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# The Cost Effectiveness of the Private-Sector Reorganization of Failed Banks

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# The Cost Effectiveness of the Private-Sector Reorganization of Failed Banks[1]

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**ABSTRACT**

In this paper, we examine how the cost to the FDIC of resolving bank failures differs between two types of resolution methods of failed banks: liquidation and a private-sector reorganization. An FDIC liquidation is analogous to a Chapter 7 bankruptcy and a private-sector reorganization is analogous to a Chapter 11 bankruptcy. Our findings show that private-sector reorganizations do not deliver the expected cost-savings prior to the passage of FDICIA in 1991, a period of industry distress. We obtain this result when we control for the selection bias that arises from the resolution process. In contrast, during the post-FDICIA period, we observe that private-sector reorganizations yield significant cost savings over FDIC liquidations. We also find that the direct costs are lower for private-sector reorganizations over the sample period. When compared to non-financial bankruptcy costs, FDIC resolution methods appear to be less costly than Chapter 7 and Chapter 11 bankruptcies.

**JEL Classifications:** G21, G28, G33
**Keywords:** bank failures, bankruptcy costs, bank resolution costs, FDIC receivership

**Opinions expressed in this paper are those of the authors and not necessarily those of the FDIC.**

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## I. Introduction

From 1986 to 2007, 2,427 depository institutions failed in the United States. Out of these, approximately 51 percent, or 1,244 institutions, with $222 billion in assets were placed under a Federal Deposit Insurance Corporation (FDIC) receivership for resolution.[2] The FDIC resolved these failure using two primary methods. In the first, an FDIC liquidation, the FDIC liquidates the assets and pays off the insured depositors. In the second, a private-sector reorganization, the FDIC sells all or part of the assets to an acquirer together with all or part of the deposits.[3] An FDIC liquidation is similar to a Chapter 7 resolution; a private-sector reorganization is similar to a Chapter 11 resolution of corporate bankruptcies. In this paper, we examine the costs of liquidation and private sector reorganization using 1,213 of the 1,244 banks that failed during the 1986 to 2007 period

An important difference between corporate and depository institution failures is that the liquidation of a bank destroys the franchise value of the bank charter. A private-sector reorganization can preserve some of the franchise value. Given that this value is non-negative, and absent additional frictions, a private-sector reorganization should always be less costly than a liquidation. Liquidation is likely to be lower cost only if there are costs associated with private sector reorganization that exceed the franchise value that is preserved. These costs can arise either from asymmetric information or lack of risk capital due to industry distress (Shleifer and Vishny, 1992). In situations where either information problems or the extent of industry distress is severe, an asset sale may result in a price lower than its value. Therefore, if the FDIC finds itself in an environment where it cannot liquidate assets in an orderly manner, a private-sector resolution might prove to be costlier than liquidation.

[2] The rest of the failures were thrift institutions, which were insured by the Federal Savings and Loan Insurance Corporation (FSLIC) or Saving Association Insurance Fund (SAIF) or resolved by the Resolution Trust Corporation (RTC). We focus on the Bank Insurance Fund (BIF) and Deposit Insurance Fund (DIF)-insured institutions and our sample draws from this group. Throughout the paper we refer to them as banks.

[3] Our definition of private-sector reorganization is closely related to the FDIC's purchase and assumption (P&A) classification of resolutions. The difference is that our definition classifies P&As that transfer less than 25 percent of assets to an acquirer as an FDIC liquidation. In our robustness checks, we vary this cutoff point between zero and 50 percent.

Indeed, our findings show that in the period preceding the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991, the private-sector reorganization is more costly, which implies bids for the failed bank do not reflect the full value of the bank franchise during the crisis period. This finding is in contrast to previous research on bank resolutions, which argues that the Purchase and Assumption (P&A) is a less costly method in the pre-FDICIA period (Bovenzi and Murton 1988; Brown and Epstein 1992; James 1991). We attribute the difference in findings to the lack of controls for selection bias in the earlier research.[4]

When we examine the post-FDICIA period we find that, as expected, the net loss on assets is lower for a private-sector reorganization in the post-FDICIA period. This result implies that a bank that was resolved by a private-sector reorganization experienced lower net loss on assets than if it had been resolved by an FDIC liquidation holding everything else constant. We infer from this finding that, the relative health of the industry and changes to the resolution process during this period resulted in bids that were more advantageous to the FDIC.

Our analysis also contributes to the literature that estimates costs of bankruptcy procedures (Chapter 7 and Chapter 11) and recovery rates for corporate failures. This literature exclusively focuses on failure resolutions under the bankruptcy code to examine costs of alternate restructuring procedures.[5] However, insured depository institutions are not subject to bankruptcy code. Instead, they undergo a bank resolution process that is implemented outside of the court system. Therefore, our analysis allows us to contrast the costs of an out-of court resolution regime to the costs of bankruptcy and recovery rates from previous literature.

The literature on the direct costs of bankruptcy procedures for corporate failures provides mixed evidence regarding the magnitude of these costs. We compare our results

[4] The type of resolution can depend on the characteristics of the failed bank, which also influences costs. Therefore, it is misleading to compare costs between the private-sector reorganization and the FDIC liquidations without controlling for the selection bias implicit in the resolution process. Our multivariate regressions control for this selection bias.

[5] Warner (1977), Altman (1984), Ang et al (1982), Tashjian et al (1996) examine costs of bankruptcy in Chapter 11 cases whereas Lawless et al. (1994) and White (1984) estimates costs in Chapter 7 bankruptcies. Pulvino (1999) compares recovery rates between Chapter 7 and Chapter 11 bankruptcies. Bris, Welch, and Zhu (2006) provide a comprehensive study of costs and recoveries in Chapter 7 and Chapter 11 cases.

to the latest evidence in Bris, Welch, and Zhu (2006) and observe that recovery rates are higher and direct expenses are lower in FDIC resolutions. This observation supports the arguments that the limitations of the bankruptcy process make it costlier relative to the resolution process for financial firms. To our knowledge, our study is the first that can shed some light on such arguments.[6]

The remainder of this paper is organized as follows. Section II describes the characteristics of different FDIC resolution methods and provides information on the number and types of failures over the 1986 to 2007 period. Section III describes our definition of resolution costs and Section IV provides a univariate analysis of the components of these costs. In Section V, we discuss the empirical model of the FDIC resolution method and the determinants of resolution costs. Section VI presents the empirical results. Section VII provides robustness checks. Section VIII compares our results for failed banks to similar studies on non-financial bankruptcies. Section IX concludes.

## II. Private-Sector Reorganization versus FDIC Liquidation of Failed-Bank Assets

In this section, we describe FDIC resolution methods in terms of their traditional classifications and develop our classification of private-sector reorganizations and FDIC liquidations. Then, we discuss the factors that can potentially influence the difference in costs between FDIC resolution methods.

### A. FDIC Resolution Methods

Banks can fail for a variety of reasons including undercapitalization, poor asset quality, weak risk management, insufficient liquidity, unsafe and unsound practices, and fraud. Whatever the cause of failure, the chartering agency has the authority to terminate the bank's charter and appoint the FDIC as the receiver. As part of the resolution process, the FDIC develops a marketing strategy that includes determining the resolution structures that it offers to potential bidders. The FDIC then markets the assets and

[6] For example Bair (2010) argues that because resolving failures of financial firms under the bankruptcy code were so cumbersome, it was difficult to resolve these companies without bailing out shareholders or causing systemic risk to the financial system. Title II of Dodd-Frank is meant to address the concern that the bankruptcy process is cumbersome and imposes extensive delays that make the resolution of large financial firms difficult and very costly.

liabilities of the failing bank and evaluates the bids it receives.[7] One option that the FDIC is required to consider is a deposit payout, where the FDIC pays the insured depositors and liquidates the assets. Alternatively, the FDIC can receive bids to purchase all or part of the assets and assume all or part of the deposit liabilities. Prior to the passage of the FDICIA, which required the FDIC to close institutions in a manner that is least costly to the deposit insurance fund, a bid had to pass the cost test to be acceptable.[8] The cost test required that the final resolution be less costly than a deposit payoff, however it did not require that the accepted bid be the least costly of all of the bids.

Under the cost test, other considerations, such as the impact on the community could have influenced the outcome of the cost test. When the FDIC designs the marketing strategy for the failed banks, it may consider implications of certain FDIC resolution methods on banking stability. Indeed, FDIC (1998b) lists the economic conditions of the institution's market area as one of the factors FDIC considers in determining the resolution structures to offer to potential bidders.

After FDICIA, however, the FDIC was required to choose the resolution method that was least costly to the deposit insurance fund(s). In this new regime, the FDIC could only calculate the least cost resolution if it analyzed bids for the insured deposits and uninsured deposits separately. Therefore, the FDIC offered resolution structures that allowed bidders to bid on all deposits or insured deposits only. This calculation allowed the agency to determine if the bidder was willing to pay more for acquiring the uninsured deposits than FDIC would save by imposing losses on those same deposits.

The FDIC also implemented other changes in the marketing strategy that could have influenced the resolution method and costs after FDICIA. The FDIC offered bidders, separate from the deposit franchise, smaller, homogenous loan pools rather than large loan portfolios. These homogeneous loan pools were tailored to better meet the bidders' business strategies. Another innovation was to offer branches for sale separately, which allowed smaller institutions to participate in the bidding process. Furthermore, the FDIC developed the loss sharing arrangements to keep assets of a large

[7] The FDIC compiles a list of potential acquirers which includes financial institutions and private investors. This list is reviewed by the financial regulatory authorities involved in the transaction to determine which bidders will be approved to acquire the failing institution.

[8] The cost test was established in the Depository Institutions Deregulation and Monetary Control Act, 1980.

bank failure within the banking system. Under the loss sharing agreement the FDIC typically covers 80 percent of the losses (95 percent in exceptional cases) on loans purchased by the acquirer and reimburses direct expenses related to the disposition of the assets. The implementation of the least cost test plus these changes in the marketing strategy may have lead to lower losses to the FDIC and lower total resolution costs. We explore this further below.

If no bids are received, or the bids do not satisfy the relevant cost test, the FDIC will resolve the bank using a deposit payoff. The FDIC can employ two methods to pay off depositors. In a deposit payout (PO), the FDIC pays off the insured depositors in cash (by check). The uninsured depositors and general creditors file claims against the receivership and they are paid their pro-rata share of their claim if funds are available as the assets are liquidated. In this case, any deposit franchise of the failed bank is destroyed. The other method is an insured-deposit transfer (IDT) where the FDIC transfers insured deposits and secured liabilities to a healthy institution, along with a cash payment.[9] This cash payment is typically less than the face value of the liabilities because the FDIC usually receives a premium from the agent institution, and thus recovers some of the value of the deposit franchise. In either method the FDIC does not cover uninsured deposits, which are reimbursed their pro-rata share as the assets are liquidated.

Alternatively, the FDIC can receive bids to purchase all or part of the assets and assume the deposit liabilities. These bids are compared to the FDIC's estimates of the liquidation value of the assets. As noted above, the volume of assets the FDIC offers the bidders can vary widely and depends on the quality of the failed bank assets. In one extreme, these bids can involve purchasing 100 percent of the assets and assuming all insured and uninsured deposits. In this case, the acquirer's bid reflects their valuation of the deposit franchise less their estimate of the expected loss on the book value of the assets. If the expected loss on assets exceeds the franchise value the bid reflects FDIC's expected payment to the acquirer. The FDIC calls this resolution structure a whole bank purchase and assumption.

[9] The healthy bank can also be viewed as a "paying agent" for the FDIC. Depositors of the failed firm have access to their insured deposits and can choose to whether to move their account to a new depository or accept the new relationship with the acquiring bank.

The FDIC can also receive bids where the bidder wants to purchase only part of the failed-bank's assets. Most resolutions fall in this category and the percentage of assets transferred to the private sector varies between zero and 100 percent. The FDIC terms these resolutions as purchase and assumptions (P&A) transactions. Prior to FDICIA, the FDIC offered all deposits in a P&A because the corporation was only required to make the acquisition less costly than liquidation. When an acquirer assumes all deposits in a P&A, 100 percent protection is essentially extended to all depositors, including uninsured depositors. In contrast, only insured depositors are protected 100 percent in a deposit payout. After FDICIA, the FDIC gave the bidders the option to bid for all of the deposits or for only the insured deposits because a least-cost resolution almost always includes imposing losses on uninsured depositors.

The last category of failure resolution methods is open-bank assistance (OBA). Here the FDIC does not establish a receivership but provides financial assistance to an open institution to prevent it from failing. Generally, the FDIC replaces the existing bank management. A major criticism of OBA is that the shareholders of the failing institution benefit from the assistance provided by the FDIC. In fact, FDICIA prohibits the use of the deposit insurance fund to benefit the shareholders or other creditors of an institution that has failed or is in danger of failing. However, during this time period, if the two-thirds of the Boards of both the FDIC and the Board of Governors of the Federal Reserve System recommended, and the secretary of the Treasury, in consultation with the President of the United States, determined that the least-costly approach would have serious adverse effects on economic conditions or financial stability, then there was an exception to this rule.[10] This is referred to as the *systemic risk exception*. Because our measures of resolution costs rely on records from the receiverships, and because OBA transactions do not result in a receivership, we exclude them from our analysis.

