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Debt Priority Structure, Market Discipline and Bank Conduct

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Abstract

We examine how debt priority structure affects bank funding costs and soundness. Leveraging an unexplored natural experiment that changes the priority of claims on banks' assets, we document asymmetric effects that are consistent with changes in monitoring intensity by various creditors depending on whether creditors move up or down the priority ladder. The enactment of depositor preference laws which confer priority on depositors reduces deposit rates but increases non-deposit rates. Importantly, subordinating non-depositor claims reduces bank risk-taking, consistent with market discipline. This insight highlights a role for debt priority structure in the regulatory framework.

Conferring priority to depositors when banks fail is a way to protect depositors. This idea received renewed attention after the crisis, with European Union policy makers calling for depositor preference reform. With depositor preference, all depositors' claims on failed banks are senior to those of non-depositors.[1] Proponents of the reform argue that priority for deposits increases market discipline.

Prior theoretical work suggests that depositor preference affects monitoring intensity by different claimants, leading to changes in bank conduct. Birchler (2000) develops a model in which uninsured depositors and non-depositors are initially of equal rank in the debt priority ladder and engage in monitoring to acquire a signal about the bank's condition. As non-depositors have superior monitoring technologies, their monitoring costs are lower relative to uninsured depositors'. Since depositor preference subordinates non-depositors' claims, they monitor more intensively because of the greater losses in the event of bankruptcy. Non-depositors then demand a higher interest rate to offset the additional monitoring costs. In contrast, uninsured depositors have reduced monitoring incentives, leading to lower monitoring costs and a lower interest rate. Based on these arguments, the market discipline literature predicts that greater monitoring by non-depositors induces changes in bank behavior, in particular in terms of risk-taking (Dewatripont and Tirole (1993); Calomiris (1999)).

In this paper, we exploit the staggered introduction of state depositor preference laws between 1983 and 1993 in 15 U.S. states to test whether depositor preference affects various creditors' monitoring incentives and, ultimately, bank conduct.[2] Depositor preference applies to state-chartered but not to nationally-chartered banks. This allows us to use difference-in-difference estimation to exploit variation across states over time in the introduction of the laws and compare how the treatment group (state-chartered banks) respond to the law change relative to a control group (nationally-chartered banks) in the same state.

Our findings support the predictions: depositor preference decreases uninsured deposit interest rates but increases non-deposit rates. Depositor preference also improves soundness, as bank risk and leverage both decline. Further tests examine how market shares of different types of debt respond to depositor preference. Supply and demand for uninsured deposits and non-deposits may adjust to changes in interest rates such that the net effects of depositor preference on market shares

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[1] Non-depositors are suppliers of Fed Funds, unsecured lenders such as holders of debentures, providers of other borrowed money, counterparties to swaps and contingent liabilities, beneficiaries of guarantees, and holders of bankers' acceptances. Non-depositors include general creditors such as trade creditors, landlords, vendors, suppliers, and employees whose salaries constitute non-deposit claims.

[2] The market discipline literature argues that investors who are not protected by deposit insurance have incentives to monitor banks because they have more to lose if a bank fails and respond to problems by withdrawing funds, refusing to roll over funds, demanding a higher expected return, or combinations thereof. These actions curb risk-taking. Flannery (2001, p. 110) states "monitoring refers to the hypothesis that investors accurately evaluate changes in a firm's condition and incorporate those assessments promptly into the firm's security prices" and "market influence is the process by which outside claimants influence a firm's actions".

are *ex ante* uncertain. We find that the market share of uninsured deposits increases whereas that of non-deposits remains unchanged.

These inferences are robust to using alternative control groups that mitigate concerns that there may be macroeconomic variation within U.S. states. While our main tests are based on within state-quarter comparisons between state-chartered and nationally-charted banks, the results are unchanged when we use a 50-state sample. A further concern may be that nationally-chartered and state-chartered banks do not evolve similarly over time, and differ in terms of size. We show that the treatment and control groups display parallel trends prior to the adoption of depositor preference, and we replicate our tests using a size-matched sample. We also rule out that anticipation effects, banking sector problems, changes in banking regulation and the deregulation of banking markets confound our inferences. Placebo tests show that changes in monitoring intensity and conduct can only be detected in banks affected by depositor preference.

We offer the following key contributions. First, our findings inform recent policy debates about depositor preference legislation as a way to strengthen market discipline. To this extent, our results reinforce the rationale for market discipline as an integral part of regulation. In particular, we illuminate the debate about whether private sector agents engage in monitoring and influence bank behavior. We find that private sector agents monitor banks and changes in debt priority influence bank conduct. This is crucial because Bliss and Flannery (2002) argue most studies struggle to find evidence for market participants' ability to change bank behavior. Aside from Ashcraft (2008), who shows subordinated debt claimants influence conduct by imposing constraints via covenants, there is little evidence that private sector agents influence bank conduct (Avery et al. (1988); Gorton and Santomero (1990); Flannery and Sorescu (1996); Martinez Peria and Schmukler (2001); Morgan and Stiroh (2001); Goldberg and Hudgins (2002); Bliss and Flannery (2002); Krishnan, Ritchken, and Thomson (2005)). Our work advances this debate but differs from Ashcraft (2008). Our setting does not require covenants but it is sufficient to rely on the switch in monitoring incentives mandated by law. This approach is more efficient than covenants that may entail large transaction costs.[3]

Second, and unlike prior work on market discipline, we focus on the mechanism that makes debtholders display behavior consistent with monitoring. While previous studies emphasize the role of bondholders and depositors for market discipline, we establish an important role for general creditors, and present evidence that legislative shocks affect monitoring incentives and can improve market discipline. In contrast to research on national depositor preference in the U.S.

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[3] Our evidence is also consistent with findings in corporate finance on the importance of contract design for monitoring incentives (Stulz and Johnson (1985), Hart and Moore (1994), and Rajan and Winton (1995)).

which primarily focuses on thrifts, failure rates, and the losses incurred in failures (Hirschorn and Zervos (1990), Osterberg (1996), and Osterberg and Thomson (1999, 2003)), we isolate the effect from the state-level depositor preference legislation that predates the introduction of national law.

I. Institutional background: The staggered nature of depositor preference legislation

The regulatory framework in the U.S. prescribes guidelines for bank resolution. During the resolution process, described in Appendix A, a failed bank's assets are transferred to the Federal Deposit Insurance Corporation (FDIC) whose task it is to identify and satisfy creditors, and maximize the net present value for the receivership claimants. The FDIC pays off claimants in line with the guidelines for receiverships established by the Banking Act of 1935.[4] The FDIC assigns priority claims to the receiver as compensation for administrative expenses. Next in line are secured claimants with collateralized claims. They are followed by depositors with balances below the deposit insurance coverage limit. Uninsured depositors whose balances exceed the deposit insurance coverage limit and non-depositors follow thereafter. The latter two groups have claims of equal priority. Last in the queue are holders of subordinated debt, and shareholders.

Several states departed from the Banking Act of 1935, and changed the debt priority structure for state-chartered banks. In 1909, Nebraska established priority for depositors over the claims of general, i.e., non-deposit, creditors. In the following years, 29 other states adopted depositor preference. Of those 29 states, 15 states (Arizona, California, Colorado, Connecticut, Florida, Hawaii, Kansas, Louisiana, Maine, Minnesota, Missouri, New Hampshire, North Dakota, Rhode Island, Texas) introduced depositor preference during our sample period 1983Q1 – 1993Q2 as shown in Table 1.

[INSERT TABLE 1: TIMING OF DEPOSITOR PREFERENCE LAWS]

How are these legal provisions embedded in state laws? To obtain the text of the law, we contact the legislative council archives and the chartering authorities in these 15 states. Appendix B presents the codified law for the states that enter our analysis.[5] While the wording differs across states, the priority structure for the claims on failed state-chartered bank's assets looks as follows: 1. administrative expenses of the receiver; 2. secured claims; 3. deposits, both insured and uninsured; 4. general creditor claims; 5. subordinated creditor claims; 6. shareholders.

Why did not all states introduce such legislation? Figure 1 does not suggest any geographic clustering of depositor preference. To understand the motivation behind these laws, we screen

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[4]   The FDIC has been the receiver for nationally-chartered banks since 1933. For state-chartered banks, state regulators had discretion about appointment of the receiver until enactment of FDICIA (FDIC and RTC (1998)). Our review of liquidations suggests that the FDIC was always appointed receiver. This is consistent with Bennett (2001), who states that the FDIC is appointed receiver in virtually all instances.

[5]   We exclude Utah and Virginia. These two states enacted depositor preference laws in 1983 but the absence of some variables and the annual sampling frequency in Call Report data prior to 1983 renders the inclusion of these two states in our empirical analyses infeasible.

legislative councils' digests, concurrencies of state amendments, and assembly laws from the legislative councils' archives. We also run keyword searches in the Journal State Legislatures, Lexis/Nexis, Factiva, and American Banker using a 6-month time window prior to the introduction of the laws.[6]

[INSERT FIGURE 1: STATE DEPOSITOR PREFERENCE LAWS]

The key result from screening the documents from the legislative councils is that depositor preference received little attention. If anything, these changes rectify omissions in previous legislation. California is an illustrative example. The concurrency of the state amendment mentions that the current law did not specify a priority for the payment of creditors and liquidation expenses, and instead requires pro rata settlement. The new legal provisions address this lack of a priority order. Further, assigning priority to depositors is believed to facilitate purchase and assumption transactions, and allows depositors to access their funds more quickly. In a few instances, the legislative council's digest highlights amendments for the reorganization and dissolution of state banks, emphasizing that changes are made to the priority claims structure in liquidations without providing a reason behind it.

Our keyword search of the media sources, limited again to 6 months prior to the introduction of the laws, does not suggest that the media paid much attention to depositor preference.[7]

Appendix B provides further details about the political and economic environment during depositor preference adoption. We conduct additional keyword searches in American Banker, Lexis/Nexis and Factiva to identify events that coincided with the changes in priority claims to understand whether banking conditions or political economy considerations drove the adoption of the laws.[8] Depositor preference laws are somewhat more frequent in states with Democratic Party governors, and when Democrats hold control of both the upper and the lower house of the legislature. However, our analysis of other events and the conditions in the banking industry yields no consistent pattern. In several states, the news search produces no information that has any bearing on the motives to introduce depositor preference. Occasionally, the media highlights bank mergers (Arizona, California) and that banks perform well in Florida, Hawaii, and Minnesota.

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[6] We use the following keywords: "deposit obligation", "depositor obligation", "claims of depositors", "claim structure", "bank liquidation", "depositor preference", "priority of claims", "priority claim", "liquidation priority", "liquidation regime", "claims to be paid before those of general creditors", "*pari passu* with general creditors", "deposit rank", "depositor rank".

[7] However, evidence suggests public awareness of the change in debt priority after introduction of the laws. First, treatment of uninsured depositors and general creditors in a failure was often known by the public. Even during liquidations of failures of state-chartered banks in which non-depositors incurred losses as a result of depositor preference, there is no indication that banks complained about depositor preference. Second, a news item from Dow Jones Newswire from 25th June 1992 highlights that depositor preference "made banks more attractive to buyers", suggesting that depositor preference laws were not perceived in a negative manner.

[8] The keywords are: "bank" OR "banking" OR "financial institution" OR "depository" OR "budget deficit" OR "budget surplus" OR "oil shock" OR "unemployment" OR "S&L crisis" OR "Savings and Loans crisis" OR "Federal Savings and Loan Insurance Corporation" OR "FIRREA" OR "M&A" OR "Dividends" OR "Earnings" OR "Deregulation" OR "Expedited Funds Availability Act".

There is some evidence that banks in Texas and California and in the North East (Maine, New Hampshire, Connecticut, Rhode Island) experience difficulties.[9]

In 1993, the legislative history took another turn on August 10th when the Clinton administration introduced national depositor preference as part of the Omnibus Budget Reconciliation Act. Depositor preference became federal law and depositor claims on state-chartered banks in states that previously did not have depositor preference and depositor claims on nationally-chartered banks also gain priority. National depositor preference has the same effects as had state laws for state-chartered banks except that national depositor preference distinguishes between domestic and foreign deposits. In a similar vein as our review of the individual state's adoption of depositor preference suggests, national depositor preference was not driven by concerns about bank soundness. Instead, national depositor preference was introduced to save money in the federal budget. The budgetary purpose of the law received attention in the media, in contrast to any mentioning of bank soundness. Legal scholars such as Curtis (1992, p. 244) are explicit in their assessment of the motivation behind the law.

> *"[…] the depositor preference regime was not enacted for reasons having to do with safe and sound bank regulation or with orderly liquidation, but rather, as indicated by its inclusion in the Omnibus Budget Reconciliation Act of 1993, entirely for budgetary reasons - it was a means for the federal government to spend less money."*

In sum, our survey of the legislative history of depositor preference does not suggest that banking characteristics or soundness considerations motivated the introduction of these laws.[10]

II. Hypotheses development

We first develop predictions for how costs of funds and funding structure respond to depositor preference laws. Next, we discuss how depositor preference affects soundness.

A. Effects on price and quantity of debt funds

The starting point for our predictions is the theory by Birchler (2000). He argues that assigning priority to depositors of a failed bank provides an incentive-compatible mechanism that protects

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[9] Anecdotal evidence suggests that depositor preference affected the treatment of depositors. Our first example predates depositor preference in California in 1986. The Los Angeles Times describes on 14 March 1985 the liquidation of Heritage Bank of Anaheim, a state-chartered bank that failed in 1984. Following appointment as a receiver, the FDIC did not prioritize claims of uninsured depositors, and withheld reimbursement of uninsured depositors. The absence of a priority claim meant their claim was equal in rank to those of general creditors. Two further examples focus on the period after enactment of depositor preference. In Oklahoma, which enacted depositor preference in 1965, the FDIC complied with depositor preference in the liquidation of First Continental Bank & Trust Co. in 1985, a state-chartered bank. The FDIC assigned priority to uninsured depositors. The Daily Oklahoman mentions on 3 July 1985 that uninsured depositors benefitted from the law as uninsured depositors recover more of their claim and got their funds more quickly than if First Continental had been a national bank. Liquidations of state-chartered banks in in Texas which enacted depositor preference in 1985 also reiterate that the FDIC complied with the laws. The liquidation of First City Bancorporation of Texas in 1992 resulted in the closure of 20 subsidiaries. The FDIC assigned priority to uninsured depositors in the subsidiary with a state charter but uninsured depositors and general creditors in subsidiaries with national charters were treated equally, sharing ratably in the proceeds of the liquidation (FDIC and RTC (1998)).

[10] Appendix C, Panel A of Table C.1, uses discrete time constant hazard models to examine the adoption of depositor preference as a function of private interest-group, public interests, political-institutional factors, and banking-sector conditions. We find no evidence that these factors predict depositor preference. We also establish the exogeneity of these laws with respect to the key outcomes with discrete time constant hazard models. The tests in Panel B of Table C.1 show that movements in our variables of interest do not trigger depositor preference laws.

small unsophisticated depositors but preserves market discipline by allocating monitoring incentives to debtholders with lower monitoring costs. In his model, a bank has access to a project with a stochastic but observable return. It therefore faces an exogenous probability of bankruptcy depending on the state of returns on its project. The bank has no wealth of its own, rather it borrows from debtholders to finance the project. If the project fails, an authority verifies the debt structure and ensures that creditors are paid off following the priority order.

Debtholders can obtain a signal about the bank's project returns but only do so if the value of the signal exceeds their private information costs because monitoring is costly (Diamond (1984)). However, informed debtholders (e.g., non-depositors) have a comparative advantage in obtaining the signal due to their superior information technologies, and therefore incur a lower cost to acquire the signal relative to uninformed debtholders (e.g., uninsured depositors) as discussed in Jackson and Kronman (1979).[11] A rational debtholder purchases the signal if its value exceeds its cost.

In the absence of depositor preference, both the informed and the uninformed debtholders rank equally in terms of the priority of their claim. Enactment of depositor preference elevates uninsured depositors' claims above the claims of non-depositors in case of bankruptcy such that senior claims (uninsured deposits) are served before junior debt (non-deposits).

We argue that this provokes asymmetric responses in monitoring incentives across different types of debtholders. Senior claims are made safer relative to junior claims because they command priority in case of bankruptcy. Uninformed debtholders therefore prefer to hold a senior claim and no longer incur relatively high monitoring costs (Birchler (2000)). Depositor preference therefore leads to a reduction in the interest rate paid on senior debt as uninsured depositors no longer require compensation for their monitoring.

