026	0.113	0.145	0.049	0.056	0.114	0.145	0.050	0.056

Panel J: Distress Measured as *Low Z-score*; 8-Quarters Horizon

Sample period:	1985-1994			2005-2014				2005-2014			
Dependent variable:	Change in… (q, q+8)			Change in… (q, q+8)				Change in… (q, q+8)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(4)	(5)	(6)	(7)
Low Z-score (q-1)	1.397***	0.949***	-0.541***	1.479***	0.562***	-0.420***	-2.766**	1.479***	0.562***	-0.420***	-2.766**
	(25.50)	(16.55)	(-59.13)	(32.09)	(3.00)	(-40.17)	(-2.22)	(32.16)	(3.00)	(-40.23)	(-2.22)
× Crisis (q-1)	0.172**	0.001	-0.032***	-0.173**	0.301	-0.067***	-6.912***	-0.190**	0.344	-0.055***	-6.901***
	(2.15)	(0.02)	(-3.48)	(-2.39)	(1.11)	(-4.59)	(-4.00)	(-2.41)	(1.29)	(-3.46)	(-3.97)
× TARP (q-1)								0.173*	-0.632**	-0.178***	1.035
								(1.83)	(-2.68)	(-3.73)	(1.14)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	444902	447018	446999	241048	241402	241391	228476	241048	241402	241391	228476
R^2	0.143	0.084	0.141	0.201	0.155	0.140	0.057	0.201	0.155	0.141	0.057

Internet Appendix Table A4. Additional Specifications of Table 5 (Cont.)

Panel K: Distress Measured as *Financial Distress*; 8-Quarters Horizon

Sample period:	1985-1994			2005-2014				2005-2014			
Dependent variable:	Change in… (q, q+8)			Change in… (q, q+8)				Change in… (q, q+8)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(4)	(5)	(6)	(7)
Financial distress (q-1)	1.407***	1.400***	-0.491***	1.161***	0.928***	-0.297***	-8.078**	1.162***	0.928***	-0.297***	-8.085**
	(38.36)	(9.71)	(-18.10)	(12.08)	(3.39)	(-8.20)	(-2.65)	(12.08)	(3.40)	(-8.19)	(-2.65)
× Crisis (q-1)	0.120*	-0.215**	-0.021	-0.184*	-0.013	-0.142***	-7.034**	-0.185*	0.034	-0.131***	-7.167**
	(1.81)	(-2.11)	(-1.01)	(-1.87)	(-0.03)	(-4.03)	(-2.51)	(-1.87)	(0.09)	(-3.55)	(-2.59)
× TARP (q-1)								0.131	-1.299***	-0.327***	2.689
								(0.87)	(-4.66)	(-5.19)	(1.17)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	444902	447018	446999	241048	241402	241391	228476	241048	241402	241391	228476
R^2	0.076	0.077	0.058	0.126	0.149	0.064	0.057	0.127	0.149	0.065	0.057

Panel L: Distress Measured as *Financial Distress*; PCA Banks Excluded; 2005-2014

Sample period:	2005-2014			
Dependent variable:	Change in… (q, q+4)			
	Log Z-score	Performing-loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(1)	(2)	(3)	(4)
Financial distress (q-1)	0.949***	0.140	-0.231***	-4.941***
	(16.12)	(0.80)	(-11.77)	(-5.36)
× Crisis (q-1)	-0.317***	-0.221	St Dev	-2.042**
	(-4.06)	(-0.96)	(-0.95)	(-2.18)
× TARP (q-1)	0.235	-0.457	-0.449***	0.515
	(1.01)	(-1.52)	(-4.03)	(0.32)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
N	246781	246978	246970	244414
R^2	0.054	0.083	0.028	0.042