Panel A of Table 1 shows the number of banks that were insured by the Bank Insurance Fund (BIF) and the Deposit Insurance Fund (DIF) and failed from 1986 through 2007.[11] There were a total of 1,244 bank failures during that period when we

[10] Currently, under the Dodd-Frank Act of 2010 the Financial Stability Oversight Council has the authority to designate the systemically important institutions.

[11] The Financial Institution Reform and Recovery Act (FIRREA) of 1989 created the Saving Association Insurance Fund (SAIF) to replace the Federal Savings and Loan Insurance Corporation (FSLIC) as the

treat each bank within a holding company as a separate observation. These failures do not include the 317 failed institutions that were insured by Federal Savings and Loan Insurance Corporation (FSLIC), 747 failed institutions that were resolved by the Resolution Trust Corporation, and six failed institutions that were insured by the Savings Association Insurance Fund (SAIF). We exclude these institutions because our analysis relies on data from FDIC internal accounting records, which are readily available for the BIF-and DIF-insured institutions.

During the sample period, we observe that the number of bank failures peaks in 1989 and dramatically drops after 1992. Indeed, during 2005 and 2006 there were no bank failures. According to our definition, there were 928 failures, where more than 25 percent of the assets remained in the private sector, and 316 failures, where the FDIC liquidated 75 percent or more of the assets. In terms of failures by resolution type, we observe in Panel A of Table 1 that out of 1,244 failures between 1986 and 2007, 236 cases (19 percent of the failures) are deposit payoffs and 1,008 cases (81 percent of the failures) are P&A transactions including whole-bank transactions. Insured deposit transfer proves to be the preferred method when the deposit payoff approach is used. Whole-bank transactions lose popularity following 1991.

Panel B of Table 1 compares our sample with the universe of BIF- and DIF-insured bank failures summarized in Panel A. Our sample includes 97.5 percent of the total failures (1,213 failures of the total 1,244) that were placed in receivership. We exclude 31 institutions for two reasons: either their resolution process was not completed by the end of 2007 (except for five institutions) or, because these institutions were trust banks and were not taking deposits or making loans at the time of failure.

We make one last adjustment. In our sample, 132 banks of the 1,213 failures belong to eleven bank holding companies. In our analysis we consolidate these failures under their respective bank holding companies and our resulting sample size is 1,092. This consolidation treats subsidiaries as if they were branches. As shown in Panel C of Table 1, the sample includes 795 institutions where more than 25 percent of the assets

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provider of deposit insurance for thrift institutions. The SAIF was administered by the FDIC separately from its bank insurance fund, called the Bank Insurance Fund (BIF). The Federal Deposit Insurance Reform Act of 2005 merged the SAIF and BIF into one insurance fund called the Deposit Insurance Fund (DIF). DIF covered the three failures that occurred during the 2005 to 2007 period.

remained in the private sector and 297 where more than 75 percent of the assets were liquidated by the FDIC.

**INSERT TABLE 1 HERE**

### B. Cost Differences between FDIC Resolution Methods

In an FDIC liquidation, costs can be higher than in a private-sector reorganization for a number of reasons. First, in a deposit payoff the franchise value of the bank is lost so the FDIC cannot capture this value (James 1991). Second, some researchers have argued that assets might be worth less in the hands of the FDIC. This is plausible because the acquiring bank in a private-sector reorganization may face fewer constraints than the FDIC in collections, loan restructuring, and legal actions (Carns and Nejezchleb 1992). Third, after an asset is transferred to the FDIC, the asset can suffer a loss in value because the bank-customer relationship breaks down and the customer can have a higher incentive to default (FDIC 1998a). Thus, under a private-sector reorganization the FDIC can recover a higher percentage of the book value of the assets, which lowers resolution costs. Therefore, given that the value of deposit and borrower relationships, or the franchise value, is nonnegative, and absent additional frictions, private-sector resolutions should always be less costly.

However, there can be other factors that could cause private-sector reorganization to yield higher costs. These costs can arise either from asymmetric information or lack of risk capital due to industry distress (Shleifer and Vishny, 1992). In situations where either information problems or the extent of industry distress is severe, the sale of assets may be characterized as a fire sale. For example, as bank failures become more frequent and the volume of non-performing and defaulted loans increases, bidders may be more risk-averse, which results in lower bids. In addition, when the industry is in distress there are fewer bidders for failed-bank assets. These bidders know that in these circumstances they have less competition for assets and therefore bid lower prices for the assets.

Our sample period allows us to observe resolution costs during periods of industry distress and periods of relative health in the industry and provide some evidence for arguments made by Shleifer and Vishny (1992). During the 1986 to 2007 period the

banking industry went from deep crisis to recovery, and eventually prosperity. Over the 1986 to 1991 period, the industry was in deep distress. As Table 1 shows, there were record levels of bank failures during this period. In addition, in the fourth quarter of 1986, 10.27 percent or 1,457 of insured commercial banks considered problem banks. By the end of 1992, the number dropped to 6.87 percent of banks, or 787 banks.[12] The high number of failures rapidly depleted the deposit insurance fund. The fund balance declined from 84 basis points of domestic deposits in 1986 to one basis point of domestic deposits in 1992.[13]

In contrast, the industry regained health after 1991 and by the end of 2007, the number of problem banks dropped to 76, or 89 basis points, of the 8,533 insured depository institutions. The insurance fund increased from one basis point in 1992 to 76 basis points of insured deposits at the end of 2007.[14] The relative health of the industry resulted in more eligible bidders and higher demand for failed bank assets. Therefore, we would expect private sector resolutions to be more costly during 1986 to 1991 and less costly after 1991.

However, we cannot attribute lower costs entirely to improved industry health. Changes to the resolution process from FIRREA in 1989 and FDICIA in 1991 resulted in bids that were more advantageous to the FDIC.[15] FIRREA allows the FDIC to offset losses via the cross guarantee provision. This clause enables the FDIC to recover some of its resolution costs by assessing these costs against the solvent insured institutions in the same holding company. FDICIA requires the FDIC to use the resolution method that is least costly to the deposit insurance fund(s). Note that this requirement may or may not translate into lower total resolution costs, which include costs borne by claimants other than the FDIC. However, since the FDIC is typically the largest claimant class, under the least cost regime we expect total resolution costs to be lower.

Two complications arise when testing the difference between the costs of resolution methods. The first pertains assigning each failure to one of the two approaches.

[12] FDIC (1986), p. 5 and FDIC (1992). p. 5.
[13] FDIC (2009), p. 145.
[14] FDIC (2009), p. 145.
[15] Appendix C provides an outline of how these two major pieces of banking legislation affected the failure resolution process.

One approach is to use the P&A method and the deposit payoff as the classifying variables. Previous research uses this classification and finds that P&As are less costly than deposit payoffs. However, this classification is noisy because not all deposit payoff transactions transfer 100 percent of the assets to the FDIC. Similarly, not all P&A transactions pass 100 percent of the assets to the acquiring bank. Therefore, the tests are confounded.

Rather than use the traditional classification of P&A and deposit payoff, we use the percentage of assets transferred to the private sector as the classifying variable. The quality of the failed-bank assets and the percentage of assets transferred to the acquirer influence the cost of the resolution. For example, in one extreme when all of the assets are passed to the acquiring bank the customers do not lose their borrowing relationship with the bank and the link between the customer's deposits and loans is preserved. Thus, the failed bank's franchise value is maintained and the receivership can recover this value. In the other extreme, when the FDIC liquidates all of the assets it does not extend any further credit—for example, it does not renew maturing loans or honor existing credit lines. The FDIC either holds the loans until maturity or sells the loans and other assets. Therefore, the borrowing relationship between the customer and the bank is destroyed and the receivership cannot recover the value of the relationship.

We define a private-sector reorganization as one where 25 percent or more assets are purchased by an acquiring bank; otherwise we classify a resolution as an FDIC liquidation. We use this cutoff point because we judge that if less than 25 percent of the assets are transferred to the acquiring bank then the link between the loans and the deposits is substantially disrupted. To check the robustness of our results we vary the cutoff point from zero to 50 percent.

The second complication is that typically the FDIC is forced to acquire and liquidate the worst quality assets when it receives no qualifying bids from a viable bank. Banks specialize in making loans and not managing bad assets. Therefore, absent substantial concessions, a prospective bidder may not bid on loans that are either delinquent or that they expect will go delinquent. Consequently, institutions that have higher quality assets and a higher franchise value associated with their deposits are more likely to attract more bidders with the result that more assets will remain in the private

sector. Therefore, it is misleading to compare costs between the private-sector reorganization and the FDIC liquidations without controlling for the selection bias implicit in the resolution process. In our empirical analysis, we correct for this selection bias.

## III. Components of Resolution Costs

The Historical Statistics on Banking (HSOB) publishes the cost to the deposit insurance fund of bank failures.[16] The cost to the deposit insurance fund is only one component of total resolution costs, and we are interested in analyzing total resolution costs. So, we use more detailed and comprehensive information from the FDIC's general ledger to construct our measures of the components of total resolution costs. From the general ledger, we obtain balance sheets and monthly income statements for the receiverships. A common definition of total bank resolution cost (TRC) is the difference between the liabilities of the failed bank ($BVL_0$) at time of failure (t=0) and the sum of the liquidation value of its assets ($LVA$) during the resolution process net of expenses incurred by the receivership ($EXP$), adjusted for any explicit premium received ($PR$) in the resolution process. Assets are liquidated over time between failure time (t=0) and termination of the receivership (t=T) and during this period FDIC incurs expenses.

$$TRC = \sum_{t=0}^{T} LVA_t - BVL_0 + PR_0 - \sum_{t=0}^{T} EXP_t \tag{1}$$

By rearranging equation (1) we can show that total resolution cost equals the market value of the equity of the failed bank (ignoring discounting). To see this, we add and subtract the book value of assets at failure ($BVA_0$) from equation (1) and define the loss on assets ($LOA$) as the difference between the liquidation value of assets ($LVA$) and the book value of assets ($BVA$). We also define the book value of equity ($BVE$) as the difference between book value of assets ($BVA$) and the book value of liabilities ($BVL$). Thus we can state equation (1) as:

[16] The HSOB is available on the FDIC website (http://www4.fdic.gov/HSOB/index.asp).

$$TRC = BVE_0 + \sum_{t=0}^{T} LOA_t + PR_0 - \sum_{t=0}^{T} EXP_t \quad (2)$$

Equation (2) shows that, total resolution cost equals the book value of equity adjusted for the gains or losses on the disposition of assets and liabilities and receivership expenses. Thus, in equation (2) we obtain the market value of equity. This interpretation enables us to link the book value of equity of the failed bank at time of failure to its market value. We organize Table 2 to reflect the definition of total resolution costs on a discounted basis as shown in equation (2). Appendix A provides an explanation of the discounting process that we use.

We report the components of the total resolution costs as a percentage of the book value of assets at failure. We start with the book value of equity on the last Call Report prior to failure. This value differs from the book value of equity at the time of failure for two reasons. First, the book value of equity changes between the time that the last Call Report is filed and the date of failure. Second, the FDIC reverses the loan loss reserves before recording the book value of equity at failure on the receiverships books. The book value of equity ratio at failure, defined as the book value of equity as a percent of book value of assets at failure, varies considerably in the sample. We have institutions that are closed with book value equity ratios as high as 26 percent (13.08 percent on the last Call Report). However, closing banks with high positive book value of equity at failure is a rarity—only nine percent of our sample has a book value of equity ratio above eight percent at the time of failure. In contrast, we observe a larger percentage of banks failing with negative book value of equity ratios. Indeed, 34 percent of our sample has zero or negative book value of equity at the time of failure. In one case, a failed bank had a negative book equity ratio as large as 56 percent.

**INSERT TABLE 2 HERE**

The next item in the table is the net loss on assets. The first component of the net loss on assets is the gain and (loss) on assets. The receivership income statements on the FDIC GL records the gain (or loss) on the disposition of assets as the difference between cash collected and the book value of assets of the failed bank. We adjust this number for

net income or loss from assistance agreements, net loss sharing expenses that arise from agreements between the receivership and acquirer, interest and fees that are earned on the assets in liquidation during the resolution process and other miscellaneous income, and the interest expense paid to the FDIC by the receivership before we arrive at the net loss on assets.

The final two components of the net loss on assets are the premium paid to and the premium received from the acquirer. The premium received reflects the amount that the acquirer pays to the receivership to assume the deposits of the failed bank, and it can be used as an imperfect proxy for the franchise value of the failed bank. The proxy is imperfect because in P&A transactions the cash payment for the liabilities can be confounded by the bid for the assets. An acquirer can adjust upward or downward the premium paid to the FDIC for the deposit franchise to compensate for their valuation of the assets. We do not discount premiums and consider them paid or received at time of failure.

The net loss on assets shows considerable variation. In one extreme case, the net loss on assets constituted 93.98 percent of the assets at failure on a discounted basis. In rare cases, there are gains on the net loss on assets but this gain is primarily due to premiums received from acquirers.