Following their subordination, non-depositors are now exposed to a greater risk of losing their claim in the event of bankruptcy. This increases their monitoring incentives because it reduces the probability that their claims are repaid in the event of bankruptcy. Non-depositors therefore intensify their costly information-gathering activities to acquire a signal (Benston et al. (1986), White (1991), Goyal (2005)). Consequently, depositor preference leads to a higher interest rate on non-deposits to compensate for the additional monitoring. The fact that non-depositors' decision to buy junior debt depends on the signal is desirable from a market discipline perspective: if the signal is good, the non-depositor buys the debt, if it is bad she will not buy the debt, suggesting that even debtholders with low information costs may not buy junior debt if they receive

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[11] Uninformed debtholders are equivalent to uninsured depositors whereas informed debtholders are equivalent to non-depositors.

a bad signal. This characteristic of junior debt reinforces its role as a disciplining device as withdrawal of non-deposit funding drains liquidity and constrains a bank's actions.

In short, depositor preference triggers a reallocation of monitoring incentives towards junior claimants with lower information-acquisition costs. This results in a better alignment of monitoring incentives with monitoring abilities, giving rise to the following five hypotheses.

First, non-depositors have an even greater incentive to acquire information following depositor preference because uninsured depositors' claims are paid off before non-depositors. Since monitoring is costly, we expect interest rates for non-deposits of treated banks to increase.

Hypothesis 1. *Following the introduction of depositor preference, interest rates for non-deposits will increase for state-chartered banks.*

Second, the increase in the cost of funds may also trigger quantity effects. For these hypotheses, we focus on market shares as Stiroh and Strahan (2003) show that market shares respond to changes in bank condition. While state-chartered banks affected by the laws may reallocate their funding away from non-deposits towards cheaper funds resulting in declines in market shares for non-deposits, non-depositors may supply additional funds to benefit from the higher expected returns. The general equilibrium effect of the changes in funding structure is *ex ante* not clear.

Hypothesis 2a. *Following the introduction of depositor preference, the quantity of non-deposit funding in terms of market share will decrease for state-chartered banks.*

Hypothesis 2b. *Following the introduction of depositor preference, the quantity of non-deposit funding in terms of market share will increase for state-chartered banks.*

Third, the elevation of uninsured depositors' claims suggests that these claimants no longer have incentives to acquire a signal about the bank's returns, so that they can remain uninformed. In turn, they earn lower returns.

Hypothesis 3. *Following the introduction of depositor preference, interest rates for uninsured deposits will decrease for state-chartered banks.*

The corresponding general equilibrium effect for the quantity of uninsured deposits in terms of market share is ambiguous. On the demand side, banks may increase demand for uninsured deposits because they are now cheaper. On the supply side, there are two countervailing forces. On the one hand, supply of uninsured deposits may decrease due to lower returns. On the other hand, supply may increase as uninsured depositors seek to benefit from the priority claim assigned to uninsured deposits in case of liquidation.

Hypothesis 4a. *Following the introduction of depositor preference, the quantity of uninsured deposit funding in terms of market share will increase for state-chartered banks.*

Hypothesis 4b.   *Following the introduction of depositor preference, the quantity of uninsured deposit funding in terms of market share will decrease for state-chartered banks.*

The net effect of depositor preference on the cost of funds depends on the funding mix. Total interest expenses will decrease as long as the reduction in interest rates on uninsured deposits is not offset by increases in interest rates on non-deposits. Alternatively, if the increase in interest rates on non-deposits is greater than the decrease in interest rates on uninsured deposits, depositor preference increases total interest expenses. The competing forces in *H1* and *H3* may offset each other so that the overall impact on interest expenses remains insignificant.

We do not anticipate that insured deposits are affected by depositor preference laws.

B. Effects on bank soundness

Ultimately, the idea of harnessing market discipline into the regulatory framework rests on two assumptions. First, private investors identify risky banks. Second, private investors trigger actions that constrain risk-taking and risk-shifting.[12] Indeed, Flannery (2001) and Goyal (2005) propose that outside claimants can influence bank behavior by raising cost of funds or reducing the supply of funds to riskier institutions to ensure they are incentivized to prudently manage risk-taking.

Corporate finance theory provides the key argument behind the influencing dimension of market discipline. Dewatripont and Tirole (1994) and Tirole (2006) posit debtholders who receive negative signals about project returns intervene into the firm, demand repayment, and refuse to roll over funds. This, in turn, drains liquidity and compromises ongoing and future investment projects. Dewatripont and Tirole (1993) and Calomiris (1999) propose that subordinated debt claims influence bank risk-taking. Similarly, Birchler (2000) shows that informed creditors, i.e., non-depositors, do not invest in a bank when they receive a negative signal. Morgan and Stiroh (2001) highlight that banks understand that risk-increasing actions affect cost and availability of debt funds, and Goyal (2005) shows that banks have an incentive to prudently manage risk-taking when they are confronted with an increase in funding costs. Therefore, maintaining access to key funding sources such as Fed Funds motivates risky banks to improve soundness. In addition, other non-depositors whose claims may not be easily liquidated also have strong incentives to influence banks to reduce risk-taking, reflected in higher Z-Scores, lower leverage (LEV), a lower standard deviation of return on assets (ROA), and lower ratios of non-performing loans to total loans (NPL).

Hypothesis 5.   *Following the introduction of depositor preference laws, state-chartered banks will take less risk.*

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[12] The Basel Committee on Banking Supervision (1999) states that "[m]arket discipline imposes strong incentives on banks to conduct their business in a safe, sound and efficient manner." Risk-shifting occurs because of asymmetric effects of default risk for bondholders and stockholders for banks in distress. Greater asset risk and leverage raise the value of stockholders' option-type claims on the banks' residual cash flows. Therefore, stockholders benefit from risk-taking as long as it is associated with a higher expected return. In contrast, the value of debtholders' fixed-income claims is reduced by greater bank risk-taking.

We summarize these predictions in Table 2 below.

[INSERT TABLE 2: HYPOTHESES]

III. Data and methodology

We obtain quarterly data for commercial and savings banks in the U.S. from their Quarterly Reports on Condition and Income (Call Report), available from the Federal Reserve Bank of Chicago for the period 1983Q1 to 1993Q2. We choose this time span because banks were not obliged to submit quarterly Call Reports prior to 1983 and because the Omnibus Budget Reconciliation Act mandated depositor preference for all banks from 1993Q3. This results in 528,522 observations for 15,392 banks for all 50 states. However, except for a set of robustness tests in our Supplementary Online Appendix, all inferences are based on a smaller sample of banks headquartered in the 15 states that enacted depositor preference between 1983Q1 and 1993Q2. This results in 199,731 observations for 5,509 banks. We exclude banks headquartered in New York state due to their specific regulatory environment. To ensure that we have a sufficient number of observations per bank, we only include banks that operate in at least four quarters prior to and following the introduction of depositor preference.[13]

In our sample, uninsured deposits account on average for 9% of total liabilities, and non-deposits account on average for 24% of total liabilities. Panel A of Table 3 shows descriptive statistics.

[INSERT TABLE 3: SUMMARY STATISTICS AND PARALLEL TRENDS]

A. Identification strategy

We use difference-in-difference estimations to exploit plausibly exogenous variation in depositor preference laws across U.S. states and across time. The effect of depositor preference is identified by comparing the evolution of funding costs, market shares, and soundness between the treatment group (i.e., the state-chartered banks) and the control group (the nationally-chartered banks) through time. While there is some macroeconomic variation within states, this setup allows us to include state-quarter fixed effects in the regression to eliminate all confounding factors within each state-quarter that affect both types of banks. The inclusion of state-quarter fixed effects provides clean identification of the average treatment effect on the treated as we exploit cross-charter variation within the state-quarter dimension of the data. We focus on the period 1983Q1 to 1993Q2, and estimate

(1) $\quad y_{ist} = \alpha + \beta StateCharter_{it} + \varphi DPL_{st} * StateCharter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$,

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[13] The results are unchanged when we include New York banks in the sample. Likewise, when we include banks that do not operate at least four quarters before and after the law change in the sample the results are virtually identical.

where y_{ist} is a dependent variable for bank i in state s at time t, capturing either the cost of funds, market shares, or soundness; DPL_{st} is a dummy variable equal to 1 for all banks in states and quarters following introduction of depositor preference, 0 otherwise; $StateCharter_{it}$ is a dummy equal to 1 for state-chartered banks, 0 for nationally-chartered banks. X_{ist} are bank-level control variables; γ_i and γ_{st} are bank- and state-quarter fixed effects, respectively. ε_{ist} is the error term. The key coefficient is φ. We cluster heteroscedasticity-adjusted standard errors at the state-level to account for serial correlation and mitigate concerns that the long time horizon and the large sample size result in small standard errors (Bertrand et al. (2004)).[14]

B. Variable definitions

To establish monitoring, we follow the market discipline literature which infers changes in monitoring intensity if debt claims attract either higher or lower funding costs in response to changes in the riskiness of the claim.[15] Our first set of tests examines the monitoring dimension of market discipline and investigates interest rates for different liability components. The Call Report data provide information on quarterly interest expenses.

To examine the effect of depositor preference on total cost of funds we use a variable that measures interest expenses on all liabilities, consisting of deposits and non-deposits (Total interest expenses), defined as the ratio of total interest expenses to total liabilities. We also focus on the costs of deposits: the ratio of interest paid on deposits to total deposits (Interest on deposits). While the Call Reports render it impossible to retrieve total expenses on uninsured deposits during the sample period, we proxy for uninsured deposit expenses using data on interest expenses on certificates of deposits over 100,000 USD (Jumbo CDs) scaled by total Jumbo CDs.[16] Non-deposit interest rates (Interest on non-deposits) are captured by the ratio of interest expenses on non-deposits to total non-deposits.

Second, for the quantity effects, we test how state-chartered banks' market shares of insured deposits (Insured deposit market share) and non-deposits (Non-deposit market share) respond. Although data for the total expenses on uninsured deposits are not available, Call Reports contain information about the volume of total uninsured deposits, so that we can analyze market shares of

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[14] Alternatively, Table A.1 in our Supplementary Online Appendix shows tests based on collapsing the data into a single pre- and post-treatment period for each bank. We obtain similar inferences.

[15] Directly testing for monitoring of bank conduct by various classes of claimants is empirically challenging (Pagano and Röell (1998), Park (2000), Goetz, Laeven and Levine (2013)). The market discipline literature assumes that investors are able to detect changes in bank risk and price such effects into debt security prices that are observable (Flannery (2001)). To illustrate, Flannery and Sorescu (1996) document that debenture yields are sensitive to bank risk and infer the presence of market discipline. Similarly, Covitz et al. (2004, p. 27) find that subordinated debt spreads correlate intuitively with the riskiness of the issuer, concluding that "subordinated debt investors appeared to have done more than merely monitor changes in banking organization conditions". Martinez Peria and Schmukler (2001) focus on deposit interest rates, and stress that depositors discipline banks by requiring higher interest rates, and that higher interest rates for riskier banks are consistent with market discipline.

[16] Our measure of Interest on deposits is a measure of average costs of total deposits that includes both insured and uninsured deposits. Expenses for Jumbo CDs are a subcomponent of the variable that captures total interest expenses.

uninsured deposits (Uninsured deposit market share). All quantities are scaled by the respective total of each of these variables held by both state- and nationally-chartered banks.

The third set of analyses focuses on soundness to test the influencing dimension of market discipline. The first soundness measure is the Z-Score. It is an accounting-based measure of distance to default, calculated as the sum of return on assets (ROA) and the equity-to-asset ratio divided by the standard deviation of ROA, calculated over a four-quarter rolling time window. This approach allows for variation in the denominator of the Z-Score, and avoids that Z-Scores are driven by variation in the levels of capital and profitability. As the Z-Score is not normally distributed we follow Beck et al. (2013) and use a log transformation; all tests are based on Z-Score (ln). Higher Z-Scores (ln) imply a lower probability of default. We also decompose the Z-Score into its components, ROA, its standard deviation, ROASD, and the capital ratio. Since none of the components is normally distributed, we apply log transformations to these three variables. To avoid taking the log of negative values if the ROA is negative, we follow Berger and Mester (2003), and add the absolute minimum value as a constant to the ROA prior to taking the log. We also use the ratio of non-performing loans to total loans (NPL), and the leverage ratio (LEV), defined as debt scaled by the sum of debt and equity to measure soundness.

The vector of time-varying control variables, X_{ist}, includes total assets (Total assets (ln)) to measure size, and we use the ratio of capital to total assets (Capital ratio (ln)) to measure capitalization, except for tests that examine the influencing dimension of market discipline where we omit this variable. Since liability composition plays a role for our tests, we control for the relative size of uninsured deposits (Uninsured deposits/Total liabilities) and of non-deposits (Non-deposits/Total liabilities), scaling both variables by total liabilities.

C. Do nationally-chartered banks constitute a valid counterfactual?

Before examining whether nationally-chartered banks are a valid counterfactual, we explore their similarity in levels to ascertain how comparable the treatment and control groups are. We present *t*-tests for differences in means between the treatment and control groups for all bank-level variables in the quarter prior to treatment in Panel B of Table 3. In all but two instances, the *t*-tests remain insignificant, suggesting that the treatment and control groups are similar. However, it is critical to recall that difference-in-difference estimation does not require identical levels of the variables between the treatment and control group because any level differences are removed by the fixed effects (Lemmon and Roberts (2010), Roberts and Whited (2013)).

Next, we focus on the key identifying assumption of parallel trends. That is, whether state-chartered banks would have evolved similarly to nationally-chartered banks in the absence of treatment. Figure 2 plots costs of funds, market shares, and soundness over eight quarters prior to,

and after, depositor preference. All variables are reported in levels to visualize the trend (Roberts and Whited (2013)). State-chartered banks are depicted by a dashed line, and nationally-chartered banks are denoted by a solid line.

Two issues stand out. First, nationally-chartered banks behave similarly to state-chartered banks in the pre-treatment period, suggesting they are a suitable counterfactual. This illustration also mitigates concerns about anticipation effects as there is no evidence that the treatment group adjusts its behavior prior to the adoption of depositor preference. However, enactment of the laws triggers for most variables differential behavior across the treatment and control groups.

Second, market shares respond heterogeneously. Consistent with the fact that insured depositors' claims remain unaffected, market shares for insured deposits do not change after enactment of the laws. Market shares for non-deposits also do not respond. In contrast, market shares of uninsured deposits increase after depositor preference is introduced.

[INSERT FIGURE 2: PARALLEL TRENDS]

To complement our visual illustration, we follow Roberts and Whited (2013) and conduct t-tests to verify parallel trends. We examine differences in the growth rate between the treatment and control groups during each pre-treatment quarter. The focus on growth rates reflects the argument above that differences in levels are differenced away. Panel C of Table 3 shows that the null of equality of means cannot be rejected in any but three out of 104 cells, suggesting the parallel trends assumption holds.

While these tests indicate that the control group is observationally similar to the treatment group, a concern may be that changes in the flow of funds triggered by depositor preference may affect bank size. Therefore, we show further tests using a size-matched sample, following Lemmon and Roberts (2010). We use nearest neighbor matching with replacement based on pre-treatment size. First, we use a probit model to estimate

$$(2) \qquad StateCharter_i = \theta_0 + \theta_1 Size_i + u_i,$$

where $StateCharter_i$ is a dummy equal to 1 if bank i has a state charter (0 otherwise), during the pre-treatment period; $Size_i$ is the mean of total assets for bank i during the pre-treatment period; and u_i is the error term. We then compute propensity scores using the estimates obtained from Equation (2). Bank i's nearest neighbor is the bank with the most similar propensity score. We also impose the condition that the propensity score must lie within a 0.01 range of bank i's propensity score. Using a 1:1 matching strategy, the matched sample pairs one state-chartered bank with one propensity-score matched nationally-chartered bank of very similar size, resulting in a sample with 42,245 observations. The matching produces a sample with similar bank sizes with values of 10.62 (treatment group) and 10.47 (control group), with a t-statistic of -0.33.

IV. Empirical results of the effects of depositor preference laws

Subsection *IV.A* presents the pricing effects, and Subsection *IV.B* focuses on quantity effects. Subsection *IV.C* discusses soundness and Subsection *IV.D* rules out alternative explanations and digs deeper into the role of monitoring.

A. Pricing effects of depositor preference

Table 4 presents in Panel A the pricing effects for the full sample, and Panel B reports on the matched sample. Our tests show that depositor preference affects funding costs. The estimates for φ are significant and display the expected sign.