The next two lines show the direct and indirect liquidation expenses. Direct expense items are akin to the direct bankruptcy costs of corporate failures. Direct liquidation expenses are salaries, travel, legal, and other professional fees, such as accounting and auditing fees incurred in the resolution process. In Table 2, we report the discounted value of direct expenses. Indirect liquidation expenses are general liquidation expenses from overhead associated with the FDIC's liquidation activities that cannot be charged to specific assets or receiverships. The allocation of these expenses to the individual receivership is challenging.

During our sample period the FDIC changed the types of expenses included and the allocation method of the indirect expenses to the receiverships. Currently, the FDIC uses a service costing approach. Under this approach, the costs are allocated to the receivership by charging it for the services provided by the FDIC, and uses market-based prices for the services. For example, indirect expenses can include a flat rate for each

claim that the FDIC processes or hourly rates for FDIC investigations of legal matters pertaining to the receivership.

Total resolutions costs are the sum of these cost components and represent the losses that are borne by all of the claims on the receivership, including losses to the deposit insurance fund represented by claims held by the FDIC. We observe significant variation. Although at one extreme total resolution cost (market value of equity at termination) is a positive number, representing a gain of as high as 8.61 percent of the assets at failure. At the other extreme this ratio is negative 134 percent.

For comparison, Table 2 provides the undiscounted values for total resolution costs and the losses to the FDIC. The FDIC publishes its share of losses (cost to the insurance fund) on an undiscounted basis in the HSOB on their website. As shown in Appendix B, we reconcile the cost to the deposit insurance fund that we calculate from the receivership books to the HSOB.

We observe the average cost to the insurance fund is 5.56 percent less than the total resolution cost on an undiscounted basis. This difference reflects costs borne by shareholders, bondholders, uninsured depositors, and trade creditors.

## IV. Univariate Analysis of the Components of Resolution Costs

Table 3 disaggregates the components of resolution costs by resolution method, size, and legislative period. We present these components on a discounted basis and in terms of the percent of total assets at failure.

***Resolution Costs by Resolution Method***: In Panel A we show results for the FDIC versus the private-sector reorganizations. The first observation is that private-sector reorganizations have lower average capital ratios at failure. The mean (median) capital ratio at failure of 2.50 percent (2.60 percent) for FDIC liquidations is significantly different from the mean (1.00 percent) and the median (1.53 percent) ratio for private-sector reorganizations.

In contrast, FDIC liquidations have significantly higher net loss on assets and higher direct receivership expenses than private-sector reorganizations. The 6.74 percent mean difference (7.67 percent median) in net loss on assets between these two resolution

methods is statistically significant. The mean direct receivership expense ratio for the FDIC liquidations is 4.71 percent compared to 3.09 percent for the private-sector reorganizations and the difference in mean (median) are highly significant. However, at this point, we cannot assess whether these differences exist because the private-sector reorganizations are inherently less costly, or if the characteristics of failed banks resolved in a private-sector reorganization differ from those of failed banks that are liquidated by the FDIC. The objective of our multivariate analysis is to disentangle these two possible effects.

In addition to direct expenses, the resolution of failed banks requires additional expenses, such as overhead expense. We observe that this is an economically significant addition because it more than doubles the direct expense ratio for the FDIC liquidations and almost quadruples the direct expense ratio for the private-sector reorganizations. It is noteworthy that indirect expenses as a percent of assets are similar for both methods. However, the direct expense ratio is significantly lower for the private-sector reorganizations. Studies that examine the bankruptcy costs of non-financial firms ignore the overhead costs of the courts, which are borne by the taxpayers. For failures of financial firms, the FDIC recognizes overhead costs and they are reflected in the receivership expenses.

The relationship we find between total resolution costs for the private-sector reorganizations and the FDIC liquidations is similar to Bovenzi and Murton (1988) and Brown and Epstein (1992) and James (1991), who find that loss rates are higher for deposit payoffs than for P&A transactions.

***Resolution Costs by Size***: The cost of resolving a failed bank can depend on size for a number of reasons. First, there can be economies of scale in asset and liabilities marketing. The receivership can construct, market, and service asset pools more efficiently when asset size is larger. Second, the characteristics of assets at small banks are typically different from those of large banks, thus generating differing liquidation costs. Empirically, it is well known that a strong negative correlation exists between bank asset size and resolution costs as a percent of assets (FDIC (1998a), p. 100).

Panel B confirms these observations. We classify total resolution costs into three size categories: small, medium, and large. We define small institutions as those with total assets at failure less than or equal to $500 million. Medium institutions are those with more than $500 million and less than or equal to $1 billion of total assets at failure, and large institution are those with more than $1 billion of total assets at failure.

The results show that small banks enter the failure state with lower book value of equity ratios. The net loss on assets exhibits an inverse relation with size. Direct and total receivership expense ratios are also lower for larger banks. As a result, we find that total resolution costs, as a percent of book value of assets at failure, decline with asset size, which confirms the findings of earlier studies.

***Resolution Costs by Legislative Period***:

We split the sample into separate legislative periods to capture the time series characteristics of the components of resolution costs. In particular, we look at the period before FDICIA and after FDICIA. The FDICIA period starts in January 1992. Panel C shows the univariate statistics for each legislative period.

The first interesting observation pertains to the capital ratio. The average book value of equity at the failed institutions shows a tendency to increase. The mean (median) capital ratio of the pre-FDICIA period is 0.95 percent (1.35 percent); this ratio increases significantly to 3.83 percent (4.25 percent) for the failures during the FDICIA period. The PCA provision of FDICIA requires the FDIC to take mandatory actions for critically undercapitalized institutions, which are banks with tangible capital ratio of two percent or below. The intent of this provision is to require distressed banks to be closed before they become severely distressed. Therefore, we expect the capital ratios of the failed banks post-FDICIA will be significantly higher than the capital ratios of the failures pre-FDICIA. Our results are consistent with this expectation.

In contrast, we observe an opposite tendency for the net loss on assets. The mean (median) net loss on assets ratio declines from 23.13 percent (22.17 percent) in the pre-FDICIA period to 12.33 percent (10.81 percent) during post-FDICIA period. This positive development is also augmented by an increase in premiums received from

acquirers. In terms of receivership expenses we do not find any significant changes in direct or indirect expenses.

As a result, we observe that the mean and median of the total resolutions cost ratio is lower during the post-FDICIA period. In particular, the mean (median) total resolutions cost ratio is 22.79 percent (21.17 percent) on a discounted basis. In contrast, in the pre-FDICIA period the mean (median) cost ratios are 35.65 percent (32.66 percent).

The total resolution cost ratio for the pre-FDICIA period is similar to the cost ratios reported in Bovenzi and Murton (1988), Brown and Epstein (1992), and James (1991), who find that the loss on assets is approximately 30 percent of failed-bank assets during the banking crisis of the late 1980s. However, previous research that investigates the determinants of the costs of bank failures typically models the loss rate as a function of bank specific variables and factors that reflect the health of the banking industry. In these studies the definition of loss varies. Bovenzi and Murton (1988), Brown and Epstein (1992), and James (1991) analyze the net loss on assets as defined in Table 2. All three studies account for the time value of money by discounting the current dollar cash flows to the failure date. In contrast, Osterberg and Thomson (1995) and the more recent studies of McDill (2004) and Schaeck (2008) model the cost to the FDIC deposit insurance fund as published in the HSOB. This value is also shown in Table 2. Consequently, these later studies model a value that does not account for the time value of money. Furthermore, the value includes both direct and indirect receivership expenses, where the latter is an allocated overhead expense.

**INSERT TABLE 3 HERE**

## V. Modeling the Determinants of the Loss Rate

We study the determinants of Net Loss on Assets (NETLOA) and direct costs (DIRECT) and identify whether or not a private-sector reorganization of failed-bank assets is inherently less costly than an FDIC liquidation.

The model is as follows:

$$L_i = X_i\beta + \gamma C_i + \varepsilon_i \tag{3}$$

The $L_i$ is the net loss on assets ratio of failed bank *i,* and $X_i$ is a vector of variables that determine the loss rate. In a separate model, we use $L_i$ to represent the direct costs associated with failed bank *i*. The variable $C_i$ takes the value of one if the failed bank is resolved using a private-sector reorganization and zero otherwise. The difference between the cost effectiveness of these two methods is captured by the γ parameter.

However, the type of resolution that the resolution process yields can depend on the characteristics of the failed bank, which also influences costs. In other words, if we estimate equation (3) ignoring this relation, then we will introduce an omitted variables bias arising from unobserved differences between the two resolution methods.

To address this sample selection bias, we use a "treatment effects" model to estimate the outcome equation (3), which captures the effect of the resolution method on the costs, and a treatment equation, which is a probit equation of the probability that the resolution process yields a private-sector reorganization. The model is:

$$C_i = \begin{cases} 1 & if \quad C_i^* > 0 \\ 0 & otherwise \end{cases} \tag{4}$$

$$C_i^* = V_i\alpha + \mu_i \tag{5}$$

In this framework, whether or not a private-sector reorganization is used, $C_i$, depends on the unobserved realization of the latent variable, $C_i^*$, which is defined in equation (5). The error terms $\varepsilon_i$ from equation (3) and $\mu_i$ from equation (5) are assumed to be bivariate normal with a covariance matrix of:

$$\text{cov}(\varepsilon_i, \mu_i) = \begin{bmatrix} \sigma^2 & \rho\sigma \\ \rho\sigma & 1 \end{bmatrix} \tag{6}$$

The probability that the resolution process yields a private-sector approach to resolve the bank failure is as follows:

$$\Pr(C_i = 1 \mid V_i) = \Phi(V_i\alpha) \tag{7}$$

where $\Phi$ is the cumulative standard normal distribution.[17]

We follow Maddala (1983) and use a two-stage estimation strategy. First we estimate the treatment equation (4) using a probit regression. From this estimation we obtain a hazard for each observation. The hazard for each observation is as follows:

$$h_i = \begin{cases} \dfrac{\phi(V_i\hat{\alpha})}{\Phi(V_i\hat{\alpha})} & \text{if } C_i = 1 \\ \dfrac{-\phi(V_i\hat{\alpha})}{1-\Phi(V_i\hat{\alpha})} & \text{if } C_i = 0 \end{cases} \tag{8}$$

where $\phi$ is the standard normal distribution.

In the second stage, we include this hazard variable as an additional regressor and the net loss on assets equation becomes:

$$E(L_i \mid C_i) = X_i\beta + \gamma C_i + \lambda h_i \tag{9}$$

where $\lambda = \rho\sigma$. Maddala (1983) shows that this two-step estimation strategy produces consistent estimates of the variance-covariance matrix for $\varepsilon_i$ and $\mu_i$. Alternatively, equations (3) and (4) can be estimated jointly using a maximum likelihood estimate. We estimate using the maximum likelihood technique as a robustness check.

The parameter $\gamma$ is biased upward if correlation between equations, $\rho$, is positive. In the case of equations (3) and (5), we expect the correlation to be negative if the resolution process yields the private-sector method when the failed-bank assets are high quality and, therefore, the net loss on assets and direct costs are lower. As a consequence, the OLS estimate of $\gamma$ will be biased downward.

### A. Cost Equation

As we indicate above we view net loss on assets as the market value equity of the failed bank at time of failure. Accordingly, our cost equation specification starts with the book-value of equity (BVERATIO) and then controls for bank-specific, industry, and economic conditions, which affect resolution costs. Appendix D provides a description of the variables and the data sources.

[17] A different approach would focus on the cost determinants of one resolution type. In this case, Heckman correction is appropriate as used by Barth, Bartholomew, and Bradley (1990).

Among the first set of bank-specific variables that capture the cost considerations are those that reflect the quality of the assets. Managers of distressed banks often do not write off loans that have gone bad and continue recording income from such assets. A measure of this tendency is the income earned but not collected variable (EARNEDINC) reported in the Call Report. We include the value of this variable the quarter before failure, as a percent of total assets at failure, in the regressions. The next two variables are the level of non-performing assets (NPA) and other real estate owned (ORE) by the bank the quarter before failure as a percentage of assets at failure. This latter variable reflects real estate that the bank ends up owning due to foreclosure.

In a report prepared for the president and Congress in July 1993, a national commission found fraud and misconduct to be an important cause of failures in the 1980s (National Commission on Financial Institution Reform, Recovery, and Enforcement, 1993). The same report also argued that losses due to fraud constituted a significant portion of total losses. No prior academic research exists that identifies the contribution of fraud to failure resolution costs. The primary reason for this lack of research is the difficulty of identifying fraud. A database compiled at the Division of Insurance and Research at the FDIC that captures the causes of failure has the potential to fill this void. However, this database only includes a subset of our sample. Instead, following Osterberg and Thomson (1995), we use loans to insiders (INSIDER) as a percentage of assets at failure as a proxy for fraud.

An additional control for the riskiness of the failed-bank assets is the brokered deposits (BROKER) the quarter before failure as a percentage of assets at failure. As the bank approaches failure managers raise insured deposits through deposit brokers by offering higher than market rates. Alternatively, the use of non-core funding to grow may simply indicate riskier business strategy. Thus, the existence of brokered deposits can signal high-risk low-quality assets.

A factor that reduces the cost of a failure is the existence of the franchise value of the bank. It is customary to use core deposits as a proxy for franchise value.[18] We follow previous research and include the ratio of core deposits to assets at failure (CORE) in the

[18] We define core deposits as the total amount of domestic deposits less the amount of time deposits of $100,000 or more that are held in domestic offices.

regressions. Another component of the franchise value is the branching network. To capture this effect, we include the number of the failed bank's branches as a percentage of the bank branches in that state (BRANCHRATIO). We also control for asset size using the natural logarithm of the assets at the failed bank (LOGASSET) and the square (LOGASSETSQ). We add this latter variable to capture nonlinearity between asset size and costs.

In addition, we control for the health of the industry by including two variables. These are the state unemployment rate in the year of the failure (UNEMP) and the number of failed banks as a percent of all banks in the state at time of failure (FAILRATE).[19]

### B. Resolution-Method Equation

We use the same variables in the resolution-method equation as in the cost equation to control for the impact of differences in the characteristics of the failed bank on the outcome of the resolution process. As our instruments in the first-stage regressions, we use proxies for the community disruption. The liquidation of bank assets and the paying off of depositors can have a profound impact on a community because bank failures can lead to the destruction of relationship lending and lead to a severe contraction in bank lending (Bernanke and Blinder 1992; Bernanke, Gertler, and Gilchrist 1996; Ashcraft 2005).

We propose the following variables as instruments in the model of the resolution method. The first one is the number of private business establishments in the year of failure, which is compiled by the Census Bureau. We use the logarithm of the number of establishments in the state (LOGESTABLISH). The second variable is the level of personal income in the community that the failed bank serves. We use the ratio of personal income in the state of the failed bank as a ratio of the U.S. personal income in the quarter of failure (PIRATIO). These variables affect the outcome of the resolution process but not the costs of the resolution.

[19] We include the failure of all banks and thrifts and all open bank assistance transactions when we calculate this failure rate.

## VI. Empirical Results

Table 4 provides the mean, median, and standard deviations of the variables used in the regression analysis. We should note that in the regressions we express the net loss on assets (NETLOA) as a positive number. This is in contrast to the data reported in Tables 2 and 3, where NETLOA is expressed as a negative number. We do not have complete data for the INSIDER variable, and in two cases the variables LOGESTABLISH and PIRATIO are missing because the failures occurred in the District of Columbia and Puerto Rico which are not included in the state level data.

**INSERT TABLE 4 HERE**

Next, we present the results of our multivariate analysis. We start with the results of the estimation of the probit regression that models the resolution method. In our second stage regressions we control for the endogenous resolution method and examine the determinants of the net losses on assets and direct costs. We report robust standard errors and include year fixed effects in all specifications.

### A. Determinants of the Resolution Method

Table 5 shows the probit results for the resolution method. In column 1 we present the results for the full sample period. In columns 2 through 3 we control for changes over time. We use the passage of the FDICIA as the break point because December 1991 nicely divides our sample period into crisis and prosperity periods. It also allows us to examine the resolution methods and costs in the FDICIA regulatory regime.

Among the cost factors, we observe that income earned but not collected (EARNEDINC) is significant and negative in the full sample estimates, which indicates an FDIC liquidation is more likely when the bank's uncollected income is higher. This finding is plausible. Quite often income earned but not collected is an indicator of a higher level of problem assets at the bank. To hide problem assets, management might book income on a nonperforming loan to prevent it from being classified as past due or non-accruing. Hence, higher EARNEDINC can reduce the probability of a private-sector

reorganization. However, when we look at the sub-period results we observe that this effect is more influential in the pre-FDICIA period. During this crisis-period the intensity of recording income that was ultimately uncollectible was high enough that it became a significant deterrent against choosing a private-sector solution on average. In contrast, other asset quality variables, such as non-performing assets (NPA) and other real estate owned (ORE) do not appear to be significant determinants of the resolution method.

High levels of brokered deposits (BROKER) increase the likelihood of an FDIC liquidation. Perhaps this is because increased use of brokered deposits can be an indication of a less valuable deposit franchise or because the use of brokered deposits indicates a riskier business strategy, or both. This significant relation holds, in the sub-periods as well as during the full period. Our two measures of franchise value, core deposits (CORE) and branching network (BRANCHRATIO), both lead to a higher probability of a private-sector reorganization.

Asset size does not show any significance in either sub-period. This result shows that any size bank in our sample has an equal chance of being resolved by either method once we control for the quality of its assets and liabilities. The economic conditions are captured by the unemployment rate (UNEMP) and the health of the industry by the failure rate (FAILRATE), neither of which shows any significance.

The full sample results show that the instruments, LOGESTABLISH and PIRATIO, are significant. More business activity increases the likelihood of private-sector reorganization. In contrast, in states where personal income is higher as a percent of national income an FDIC liquidation is more likely. Perhaps in these areas customers can have business relationships with multiple banks and the impact of a bank failure on the community is reduced. This result appears despite the changes in FDICIA and may indicate that cost minimization is not in conflict with the interests of the community.

**INSERT TABLE 5 HERE**

### B. Determinants of the Net Loss on Assets

Table 6 shows the results for the second stage regressions. Our focal variable is the RESMETHOD, which is a binary variable that takes the value of one if the method is a private-sector reorganization and zero for an FDIC liquidation.

We first present the results for the ordinary least squares (OLS) estimates of equation (3). We observe that resolutions under the private-sector method are on average seven percent less costly than the liquidation method. This finding is consistent with the prior literature. This literature, which ignores the endogeneity of resolution process, concludes that FDIC liquidations are more costly. However, this OLS estimation cannot distinguish whether the difference is caused by the resolution method or by the characteristics of the failed bank, which also influences costs.

In column 2, we control for the selection component for the full sample period. The parameter $\lambda$, which controls for outcome of resolution process, is significant and negative indicating that the OLS estimates of the coefficient of RESMETHOD is downward biased. Once we control for the selection bias, we find that for the full sample period RESMETHOD is no longer statistically significant. Because this variable measures the cost differential between a private-sector reorganization and an FDIC liquidation, this finding provides evidence that the private-sector reorganization is not inherently less costly, instead failed banks that are resolved by this method have characteristics that lead to lower costs. This evidence reverses the previous findings that it is more costly for the FDIC to liquidate the failed-bank assets.

The sub-period results provide further insight. We find that the coefficient on RESMETHOD is positive and significant during the pre-FDICIA period but becomes negative and significant during the post-FDICIA period. Consistent with the arguments in Shleifer and Vishny (1992), we find that during periods of industry distress this loss in value in a private-sector resolution outweighs the loss in franchise value that occurs in an FDIC liquidation. Our results from the post-FDICIA period, 1992 to 2007, also provide support to their arguments. Column 4 of Table 6 shows that RESMETHOD is significant and negative during this period. Note that the parameter $\lambda$, which controls for outcome of resolution process, is not significant which indicates that selection is not an important factor in the FDICIA period. Indeed, when we estimate the model using OLS for the

FDICIA period we find that the results remain unchanged qualitatively. These findings imply that private-sector reorganizations were more cost effective than liquidations.

**INSERT TABLE 6 HERE**

The remaining coefficient estimates have plausible interpretations. A higher book-value of equity ratio is associated with lower costs. Factors that indicate a lower asset quality, such as non-performing assets, other real estate owned, and uncollected income lead to a higher loss on assets.

On the liability side, higher brokered deposits (BROKER) are associated with higher net loss on assets. The proxies for franchise value, core deposits (CORE) and branching network (BRANCHRATIO), lead to a lower net loss on assets. All three liability variables are significant in the pre-FDICIA period, but fail to retain their significance during the post-FDICIA period.

In terms of asset size, results show that the net loss on assets ratio increases at a decreasing rate with asset size. This observation is consistent with the finding shown on Table 3 that larger asset size failures have lower loss ratios. We further analyze the size-effect in our robustness section below.

Also, we observe that the coefficient on FAILRATE is positive and significant and the coefficient of UNEMP is positive and significant, which indicate that net losses on assets are greater if the industry is in distress and general economic conditions are poor. These findings are plausible because when poor industry and economic conditions exist, it becomes increasingly difficult to find viable bidders causing the FDIC to make higher concessions when it finds one. Schleifer and Vishny (1992) and Acharya, Bharath, and Srinivasan (2007) make similar observations for corporate bankruptcies and argue that recovery rates are lower when the industry of the failed firms is in distress.

### C. Determinants of Direct Expenses

Table 7 presents regression estimates that examine the determinants of the direct resolution expenses as a percent of assets at failure. The OLS estimates in the first column show that RESMETHOD is negative and statistically significant, which indicates

that a private-sector reorganization has lower direct costs than an FDIC liquidation, holding everything else equal. Again, this estimate reflects both the effectiveness of the method and the characteristics of the failed bank. The results in columns 2 through 4 control for selection. We observe that RESMETHOD maintains its significance during the full-period as well as the sub-periods. This observation supports the hypothesis that the private-sector reorganization is an inherently less costly method in terms of direct expenses. This finding is plausible because private-sector reorganization take significantly less time to resolve. In unreported analysis, we calculate the average (median) time in receivership for both resolution methods, and find that the private sector reorganizations spend an average of one year less time in receivership.

**INSERT TABLE 7 HERE**

Other coefficient estimates uncover interesting relations. The NPA and ORE increase direct costs attached to the disposition of assets. ORE's significance is quite robust across the full period and sub-period specifications. A more extensive branching system is associated with higher direct expenses in all but the post-FDICIA period. Also, the size variable is negative showing that there are economies of scale in terms of direct expenses.

## VII. Robustness Checks

To check the robustness of our results we first test whether the variables used to identify the selection are not correlated with the net loss on assets. We currently use the number of business establishments in the state (LOGESTABLISH) and the ratio of personal income in the state of the failed bank to U.S. personal income (PIRATIO) as instruments to model the resolution method. The reasoning behind these instruments is that, after controlling for the resolution method, these variables are unlikely to affect the cost of the failure. However, these variables can affect the attractiveness of the bank franchisee to a potential buyer, and hence the amount the buyer is willing to pay for the bank. In turn, this may affect the costs of resolution. Thus, the instruments may not satisfy the exclusion restriction.

To test whether the instruments are uncorrelated with the net loss on assets we include these variables in both the resolution method equation and the cost equation. Table 8 shows the results. In the net loss on assets equation, the instruments (LOGESTABLISH and PIRATIO) are not significant. Therefore, it is reasonable to exclude them from this equation. Furthermore, including the instruments in the second stage regression does not qualitatively change our results.

We present further robustness checks in Table 9. First, we report the maximum likelihood estimates of the treatment models on net loss on assets investigated in Table 6. Panel A of Table 9 shows the coefficient estimate of RESMETHOD. The results are qualitatively the same. This finding strengthens our earlier interpretations that private-sector reorganizations do not inherently result in lower cost in the pre-FDICIA period. The likelihood ratio rejects the hypothesis that two error terms between equation (3) and (5) are uncorrelated, thus the OLS estimates are biased.

Next, we vary the cutoff points that we use to classify the resolution as an FDIC liquidation or a private-sector reorganization. Panel B of Table 9 shows the coefficient on RESMETHOD in the treatment regression on net loss on assets. When we use a zero percent cutoff, only 74 of the institutions are considered to be resolved using an FDIC liquidation. We observe an interesting result. In this case the private-sector reorganization is significantly more expensive. However, as we define FDIC liquidations to include more institutions by changing the threshold for assets passed, the differences gradually decline in the full sample. In contrast, we observe the opposite behavior for the post-FDICIA period. The private-sector reorganizations prove to be less costly than the liquidation cases as the group of private-sector reorganizations reflects a higher percentage of assets remaining in the private sector.

The other robustness check pertains to an alternative way to model the nonlinearity between net loss on assets and the failed banks' asset size. We assign institutions to small, medium and large size categories. Small institutions have less than $500 million in assets, medium institutions are those that have between $500 million and $1 billion in assets and large institutions are those that have more than $1 billion in assets. Panel C in Table 9 presents the coefficients on the medium and large-size dummy variables from the Net Loss on Assets equations where we treat small institutions as the

baseline case. We observe that the coefficient for the medium-size bank dummy variable is positive but for large banks it is negative. This finding implies that initially the net loss on assets increased with size but as the size gets very large it falls.

As another robustness check, we lag our instruments in the resolution method regression by a year. We show the coefficient for the RESMETHOD in Panel D of Table 9. Our results prove robust to this change.

We undertake a series of other robustness checks, which we do not report here.[20] First, we investigate whether or not grouped institutions have a different cost structure. Toward this end, we introduce a dummy variable for grouped institutions in our regressions. Alternatively, we exclude grouped institutions and estimate our regressions for this subgroup. In either case, the resulting coefficients on RESMETHOD qualitatively remain unchanged.

We also investigate the possible effects of interstate banking legislation changes at the state level. Using the dates identified by Kroszner and Strahan (1999) we add a variable to our regression model that indicates whether a failure occurred when interstate banking was allowed by state banking regulations. The coefficient assigned to RESMETHOD remains qualitatively similar to those reported in Tables 6.