In the full sample, we find that depositor preference lowers overall funding costs (*t*-statistic -5.80) for state-chartered banks, reflected in a decline of the ratio of total interest expenses to total liabilities by 0.0189, equivalent to a 1.33% decrease in interest expenses for the average bank in the sample.[17] Matching on bank size reinforces this point: we obtain a similar magnitude of the coefficient (-0.0199) as well as a similar level of significance (*t*-statistic -5.84).

Next, we focus on the cost of different types of funds. There is strong evidence in support of *Hypothesis 1,* suggesting greater market discipline as non-depositors intensify monitoring of state-chartered banks. The effects are economically and statistically significant. The costs for non-deposit funding increase in the full sample with a coefficient of 0.1338 (*t*-statistic 8.51) and in the matched sample with a coefficient of 0.1186 (*t*-statistic 6.96). These figures are equivalent to a 21% (19% in the matched sample) increase relative to the mean, or 11% (9% in the matched sample) of a standard deviation increase.

We also find support for *Hypothesis 3*. The costs of Jumbo CDs decline by approximately 1.91% with *t*-statistics of -2.34 and -1.77 for the full and for the matched sample, respectively. In addition, the cost of deposit funds decline with *t*-statistics of -6.55 and -6.15 in the full and in the matched sample, respectively. This is because the cost of deposit funds variable contains both insured and uninsured deposits.

The increase in interest payments to non-depositors is approximately six times larger than the coefficient for the decrease in interest payments to uninsured depositors. The magnitude for the effect on non-deposits is reasonable: non-deposit claims are moving down the priority ladder and face a lower probability of being paid out in liquidation. Moreover, the magnitude of this effect could be due to an inelastic demand for non-deposits, as described in Section *IV.B* below, such that a change in the supply of non-deposits provokes a more than proportional price change.

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[17] To illustrate, the average treatment effect is computed by dividing the key coefficient (-0.0189) in the regression for total interest expenses by the average total interest rate of 1.4197%, i.e., (-0.0189/1.4197)*100 = -1.33%.

Among the control variables, we find that size (ln) correlates positively with the dependent variables, whereas better capitalized banks pay lower interest rates, except for non-deposits, where we obtain a positive and significant effect. The ratio of uninsured deposits to total liabilities is positively associated with total interest expenses, interest on deposits, and interest on non-deposits but it is inversely related to interest on Jumbo CDs. Total interest expenses and interest on Jumbo CDs are negatively associated with the ratio of non-deposit funding to total liabilities. Non-deposit interest expenses go hand in hand with a greater reliance on non-deposit funding relative to total liabilities.[18]

[INSERT TABLE 4: PRICING EFFECTS OF DEPOSITOR PREFERENCE]

B. Quantity effects of depositor preference

Table 5 examines market shares. Panel A shows the coefficients for the full sample, and Panel B reports on the matched sample.[19] Debt priority changes do not affect state-chartered banks' market share for insured deposits but there is a significant increase in state-chartered banks' market share of uninsured deposits of 8 percentage points (*t*-statistic of 2.17), consistent with *Hypothesis 4a*. As our tests rely upon variation within state-quarters, the increase in uninsured deposit market share may originate from uninsured depositors' switching from nationally-chartered banks to state-chartered banks.[20] A rightward shift of the uninsured deposits supply curve is in line with the idea that conferring seniority reduces these depositors' monitoring incentives. The final column shows an insignificant effect for the market share of non-deposits.

The coefficients for the matched sample in Panel B confirm our inferences. Market shares for insured and non-deposits are unaffected, but there is a significant increase in the market share for uninsured deposits. The control variables remain insignificant.[21]

[INSERT TABLE 5: QUANTITY EFFECTS OF DEPOSITOR PREFERENCE]

Next, we examine whether the impact of depositor preference on funding costs and market shares persists. We augment our tests from Table 4 and Table 5 and include eight additional dummy

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[18] We perform additional tests in our Supplementary Online Appendix. Table A.2 shows reduced form models with the State charter dummy, the dummy for depositor preference, their interaction, and bank- and quarter-fixed effects in Panel A for pricing effects to rule out that bank characteristics systematically coincide with depositor preference. Panel B of Table A.2 uses all 50 states, including banks from non-depositor preference states to test if the choice of the control group plays a role for our inferences. The coefficient estimates are unaffected.

[19] For the quantity results tests based on the matching procedure, we calculate market shares using the matched bank-level data.

[20] An alternative explanation for the increase in uninsured deposit market share could be that investors switch from holding non-deposits to deposits in state-chartered banks under depositor preference. Unreported tests in which we model the effect of depositor preference on the ratio of non-deposit investments to deposits in a sample of state-chartered banks in depositor preference states empirically refute this view.

[21] Panel A of Table A.3 in the Supplementary Online Appendix reports reduced form models for quantity effects, leaving our inferences unaffected. Panel B uses the sample consisting of all 50 states. This test is important to assuage concerns that our control group in the main setup is directly affected due to the sample composition in the quantity analysis since identification arises from within state-quarter variation between state-chartered and nationally-chartered banks. In Table 5, increases in the quantity of the treated group could be drawn from the control group because uninsured claimants may move their balances seeking a safer claim afforded by depositor preference in a competitive environment. This possibility may be reflected in Figure 2 in the plots for market shares. While the setup with 50 states cannot completely rule out spillover effects to banks across state borders, the alternative control group of banks from outside the state is not subject to depositor preference. Therefore, this control group is less likely affected by within state competition. Our inferences remain very similar.

variables, called After *i* with *i* ∈ *(1, 2, ...8)* where After *1* is equal to one in the quarter a state adopts depositor preference (0 otherwise). After *2* is equal to one if the state adopted depositor preference one quarter ago (or 0 otherwise). Likewise, After *3* is a dummy equal to one if the quarter of enactment was two quarters earlier (0 otherwise). The additional dummy variables are interacted with the state charter dummy.

Panel A of Table 6 shows that the pricing effects persist with immediate and enduring declines in total interest expenses and payments on the two measures of deposit expenses. The increase in interest on non-deposits takes one quarter to materialize.

The tests for markets shares in Panel B give a more nuanced picture. While the market shares for uninsured deposits experience immediate statistically and economically significant increases, market shares of deposits and non-deposits are unaffected. Insured deposits are unaffected by the law. The increase in the cost of non-deposit funds despite the absence of a significant market share effect on non-deposits is consistent with an inelastic demand for this type of funds.[22]

[INSERT TABLE 6: LONG-RUN EFFECTS OF DEPOSITOR PREFERENCE]

C. Effects on bank soundness

This section tests whether changes in debt priority influence conduct. All tests for soundness omit the capital ratio (ln) as a control variable because it is a component of the Z-Score (ln).

Consistent with *Hypothesis 5*, Panel A of Table 7 shows that state-chartered banks' Z-Scores (ln) increase significantly (*t*-statistic 9.50), indicating improved soundness for the full sample, with a large effect of 24%. This is driven by a 4% increase in profits (*t*-statistic 2.51), and a 9.4% increase in the capital ratio (ln) (*t*-statistic 7.39), while the volatility of profits declines by 3.2% (*t*-statistic -2.00). The findings for NPL and LEV reinforce this point.[23] The size-matched sample in Panel B also supports *Hypothesis 5*. Both statistical and economic magnitudes remain similar, except for the effect on profit volatility with a *t*-statistic of -1.60.[24]

For the control variables, we find that size (ln) is significantly negatively related to the NPL ratio, the capital ratio (ln), and the standard deviation of ROA (ln) but it positively affects LEV and ROA (ln). The ratio of uninsured deposits to total liabilities is positively related to the Z-Score (ln), and the capital ratio (ln) but it is inversely associated with the NPL ratio and LEV. The ratio

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[22] In an unreported test, we model the quantity of non-deposit funds as a function of the interest expenses paid on non-deposit funds to examine the elasticity of demand for this type of funds. The coefficient is -0.11 for non-deposits and the coefficient is highly significant, suggesting that demand for non-deposits is highly inelastic.

[23] Table A.4 in the Supplementary Online Appendix contains reduced form models in Panel A for soundness effects and uses a sample of 50 states in Panel B. The results remain very similar.

[24] If asset quality improves in response to depositor preference, one would expect these laws also to reduce the probability of failure. Our Supplementary Online Appendix, Table A.5 presents failure prediction models and confirms this hypothesis.

of non-deposits to total liabilities is positively associated with the Z-Score (ln) and the capital ratio (ln) while it is negatively and significantly related to both the NPL ratio and LEV.

[INSERT TABLE 7: EFFECTS ON BANK SOUNDNESS]

D. Alternative explanations and further tests for monitoring

Prior to concluding that our results reflect causal changes in monitoring intensity, we rule out plausible alternative explanations. Two alternative explanations warrant attention. First, banks may pay higher rates to non-depositors to deter them from monitoring. That is, increases in rates could be viewed as compensation for non-depositors to discourage them from information-gathering to avoid that they force changes in conduct. If true, banks with high non-deposit interest expenses are unlikely to improve soundness more than those with low non-deposit interest expenses because non-depositors in such banks are already compensated.

Panel A of Table 8 splits the sample at the median of non-deposit expenses with the Z-Score (ln) as the dependent variable. Banks with non-deposit interest expenses greater than the median display greater adjustments in Z-Scores (ln), i.e., the results reject this alternative explanation. Our Chow tests reject the equality of the key coefficient between the subsamples.

Second, the improvements in soundness may reflect reductions in total funding costs, because lower funding costs increase, *ceteris paribus*, capital ratios via the documented increase in ROA (ln). We replicate the tests for Z-Score (ln), NPL and LEV but additionally control for total deposit interest expenses (defined as total interest on deposits in dollar terms) and total non-deposit interest expenses (defined analogously). If this explanation is true, controlling for these variables should render the key interaction term insignificant. Panel B shows this is not the case.

[INSERT TABLE 8: RULING OUT ALTERNATIVE EXPLANATIONS]

We show more tests to reinforce the view that monitoring is at the heart of our results. We first exploit the idea that banks which are closer to insolvency should receive greater scrutiny by non-depositors, who should respond more strongly to changes in priority structure. Thus, increases in non-deposit interest expenses should be greater for unsound banks relative to sound banks.

We classify banks with Z-Scores (ln) equal to or below the median, and banks with NPL ratios and LEV ratios above the median as unsound; the remaining banks are classified as sound. Next, we replicate our tests with non-deposit interest expenses as the dependent variable for these subsamples in Panel A of Table 9. Non-deposit interest rates respond more strongly to depositor preference among unsound banks. Chow tests reject the equality of the coefficients across the subsamples.

Panel B splits the sample at the median Z-Score (ln) to test if unsound banks that are likely to be monitored more intensively after the law change take greater steps to improve soundness. The adjustments for Z-Scores (ln), NPL, and LEV are more pronounced for unsound banks, a result supported by Chow tests.

Our results show immediate effects on deposit rates. These effects are likely to reflect dependence on uninsured, interest earning deposits with maturities less than one quarter. If true, banks with greater reliance on this type of funds should display greater responsiveness than those with little reliance on such funds. Our proxy for these types of funds, Jumbo CDs with a maturity of less than one quarter, are well suited to examine this issue as they account for 7.38% of total deposits. We split the sample at the median of Jumbo CDs with a maturity of less than one quarter and report results for total interest expenses, interest on deposits and interest on uninsured deposits. The magnitudes of the key coefficient and the *t*-statistics are larger for those banks with greater reliance on short-term uninsured Jumbo CDs in Panel C.

The final test explores whether our results are consistent with increased monitoring. Following Stiroh and Strahan (2003), who find that market forces reallocate market shares from weak banks toward better banks, we examine market shares for non-deposits in subsamples of sound and unsound banks as a proportion of non-deposits in all state-chartered banks. The distinction between sound and unsound banks is based on Z-Scores (ln). The data is collapsed in the depositor preference states to the mean value within each group of sound and unsound banks in the state prior to and following the adoption of the laws. Panel D shows that market shares increase following depositor preference for the subsample of sound banks whereas banks with Z-Scores (ln) below the median contract. While the market share for non-deposits is similar in the pre-treatment period, the *t*-test for the difference in means following the enactment of the laws is significant, consistent with the idea that junior creditors move from unsound to sound banks. The *t*-tests for the differences in means prior to and following the law change are also significant.

[INSERT TABLE 9: FURTHER EVIDENCE FOR MONITORING]

V. Confounding events and other robustness concerns

We now focus on confounding events and omitted variables. To confound our coefficient estimates omitted variables must differentially affect state- and nationally-chartered banks in the same state, and coincide with depositor preference adoption. While finding such omitted variables is less likely in our context than in a study with only one treatment, several events and regulatory changes occur during our sample period. Therefore, we show tests to rule out that they affect our inferences. All tables that address confounding events are relegated to Appendix D.

Banking problems characterize the sample period. Declining real estate prices caused banking turmoil in New Hampshire, Connecticut, Massachusetts, and Rhode Island. In New England, many banks failed between 1990 and 1992. This New England banking crisis coincides with the adoption of depositor preference in New Hampshire, Connecticut, Maine, and Rhode Island. Texas, which adopted depositor preference in 1985, also experienced banking problems as real estate prices fell between 1985 and 1987 (Gan (2004)). The last prominent confounding event is the S&L crisis with over 1,000 failures of S&Ls between 1986 and 1995. This crisis was driven by a tax reform which brought the real estate boom to a halt and deregulation.

Although these three crises coincide with the adoption of depositor preference, it is difficult to see how they differentially affect state- and nationally-chartered banks. We first rule out that these crises affect funding costs. To focus on the New England crisis, Panel A of Table D.1 removes observations for Connecticut, Maine, New Hampshire, and Rhode Island between 1991 and 1993. Panel B removes observations of Texan banks from 1986 onwards. Panel C includes an additional interaction term between the state charter dummy and a proxy for the intensity of the Savings & Loans (S&L) crisis, measured as the ratio of failed thrift assets to total bank assets per state. This approach departs from our method of investigating the crises in Texas and New England because the severity of the crisis differed across states. All tests reject the idea that these crises interfere with our key coefficients.

In response to these crises, legislators passed the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) in 1989 and the Federal Deposit Insurance Corporation Improvement Act (FDICIA) in 1991. The FIRREA altered the process for receivership claims. Although it did not change the order of priority in which creditors of a failed institution are paid off, it contained arguments to avoid treating creditors of a given class equally because certain liability components and off-balance sheet items may affect the choice of resolution methods with effects for resolution costs (Marino and Bennett (1999)). This provided incentives for the FDIC to exert discretion in its treatment of creditors of a similar class.[25]

While FIRREA provided scope for preferring some creditors so that our results from 1989 onwards may be influenced by choices made by the FDIC, we emphasize that our focus is on the monitoring incentives of claimholders and their associated effects, rather than discretion the FDIC may or may not have exercised. Even if the FDIC exerted discretion, claimants' incentives remain unchanged because the decision to treat creditors differently rests with the FDIC. Consequently,

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[25] In instances when the FDIC exerted discretion prior to our sample period, creditors challenged their treatment in court, resulting in the "First Empire" decision in 1978 (FDIC and RTC (1998)). The Ninth Circuit Court of Appeals established that the FDIC cannot arrange transactions that passed all of a bank's assets and satisfied some of its liabilities in full but failed satisfying other liabilities, regardless of class. Following the unfavorable court ruling, the FDIC lobbied for discretion, and the FIRREA enshrined the discretionary choice into law in 1989.

there is *ex ante* uncertainty surrounding the FDIC's choice and non-depositors still face a threat of losing their investment in case of bankruptcy. Therefore, our findings should not be affected by FIRREA.[26] To verify our claim, we remove observations from 1989Q4 to 1993Q2 during which FIRREA was in place. Our key coefficients should vary if FIRREA plays any role for our results. Panel D rejects this view.

The FDICIA contained further measures to improve soundness, such as increasing regulatory powers. To rule out its effects, Panel E omits observations during the FDICIA period 1991Q4 to 1993Q2. Our results remain unaffected.

The lifting of geographical restrictions on bank activities also coincides with the sample period. From the 1970s onwards, 38 states deregulated intrastate branching and allowed BHCs to convert subsidiaries into branches, and states permitted *de novo* branching. Likewise, many states deregulated interstate restrictions, culminating in the Riegle-Neal Interstate Banking Act of 1994 which allowed banks and BHCs to acquire banks and BHCs elsewhere. These changes do not affect state- and nationally-chartered banks differentially, nor do they affect the priority structure of claims. Panel F contains an additional interaction term between the State charter variable and a dummy that takes on the value of 1 if a state allowed intrastate branching (0 otherwise). Panel G includes an interaction between the State charter variable and a dummy that takes the value of 1 if a state allowed interstate branching (0 otherwise). The results are similar.