We also investigate whether the composition of the loans of the failed bank matters. Specifically, we introduce the percentage breakdown of use the commercial, residential real estate, and construction loans (as a percent of total assets) as regressors in the first and second state regressions. Our results pertaining to resolution method remain unchanged.

We focus our final robustness check on the book value of equity to investigate a discrepancy that exists between our results and those of James (1991). He finds a positive relationship between the book value of equity and the costs of a resolution. He interprets this finding as an indication that fraud and insider abuse is more prevalent in well capitalized failures. Our results show the opposite relation—when an institution has higher book value of equity, the pre-expense losses on assets are significantly lower (Table 6). The book value of equity does not significantly affect direct expenses (Table 7). We could not replicate the results that James (1991) reports using the same regression

[20] The results are available upon request.

techniques and sample period. We could not produce a positive and significant relation between the book value of equity and resolution costs. We also checked the sensitivity of our results to the inclusion of the book value of equity and find that our regressions were robust to removing the book value of equity variable. Given our interpretation of resolution costs as the market value of equity, a negative relation between the book value of equity and resolution costs is plausible. We attribute the difference between our results and James to differences in the timeliness (i.e. subsequent revisions and updates) of the data. To obtain a reasonable sample size, James includes receiverships that are not terminated and therefore his measure of costs includes an estimate of costs to the end of the receivership. We have the luxury of restricting our results to only the receiverships that are terminated, and therefore have a measure of realized losses.

## VIII. Comparisons with Evidence on Non-Financial Bankruptcies

In the corporate bankruptcy code, Chapter 7 and Chapter 11 are the two bankruptcy resolution methods. In Chapter 7, the assets of the debtor are turned over to a bankruptcy trustee. This trustee converts assets to cash and distributes the proceeds to the creditors. This is analogous to an FDIC liquidation in the case of bank failures. In a Chapter 11 bankruptcy process all or part of the going concern value of the firm is preserved by reorganization. This is similar to a private-sector reorganization. For example, in a purchase and assumption transaction when the receivership sells all or part of a bank to the private-sector, the acquirer essentially reorganizes the failed bank.

However, there are also significant differences between corporate bankruptcy processes and bank failure resolutions as discussed in Bliss and Kaufman (2006). These differences are important considerations when we compare costs resulting from bank failures with estimates of creditor losses and direct bankruptcy costs for non-financial firms.

As Bliss and Kaufman (2006) point out, general corporate bankruptcy code in the U.S. favor debtors over two other stakeholders—the creditors and in-place managers. In contrast, the bank insolvency code favors depositors over debtors, which can increase the overall recovery to the creditors. The corporate bankruptcy code also favors reorganization (Chapter 11) over liquidation (Chapter 7), which causes bankruptcy to

linger in the judicial system. This process can affect the liquidity of the creditors, because there is a limited ability to pay creditors before proceeds are received from the sale of assets or an organization plan is approved. In contrast, the bank resolution and receivership process encourages speedy legal resolution and payment can be made to creditors prior to the liquidation of the assets, for example in the form of advanced dividends.

These important differences can be due to the different goals of the codes. While the goal of the corporate bankruptcy code is not explicitly spelled out in the code, the goal of the bank insolvency resolution is explicit. The resolution needs to be the least costly to the depositor insurance fund of all possible methods. Furthermore, the FDIC is charged with a fiduciary responsibility to maximize the return on the assets of any failed bank. To achieve this goal early intervention is formalized. Also, the FDIC has a number of special receivership powers, over and above those of a trustee in bankruptcy.[21] Among these powers is the right to disallow claims and to repudiate contracts within a reasonable amount of time if the contract is deemed burdensome. For example if the FDIC deems some employee contracts (thus receivables) excessive, it may not honor such contracts, thereby mitigating losses. Furthermore, in a failed bank receivership the absolute priority rule is strictly enforced, hence, there are no costly negotiations between claimant classes, which can prolong the bankruptcy process.

Therefore, one can expect the recoveries and bankruptcy costs under the bank resolution process to be lower than bankruptcy resolutions under the corporate bankruptcy code. Indeed, it is possible that recognition that the bankruptcy process is cumbersome and imposes extensive delays that make the resolution of large financial firms difficult and very costly lead to changes in the Dodd-Frank legislation.

It is not a straightforward task to compare recoveries and costs under both codes. A thorough analysis should carefully control for sample differences, which is beyond the scope of this paper. Instead, we compare our findings with those of published work for corporate bankruptcies. In a recent paper, Bris, Welch, and Zhu (2006) provide these estimates for Chapter 7 and Chapter 11 bankruptcies for 300 bankruptcies from 1995 to 2001. In terms of losses, they show that creditors lose less under Chapter 11 than in

[21] See FDIC (1998) for a comparison of bank resolution process with bankruptcy law.

Chapter 7 bankruptcies. They report average losses under Chapter 11 of about 30 percent. In contrast, the average loss for Chapter 7 is 70 percent under optimistic estimates. A comparison of these numbers with our estimates for the full sample (23.06 percent for private-sector reorganization and 39.59 percent for liquidations) provide some evidence for the argument that creditor losses might be smaller under the bank insolvency code.[22] We also observe that the difference in average losses between resolution methods is much larger for corporate bankruptcies than for bank failure resolutions. However, the finding that losses in a Chapter 11 bankruptcy are lower than for a Chapter 7 bankruptcy parallels our finding for the bank resolutions in the post-FDICIA period. We should note that the sample used in Bris, Welch and Zhu (2006) is much smaller in terms of asset size than the sample we use, and there is evidence that costs as a percent of assets gets smaller as asset size increases in bank failures. Their sample covers a period of relatively prosperous period in the corporate sector—1995 to 2001. Furthermore, their sample focuses on non-financial firms, which come from various industries that may be systematically different than financial firms.

In terms of direct expenses, Bris, Welch, and Zhu (2006) list the components of Chapter 7 expenses as the trustee, accountant, and debtor attorney expenses. The trustee is responsible for the sale of the assets and distribution of the proceeds to the creditors. For Chapter 11 expenses, they present debtor expenses and unsecured creditors' committee expenses. They report mean (median) expenses to be 8.1 (2.5) percent of pre-bankruptcy assets for Chapter 7 and 16.9 (1.9) percent for Chapter 11 bankruptcies. In contrast to our results, their statistical tests show that direct expense ratios are similar across Chapter 7 and 11 bankruptcy procedures. The results shown in Table 7 indicate that over the entire sample period direct expenses are lower for a private-sector reorganization, which resembles a Chapter 11 bankruptcy, than they are for an FDIC liquidation, which resembles a Chapter 7 bankruptcy.

When we compare the mean (median) direct expense ratios of 4.71 (4.42) percent for an FDIC liquidation and 3.09 (2.85) percent for a private-sector reorganization to those reported in Bris, Welch and Zhu (2006), the costs appear broadly comparable.

[22] The post-FDICIA period is closer to the sample period of Bris, Welch, and Zhu (2006). For this period, the costs are 22.79 percent and 35.65 percent of assets for bank reorganization and liquidations, respectively.

However, we should note that the distribution of the expense ratios in the bankruptcy sample are less skewed in our sample. Also, the expense ratios for nonfinancial bankruptcies are associated with asset sizes much smaller than the average size of bank failures.

## IX. Conclusion

In this new era of bank failure resolutions, a careful analysis of the past is warranted. To provide useful guidance for an efficient resolution process, we undertake a thorough analysis of the resolution method and costs.

We find that during 1986 to 2007 the mean discounted net loss on the disposition of assets as a percent of total assets (net loss on assets) is 21.42 percent. The direct expenses incurred by the FDIC to resolve our sample bank failures as a percentage to assets 3.53 percent.

There is significant time variation in the average net loss on assets. This ratio is 23.13 percent for the period of crisis in the the banking industry, 1986 to 1991, but declined to 12.83 percent during the post-FDICIA period. We do not observe any significant changes between these two periods for the direct receivership expense ratio.

We also compare resolutions costs in FDIC liquidations and private-sector reorganizations. The mean discounted net loss on assets for FDIC liquidations is 26.23 percent and for private sector reorganizations is 19.59 percent. After we control for the characteristics of the failed bank that affects the outcome of the resolution process, we find that a private-sector reorganization does not result in any cost savings in the pre-FDICIA period. Direct expenses as a percent of assets is 4.71 percent for FDIC liquidations and 3.09 percent for private sector reorganizations. Lower direct expenses persist for private sector reorganizations after controlling for the characteristics of the failed bank.

These findings support Shleifer and Vishny's (1992) arguments that recoveries are higher (lower) when the industry is healthier (in distress). During the post-FDICIA period concerns about liquidity in the deposit insurance fund seldom emerged. This change allowed the FDIC more flexibility in the types of resolutions they were able to pursue. Also, the industry was relatively healthy during this period, which resulted in a

higher number of viable bidders and more competition for failed bank assets. Both the additional flexibility afforded by high levels of liquidity and greater competition for failed-bank assets resulted in bids on failed bank assets were advantageous to the FDIC.

One of the novel findings presented in this paper is that the economic impact on the community in which the failed bank operates is related to the resolution method that is used. In communities with low-income and high unemployment rates, FDIC liquidations are less likely. This is true even during the post-FDICIA era when the FDIC was required to resolve banks in a manner that is least costly to the deposit insurance fund. One possible explanation of this result is that there is no conflict between minimizing the disruption to the community and minimizing the cost of the resolution.

Finally, our findings shed some light on the differences in bankruptcy costs across industries and types of resolutions. We show that both losses on assets and direct expenses in FDIC resolutions are lower than those in non-financial bankruptcies. Although this observation cannot be taken as the definitive word because we cannot control for the differences in the sample period, the size of the institutions, and the characteristics of financial versus non-financial firms, these initial findings provide some support for the argument that the U.S. bankruptcy process is costlier for resolving financial institution failures.

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## Appendix A
## Discounting Gains and Losses

To express the cash flows in equation (2) on a discounted basis we need to find discounted value of premiums, expenses, and loss on assets. We assume the premium is received at time of failure, and hence, no discounting is needed. Discounting expenses is straightforward. Discounting loss on assets is not straightforward because of data limitations. In the accounting records we do not have the liquidation value of assets ($LVA_t$). Instead, we have the gain or loss on asset in each period associated with the period t assets that were liquidated ($BVA_t$ - $LVA_t$). To determine the discounted value of losses under this data restriction, we can express the discounted value of the loss on assets ($LOA_0$) as.

$$LOA_0 = BVA_0 - \sum_{t=1}^{T} \frac{LVA_t}{(1+r_t)^t} \tag{A1}$$

where the appropriate risk-free rate is $r_t$, or alternatively,

$$LOA_0 = \sum_{t=1}^{T} \left[ BVA_t - \frac{LVA_t}{(1+r_t)^t} \right] \tag{A2}$$

We re-arrange equation (A2) and add and subtract $\sum_{t=1}^{T} \frac{BVA_t}{(1+r_t)^t}$ to arrive at the following:

$$LOA_0 = \sum_{t=1}^{T} \frac{BVA_t - LVA_t}{(1+r_t)^t} + \sum_{t=1}^{T} \frac{((1+r)^t - 1)BVA_t}{(1+r_t)^t} \tag{A3}$$

The first term in equation (A3) is the discounted value of the accounting loss (or gain) on the assets at time *t*. The second term, which reflects the opportunity cost, or carrying cost, for the assets in liquidation. As we can observe, if we simply discount the gain (or loss) on assets in each period, we would underestimate the present value of the discounted losses.

Replacing the sum of the loss on assets in equation (2) with the discounted value ($LOA_0$) together with the premiums and discounted values of expenses we obtain the discounted value of resolution costs.

We use the following procedure for discounting. We match a Treasury yield curve to each failure based on the month that the bank failed and then fit a cubic spline to each yield curve to calculate a yield for each month along the yield curve. We use these smoothed yields to discount each of the monthly cash flows.

## Appendix B
## Reconciliation of FDIC Cost to Total Resolution Cost

Total resolution costs represent losses to all of the claimants against the receivership, including losses to the FDIC. The Division of Finance at the FDIC publishes the loss to the FDIC in the Historical Statistics on Banking (HSOB). In this Appendix, we decompose the total resolution costs shown on Table 2 into the loss to the FDIC and other claimants.

In Panel A of Table B, we show the average undiscounted measure of total resolution costs of $26.989 million. In Panel B of Table B, we show how the $26.989 million in total resolution costs is borne by different classes of claimants. The largest claimant class is the FDIC claim which represents the subrogated claim of the FDIC. This claim includes any deposit claim that was covered by the deposit insurance fund.[23] The FDIC claim also includes any other liability that the receivership has with the FDIC in its corporate capacity such as loans made to the receivership and the accrued interest on those loans. We then show the recoveries on the claim. We include the net loss on assistance agreements because that loss is borne solely by the FDIC. Also, we include accounting adjustments, which we call "Non-Cash Adjustments." These items include items such as adjustments to prior period income and expenses, which comprise the majority of the average of $1.7 million.[24] As shown in Panel B, on average, the loss on the FDIC claim was $26.124 million or approximately 21 percent of the $126.743 million average claim.

[23] Recall that prior to FDICIA the FDIC may have covered both insured and uninsured depositors. After the passage of FDICIA and the accompanying least cost provision, there is an incentive for the FDIC to cover only the insured depositors.
[24] These adjustments are all supported by journal entry activity for the receiverships.

Other claims include other deposit claims, such as uninsured deposits where applicable, general trade creditors and other unsecured debt holders. On average these claimants lose $1.659 million or approximately 27 percent of their $6.150 million average claim.

On a few occasions after the FDIC and other claims have been paid in full (and also the interest due to the claimants) then the stockholders of the assuming institution will receive some payment.[25] As shown in Table B, on average the dividends to stockholders are $794,000. The sum of the loss to the FDIC claim, the loss to other claimants offset by the dividends paid to the stockholders is the accounting value of average total resolution costs, $26.989 million.

In Panel C of Table B we show how the cost estimates published by the FDIC's Division of Finance, which reflects the cost to the deposit insurance fund, relates to the loss on the FDIC.[26] The loss to the FDIC reported by the Division of Finance is $25.796 million. To arrive at this figure from the loss to the FDIC claim shown in Panel B, first, we reverse the amount of post-insolvency interest that was accrued but not paid to the FDIC. If the FDIC is paid in full, then the receivership also compensates the FDIC for interest that it would have earned on the claim. This amount of interest that was accrued but not paid is reversed because it was not part of the original FDIC claim. Recoveries from secondary insurance funds offset the loss to the FDIC.[27] The next item reverses the amount of the total FDIC claim that is associated with an assessment for a cross guaranty

[25] This occurs for 6 of the 1,213 institutions in our sample.
[26] This estimate of loss which is calculated by the FDIC's Division of Finance is available publicly on the FDIC website in the Historical Statistics on Banking at http://www4.fdic.gov/hsob/index.asp.
[27] Secondary insurers provide deposit insurance to member institutions for deposits in excess of applicable Corporation insurance limits. The FDIC may enter into agreements with secondary insurers that allow the FDIC to cover uninsured depositors that are covered by the secondary insurer and be subrogated in the usual manner. The secondary insurer then pays the FDIC an amount equal to the uninsured deposits that were covered.

that was not paid in full. Again, this item lowers the loss to the FDIC. Finally, we also include a line called "Accounting Adjustments". This item includes any adjustments that were made to prior period accounting entries.[28] Once all of the adjustments are made, we arrive at the loss to the FDIC published by the Division of Finance.

[28] These adjustments are all supported by data from journal entries from the General Ledger.

**Table B**
**Losses to Claimants**
**BIF-Insured Sample**
**(Average, $000 omitted)**

Source: FDIC General Ledger and FDIC Failed Bank Cost Analysis (also reflected in the FDIC Historical Statistics on Banking)
The sample includes all BIF-Insured banks that failed between 1986 and 2007 and were inactivated before December 2004. The sample also includes three institutions that failed in or before 1991 that were still active as of 2004. The sample excludes Meriden Trust and Safe Deposit Bank because it did not make loans or take deposits. Individual institutions (number in parenthses) in the following holding companies are consolidated and counted as one institution: First Republic (41), MCorp (20), Texas American Bankshares (24), National Bankshares (9), Bank of New England (3), Southeast Bank (2), New Hampshire banks (7), First City (20), Merchant Bank (2), Bridgeport (2), and Eastland (2).
* Indicates that the calculation is an implied number. The assistance amount for some large transactions was calculated as a residual to balance to the loss number from the Failed Bank Cost Analysis.

| | | | |
|---|---|---|---|
| **Panel A: Receivership Accounting** | | | |
| Number (000 included) | 1,092 | | |
| Book Value of Assets at Failure | | 183,663 | |
| Total Resolution Costs, Not Discounted (from Table 2) | | (26,989) | -14.69% |
| **Panel B: Claims and Recoveries** | | | |
| FDIC Claim | (126,743) | | |
| Recoveries on FDIC Claim | 105,432 | | |
| Net (Income)/Loss, Assistance Agreements* | (6,481) | | |
| Other Non-Cash Adjustments | 1,667 | | |
| Loss on FDIC Claim | | (26,124) | |
| Other Claims | (6,150) | | |
| Recoveries on Other Claims | 4,492 | | |
| Loss to Other Claimants | | (1,659) | |
| Dividends to Stockholders | | 794 | |
| Total Resolution Costs, Not Discounted | | (26,989) | -14.69% |
| **Panel C: Reconciliation of Loss on FDIC Claim to FDIC Loss per the Failed Bank Cost Analysis** | | | |
| Loss on FDIC Claim | | 26,124 | |
| Reverse the Post Insolvency Interest Paid to the FDIC | 336 | | |
| Reverse Accrued Interest Due to the Corporation | (2,242) | | |
| Recovery from Secondary Insurance Funds | (21) | | |
| Reverse Remaining Cross Guaranty Claim | (57) | | |
| Accounting Adjustments | 1,656 | | |
| Total Adjustments | | (328) | |
| Cost to the FDIC, Not Discounted | | 25,796 | 14.05% |

## Appendix C

### Legislative Background

This appendix summarizes the components of FIRREA and FDICIA that have affected the failure resolution process.

**Financial Institutions Reform, Recovery and Enforcement Act (FIRREA) of 1989**

Although FIRREA primarily addresses issues associated with savings and loan crisis, some provisions also addressed losses to the FDIC insurance funds. In particular FIRREA:

- Added section 5(e) to the FDI Act that prevents affiliated banks from shifting assets and liabilities and provides for cross guarantees to be established among affiliated institutions. (This provision was most notably used for the resolutions of the Bank of New England in January of 1991, Southeast Banking Corporation in September of 1991 and First City in October of 1992.)
- Established a maximum amount for the claim of any receivership claimant. The maximum amount was set to the amount that the claimant would have received if the institution's assets had been liquidated.
- Granted the FDIC discretion to minimize loss by using its own resources to make additional payments to any creditor or class of creditors without being obligated to make the same payment to any other creditor or class of creditors.
- Authorized the FDIC to appoint itself receiver of any state depository institution (under certain criteria).
- Repealed tax benefits associated with OBA.
- Included two additional one-year extensions (for a total of three possible one-year extensions) on the life of a bridge bank.
- Established a standardized claims process for all federal and state chartered banks and thrifts.

**The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991**

- Established prompt corrective action whereby specific regulatory actions, including closure, are legislated based on the categories described in the following table.

**Prompt Corrective Action Categories**

To be considered well capitalized, an institution must not be subject to any formal enforcement action that requires it to meet and maintain a certain capital level. If the bank has a composite CAMELS rating of 1 in the most recent examination and is not experiencing or anticipating significant growth, then the leverage ratio can be as low as 3 percent for both the Adequately Capitalized and Undercapitalized categories.

| | Total Risk-Based Capital Ratio | Tier 1 Risk-Based Capital Ratio | Leverage Ratio | Tangible Equity to Total Assets |
|---|---|---|---|---|
| **Well Capitalized** | 10 percent or higher and | 6 percent or higher and | 5 percent or higher | |
| **Adequately Capitalized** | 10 percent or higher and | 4 percent or higher and | 4 percent or higher | |
| **Undercapitalized** | Less than 8 percent or | Less than 4 percent or | Less than 4 percent | |
| **Significantly Undercapitalized** | Less than 6 percent or | Less than 3 percent or | Less than 3 percent | |
| **Critically Undercapitalized** | | | | Less than 2 percent |

- Established the requirement that a receiver must be appointed no later than 90 days after an institution falls to critically undercapitalized. This period can be extended twice, in 90 day increments, to protect the fund from losses.
- Required institutions to be resolved in a manner that is least-costly to the deposit insurance fund (commonly referred to as the Least Cost Test).
- Restricted the FDIC's ability to provide OBA to the case where capital is not likely to increase without assistance if the bank's management is not the cause of the problems at the bank and it meets the least costly requirement.
- Limited the ability of undercapitalized or critically undercapitalized institutions to borrow from the Fed, and, so increased the likelihood of liquidity failures.
- Required FDIC asset disposition to meet certain requirements including preservation of affordable housing. The affordable housing program was established by federal appropriation starting in 1992 and ending in 1996.

## Appendix D
## Variable Descriptions and Sources

| | Description | Source |
|---|---|---|
| RESMETHOD | 1 if assets passed to the acquirer is greater than 25 percent of book value of assets at failure, 0 otherwise | Failure Transactions Database, FDIC General Ledger |
| PASSRATIO | Assets passed to the acquirer as a percent of the book value of assets at failure | Failure Transactions Database, FDIC General Ledger |
| NETLOA | Net loss on assets, discounted, as a percent of assets at failure | FDIC General Ledger |
| BVERATIO | Book value of equity at failure as a percent of assets at failure | FDIC General Ledger |
| NPA | Non-performing assets as a percent of book value of assets at failure | Call Report, Schedule RC-N, FDIC General Ledger |
| ORE | Owned real estate as a percent of book value of assets at failure | Call Report, Schedule RC, Line 7, FDIC General Ledger |
| EARNEDINC | Income earned but not collected, quarter before failure as a percent of asset at failure | Call Report, Schedule RC-C, Item 11, FDIC General Ledger |
| INSIDER | Loans to insiders, quarter before failure, as a percent of assets at failure | Call Report, Schedule RC-M, 1.a., FDIC General Ledger |
| BROKER | Brokered deposits, quarter before failure, as a percent of assets at failure | Call Report, Schedule RC-E, Item M1.b., FDIC General Ledger |
| CORE | Core deposits (total domestic office deposits less time deposits over $100,000 or more held in domestic offices), quarter before failure, as a percent of assets at failure | Call Report, Schedule RC-E, FDIC General Ledger |
| LOGASSET | Log of total assets at failure | FDIC General Ledger |
| LOGASSETSQ | Log of total assets at failure, squared | FDIC General Ledger |
| UNEMP | Unemployment rate in the state of the failed bank in the quarter of failure, seasonally adjusted | Bureau of Labor Statistics |
| FAILRATE | Number of failed banks as a percent of all banks in the same state and quarter as the failed bank | Call Report, FDIC Failure Transactions Database |
| LOGESTABLISH | Log of the number of business establishments in the same state and year as the failed bank | U.S. Census Bureau |
| BRANCHRATIO | Total number of offices operated by an institution divided by the number of branches in the state | FDIC Structure database |
| PIRATIO | Personal income in state of failed bank as a percent of U.S. personal income in quarter of failure | Bureau of Economic Analysis |
| PREFDICIA | 1 if the date of failure is before January 1, 1992, 0 otherwise | |
| DIRECT | Direct expenses, discounted as a percent of assets at failure | FDIC General Ledger |

**Table 1**
**Resolution Types**

Source: Failure Transactions Database and FDIC General Ledger
We exclude assistance transactions from the total number of failures.
The sample includes all BIF-Insured banks that failed between 1986 and 2007 and were inactivated before December 2004. The sample also includes three institutions that failed in or before 1991 that were still active as of 2007. The sample excludes Meriden Trust and Safe Deposit Bank and Private Bank and Trust because they did not make loans or take deposits.
FDIC=less than 25 percent of the assets are passed to an acquirer; Private Sector=25 percent or more of the assets are passed to an acquirer
IDT=Insured Deposit Transfer;
P&A=Purchase and assumption; PA=P&A all deposits
PI=P&A insured deposits; PO=Payout

**Panel A: BIF and DIF Insured Failures, 1986-2007**

| | | | | Deposit Payoff | | P&A | | |
|---|---|---|---|---|---|---|---|---|
| **Year of Failure** | **Total** | **FDIC** | **Private Sector** | **IDT** | **PO** | **PA** | **PI** | **Whole Bank** |
| 1986 | 138 | 32 | 106 | 19 | 21 | 98 | 0 | 0 |
| 1987 | 184 | 48 | 136 | 40 | 11 | 115 | 0 | 18 |
| 1988 | 200 | 29 | 171 | 30 | 6 | 96 | 0 | 68 |
| 1989 | 206 | 37 | 169 | 23 | 9 | 132 | 0 | 42 |
| 1990 | 168 | 42 | 126 | 12 | 8 | 106 | 0 | 42 |
| 1991 | 124 | 37 | 87 | 17 | 4 | 80 | 0 | 23 |
| 1992 | 120 | 42 | 78 | 13 | 11 | 46 | 42 | 8 |
| 1993 | 41 | 17 | 24 | 0 | 5 | 6 | 30 | 0 |
| 1994 | 13 | 7 | 6 | 2 | 0 | 4 | 7 | 0 |
| 1995 | 6 | 3 | 3 | 1 | 0 | 2 | 3 | 0 |
| 1996 | 5 | 2 | 3 | 0 | 0 | 4 | 1 | 0 |
| 1997-2007 | 39 | 20 | 19 | 0 | 4 | 9 | 22 | 4 |
| Total | 1,244 | 316 | 928 | 157 | 79 | 698 | 105 | 205 |