Two more legislative changes deserve attention. The repeal of Regulation Q by the Depository Institutions Deregulation and Monetary Control Act removed interest rate ceilings on savings and time deposits in 1986Q3, and the Competitive Equality Banking Act (CEBA) in 1987 permits emergency interstate bank acquisition, and allowed the FDIC to operate bridge banks. We interact the State charter dummy with a dummy that takes on the value of 1 for the period when Regulation Q is removed in Panel H (0 otherwise). Panel I proceeds equivalently with a dummy that takes on the value of 1 for the CEBA period. Our inferences remain unaffected.

Next, we revisit the parallel trends assumption using placebo tests in Appendix Table D.2. The intuition is that the results shown so far can only be observed when depositor preference is in force but cannot be observed at previous points in time (pre-treatment period). Panel A of Table D.2 assigns placebo depositor preference treatment randomly across states in the pre-treatment period

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[26] To establish whether the FDIC exerted discretion, we randomly select failures of state-chartered banks from the list of failed banks on the FDIC website, and used search engines to retrieve information about their resolutions. We also review case studies of failures reported in FDIC and RTC (1998). Our review provides little support for the notion that the FDIC made use of the discretion provided by FIRREA. Discretion only played a role in a very limited number of instances, e.g., in the failure of First City Bancorporation of Texas, Inc. in 1992. Its failure involved 20 subsidiaries, with expected losses in four subsidiaries. The FDIC handed out a disparate treatment of failed bank depositors and non-depositors. In sixteen of the failed banks where the FDIC expected no loss, depositors and general creditors were all paid in full. In contrast, in the four banks that were expected to cause losses to the FDIC, the FDIC only protected insured deposits at the time of the failure.

and interacts the placebo treatment with the State charter dummy. These random placebo treatments do not change debt priority claims, and the interactions with the placebo treatment remain insignificant. This test also mitigates concerns about anticipation effects. Next, we run the analysis using states neighboring depositor preference states which do not implement the legislation themselves in Panel B. These placebo tests also do not invalidate our inferences.

The tests for soundness are shown in Table D.3. Neither the New England banking crisis (Panel A) nor the problems in Texas (Panel B) nor the S&L crisis (Panel C) affect our estimates for the effect of the interaction term on Z-Scores (ln), ROA (ln), capital ratio (ln), and NPL. While the relationship between the key interaction term and ROASD (ln) displays some sensitivity, our main inferences remain intact. Changes in regulation in Panel D (exclusion of the FIRREA period), Panel E (exclusion of the FDICIA period), Panel F (intrastate deregulation) and Panel G (interstate deregulation), reiterate our findings although the volatility of profits coefficient is more sensitive. Considering the role of Regulation Q (Panel H) and the CEBA (Panel I) also does not invalidate our conclusions.[27]

The placebo tests also hold for soundness, presented in Table D.4. Panel A shows that randomly assigned pre-treatment placebo treatments have no effect on soundness, and Panel B replicates these tests when the placebo treatment is assigned to the neighboring states without depositor preference. All dependent variables remain unaffected in these tests.

VI. Falsification tests and external validity

We now present a falsification exercise, and run Monte Carlo simulations with 1,000 replications to check whether state-chartered banks are affected by national depositor preference in 1993. We constrain the sample to state-chartered banks from the 15 states in our main tests because a suitable control group does not exist. We set the start date to the quarter in which the state where the bank is headquartered introduces depositor preference, and extend the sample period to 1999Q4. Next, we randomly assign banks to a placebo treatment equal to 1 in 1993Q3 and all subsequent quarters (0 otherwise). We estimate

$$(3) \qquad y_{ist} = \alpha + \pi placebo_{ist} + \gamma X_{ist} + \varphi_i + \varphi_{st} + \varepsilon_{ist} \,.$$

This specification estimates how much higher (lower) the dependent variable was in the same bank after national depositor preference under the Omnibus Budget Reconciliation Act. Because

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[27] We relegate additional tests into the Supplementary Online Appendix. While only 2.1% of banks change charter, Table A.6 examines whether banks avoid being subject to depositor preference and switch charters. We use probit regressions to model charter switches. The dummy for depositor preference is insignificant. Table A.7 shows that omitting charter switchers does not affect our conclusions for the pricing effects in Panel A, and Panel B and Panel C reiterate these findings for the quantity and soundness effects, respectively. In addition, we focus on banks that belong to a BHC in Table A.8 and constrain the sample to members of BHCs where the BHC itself has at least one subsidiary with a state charter and one with a national charter (Kaufman (1997)). Subsidiaries in the same BHC with state-charters also respond significantly to depositor preference relative to subsidiaries with national charters. We also examine whether interest rate measurement drives our results. While the main tests rely on contemporaneous interest expenses, short term interest rates may increase even within a quarter. Table A.9 uses lagged (Panel A) and average balances (Panel B) of interest expenses. Our inferences remain very similar.

this law should not affect state-chartered banks, the null of zero effect is true. Thus, we should only reject the null by making Type 1 errors. Panel A of Table 10 examines funding costs, and Panel B presents the tests for soundness. The rejection rates are in line with those that would occur through Type 1 errors for both panels. In most cases, the average value of π is close to 0, suggesting that state-chartered banks are unaffected by national depositor preference.

Finally, we discuss external validity using national depositor preference to test whether our findings generalize beyond our economic laboratory. We again extend the sample period to 1999Q4. The treatment group consists of all banks in states that did not implement depositor preference prior to 1993Q3 and nationally-chartered banks in states that had introduced depositor preference. Given that state-chartered banks in states that enacted depositor preference were already subject to these provisions, they are an ideal control group. We exclude all quarters prior to the adoption of state-level depositor preference for states which adopted state depositor preference. Panel C of Table 10 confirms our key results for national depositor preference. National depositor preference significantly reduces deposit expenses and expenses for Jumbo CDs, and significantly increases non-deposit expenses. The overall effect on funding costs is insignificant. Panel D shows that Z-Scores (ln) improve significantly, and the NPL ratio declines significantly. The decomposition of the Z-Score (ln) indicates improvements also in the capital ratio (ln) and profitability. In sum, while the effects from national depositor preference are somewhat less pronounced, these results suggest that our inferences have external validity.

[INSERT TABLE 10: FALSIFICATION TEST AND EXTERNAL VALIDITY]

VII. Concluding remarks

We use an unexplored natural experiment to inform the debate about market discipline by using the staggered introduction of depositor preference laws in the U.S. These laws change the priority of claims on bank assets which allows us to test whether changes in priority structure affect the monitoring incentives of different claimants. Non-depositors' claims are subordinated to those of depositors under depositor preference. Thus, non-depositors have greater monitoring incentives. In addition, we test the impact of depositor preference on market shares of different liabilities and, importantly, whether changes in debt priority structure affect bank soundness.

We obtain two key results. First, the change in claim structure triggers changes in funding costs and, ultimately, conduct. Non-deposit funds become significantly more expensive. Second, changes in debt priority structure significantly improve soundness. In line with the idea that unsound banks are likely to be subject to greater scrutiny by non-depositors, we find that the increase in the costs of non-deposit funds is larger in magnitude for such banks. These results support the idea that changes in monitoring drive our results, and are consistent with theories by

Fama (1980) and Rajan and Winton (1995), who predict an inverse relationship between the seniority of debt claims and debtholders' monitoring incentives.

Our findings contribute to a lively policy debate. First, they justify the introduction of depositor preference in Europe in 2014 which was subject to controversial discussions between policy makers and the banking industry. Furthermore, the evidence supports the idea behind the introduction of convertible subordinated debt requirements into the regulatory framework based on the objective of shifting monitoring to investors with efficient information-acquisition and processing capabilities. To that extent, they are in line with the motivation behind the concept of Total Loss Absorbing Capacity (TLAC) advocated by the Financial Stability Board.

We temper our summary because bank business models have changed over the past decades. Our setting renders it infeasible to use recent data. Further, while many European banks are comparable to state-chartered banks in the U.S., the large internationally active European banks differ in terms of funding structures from their smaller counterparts. Therefore, we are careful in extending our results to large banks with extensive reliance on non-deposit funds. This is a caveat because the subordination of non-depositors may increase the risk of runs by such claimants as illustrated in the 2008 crisis. We also do not claim that depositor preference is a panacea to constrain risk-taking. Yet, protecting depositors on the one hand and increasing market discipline on the other hand has potential to improve bank soundness.

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Table 1
Timing of depositor preference laws

State	Date Effective	In Sample
Alaska	10/15/1978	No
Arizona	9/21/1991	Yes
California	6/27/1986	Yes
Colorado	5/1/1987	Yes
Connecticut	5/22/1991	Yes
Florida	7/3/1992	Yes
Georgia	1974[+]	No
Hawaii	6/24/1987	Yes
Idaho	1979[++]	No
Indiana	1943	No
Iowa	1/1/1970	No
Kansas	7/1/1985	Yes
Louisiana	1/1/1985	Yes
Maine	4/16/1991	Yes
Minnesota	4/24/1990	Yes
Missouri	5/15/1986	Yes
Montana	1927	No
Nebraska	1909	No
New Hampshire	6/10/1991	Yes
New Mexico	6/30/1963	No
North Dakota	7/1/1987	Yes
Oklahoma	5/26/1965	No
Oregon	1/1/1974	No
Rhode Island	2/8/1991	Yes
South Dakota	7/1/1969	No
Tennessee	1969	No
Texas	8/26/1985[+++]	Yes
Utah	1983	No
Virginia	7/1/1983	No
West Virginia	5/11/1981	No

Notes: We present the date of depositor preference law enactment in each state. The information is taken from Marino and Bennett (1999). [+]indicates that the legislation became effective on either January 1 or July 1. [++] indicates the law was passed by both houses on July 1, but that enactment date is unclear. Where only the year is indicated, neither the month nor the day of enactment are available and we impute January 1 as the enactment date. [+++] Texas amended its law in 1993Q2 and did not have depositor preference until national depositor preference was enacted in August 1993. Utah enacted depositor preference law during 1983Q1.

Table 2
Hypotheses

	Type of claim	Direction of coefficient	
		Pricing effect Predicted sign on φ from Equation (1)	Quantity effect (Market share) Predicted sign on φ from Equation (1)
Monitoring	Non-deposits	+	+/-
	Uninsured deposits	-	+/-
	Insured deposits	0	0
Influencing	**Risk measure**	Predicted sign on φ from Equation (1)	
	Z-Score	+	
	Leverage	-	
	Non-performing loans ratio	-	

Table 3
Summary statistics and tests for parallel trends

Panel A: Summary statistics for the period 1983Q1-1993Q2

Variable	N	Mean	SD	p5	p95
Dependent variables					
Total interest expenses (in % of Total liabilities)	199,731	1.4197	0.4226	0.7769	1.9693
Interest on deposits (in % of Total deposits)	199,731	1.4296	0.4343	0.7797	1.9940
Interest on Jumbo CDs (in % of Total Jumbo CDs)	171,361	1.9149	0.9783	0.7937	3.2494
Interest on non-deposits (in % of Total Non-deposits)	199,731	0.6352	1.2257	0	2.3013
Insured deposit market share	1,286	0.5	0.2547	0.1507	0.8493
Uninsured deposit market share	1,286	0.5	0.2879	0.0001	0.7767
Non-deposit market share	1,286	0.5	0.3232	0.0397	0.9603
Z-Score (ln)	199,731	4.1712	0.9880	2.4673	5.6191
Return on assets (ROA, ln)	199,731	-6.1292	0.7817	-6.9078	-5.0164
Return on assets, standard deviation (ROASD, ln)	199,731	-6.6848	0.8391	-7.9742	-5.2265
Capital ratio (ln)	199,731	-2.5881	0.7208	-3.1650	-1.9155
Non-performing loans to total loans (NPL)	199,731	0.0170	0.0228	0	0.0685
Leverage ratio (Debt to debt and equity, LEV)	199,731	0.9145	0.0349	0.8527	0.9578
Explanatory variables					
State charter	199,731	0.6501	0.4769	0	1
Depositor preference	199,731	0.5799	0.4935	0	1
Uninsured deposits/Total liabilities	199,731	0.0938	0.1003	0	0.3587
Non-deposits/Total liabilities	199,731	0.2399	0.2446	0.0460	0.9913
Bank size (ln)	199,731	10.6347	1.1830	8.9856	12.7530
Interstate deregulation	199,731	0.5198	0.4996	0	1
Intrastate deregulation	199,731	0.4289	0.4949	0	1
S&L crisis	199,731	0.0384	0.0743	0	0.2306
Regulation Q	199,731	0.1020	0.3026	0	1
Competitive equality banking act	199,731	0.3831	0.4861	0	1

Panel B: Bank-level variables in the quarter prior to depositor preference enactment

Variable	Treatment	Control	Difference	*t*-Statistic
Total interest expenses (in % of Total liabilities)	1.4475	1.4138	0.0337	0.31
Interest on deposits (in % of Total deposits)	1.4576	1.4067	0.0509	0.46
Interest on Jumbo CDs (in % of Total Jumbo CDs)	2.2226	2.2225	0.0001	0.01
Interest on non-deposits (in % of Total Non-deposits)	0.6923	0.8593	-0.1670	-1.56
Z-Score (ln)	3.8146	3.2161	0.5985	1.09
Return on assets (ROA, ln)	-6.0919	-6.1577	0.0658	0.54
Return on assets, standard deviation (ROASD, ln)	-6.6101	-6.7221	0.1120	1.01
Capital ratio (ln)	-2.6245	-2.8834	0.2589	1.21
Non-performing loans to total loans (NPL)	0.0221	0.0205	0.0016	0.51
Leverage ratio (Debt to debt and equity, LEV)	0.9153	0.9217	-0.0064	-1.29
Bank size (ln)	10.0949	11.3033	-1.2084	-0.53
Uninsured deposits/Total liabilities	0.0883	0.0656	0.0227	1.85*
Non-deposits/Total liabilities	0.1533	0.2193	-0.0660	-1.96**

Panel C: Tests for parallel trends (Difference in mean changes)

Time period prior to enactment of depositor preference	t-1		t-2		t-3		t-4	
Variable	Difference Means	Wilcoxon p-value	Difference Means	Wilcoxon p-value	Difference Means	Wilcoxon p-value	Difference Means	Wilcoxon p-value
Δ Total interest expenses (in % of Total liabilities)	-0.003	0.852	0.001	0.756	-0.005	0.756	0.024	0.290
Δ Interest on deposits (in % of Total deposits)	0.001	0.917	-0.002	0.787	0.003	0.984	0.011	0.885
Δ Interest on Jumbo CDs (in % of Total Jumbo CDs)	0.001	0.125	-0.007	0.127	0.002	0.885	0.020	0.520
Δ Interest on non-deposits (in % of Total Non-deposits)	0.038	0.694	-0.148	0.443	0.032	0.917	0.206	0.254
Δ Insured deposit market share	-0.009	0.191	0.004	0.141	0.020	0.081	-0.001	0.468
Δ Uninsured deposit market share	0.003	0.609	0.048*	0.082	0.007	0.431	-0.046	0.613
Δ Non-deposit market share	0.018	0.917	-0.005	0.836	0.005	0.443	-0.069	0.589
Δ Z-Score (ln)	0.915	0.254	-0.254	0.520	-0.063	0.633	-0.013	0.443
Δ ROA (ln)	0.005	0.740	0.001	0.708	-0.001	0.096	0.003	0.338
Δ ROASD (ln)	0.000	1.000	-0.001	0.944	-0.000	0.954	0.005	0.725
Δ Capital ratio (ln)	-0.010	0.885	0.008	0.395	0.003	0.663	0.013	0.152
Δ Non-performing loans to total loans (NPL)	0.178	0.756	-0.056	0.254	1.118	0.756	-0.047	0.548
Δ Leverage ratio (Debt to debt and equity, LEV)	-0.001	0.819	-0.000	0.819	0.001	0.663	0.002	0.221

Time period prior to enactment of depositor preference	t-5		t-6		t-7		t-8	
Variables	Difference Means	Wilcoxon p-value	Difference Means	Wilcoxon p-value	Difference Means	Wilcoxon p-value	Difference Means	Wilcoxon p-value
Δ Total interest expenses (in % of Total liabilities)	0.008	0.633	0.001	0.633	0.009	0.694	0.015	0.435
Δ Interest on deposits (in % of Total deposits)	0.028	0.604	0.009	0.756	-0.015	0.604	0.058	0.291
Δ Interest on Jumbo CDs (in % of Total Jumbo CDs)	0.011	0.890	0.005	0.453	-0.096	0.686	0.019	0.419
Δ Interest on non-deposits (in % of Total Non-deposits)	0.243*	0.090	-0.039	0.819	0.315	0.272	-0.242	0.270
Δ Insured deposit market share	-0.001	0.694	0.002	0.395	0.005	0.115	-0.002	0.854
Δ Uninsured deposit market share	0.022	0.748	-0.057	0.908	0.043	0.488	-0.013	0.705
Δ Non-deposit market share	0.048	0.171	-0.029	0.697	0.037*	0.077	-0.026	0.730
Δ Z-Score (ln)	0.013	0.487	-0.012	0.534	-0.007	0.708	-0.032	0.168
Δ ROA (ln)	-0.004	0.917	-0.009	0.331	-0.009	0.108	0.006	0.457
Δ ROASD (ln)	0.010	0.311	-0.003	0.523	-0.002	0.962	-0.001	0.795
Δ Capital ratio (ln)	0.005	0.663	0.001	0.663	0.002	0.468	0.012	0.198
Δ Non-performing loans to total loans (NPL)	0.448	0.309	0.366	0.724	-0.533	0.383	-0.121	0.927
Δ Leverage ratio (Debt to debt and equity, LEV)	0.001	0.254	-0.001	0.548	0.001	0.351	0.001	0.198

Notes: We present summary statistics for all variables in Panel A for the period 1983Q1-1993Q2. Note that the interest variables are expressed as quarterly interest rates, e.g., the quarterly Total interest rate of 1.4197 is equivalent to an annual Total interest rate of 5.800%. Total interest expenses, interest on deposits, interest on Jumbo CDs, and interest on non-deposits are reported in % of the respective total, i.e., the denominator for total interest expenses is total liabilities, the denominator for interest on deposits is total deposits, the denominator for interest on Jumbo CDs is total Jumbo CDs, and the denominator for interest on non-deposits is total non-deposits. The denominator for total non-deposits includes Fed Funds purchased, unsecured claims such as debentures, claims by providers of other borrowed money, claims by counterparties to swaps and contingent liabilities, claims of beneficiaries of guarantees, claims of holders of bankers' acceptances, and claims by other general creditors such as trade creditors, landlords, vendors, suppliers, and employees whose salaries constitute a non-deposit claim. All of these claims are non-deposits and are therefore integral components of the denominator. The number of observations for Jumbo CDs is smaller than for other types of deposits because the data for Jumbo CDs is only available from 1984Q1 onwards. Insured deposit/Uninsured deposit/Non-deposit market share is defined as the ratio of the sum of insured deposits/uninsured deposits/non-deposits by state-chartered banks to total insured deposits/uninsured deposits/non-deposits in the respective state-quarter. The Z-Score is defined as sum of the capital ratio plus return on assets, scaled by the standard deviation of return on assets for a four-quarter rolling time window. The capital ratio is defined as capital scaled by total assets. State charter is a dummy that takes on the value of one if the bank has a state-charter or 0 otherwise. Depositor preference is a dummy that takes on the value of one if the state adopted depositor preference or 0 otherwise, and Bank size is defined in terms of total assets. Panel B shows differences in means between the treatment and control group for the bank-level variables and the associated *t*-statistics in the quarter prior to the adoption of depositor preference. Panel C presents tests for parallel trends for the eight quarters prior to the introduction of depositor preference by showing differences in mean changes in all variables. To illustrate, the difference in means at *t-1* is the difference in mean change from *t-2* to *t-1* between treatment and control group. We proceed equivalently for the seven subsequent quarters.

Table 4
Pricing effects of depositor preference laws

Panel A: Pricing effects (Full sample)

Dependent variable	Total interest expenses	Interest on Deposits	Interest on Jumbo CDs	Interest on non-deposits
State charter	0.0176*	0.0202**	-0.0277	-0.0767*
	(1.93)	(2.26)	(-1.04)	(-1.76)
State charter*Depositor preference	-0.0189***	-0.0221***	-0.0366**	0.1338***
	(-5.80)	(-6.55)	(-2.34)	(8.51)
Bank size (ln)	0.1502***	0.1579***	0.0834***	0.0730***
	(14.62)	(15.09)	(5.52)	(4.21)
Capital ratio (ln)	-0.0354***	-0.0378***	-0.0579***	0.0219***
	(-11.27)	(-11.13)	(-10.11)	(2.69)
Uninsured Deposits/Total liabilities	0.0083***	0.0064***	-0.1132***	0.0431***
	(3.94)	(2.92)	(-16.90)	(4.91)
Non-Deposits/Total liabilities	-0.0250**	0.0048	-0.1139***	0.2270***
	(-2.26)	(0.43)	(-5.72)	(6.00)
Bank FE	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES
Observations	199,731	199,731	171,361	199,731
R-squared	0.7563	0.7693	0.2450	0.2583
Number of banks	5,509	5,509	5,499	5,509

Panel B: Pricing effects (Propensity score matched sample on bank size)

Dependent variable	Total interest expenses	Interest on Deposits	Interest on Jumbo CDs	Interest on non-deposits
State charter	0.0166	0.0190	0.0093	-0.0634
	(0.95)	(1.09)	(0.20)	(-0.93)
State charter*Depositor preference	-0.0199***	-0.0219***	-0.0266*	0.1186***
	(-5.84)	(-6.15)	(-1.77)	(6.96)
Bank size (ln)	0.1551***	0.1613***	0.1023***	0.0849***
	(14.22)	(14.52)	(6.05)	(4.94)
Capital ratio (ln)	-0.0370***	-0.0397***	-0.0695***	0.0213**
	(-10.85)	(-10.73)	(-9.38)	(2.45)
Uninsured Deposits/Total liabilities	0.0083***	0.0065***	-0.1211***	0.0423***
	(3.80)	(2.91)	(-16.13)	(4.74)
Non-Deposits/Total liabilities	-0.0286**	0.0047	-0.1321***	0.2380***
	(-2.40)	(0.39)	(-6.01)	(6.00)
Bank FE	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES
Observations	42,245	42,245	42,245	42,245
R-squared	0.7575	0.7706	0.2354	0.2570
Number of banks	1,200	1,200	1,200	1,200

Notes: We present the results of difference-in-difference regressions examining the effect of state depositor preference laws on banks' costs of funds in Panel A using the full sample. We estimate Equation (1) using data from the 15 states that enacted depositor preference law between 1983Q1 and 1993Q2. Note that the number of observations for the test on Interest on Jumbo CDs is smaller because data on Jumbo CDs is available only from 1984Q1 onwards. Panel B replicates the tests from Panel A but uses a propensity score matched sample on bank size as described in *Section III.C*, Equation (2). The vector of control variables includes bank size (ln), the capital ratio (ln), the ratio of uninsured deposits to total liabilities, and the ratio of non-deposits to total liabilities. Total interest expenses, interest on deposits, interest on Jumbo CDs, and interest on non-deposits are reported in % of its respective total, i.e., the denominator for total interest expenses is total liabilities, the denominator for interest on deposits is total deposits, the denominator for interest on Jumbo CDs is total Jumbo CDs, and the denominator for interest on non-deposits is total non-deposits. Standard errors are clustered at the state level. Robust *t*-statistics are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5
Quantity effects (market share) of depositor preference laws

Panel A: Quantity effects - market shares (Full sample)

Dependent variable	Insured deposit market share	Uninsured deposit market share	Non-deposit market share
State charter*Depositor preference	-0.0129	0.0810**	-0.0561
	(-0.27)	(2.17)	(-0.76)
Bank size (ln)	-0.0094	0.0133	0.3443***
	(-0.22)	(0.74)	(5.77)
Capital ratio (ln)	0.0498	-0.0230	-0.0124
	(0.94)	(-0.92)	(-0.16)
Uninsured Deposits/Total liabilities	0.1032***	-0.0197	0.0547
	(3.20)	(-1.17)	(0.59)
Non-Deposits/Total liabilities	-0.0819*	0.0429	-0.1620*
	(-1.91)	(1.71)	(-1.79)
State charter FE	YES	YES	YES
State*Quarter FE	YES	YES	YES
Observations	1,256	1,256	1,256
R-squared	0.0970	0.8391	0.0404
Number of state-charter panels	30	30	30

Panel B: Quantity effects - market shares (Propensity score matched sample on bank size)

Dependent variable	Insured deposit market share	Uninsured deposit market share	Non-deposit market share
State charter*Depositor preference	0.0022	0.0698***	0.0148
	(0.14)	(3.07)	(0.20)
Bank size (ln)	-0.0778	-0.0803	0.3752
	(-1.39)	(-0.76)	(1.36)
Capital ratio (ln)	-0.0008	0.0897	0.0038
	(-0.05)	(1.30)	(0.07)
Uninsured Deposits/Total liabilities	-0.0046	-0.0701**	-0.0256
	(-0.19)	(-2.38)	(-0.27)
Non-Deposits/Total liabilities	0.0147*	-0.0525***	-0.1229
	(2.00)	(-3.30)	(-1.72)
State charter FE	YES	YES	YES
State*Quarter FE	YES	YES	YES
Observations	1,256	1,256	1,256
R-squared	0.0789	0.7938	0.1379
Number of state-charter panels	30	30	30

Notes: We present the results of difference-in-difference regressions examining quantity effects of state depositor preference laws on market shares of insured deposits, uninsured deposits, and non-deposits using the full sample in Panel A. Market shares are measured at the charter-state level. We estimate Equation (1) using data from the 15 states that enacted depositor preference law between 1983Q1 and 1993Q2. Panel B replicates the tests from Panel A but uses a propensity score matched sample on bank size as described in Section *III.C*, Equation (2). The vector of control variables includes bank size (ln), the capital ratio (ln), the ratio of uninsured deposits to total liabilities, and the ratio of non-deposits to total liabilities. All bank-level control variables are averaged by state-quarter. As both types of bank charters are present in all state-quarters the State charter dummy is time invariant and is captured by the State charter dummy. The final row in both panels reports the aggregated bank-level data to the state level per type of charter. Standard errors are clustered at the state level. Robust *t*-statistics are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6
Long-run effects of depositor preference

Panel A: Long run effects – pricing effects					Panel B: Long run effects – market shares		
Dependent variable	Total interest expenses	Interest on deposits	Interest on Jumbo CDs	Interest on non-deposits	Insured deposit market share	Uninsured deposit market share	Non-deposit market share
State charter	0.0172	0.0199	-0.0166	-0.0787	0.3918***	0.1317***	-0.2401***
	(1.20)	(1.26)	(-0.34)	(-1.40)	(32.66)	(8.18)	(-8.90)
State charter*After *1*	-0.0267***	-0.0287***	-0.0047**	0.0469	0.0273	0.1890***	-0.0677
	(-3.59)	(-3.54)	(-2.16)	(1.44)	(0.43)	(10.96)	(-0.43)
State charter*After *2*	-0.0194***	-0.0236***	-0.0286*	0.1021***	0.0273	0.1753***	-0.0267
	(-2.93)	(-3.45)	(-1.67)	(2.76)	(0.43)	(2.92)	(-0.17)
State charter*After *3*	-0.0248***	-0.0279***	-0.0590**	0.1207***	0.0406	0.0941	-0.0498
	(-3.79)	(-4.27)	(-2.52)	(4.17)	(0.63)	(1.34)	(-0.32)
State charter*After *4*	-0.0207***	-0.0242***	-0.0715***	0.1677***	0.0392	0.1026*	-0.0262
	(-3.52)	(-4.20)	(-4.34)	(6.24)	(0.60)	(1.75)	(-0.16)
State charter*After *5*	-0.0181***	-0.0213***	-0.0284**	0.1308***	0.0233	0.0453	-0.0935
	(-2.62)	(-3.17)	(-2.14)	(2.63)	(0.33)	(0.74)	(-0.54)
State charter*After *6*	-0.0139*	-0.0173**	-0.0379**	0.1116**	0.0072	0.1861***	-0.0243
	(-1.91)	(-2.28)	(-2.41)	(2.45)	(0.09)	(2.60)	(-0.15)
State charter*After *7*	-0.0203***	-0.0220***	-0.0474**	0.1837***	0.0523	0.0504	-0.0266
	(-2.80)	(-3.09)	(-2.42)	(6.19)	(0.72)	(0.61)	(-0.15)
State charter*After *8*	-0.0172**	-0.0188**	-0.0511**	0.1054**	0.0486	0.0887***	-0.0086
	(-2.18)	(-2.30)	(-2.50)	(2.44)	(0.62)	(3.36)	(-0.05)
Bank size (ln)	0.1502***	0.1579***	-0.2096***	0.0734***	-0.0081	0.0141	0.3410***
	(6.41)	(6.76)	(-4.70)	(3.06)	(-0.83)	(1.03)	(18.84)
Capital ratio (ln)	-0.0354***	-0.0378***	-0.0970***	0.0216***	0.0543***	-0.0198	-0.0203
	(-6.22)	(-6.09)	(-8.99)	(2.69)	(4.38)	(-1.35)	(-0.86)
Uninsured Deposits/Total liabilities	0.0083*	0.0063	-0.0972***	0.0430***	0.1080***	-0.0173	0.0544
	(1.91)	(1.42)	(-5.63)	(2.86)	(6.80)	(-1.27)	(1.23)
Non-Deposits/Total liabilities	-0.0251	0.0048	0.0362	0.2267***	-0.0857***	0.0413***	-0.1538***
	(-1.02)	(0.18)	(0.75)	(3.09)	(-4.65)	(2.98)	(-3.74)
Bank FE	YES	YES	YES	YES	NO	NO	NO
State*Quarter FE	YES	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	171,361	199,731	1,256	1,256	1,256
R2	0.7563	0.7693	0.1669	0.2584	0.7826	0.8306	0.6284
Number of banks	5,509	5,509	5,499	5,509			
Number of state-charter panels					30	30	30

Notes: We present the results of difference-in-difference regressions for the long-run effect of state depositor preference law enactment. Panel A focuses on pricing effects. Total interest expenses, interest on deposits, interest on Jumbo CDs, and interest on non-deposits are reported in % of its respective total, i.e., the denominator for total interest expenses is total liabilities, the denominator for interest on deposits is total deposits, the denominator for interest on Jumbo CDs is total Jumbo CDs, and the denominator for interest on non-deposits is total non-deposits. Note that the number of observations for the test on Interest on Jumbo CDs is smaller because data on Jumbo CDs is available only from 1984Q1 onwards. Panel B examines quantity effects using market shares. We use data from the 15 states that enacted depositor preference law between 1983Q1 and 1993Q2. In these tests, the main explanatory variable is an interaction between the State charter dummy variable and a recoded depositor preference law dummy, *After i*, where $i = \in (1, ... ,8)$. For instance, *After 2* is equal to one if the state adopted depositor preference law one quarter ago, or 0 otherwise. Likewise, *After 3* is a dummy equal to one if the quarter of enactment was two quarters earlier, and 0 otherwise. *State charter$_{it}$* is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The vector of control variables includes bank size (ln), the capital ratio (ln), the ratio of uninsured deposits to total liabilities, and the ratio of non-deposits to total liabilities. Robust *t*-statistics are reported in parentheses and standard errors are clustered on the state level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 7
Effects on bank soundness from depositor preference laws

Panel A: Soundness measures and decomposition of Z-Score (ln) (Full sample)

Dependent variable	Soundness measures			Decomposition of Z-Score (ln)		
	Z-Score (ln)	NPL	LEV	ROA (ln)	Capital ratio (ln)	ROASD (ln)
State charter	0.4335***	-0.0009	0.0003	0.1028***	0.1458***	-0.1100***
	(4.94)	(-1.27)	(0.38)	(5.37)	(4.69)	(-4.17)
State charter*Depositor preference	0.2446***	-0.0012***	-0.0054***	0.0394**	0.0941***	-0.0318**
	(9.50)	(-4.39)	(-7.96)	(2.51)	(7.39)	(-2.00)
Bank size (ln)	-0.0317	-0.0025***	0.0350***	0.2250***	-0.2929***	-0.1641***
	(-0.69)	(-5.65)	(22.55)	(16.32)	(-13.40)	(-10.95)
Uninsured Deposits/Total liabilities	0.1461***	-0.0005***	-0.0016***	-0.0071	0.0445***	0.0023
	(11.78)	(-4.17)	(-4.69)	(-1.55)	(9.90)	(0.49)
Non-Deposits/Total liabilities	0.2264***	-0.0037***	-0.0042***	0.0083	0.0630***	0.0371***
	(5.66)	(-9.74)	(-5.46)	(0.65)	(5.20)	(2.58)
Bank FE	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	199,731	199,731	199,731	199,731
R-squared	0.8934	0.4625	0.7073	0.5132	0.6777	0.4748
Number of banks	5,509	5,509	5,509	5,509	5,509	5,509