**Panel B: Sample**

| | | | | Deposit Payoff | | P&A | | |
|---|---|---|---|---|---|---|---|---|
| **Year of Failure** | **Total** | **FDIC** | **Private Sector** | **IDT** | **PO** | **PA** | **PI** | **Whole Bank** |
| 1986 | 138 | 32 | 106 | 19 | 21 | 98 | 0 | 0 |
| 1987 | 184 | 48 | 136 | 40 | 11 | 115 | 0 | 18 |
| 1988 | 200 | 29 | 171 | 30 | 6 | 96 | 0 | 68 |
| 1989 | 206 | 37 | 169 | 23 | 9 | 132 | 0 | 42 |
| 1990 | 168 | 42 | 126 | 12 | 8 | 106 | 0 | 42 |
| 1991 | 123 | 36 | 87 | 17 | 3 | 80 | 0 | 23 |
| 1992 | 116 | 41 | 75 | 13 | 11 | 46 | 40 | 6 |
| 1993 | 39 | 16 | 23 | 0 | 5 | 6 | 28 | 0 |
| 1994 | 12 | 7 | 5 | 1 | 0 | 4 | 7 | 0 |
| 1995 | 6 | 3 | 3 | 1 | 0 | 2 | 3 | 0 |
| 1996 | 4 | 2 | 2 | 0 | 0 | 3 | 1 | 0 |
| 1997-2007 | 17 | 5 | 12 | 0 | 0 | 7 | 7 | 3 |
| Total Sample | 1,213 | 298 | 915 | 156 | 74 | 695 | 86 | 202 |
| Sample as a Percent | 97.5% | 94.3% | 98.6% | 99.4% | 93.7% | 99.6% | 81.9% | 98.5% |

**Panel C: Grouped Sample**

| | | | | Deposit Payoff | | P&A | | |
|---|---|---|---|---|---|---|---|---|
| **Year of Failure** | **Total** | **FDIC** | **Private Sector** | **IDT** | **PO** | **PA** | **PI** | **Whole Bank** |
| 1986 | 138 | 32 | 106 | 19 | 21 | 98 | 0 | 0 |
| 1987 | 184 | 48 | 136 | 40 | 11 | 114 | 0 | 19 |
| 1988 | 160 | 29 | 131 | 30 | 6 | 56 | 0 | 68 |
| 1989 | 164 | 37 | 127 | 22 | 9 | 90 | 0 | 43 |
| 1990 | 160 | 41 | 119 | 12 | 8 | 97 | 0 | 43 |
| 1991 | 113 | 36 | 77 | 17 | 3 | 69 | 0 | 24 |
| 1992 | 95 | 41 | 54 | 13 | 11 | 31 | 34 | 6 |
| 1993 | 39 | 16 | 23 | 0 | 5 | 6 | 28 | 0 |
| 1994 | 12 | 7 | 5 | 1 | 0 | 4 | 7 | 0 |
| 1995 | 6 | 3 | 3 | 1 | 0 | 2 | 3 | 0 |
| 1996 | 4 | 2 | 2 | 0 | 0 | 3 | 1 | 0 |
| 1997-2007 | 17 | 5 | 12 | 1 | 0 | 7 | 6 | 3 |
| Total Sample | 1,092 | 297 | 795 | 156 | 74 | 577 | 79 | 206 |

**Table 2**
**Descriptive Statistics for Components of Resolution Costs**
**BIF-Insured Sample**
**as a Percent of the Book Value of Assets at Failure**

Source: FDIC General Ledger, Receivership Financial Statements
The sample includes all BIF-Insured banks that failed between 1986 and 2007 and were inactivated before December 2004. The sample also includes three institutions that failed in or before 1991 that were still active as of 2004. The sample excludes Meriden Trust and Safe Deposit Bank and Private Bank and Trust because they did not make loans or take deposits. Individual institutions (number in parentheses) in the following groups are consolidated and counted as one institution: First Republic (41), MCorp (20), Texas American Bankshares (24), National Bankshares (9), Bank of New England (3), Southeast Bank (2), New Hampshire Banks (7), First City (20), Merchant Bank (2), Bridgeport (2) and Eastland (2). Except where noted, we discount the monthly cash flows using the Treasury yield curve that was prevailing on the date of failure. The yield curve is smoothed to generate a rate for the monthly maturity points using a cubic spline. Cost to the FDIC is available at http://www2.fdic.gov/hsob/index.asp .

| | Weighted Average | Mean | Standard Deviation | Minimum | First Quartile | Median | Third Quartile | Maximum |
|---|---|---|---|---|---|---|---|---|
| Book Value of Assets at Failure ($000 omitted) | | 183,663 | 1,421,160 | 1,357 | 12,888 | 24,429 | 50,627 | 32,927,546 |
| Book Value of Equity on the Last Call Report (as a percent of Assets on Last Call Report) | -1.22 | -1.47 | 5.99 | -47.94 | -3.31 | -0.24 | 1.55 | 13.08 |
| Book Value of Equity | 4.78 | 1.41 | 6.50 | -56.07 | -1.35 | 1.84 | 4.76 | 26.45 |
| Net Loss on Assets | -12.88 | -21.42 | 13.93 | -93.98 | -30.07 | -19.96 | -11.19 | 14.14 |
| Gain and (Loss) on Assets | -17.46 | -27.69 | 16.95 | -129.79 | -39.36 | -27.74 | -15.39 | -0.35 |
| Premiums Paid to Acquirer | -0.88 | -11.50 | 10.62 | -49.33 | -17.91 | -8.99 | -1.88 | -0.01 |
| Premiums Received from Acquirer | 0.69 | 1.45 | 2.15 | 0.00 | 0.21 | 0.76 | 1.86 | 28.75 |
| Direct Liquidation Expenses | -1.70 | -3.53 | 2.11 | -12.70 | -4.74 | -3.44 | -2.06 | -0.09 |
| Indirect Liquidation Expenses | -3.44 | -8.66 | 8.18 | -46.64 | -10.98 | -5.79 | -3.31 | -0.08 |
| Total Resolution Costs | -18.01 | -33.61 | 19.67 | -133.63 | -45.11 | -30.46 | -19.78 | 8.61 |
| Total Resolution Costs, Not Discounted | -14.69 | -29.95 | 19.16 | -127.06 | -40.45 | -26.58 | -16.10 | 10.79 |
| Cost to the FDIC, Not Discounted | -14.05 | -24.39 | 13.92 | -90.24 | -32.76 | -22.96 | -14.03 | 0.00 |

**Table 3**
**Mean and (Median)**
**BIF-Insured Sample**
**as a Percent of the Book Value of Assets at Failure**

Source: FDIC General Ledger, Receivership Financial Statements
The sample includes all BIF-Insured banks that failed between 1986 and 2007 and were inactivated before December 2004. The sample also includes three institutions that failed in or before 1991 that were still active as of 2004. The sample excludes Meriden Trust and Safe Deposit Bank and Private Bank and Trust because they did not make loans or take deposits. Individual institutions (number in parentheses) in the following groups are consolidated and counted as one institution: First Republic (41), MCorp (20), Texas American Bankshares (24), National Bankshares (9), Bank of New England (3), Southeast Bank (2), New Hampshire Banks (7), First City (20), Merchant Bank (2), Bridgeport (2) and Eastland (2). We discount the monthly cash flows using the Treasury yield curve that was prevailing on the date of failure. The yield curve is smoothed to generate a rate for the monthly maturity points using a cubic spline.
FDIC is a resolution where less than 25 percent of the assets are passed to the acquirer. Private Sector is a resolution where 25 percent or more of the assets are passed to the acquirer.
Small institutions are those with $100 million or less in total in assets. Medium institutions are those with over $100 million but less than $500 million in total assets. Large institutions are those with more than $500 million in total assets.
***=Significantly different than FDIC, Small, or Pre-FDICIA at the 99 percent confidence level; **=at the 95 percent confidence level; *=at the 90 percent confidence level.
+++=Significantly different than Medium at the 99 percent confidence level; ++=at the 95 percent confidence level; +=at the 90 percent confidence level.

| | Book Value of Equity | Net Loss on Assets | Gain/(Loss) on Assets | Premiums Paid to the Acquirer | Premiums Received from Acquirer | Indirect Expenses | Direct Expenses | Total Resolution Costs |
|---|---|---|---|---|---|---|---|---|
| **Panel A: Resolution Type** | | | | | | | | |
| FDIC Liquidations | 2.50 | -26.33 | -39.69 | -0.01 | 0.67 | -8.55 | -4.71 | -39.59 |
| | (2.60) | (-25.45) | (-39.04) | (0.00) | (0.08) | (-6.03) | (-4.42) | (-37.28) |
| Private Sector Reorganizations | 1.00 *** | -19.59 *** | -23.21 *** | -4.44 *** | 1.03 | -8.70 *** | -3.09 *** | -23.06 *** |
| | (1.53) *** | (-17.78) *** | (-23.06) *** | (0.00) *** | (0.20) * | (-5.65) | (-2.95) *** | (-27.35) *** |
| **Panel B: Size** | | | | | | | | |
| Small | 1.13 | -21.59 | -27.30 | -3.48 | 0.92 | -8.89 | -3.64 | -34.11 |
| | (1.66) | (-20.57) | (-20.57) | (0.00) | (0.12) | (-6.08) | (-3.53) | (-30.72) |
| Medium | 3.13 *** | -21.71 | -32.56 *** | -1.87 ** | 1.06 * | -8.15 ** | -3.14 ** | -32.99 |
| | (3.77) ** | (-19.17) | (-31.53) ** | (0.00) ** | (0.29) | (-4.98) ** | (-3.04) *** | (-31.01) |
| Large | 3.36 * | -12.86 *** +++ | -17.11 *** +++ | -0.63 | 0.75 | -2.16 *** +++ | -1.53 *** +++ | -16.55 *** +++ |
| | (4.80) * | (-15.25) *** +++ | (-19.34) *** +++ | (0.00) | (0.21) | (-1.23) *** +++ | (-1.48) *** +++ | (-19.50) *** +++ |
| **Panel C: Legislative Period** | | | | | | | | |
| Pre-FDICIA | 0.95 | -23.13 | -28.56 | -3.72 | 0.84 | -8.99 | -3.54 | -35.65 |
| | (1.35) | (-22.17) | (-29.38) | (0.00) | (0.10) | (-5.78) | (-3.47) | (-32.66) |
| FDICIA | 3.83 *** | -12.33 *** | -23.07 *** | -0.62 *** | 1.38 *** | -6.93 | -3.53 | -22.79 *** |
| | (4.25) *** | (-10.81) *** | (-22.18) *** | (0.00) *** | (0.47) *** | (-5.82) | (-3.24) | (-21.17) *** |

**Table 4**
**Descriptive Statistics**

Variables are in percent except RESMETHOD, LOGASSET, LOGASSETSQ, LOGESTABLISH and PREFDICIA.

| | Number | Mean | Standard Deviation | Minimum | First Quartile | Median | Third Quartile | Maximum |
|---|---|---|---|---|---|---|---|---|
| RESMETHOD | 1,092 | 0.73 | 0.45 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| PASSRATIO | 1,092 | 52.43 | 32.44 | 0.00 | 21.40 | 58.99 | 79.74 | 100.00 |
| NETLOA | 1,092 | 21.42 | 13.93 | -14.14 | 11.19 | 19.96 | 30.07 | 93.98 |
| BVERATIO | 1,092 | 1.41 | 6.50 | -56.07 | -1.35 | 1.84 | 4.76 | 26.45 |
| NPA | 1,092 | 14.77 | 9.89 | 0.00 | 7.99 | 13.00 | 19.24 | 71.72 |
| ORE | 1,092 | 5.51 | 5.45 | 0.00 | 1.81 | 4.32 | 7.63 | 58.68 |
| EARNEDINC | 1,092 | 1.21 | 0.84 | 0.00 | 0.68 | 0.98 | 1.45 | 6.58 |
| INSIDER | 1,086 | 1.30 | 2.58 | 0.00 | 0.02 | 0.42 | 1.63 | 41.34 |
| BROKER | 1,092 | 3.22 | 9.52 | 0.00 | 0.00 | 0.00 | 0.03 | 96.39 |
| CORE | 1,092 | 89.11 | 15.42 | 9.79 | 80.94 | 91.13 | 98.20 | 152.70 |
| LOGASSET | 1,092 | 10.30 | 1.29 | 7.21 | 9.46 | 10.10 | 10.83 | 17.31 |
| LOGASSETSQ | 1,092 | 107.83 | 29.06 | 52.03 | 89.57 | 102.08 | 117.34 | 299.63 |
| UNEMP | 1,092 | 7.03 | 1.63 | 2.67 | 6.10 | 6.83 | 7.90 | 19.44 |
| FAILRATE | 1,092 | 1.41 | 1.65 | 0.00 | 0.29 | 0.88 | 1.73 | 14.93 |
| LOGESTABLISH | 1,090 | 12.08 | 0.96 | 9.56 | 11.36 | 12.02 | 12.89 | 13.57 |
| BRANCHRATIO | 1,092 | 0.26 | 1.27 | 0.01 | 0.02 | 0.07 | 0.14 | 27.38 |
| PIRATIO | 1,090 | 4.13 | 3.35 | 0.16 | 1.30 | 2.97 | 6.10 | 13.39 |
| PREFDICIA | 1,092 | 0.84 | 0.37 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| DIRECTRATE | 1,092 | 3.53 | 2.11 | 0.09 | 2.06 | 3.44 | 4.74 | 12.70 |