Panel B: Soundness measures and decomposition of Z-Score (ln) (Propensity score matched sample on bank size)

Dependent variable	Soundness measures			Decomposition of Z-Score (ln)		
	Z-Score (ln)	NPL	LEV	ROA (ln)	Capital ratio (ln)	ROASD (ln)
State charter	-0.2230	0.0137***	0.0037*	0.0645**	-0.0615	0.1353**
	(-1.49)	(5.31)	(1.69)	(2.43)	(-1.18)	(2.05)
State charter*Depositor preference	0.0160***	-0.0171***	-0.0133***	0.0422**	0.2303***	-0.2222***
	(3.79)	(-6.48)	(-5.39)	(2.41)	(4.28)	(-2.92)
Bank size (ln)	-0.2101***	-0.0016***	0.0376***	0.2320***	-0.3775***	-0.1007***
	(-4.69)	(-3.36)	(18.07)	(15.71)	(-14.53)	(-5.91)
Uninsured Deposits/Total liabilities	0.1412***	-0.0003	-0.0018***	-0.0062	0.0550***	-0.0038
	(8.73)	(-1.48)	(-2.77)	(-1.30)	(5.87)	(-0.58)
Non-Deposits/Total liabilities	0.0928*	-0.0039***	-0.0087***	0.0096	0.1005***	0.0418*
	(1.79)	(-5.92)	(-5.66)	(0.73)	(3.84)	(1.79)
Bank FE	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	42,245	42,245	42,245	42,245	42,245	42,245
R-squared	0.8940	0.4463	0.6819	0.5152	0.6720	0.4748
Number of banks	1,200	1,200	1,200	1,200	1,200	1,200

Notes: Panel A presents the results of difference-in-difference regressions examining the effect of state depositor preference law enactment on the Z-Score (ln), the non-performing loans ratio, and the leverage ratio as measures of bank soundness using the full sample based on Equation (1). In addition, we also examine the individual components of the Z-Score (ln). Panel B replicates the tests from Panel A but uses a propensity score matched sample on bank size as described in Section *III.C*, Equation (2). The vector of control variables includes bank size (ln), the ratio of uninsured deposits to total liabilities, and the ratio of non-deposits to total liabilities. These regressions omit the capital ratio (ln) as it is a key component of the Z-Score (ln). Standard errors are clustered at the state level. Robust *t*-statistics are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8
Ruling out alternative explanations

Panel A: Sample split by interest on non-deposits			Panel B: Regressions controlling for funding costs		
Dependent variable		**Z-Score (ln)**			
Sample split		Interest on non-deposits	**Z-Score (ln)**	**NPL**	**LEV**
	> Median	≤ Median			
State charter	0.4725***	0.2913***	0.4334***	-0.0010	0.0003
	(4.71)	(3.85)	(4.94)	(-1.27)	(0.39)
State charter*Depositor preference	0.2705***	0.1737***	0.2446***	-0.0012***	-0.0054***
	(8.62)	(5.20)	(9.50)	(-4.39)	(-7.96)
Bank size (ln)	-0.0469	-0.0013	-0.0316	-0.0024***	0.0350***
	(-0.95)	(-0.03)	(-0.69)	(-5.60)	(22.55)
Uninsured Deposits/Total liabilities	0.1556***	0.0906***	0.1461***	-0.0005***	-0.0016***
	(10.43)	(6.55)	(11.79)	(-4.19)	(-4.66)
Non-Deposits/Total liabilities	0.2455***	0.0000	0.2266***	-0.0037***	-0.0042***
	(5.06)	(0.00)	(5.65)	(-9.75)	(-5.51)
Total deposit interest expenses			0.0076	0.0012***	-0.0001
			(0.51)	(2.87)	(-0.27)
Total non-deposit interest expenses			0.0115	0.0008	-0.0026**
			(0.27)	(0.97)	(-2.31)
Bank FE	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES
Observations	99,827	99,904	199,731	199,731	199,731
R-squared	0.8733	0.9206	0.8934	0.4626	0.7073
Number of banks	2,833	2,676	5,509	5,509	5,509
F-test (Chow test)		4.839			
F-test (*p*-value)		0.000			

Notes: Panel A models the responsiveness of Z-Scores (ln) to the introduction of depositor preference. We split the sample at the median of interest on non-deposits. Panel B presents tests that are identical to those reported in Panel A of Table 7 but the analyses in Table 8 additionally control for total deposit interest expenses (defined as total interest on deposits in dollar terms) and total non-deposit interest expenses (defined analogously). The vector of control variables includes bank size (ln), the ratio of uninsured deposits to total liabilities, and the ratio of non-deposits to total liabilities. These regressions omit the capital ratio (ln) as it is a key component of the Z-Score (ln). Standard errors are clustered at the state level. Robust *t*-statistics are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9
Further evidence for monitoring

Panel A: Behavior of non-deposit interest rates across subsamples conditioned on soundness

Dependent variable	Interest on non-deposits		Interest on non-deposits		Interest on non-deposits	
			Non-performing loans ratio (NPL)			
Sample split	Z-Score (ln)				Leverage (LEV)	
	> Median	≤ Median	> Median	≤ Median	> Median	≤ Median
State charter	-0.1577**	-0.0257	0.0111	-0.1381**	-0.0591	-0.1458*
	(-2.15)	(-0.50)	(0.22)	(-2.06)	(-1.11)	(-1.70)
State charter*Depositor preference	0.0979***	0.1743***	0.1346***	0.1302***	0.1535***	0.0862***
	(5.63)	(7.15)	(6.14)	(6.01)	(7.22)	(4.27)
Bank size (ln)	0.0167	0.1084***	0.0352	0.1140***	0.1262***	0.0246
	(0.70)	(4.57)	(1.49)	(4.51)	(6.12)	(1.01)
Capital ratio (ln)	0.0421	0.0111	0.0364**	0.0140	0.0102	0.0527***
	(1.28)	(1.36)	(2.27)	(1.53)	(1.22)	(2.83)
Uninsured Deposits/Total liabilities	0.0083	0.0603***	0.0361***	0.0461***	0.0338***	0.0486***
	(0.83)	(5.03)	(3.32)	(4.02)	(2.78)	(4.39)
Non-Deposits/Total liabilities	0.2065***	0.2063***	0.2988***	0.1512***	0.0829*	0.3633***
	(5.24)	(4.05)	(7.20)	(3.36)	(1.80)	(8.64)
Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	99,844	99,887	99,878	99,853	99,861	99,870
R-squared	0.2813	0.2452	0.2709	0.2511	0.2610	0.2375
Number of banks	2,582	2,927	2,677	2,832	2,844	2,665
F-test (Chow test)	1.853		1.358		2.179	
F-test (p-value)	0.000		0.000		0.000	

Panel B: Responsiveness of soundness measures across subsamples conditioned on soundness

Dependent variable	Z-Score (ln)		Non-performing loans (NPL)		Leverage (LEV)	
Sample split	Z-Score (ln)		Z-Score (ln)		Z-Score (ln)	
	> Median	≤ Median	> Median	≤ Median	> Median	≤ Median
State charter	0.2961***	0.8644***	-0.0003	-0.0020*	-0.0049***	0.0018*
	(4.66)	(6.82)	(-0.39)	(-1.66)	(-4.67)	(1.90)
State charter*Depositor preference	0.1186***	0.1727***	-0.0002	-0.0017***	-0.0026***	-0.0049***
	(6.38)	(5.32)	(-0.48)	(-4.38)	(-2.67)	(-5.16)
Bank size (ln)	0.1595***	0.1390**	-0.0008**	-0.0054***	0.0183***	0.0446***
	(3.66)	(2.23)	(-2.07)	(-8.46)	(7.61)	(25.67)
Uninsured Deposits/Total liabilities	0.0683***	0.1002***	-0.0008***	-0.0000	-0.0003	-0.0018***
	(6.09)	(6.84)	(-6.82)	(-0.15)	(-0.82)	(-4.26)
Non-Deposits/Total liabilities	0.0451	0.0582	-0.0027***	-0.0048***	-0.0014	-0.0038***
	(1.62)	(1.49)	(-6.22)	(-8.63)	(-1.49)	(-4.25)
Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	99,844	99,887	99,844	99,887	99,844	99,887
R-Squared	0.9268	0.9099	0.4262	0.4810	0.7046	0.7367
Number of banks	2,582	2,927	2,582	2,927	2,582	2,927
F-test (Chow test)	57.427		3.523		19.807	
F-test (p-value)	0.000		0.000		0.000	

Panel C: Behavior of interest rates across subsamples conditioned on reliance on Jumbo CDs with a maturity of less than one quarter

Dependent variable	Total interest expenses		Interest on deposits		Interest on Jumbo CDs	
Sample split	Jumbo CDs (Maturity < 1 quarter)		Jumbo CDs (Maturity < 1 quarter)		Jumbo CDs (Maturity < 1 quarter)	
	>Median	≤ Median	>Median	≤ Median	>Median	≤ Median
State charter	0.0089	0.0225*	0.0142	0.0268**	-0.0245	-0.0449
	(0.71)	(1.95)	(1.15)	(2.38)	(-0.71)	(-1.14)
State charter*Depositor preference	-0.0210***	-0.0164***	-0.0258***	-0.0196***	-0.0403**	-0.0260
	(-4.59)	(-3.61)	(-5.49)	(-4.29)	(-2.33)	(-1.34)
Bank size (ln)	0.1407***	0.1432***	0.1421***	0.1605***	0.1072***	0.0342
	(12.60)	(9.64)	(12.12)	(10.73)	(5.55)	(1.43)
Capital ratio (ln)	-0.0310***	-0.0388***	-0.0322***	-0.0443***	-0.0590***	-0.0466***
	(-10.55)	(-7.31)	(-10.38)	(-6.61)	(-9.17)	(-3.90)
Uninsured Deposits/Total liabilities	0.0158***	0.0030	0.0148***	-0.0004	-0.0927***	-0.1478***
	(8.85)	(0.83)	(7.92)	(-0.12)	(-13.04)	(-12.98)
Non-Deposits/Total liabilities	0.0295***	-0.0586***	0.0608***	-0.0293*	-0.1435***	-0.0721***
	(3.37)	(-3.51)	(7.96)	(-1.69)	(-5.55)	(-2.78)
State charter FE	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	82,577	117,154	82,577	117,154	72,208	99,153
R-squared	0.7473	0.7827	0.7680	0.7910	0.3288	0.2173
Number of banks	2,463	3,046	2,463	3,046	2,463	3,036
F-test (Chow test)	23.356		23.997		2.397	
F-test (p-value)	0.000		0.000		0.000	

Panel D: Descriptive statistics for state-chartered banks' non-deposit market shares conditioned on soundness

| Dependent variable	Non-deposit market share		
Sample split	Z-Score (ln)		
	>Median	≤ Median	t-Statistic
Prior to depositor preference	0.50	0.50	0.59
Following depositor preference	0.58	0.42	8.14***
t-Statistic	2.62***	3.17***	

Notes: Panel A investigates the responsiveness of non-deposit interest rates when the sample is split at the median of the Z-score (ln), the NPL ratio, and LEV to establish if weaker banks respond more strongly to depositor preference laws, and Panel B focuses on how Z-Scores (ln), the NPL ratio, and LEV respond to depositor preference. The sample is split at the median of the Z-Score (ln) in these tests. Panel C examines the behavior of total interest rates, interest on deposits, and interest on Jumbo CDs across subsamples conditioned on reliance on Jumbo CDs with a maturity of less than one quarter. The vector of control variables includes bank size (ln), the capital ratio (ln), the ratio of uninsured deposits to total liabilities, and the ratio of non-deposits to total liabilities. In Panel B, we omit the capital ratio (ln) as it is a key component of the Z-Score (ln). Panel D examines the non-deposit market share, and the sample is split at the median level of the Z-Score (ln). In Panel A and Panel C, the dependent variables Total interest expenses, interest on deposits, interest on Jumbo CDs, and interest on non-deposits are reported in % of its respective total, i.e., the denominator for total interest expenses is total liabilities, the denominator for interest on deposits is total deposits, the denominator for interest on Jumbo CDs is total Jumbo CDs, and the denominator for interest on non-deposits is total non-deposits. Standard errors are clustered at the state level. Robust t-statistics are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10
Falsification tests and external validity: National depositor preference

Panel A: Monte Carlo simulations for the role of national depositor preference: Funding costs

Dependent variable	Total interest expenses	Interest on deposits	Interest on Jumbo CDs	Interest on non-deposits
Rejection rate at the 1 % level (2-tailed test)	1.2%	0.8%	1.0%	0.8%
Rejection rate at the 5 % level (2-tailed test)	4.9%	4.7%	5.5%	5.1%
Rejection rate at the 10 % level (2-tailed test)	8.5%	9.5%	10.9%	9.6%
Mean coefficient (standard error) for π	-0.0001 (0.0002)	-0.0000 (0.0002)	0.0001 (0.0006)	-0.0016 (0.0021)

Panel B: Monte Carlo simulations for the role of national depositor preference: Soundness measures and decomposition of Z-Score (ln)

	Soundness measures			Decomposition of Z-Score (ln)		
Dependent variable	Z-Score (ln)	NPL	LEV	ROA (ln)	Capital ratio (ln)	ROASD (ln)
Rejection rate at the 1 % level (2-tailed test)	1.3%	1.4%	1.0%	1.0%	0.9%	1.3%
Rejection rate at the 5 % level (2-tailed test)	4.9%	5.1%	6.3%	5.3%	6.7%	5.3%
Rejection rate at the 10 % level (2-tailed test)	11.2%	10.2%	12.6%	11.4%	10.7%	11.6%
Mean coefficient (standard error) for π	-0.0254 (0.2049)	-0.0052 (0.0053)	-0.6395 (0.6803)	0.0102 (0.1366)	0.0773 (0.0701)	-0.0197 (0.1221)

Panel C: National depositor preference and funding costs / **Panel D: National depositor preference, soundness and decomposition of Z-Score (ln)**

| Dependent variable	Total interest expenses	Interest on deposits	Interest on Jumbo CDs	Interest on non-deposits	Z-Score (ln)	NPL	LEV	ROA (ln)	Capital ratio (ln)	ROASD (ln)
Treatment group	0.0006	0.0057	0.0001*	-0.0906***	-0.1141***	0.0024***	0.0001	-0.1395***	-0.0420***	0.0342**
	(0.11)	(1.48)	(1.84)	(-3.15)	(-4.25)	(12.00)	(0.49)	(-12.01)	(-5.74)	(2.52)
Treatment group*National Depositor preference	0.0051	-0.0066***	-0.0004***	0.0720***	0.1820***	-0.0006***	-0.0001	0.0513***	0.0066***	0.0767***
	(1.54)	(-2.93)	(-9.10)	(2.96)	(11.62)	(-5.17)	(-0.75)	(7.78)	(2.89)	(8.46)
Bank size (ln)	0.1014***	0.0969***	0.0005***	0.0973***	0.1502***	0.0002*	0.0157***	0.2763***	-0.2198***	-0.1163***
	(22.90)	(30.40)	(16.11)	(8.23)	(11.38)	(1.88)	(82.77)	(57.80)	(-38.58)	(-16.51)
Capital ratio (ln)	-0.0362***	-0.0409***	-0.0004***	0.0288***						
	(-13.60)	(-13.63)	(-14.94)	(4.10)						
Uninsured Deposits/Total liabilities	0.0060***	0.0023*	-0.0003***	-0.0195**	0.0834***	-0.0005***	0.0001	-0.0221***	0.0120***	0.0117***
	(5.47)	(1.66)	(-11.50)	(-2.29)	(12.25)	(-10.47)	(1.26)	(-9.07)	(9.65)	(3.87)
Non-Deposits/Total liabilities	-0.0114***	-0.0174***	-0.0000	0.1664***	-0.0603***	-0.0017***	0.0030***	0.0011	-0.0221***	0.0478***
	(-3.72)	(-4.95)	(-1.11)	(9.66)	(-4.88)	(-24.37)	(23.71)	(0.27)	(-8.30)	(8.38)
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	643,490	643,490	601,051	643,490	643,490	643,490	643,490	643,490	643,490	643,490
R-squared	0.7962	0.7878	0.7170	0.2894	0.9608	0.5097	0.7659	0.5306	0.7922	0.4681
Number of banks	16,019	16,019	16,019	16,019	16,019	16,019	16,019	16,019	16,019	16,019

Notes: We report Monte Carlo simulations based on 1,000 replications for the effect of national depositor preference on funding costs in Panel A, and for the effects on bank soundness and the decomposition of the Z-Score (ln) in Panel B. We estimate Equation (3) using data on state-chartered banks between 1989Q3 and 1999Q4. We randomly assign banks to placebo treatment status and set $placebo_{ist}$ equal to 1 for 'treated' banks and equal to 0 for 'untreated' banks during the period 1993Q3 to 1999Q4. For all time periods before 1993Q3 $placebo_{ist}$ equals 0. We then estimate the regression and save the *p*-value on the coefficient π and repeat this process 1,000 times and compute the rejection rates of the null hypothesis $\pi = 0$ at the 1%, 5%, and 10% levels. We also report the mean coefficient and the average standard error for π below the rejection rates. Panel C and Panel D present tests of external validity by examining the effect of national depositor preference law, introduced in 1993Q3. The treatment group consists of both national and state banks that were not subject to depositor preference prior to 1993Q3. Note that the number of observations in Panel C is smaller for Jumbo CDs because data on Jumbo CDs is only available from 1984Q1 onwards. We estimate $y_{ist} = \alpha + \varphi Treatment\ group_{ist} + \beta NDPL_t * Treatment\ group_{ist} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where *y* denotes the dependent variable of bank *i* in state *s* at time *t*. *NDPL* is the dummy for national depositor preference, 0 otherwise. The set of bank-time varying control variables X_{ist} include the logarithm of banks' total assets (Bank size, ln), the ratio of uninsured deposits to total liabilities, the ratio of non-deposits to total liabilities, and the ratio of capital to total assets (Capital ratio, ln), unless stated otherwise. In Panel A and Panel C, the dependent variables Total interest expenses, interest on deposits, interest on Jumbo CDs, and interest on non-deposits are reported in % of its respective total, i.e., the denominator for total interest expenses is total liabilities, the denominator for interest on deposits is total deposits, the denominator for interest on Jumbo CDs is total Jumbo CDs, and the denominator for interest on non-deposits is total non-deposits. *t*-statistics are reported in parentheses and standard errors are clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Figure 1
State depositor preference laws
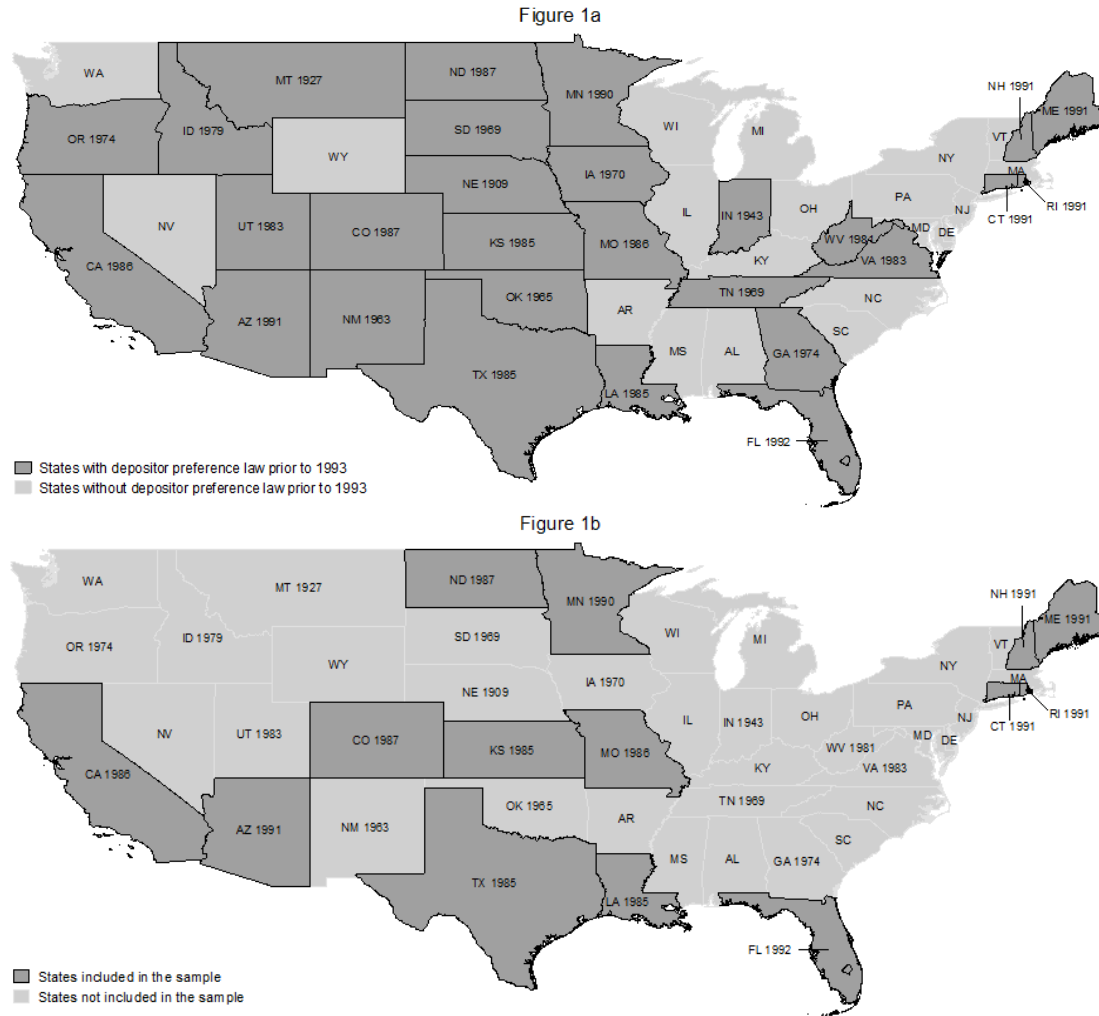
Figure 1a

Figure 1b

Notes: Figure 1a provides an overview about the states that introduced depositor preference laws prior to 1993. Figure 1b illustrates which states are included in our sample. Alaska and Hawaii introduced depositor preference laws in 1978 and 1987, respectively. They are not reported for space constraints.

Figure 2
Parallel Trends
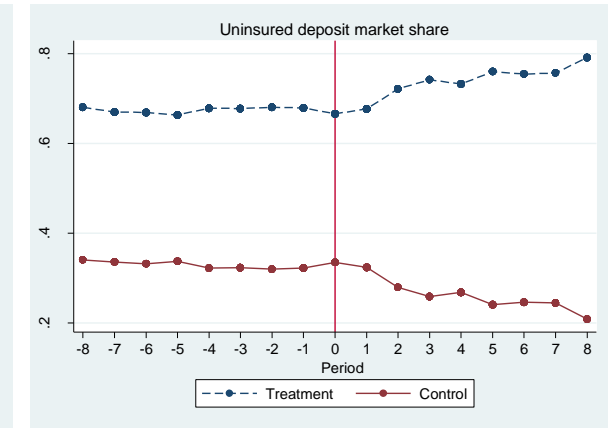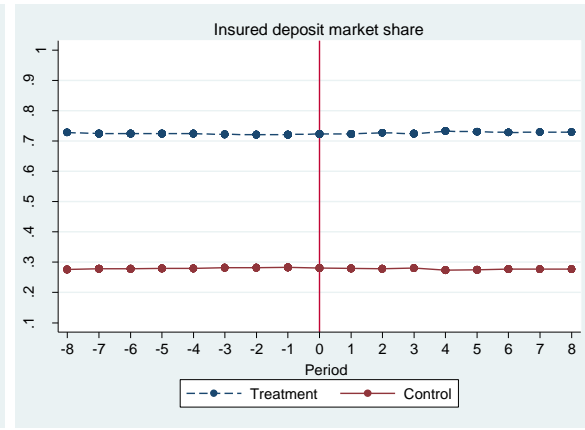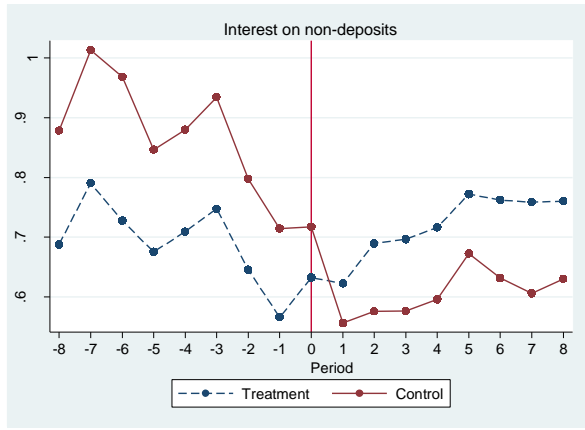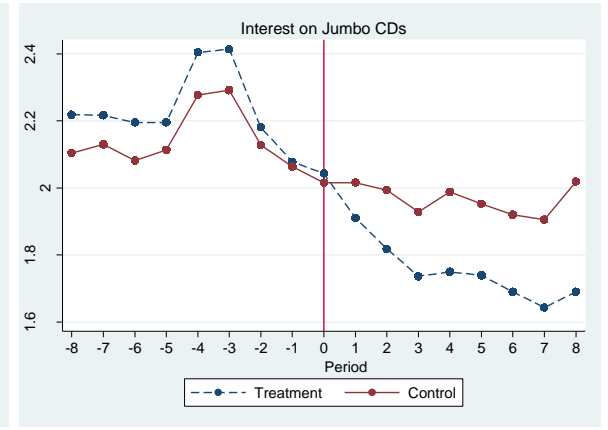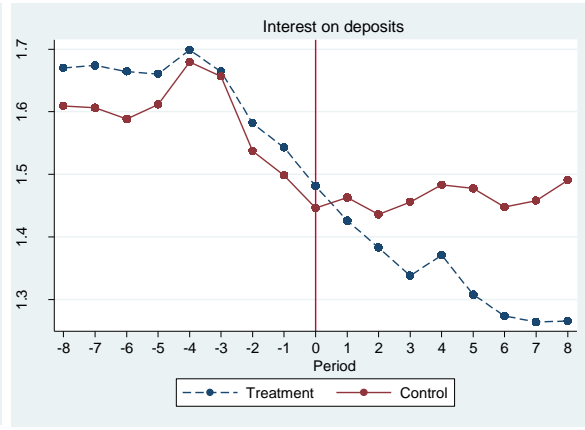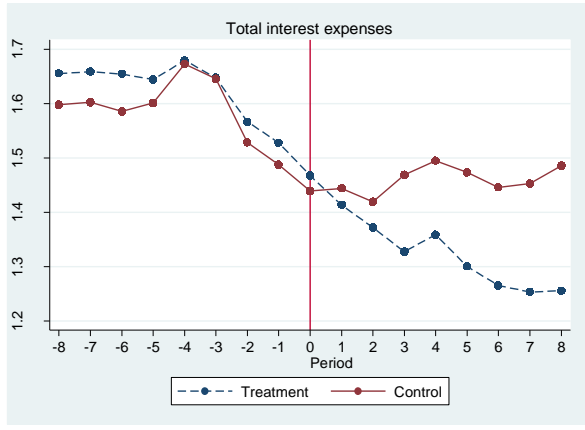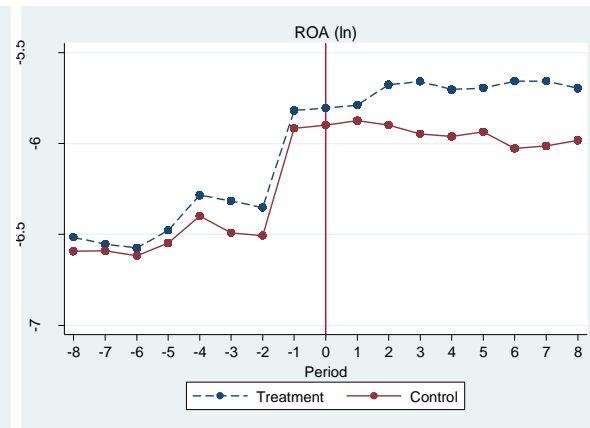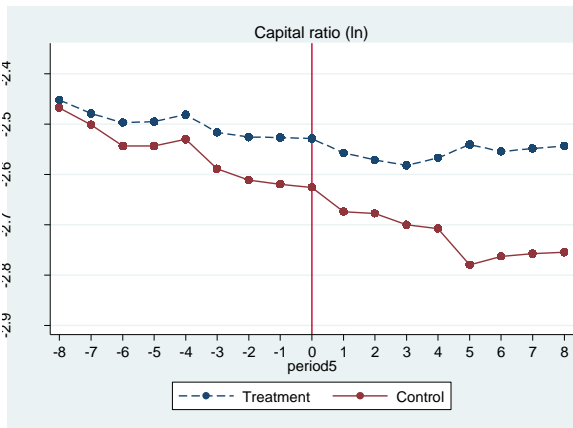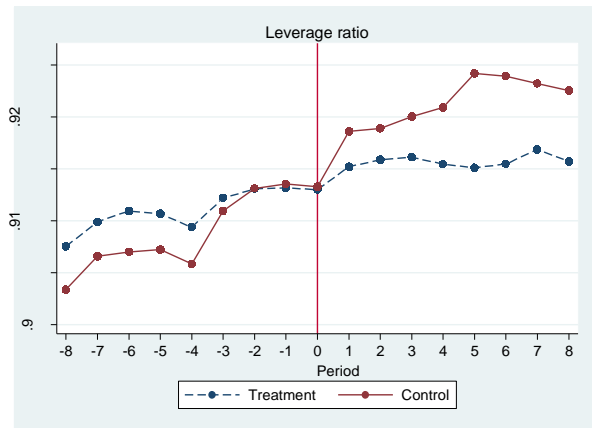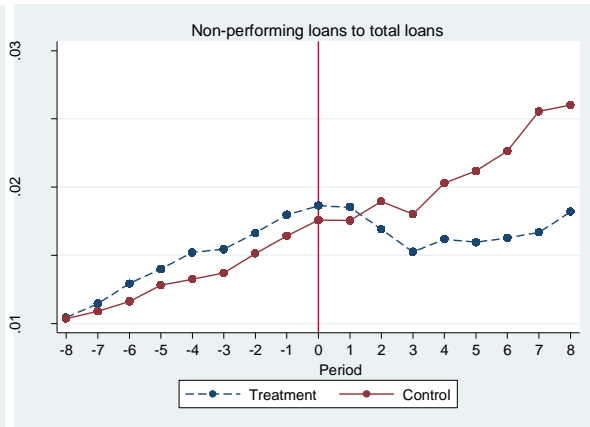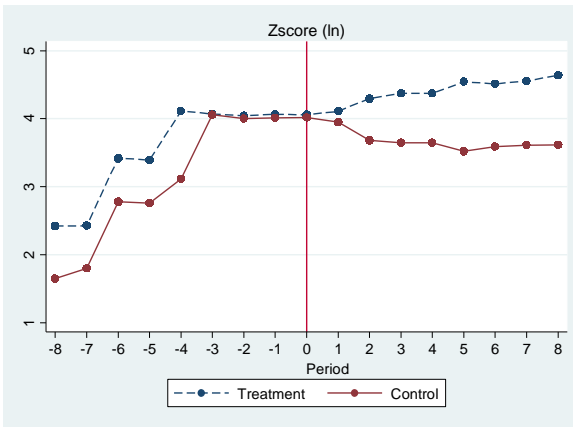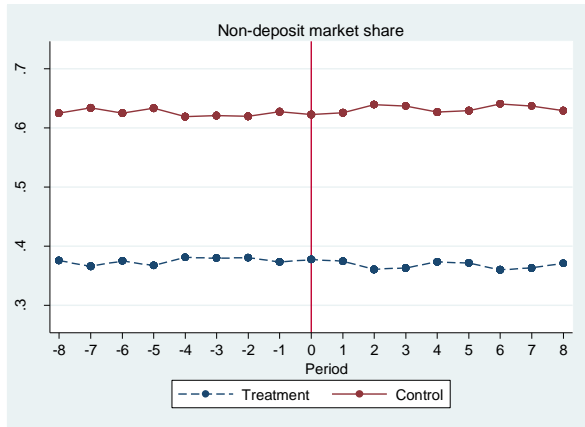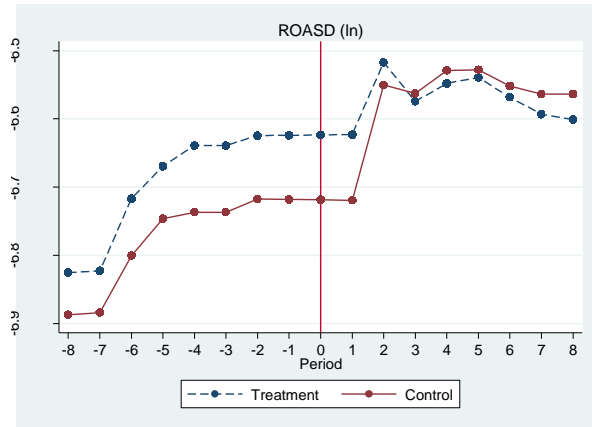
Notes: Figure 2 illustrates the behavior of the dependent variables for eight quarters preceding depositor preference law enactment, and eight quarters following the introduction of these laws. State-chartered banks (the treatment group) are represented by a dashed line, whereas nationally-chartered banks (the control group) are depicted by a solid line.