**Table 5**
**Resolution Method**

Probit regression with robust standard errors. The dependent variable is 1 if the amount of assets passed is greater than or equal to 25 percent of the book value of assets at failure and 0 otherwise.
The coefficients of the probit regression are reported and the absolute value of the t-statistics are in parentheses.
Dummies for the year of failure are included in the regression but the coefficients are not reported here.
* Indicates can reject the null hypothesis that the coefficient is zero at the 90th percent confidence interval.
**=95th percent confidence interval; ***=99th percent confidence interval.

| | | Pre-FDICIA | FDICIA |
|---|---|---|---|
| | (1) | (2) | (3) |
| NPA | -0.001 | -0.000 | -0.002 |
| | (0.22) | (0.20) | (0.000) |
| ORE | -0.014 | -0.015* | -0.009 |
| | (1.63) | (1.73) | (0.38) |
| EARNEDINC | -0.240*** | -0.246*** | -0.171 |
| | (3.91) | (3.96) | (0.91) |
| INSIDER | 0.005 | 0.003 | 0.195* |
| | (0.30) | (0.19) | (1.71) |
| BROKER | -0.013*** | -0.011** | -0.035* |
| | (2.80) | (2.13) | (1.85) |
| CORE | 0.010*** | 0.011*** | 0.004 |
| | (3.13) | (3.31) | (0.45) |
| BRANCHRATIO | 0.270** | 0.196* | 2.841*** |
| | (2.07) | (1.87) | (3.07) |
| LOGASSET | 0.493 | 0.699* | 0.265 |
| | (1.36) | (1.84) | (0.20) |
| LOGASSETSQ | -0.022 | -0.029* | -0.028 |
| | (1.36) | (1.73) | (0.46) |
| UNEMP | -0.039 | -0.018 | -0.227 |
| | (1.17) | (0.48) | (1.64) |
| FAILRATE | -0.026 | -0.022 | -0.048 |
| | (0.87) | (0.70) | (0.31) |
| LOGESTABLISH | 0.499*** | 0.412*** | 1.015*** |
| | (4.41) | (3.05) | (2.83) |
| PIRATIO | -0.148*** | -0.128*** | -0.159** |
| | (4.83) | (3.17) | (2.11) |
| Constant | -8.024*** | -8.693*** | -10.382 |
| | (3.08) | (3.26) | (1.15) |
| Number of Obs. | 1,084 | 914 | 170 |
| Pseudo-R Squared | 0.085 | 0.060 | 0.204 |

**Table 6**
**Net Loss on Assets**

Column (1) presents OLS regression results with robust standard errors. The dependent variable is the net loss on assets as a percent of total assets at failure (NETLOA).
The coefficients of the OLS regression are reported and the absolute value of the t-statistics are in parentheses.
Dummies for the year of failure are included but the coefficients are not reported here.
* Indicates can reject the null hypothesis that the coefficient is zero at the 90th percent confidence interval.
**=95th percent confidence interval; ***=99th percent confidence interval.

| | OLS | Treatment | Pre-FDICIA | FDICIA |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| RESMETHOD | -7.081*** | 5.043 | 16.188** | -10.949*** |
| | (8.87) | (1.13) | (2.03) | (2.60) |
| BVERATIO | -0.702*** | -0.693*** | -0.724*** | -0.475*** |
| | (8.30) | (14.03) | (12.54) | (4.90) |
| NPA | 0.227*** | 0.232*** | 0.228*** | 0.201*** |
| | (6.40) | (6.37) | (4.56) | (2.86) |
| ORE | 0.440*** | 0.482*** | 0.546*** | 0.414*** |
| | (8.54) | (7.22) | (5.74) | (3.34) |
| EARNEDINC | 3.547*** | 4.453*** | 5.611*** | 0.727 |
| | (6.06) | (7.79) | (6.48) | (0.75) |
| INSIDER | 0.538*** | 0.486*** | 0.475*** | 1.063* |
| | (5.39) | (3.61) | (2.71) | (1.66) |
| BROKER | 0.148** | 0.205*** | 0.224*** | 0.129 |
| | (2.42) | (4.81) | (3.81) | (1.43) |
| CORE | -0.106*** | -0.143*** | -0.198*** | 0.054 |
| | (4.26) | (5.07) | (4.50) | (1.03) |
| BRANCHRATIO | -0.862** | -1.321*** | -1.666*** | -0.342 |
| | (2.02) | (2.95) | (2.69) | (0.41) |
| LOGASSET | 8.585*** | 7.061** | 4.411 | 4.222 |
| | (3.10) | (2.56) | (1.08) | (0.90) |
| LOGASSETSQ | -0.345*** | -0.283** | -0.159 | -0.222 |
| | (2.75) | (2.29) | (0.87) | (1.09) |
| UNEMP | 1.130*** | 1.302*** | 1.139*** | 0.435 |
| | (4.06) | (4.85) | (3.15) | (0.67) |
| FAILRATE | 0.935*** | 1.015*** | 1.039*** | 1.449* |
| | (4.02) | (4.23) | (3.31) | (1.74) |
| Constant | -26.785* | -24.835 | -22.016 | 3.580 |
| | (1.79) | (1.48) | (1.01) | (0.13) |
| Lambda | | -7.328*** | -13.998*** | 3.185 |
| | | (2.78) | (3.01) | (1.22) |
| Number of Obs. | 1,086 | 1,085 | 914 | 171 |
| R Squared | 0.519 | | | |
| Wald Statistic | | 997.995*** | 540.460*** | 197.827*** |

**Table 7**
**Direct Expenses**

Column (1) presents OLS regression results with robust standard errors. The dependent variable is the direct expenses as a percent of total assets at failure (DIRECT).
The coefficients of the OLS regression are reported and the absolute value of the t-statistics are in parentheses.
Dummies for the year of failure are included but the coefficients are not reported here.
* Indicates can reject the null hypothesis that the coefficient is zero at the 90th percent confidence interval.
**=95th percent confidence interval; ***=99th percent confidence interval.

| | OLS | Treatment | Pre-FDICIA | FDICIA |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| RESMETHOD | -1.513*** | -5.097*** | -4.950*** | -2.637*** |
| | (12.97) | (5.51) | (3.78) | (2.95) |
| BVERATIO | -0.009 | -0.011 | -0.011 | -0.010 |
| | (0.82) | (1.27) | (1.09) | (0.48) |
| NPA | 0.021*** | 0.019** | 0.021** | 0.009 |
| | (3.14) | (2.49) | (2.57) | (0.62) |
| ORE | 0.072*** | 0.060*** | 0.059*** | 0.083*** |
| | (6.62) | (4.25) | (3.78) | (3.16) |
| EARNEDINC | 0.037 | -0.230* | -0.240* | 0.078 |
| | (0.51) | (1.91) | (1.70) | (0.38) |
| INSIDER | 0.019 | 0.035 | 0.029 | 0.176 |
| | (1.13) | (1.23) | (1.02) | (1.30) |
| BROKER | 0.016** | -0.001 | 0.004 | -0.025 |
| | (2.12) | (0.12) | (0.47) | (1.31) |
| CORE | -0.009* | 0.002 | -0.000 | 0.021* |
| | (1.84) | (0.27) | (0.04) | (1.87) |
| BRANCHRATIO | 0.130*** | 0.266*** | 0.262*** | -0.031 |
| | (2.63) | (2.82) | (2.60) | (0.17) |
| LOGASSET | -1.194*** | -0.746 | -0.266 | -3.626*** |
| | (3.13) | (1.28) | (0.40) | (3.65) |
| LOGASSETSQ | 0.030* | 0.012 | -0.007 | 0.132*** |
| | (1.84) | (0.45) | (0.24) | (3.05) |
| UNEMP | -0.074* | -0.116** | -0.126** | 0.236* |
| | (1.84) | (2.04) | (2.13) | (1.73) |
| FAILRATE | 0.083** | 0.057 | 0.065 | 0.048 |
| | (2.12) | (1.13) | (1.27) | (0.27) |
| Constant | 10.428*** | 9.807*** | 10.543*** | 20.968*** |
| | (4.73) | (2.76) | (2.98) | (3.48) |
| Lambda | | 2.164*** | 2.068*** | 0.617 |
| | | (3.96) | (2.70) | (1.11) |
| Number of Obs. | 1,086 | 1,085 | 914 | 171 |
| R Squared | 0.318 | | | |
| Wald Statistic | | 322.197*** | 252.026*** | 165.090*** |

**Table 8**
**Net Loss on Assets Robustness**

The dependent variable is the net loss on assets as a percent of total assets at failure (NETLOA).
The coefficients of the OLS regression are reported and the absolute value of the t-statistics are in parentheses.
Dummies for the year of failure are included but the coefficients are not reported here.
* Indicates can reject the null hypothesis that the coefficient is zero at the 90th percent confidence interval.
**=95th percent confidence interval; ***=99th percent confidence interval.

| | Treatment | Pre-FDICIA | FDICIA |
|---|---|---|---|
| | (1) | (2) | (3) |
| RESMETHOD | 0.962 | 14.402 | -10.594** |
| | (0.11) | (1.24) | (2.04) |
| BVERATIO | -0.695*** | -0.725*** | -0.473*** |
| | (14.19) | (12.72) | (4.86) |
| NPA | 0.232*** | 0.233*** | 0.200*** |
| | (6.81) | (4.84) | (2.80) |
| ORE | 0.459*** | 0.530*** | 0.415*** |
| | (6.55) | (5.25) | (3.37) |
| EARNEDINC | 4.215*** | 5.598*** | 0.756 |
| | (5.18) | (5.08) | (0.77) |
| INSIDER | 0.476*** | 0.457*** | 1.050 |
| | (3.77) | (2.71) | (1.59) |
| BROKER | 0.185*** | 0.212*** | 0.133 |
| | (3.71) | (3.39) | (1.43) |
| CORE | -0.129*** | -0.188*** | 0.054 |
| | (3.70) | (3.66) | (1.02) |
| BRANCHRATIO | -0.770 | -1.256 | -0.348 |
| | (1.23) | (1.61) | (0.35) |
| LOGASSET | 7.936*** | 4.973 | 4.509 |
| | (2.78) | (1.12) | (0.92) |
| LOGASSETSQ | -0.327** | -0.189 | -0.234 |
| | (2.56) | (0.96) | (1.11) |
| UNEMP | 1.120*** | 1.042*** | 0.339 |
| | (4.05) | (2.86) | (0.42) |
| FAILRATE | 0.925*** | 0.956*** | 1.485* |
| | (3.96) | (3.08) | (1.76) |
| LOGESTABLISH | 1.686 | 1.091 | -0.161 |
| | (1.07) | (0.57) | (0.08) |
| PIRATIO | -0.235 | -0.013 | 0.079 |
| | (0.49) | (0.02) | (0.17) |
| Constant | -46.039* | -36.595 | 3.931 |
| | (1.82) | (1.04) | (0.13) |
| Lambda | -4.934 | -12.959* | 2.975 |
| | (0.96) | (1.91) | (0.94) |
| Number of Obs. | 1,085 | 914 | 171 |
| R Squared | | | |
| Wald Statistic | 1148.362*** | 584.419*** | 209.675*** |

## Table 9
## Robustness Checks

The null hypothesis for the likelihood ratio (LR) test in Panel A is that the two equations are independent.
In Panel B the reported coefficients are on RESMETHOD and the absolute value of the t-statistic is in parentheses.
All regressions includes time dummies, with the exception of those in Panel C.
* Indicates can reject the null hypothesis that the coefficient is zero at the 90th percent confidence interval. **=95th percent confidence interval; ***=99th percent confidence interval.

| | Treatment | Pre-FDICIA | FDICIA |
|---|---|---|---|
| | (1) | (2) | (3) |
| **Panel A: Maximum Likelihood Estimates for Net Loss on Assets** | | | |
| RESMETHOD | 3.977 | 5.619*** | -14.301*** |
| Lambda | -6.755 | -7.811 | 5.302 |
| LR Test | 4.715** | 31.680*** | 6.715*** |
| **Panel B: Cutoff Points on Assets Passed** | | | |
| 0% | 15.688*** | 18.731*** | 0.001 |
| | (3.62) | (3.07) | (0.00) |
| 10% | 12.964*** | 20.150** | -8.788* |
| | (2.60) | (2.46) | (1.70) |
| 50% | 7.976** | 19.007* | -5.933 |
| | (2.01) | (1.85) | (1.29) |
| **Panel C: Size Cutoffs** | | | |
| Medium | 3.395** | 5.315*** | -3.776* |
| | (2.34) | (2.62) | (1.76) |
| Large | -3.416 | -4.326 | -2.122 |
| | (1.44) | (1.19) | (0.69) |
| **Panel D: Lagged Instruments** | | | |
| RESMETHOD | 3.513 | 12.792* | -10.892** |
| | (0.83) | (1.80) | (2.57) |