Appendix A: Appointment of the receiver and description of bank resolutions

1. Appointment of the receiver

The FDIC is the receiver for all national banks (FDIC and RTC (1998)). For state chartered banks, Congress preferred that the FDIC is the receiver, but permitted each state to appoint a receiver according to state law. By 1934, 30 states allowed for provisions by which the FDIC could be appointed receiver, and by now most states require that the FDIC be appointed receiver. In fact, FDIC and RTC (1998, p. 474) state that "Today, state regulatory agencies virtually always request the appointment of the FDIC when a receiver is appointed." The evolution of the FDIC as the receiver is also reflected by Bennett (2001, p. 6) who states that "[…] the chartering authority closes the bank and appoints the FDIC as receiver", suggesting that there is no discretionary choice as to the appointment of the receiver.

2. Bank resolutions

Our description of bank resolutions is based on Bennett (2001) and Blair and Kushmeider (2006). The process of dealing with failed banks involves two steps. First, the FDIC resolves the bank in the resolution stage. Next, the assets of the bank are liquidated; this is the receivership process, detailed below. The receiver markets the failed bank's assets, sells them, and distributes the proceeds (less expenses) to the bank's creditors.

Overview of the steps involved in resolving a failed bank

In the first stage, FDIC staff establish the value of the bank's assets, solicit bids for the sale of the bank, and screen bids to determine which one allows the least costly resolution. Prior to the enactment of FDICIA, the cost test required that the resolution method is less costly than a payoff. As of 1991 when FDICIA came into force, the FDIC is required to choose the resolution method that minimizes the cost to taxpayers among all other alternative methods (unless a systemic risk exception applies).

Resolution method

In instances when the least costly bid involves acquisition of some or all of the assets and liabilities of the bank, the FDIC cooperates with the acquirer until the closing is finalized. Alternatively, if the least costly bid does not involve acquisition of the failed bank, the FDIC pays off insured depositors and liquidates the assets. During the receivership process, the FDIC liquidates any remaining assets and distributes the proceeds in line with either state laws for state-chartered banks or national law for nationally-chartered banks.

Resolution transactions

Two different resolution transactions exist: open-bank and close-bank transactions. During an open-bank transaction, the FDIC offers the bank financial assistance in the form of loans, asset purchases, or a note or cash to restore capital to a positive level while the bank remains open for business.

Closed-bank transactions are purchase and assumption (P&A) transactions and deposit payoffs. In a P&A transaction, a sound bank purchases some or all of the assets of the failed institution and assumes some or all of its liabilities. P&A transactions may use bridge banks where the FDIC acquires the failed bank to take over operations and maintain banking services. Such a transaction is useful if the FDIC needs time between the failure of the bank and establishing a satisfactory arrangement to resolve the bank. In contrast, in a deposit payoff, the FDIC pays all of the bank's depositors the full amount of their insured deposits. Thereafter, the FDIC liquidates the assets and pays off the remaining claimants.

Appendix A: Appointment of the receiver and description of bank resolutions

The FDIC distinguishes between straight deposit payoffs and insured deposit transfers. In the former case, the FDIC establishes the amount of insured deposits and directly pays depositors the appropriate amount by issuing a cheque. In the latter case, insured deposits are transferred to a sound bank that acts as an agent for the FDIC so that depositors can withdraw their deposits or retain them in the agent bank using the agent bank's deposit services.

Treatment of claims

When a bank fails, the FDIC fulfils the claims and the receivership functions. Prior to the closure, the FDIC assesses the financial and operational information to gauge the resources and staff needed to perform its task and appoints a claims agent to lead the process. In this period, the FDIC gathers as much information as possible by reviewing deposit records and establishing preliminary insurance determinations. The FDIC also takes possession of the files and records to determine the insured status of deposits, and claims staff determine the final depositor payouts on the closing day.

If deposits are not acquired by another bank, FDIC staff perform the insurance determination to assess which deposits are fully insured to process the claims of uninsured depositors and other claimants. Payments to insured depositors and the payment of claims above the insurance coverage ceiling start on the following business day after closure. Typically, banks are closed on a Friday, and depositors have access to their insured deposits the following week on Monday.

During the closing weekend, the final insurance determination must be made by locating and aggregating deposit accounts related by name, address, or tax identification number. Next, ownership rights and capacities are established and the insurance limit is applied. In the final step, FDIC staff furnish a combined account statement for depositors with multiple accounts.

In a resolution via liquidation, deposit amounts that are fully insured are passed on to an agent bank in an insured deposit transfer. Alternatively, the FDIC may also pay depositors directly using a cheque mailed to the depositor's address.

If an account exceeds the coverage limit or if other questions exist, FDIC staff contact depositors to obtain additional information prior to processing the full claim. Typically, FDIC staff rely on the bank's records to establish the status of depositor claims. All insurance payments are available to depositors for 18 months. Unclaimed funds are escheated with the appropriate state. The state may attempt to locate the depositors for ten years. After this period, the funds revert to the FDIC.

In its role as a receiver, the FDIC notifies general creditors and settles their claims to the extent that funds remain available after depositors are paid. To this end, the FDIC follows a claims process which requires a notice in a local newspaper for three consecutive months. The FDIC also mails individual notices to the creditors on the books and records of the failed bank.

Creditors are entitled to file a claim during a time frame specified in the notice they receive, typically 90 days from the date of the notice. Once the FDIC receives the claim, a determination of the claim's validity is made. If there are sufficient funds recovered, general creditors are reimbursed in whole or in part. If no funds are available for distribution, the claimants obtain a receivership certificate which indicates entitlement to a share in the receivership estate.

In instances where FDIC staff identify depositors who also have delinquent loans with the bank, the FDIC may exercise the right to set off the accounts of these depositors. Customers with uninsured deposits may request to have their loan balances reduced by the amount of their uninsured depositors.

Appendix B: Details on the introduction of depositor preference laws for each state

<u>**Arizona**</u>

Date of depositor preference enactment: *21ˢᵗ September 1991*

Party control

<u>Governor: R</u>   <u>Party control upper and lower house: R</u>

Legal provision

Priority of claims; interest

    A. *Claims allowed in a proceeding under this article shall be paid in the following order:*
        1. *Costs and expenses of the administration of the receivership and liquidation.*
        2. *Taxes due to this state.*
        3. *Claims with priority under the laws of this state and under federal law.*
        4. *Claims of creditors that are fully secured including contract claims for interest to the date of payment.*
        5. *Claims of depositors.*
        6. *Claims of general creditors.*
        7. *Claims on obligations that are subordinated to the claims of general creditors.*
    B. *Claims that are approved shall bear interest calculated as provided by law or by judgement from the date that the court grants the superintendent's application for the appointment of a receiver for that bank to the extent that monies are available to pay that interest. If monies are not available to pay interest, the interest shall be prorated. Interest owned shall receive the same priority as the claim on which it accrues, but interest on a claim shall not be paid until all claims with that same class have received payment of the full principal amount of the claim.*
    C. *Any monies remaining after the payment of claims as provided in this section shall be returned to the stockholders of the bank as prescribed by this article.*

Further particulars and coinciding factors

The ongoing bank merger wave affects many counties in Arizona. A merger between BankAmerica and Security Pacific and the NCNB-C&S Sovran consolidation results in concentrated banking conditions in Arizona as the merger partners operate competing offices there.

Appendix B: Details on the introduction of depositor preference laws for each state

California

Date of depositor preference enactment: 27th *June 1986*

Party control

Governor: R   Party control upper and lower house: D

Legal provision

(a) Expenses and claims of unsecured creditors have priority in the following order:
> *(1) Expenses of liquidation and approved claims for fees and assessments due the department.*
> *(2) Approved claims given priority under other provisions of state or federal law, including, but not limited to, Sections 3114 and 3240.*
> *(3) Approved claims for "deposits", as that term is defined in 12 U.S.C. Section 1813(l), but including obligations of the type described in 12 U.S.C. Section 1813(l) (5) (A) and (B).*
> *(4) Approved claims for other general liabilities.*
> *(5) Approved claims for obligations subordinated to deposits and other general liabilities.*

(b) Interest shall be given the same priority as the claim on which it is based, but no interest shall be paid on any claim until the principal of all claims within the same class has been paid or adequately provided for in full.

(c) Any funds remaining shall be paid to shareholders.

Further particulars and coinciding factors

The authorities also emphasize that these provisions facilitate the structuring of purchase and assumption transactions and enable depositors to have quick access to their funds.

The savings and loans crisis gets much attention in the press after Seapointe Savings and Loan Association collapses, and the bank merger wave also affects many counties in California. Energy prices are reported to decline.

Appendix B: Details on the introduction of depositor preference laws for each state

<u>**Colorado**</u>

Date of depositor preference enactment: 1st *May 1987*

Party control

<u>Governor: D</u>   <u>Party control upper and lower house:</u> R

Legal provision

Liquidation by commissioner – procedure. (9) (a) On liquidation of a state bank, after payment of federal deposit insurance, claims for payment have the following priority:

- *(I)   Obligations incurred by the commission, fees and assessment due to the division, and expenses of liquidation, all of which may be covered by a proper reserve of funds;*
- *(II)   Claims of depositors having an approved claim against the general liquidation account of the bank;*
- *(III)   Claims of general creditors having an approved claim against the general liquidating account of the bank;*
- *(IV)   Claims otherwise proper that were not filed within the time prescribed by this code;*
- *(V)   Approved claims of subordinate creditors; and*
- *(VI)   Claims of stockholders of the bank.*

Further particulars and coinciding factors

Big bank holding companies and the thrift industry report weak performance.

Appendix B: Details on the introduction of depositor preference laws for each state

<u>**Connecticut**</u>

Date of depositor preference enactment: 1st *May 1987*

Party control

<u>Governor:</u> Independent <u>Party control upper and lower house:</u> D

Legal provision

Section 1. Section 36-51 of the general statutes is repealed and the following is substituted in lieu thereof:
(a) The avails of the property of any capital stock bank organized under the laws of this state in the hands of a receiver shall be distributed in the following order of priority:
*   (1) The charges and expenses of settling its affairs;*
*   (2) the circulating notes, if any;*
*   (3) all deposits;*
*   (4) all sums which have been subscribed and paid in for its stock by the state*
*   or the school fund;*
*   (5) all other liabilities;   and*
*   (6) the claims of stockholders.*

Further particulars and coinciding factors

Connecticut was affected by the New England banking crisis. Several news items focus on the problems surrounding Bank of New England. The media criticize regulators for lax supervision. Other news items highlight poor performance of the banking industry, reflected in rising loan loss reserves, dividend cuts, and banks raise capital under regulatory pressure.

Appendix B: Details on the introduction of depositor preference laws for each state

Florida

Date of depositor preference enactment: 3rd *July 1992*

Party control

Governor: D   Party control upper and lower house: Split between R and D

Legal provision

Transfers by banks and other acts in contemplation of insolvency.

(1) *Any and all transfers of the notes, bonds, bills of exchange, or other evidences of debt owing to any bank or trust company or of deposits to its credit; all assignments of mortgages, securities, or real estate or of any judgments or decrees in its favor; all deposits of money, bullion, or other valuable thing for its use or for the use of any of its stockholders or creditors; and all payments of money to either, made after the commission of an act of insolvency or in contemplation thereof made with a view to the preference of one creditor to another shall be void.*

(2) *Unsecured claims for payment against any financial institution shall have the following priority for any distribution made after July 3, 1992:*
   (a) *Expenses of the liquidation or the receivership estate;*
   (b) *State claims;*
   (c) *Approved claims for a "deposit," as that term is defined in 12 U.S.C. s. 1813(l);*
   (d) *Approved claims for other general creditors;*
   (e) *Approved claims for obligations subordinate to deposits and other general liabilities; and*
   (f) *Shareholders' claims in proportion to the stock held by them respectively or their interest therein as appearing.*

(3) *Except in any action brought by the department, no attachment, injunction, or execution shall be enforced against such financial institution or any of its property before final judgment in any suit, action, or proceeding in any state or federal court.*
  .

Further particulars and coinciding factors

Several media sources report on improved bank performance in terms of higher earnings and lower loan losses at banks with operations in Florida.

Appendix B: Details on the introduction of depositor preference laws for each state

<u>**Hawaii**</u>

Date of depositor preference enactment: *24th June 1987*

Party control

<u>Governor:</u> D   <u>Party control upper and lower house:</u> D

Legal provision

Priority of expenses and claims. In the event of the insolvency or voluntary or involuntary liquidation of any bank under this chapter, the expenses and claims shall have priority in the following order:

(1) Administrative expenses;

(2) Unsecured claims for wages, salaries, or commissions, including vacation, severance or sick leave pay, earned by an individual within ninety days before the date of the commissioner's position in and amount not exceeding $2000 for each individual.

(3) Claims of depositors. Any corporation guaranteeing or insuring the deposits is subrogated to all rights of the owners of such deposits to the extent of payment. The right of any agency of the Unites States insuring depositors to be subrogated to the rights of depositors upon payment of their claims may not be less extensive than the law of the United States requires as a condition of the authority to issue such insurance or make such payments to depositors of national banks;

(4) All other unsecured claims in amounts allowed by the court, including claims of secured creditors to the extent the amount of their claims exceed the present fair market value of their collateral, the claim of a lessor for damages resulting from the termination of a lease of property may not be allowed in an amount in excess of the rent reserved by the lease, without acceleration for sixty days after the lessor repossessed the leased property, or the leased property was surrendered to the lessor, whichever first occurs, whether before or after the commissioner took possession of the institution, plus any unpaid rent due under the lease, without acceleration, on the date of possession or surrender. A claim for damages resulting from the termination of an employment contract, may not be allowed an amount in excess of the compensation provided by the contract, without acceleration, for ninety days after the employee was directed to terminate or the employee terminated performance under the contract whichever first occurs, whether before or after the commissioner took possession of the institution, plus any unpaid compensation due under the contract, without acceleration, on the data the employee was directed to terminate to the employee terminated performance. Claims for damages resulting from the termination of employment contract of persons who were in control of the institution are not entitled to priority under this subsection;

(5) Claims for debts that are subordinated under the provisions of a subordination agreement or other instrument;

(6) Claims of depositors who are controlling persons;

(7) Claims of persons who were at any time in control of the institution;

(8) All other claims.

Further particulars and coinciding factors

News items focus on the islands' dominant bank, Bancorp Hawaii, which is prospering and deemed to be headed for another year of excellent performance.

Appendix B: Details on the introduction of depositor preference laws for each state

Kansas

Date of depositor preference enactment

1st July 1985

Party control

Governor: D   Party control upper and lower house: R

Legal provision

Receiver to take charge of assets; order of payment.

(a) A receiver appointed pursuant to K.S.A. 9-1905 and amendments thereto, under the direction of the commissioner, shall take charge of any insolvent or critically undercapitalized bank or trust company and all of its assets and property, and liquidate the affairs and business thereof for the benefit of its depositors, creditors and stockholders. The receiver may sell or compound all bad and doubtful debts and sell all the property of the bank or trust company upon such terms as the district court of the county where the bank or trust company is located shall approve. The receiver shall pay over all moneys received to the creditors and depositors of such bank or trust company as ordered by the commissioner

(b) In distributing assets of the insolvent or critically undercapitalized bank or trust company in payment of its liabilities, the order of payment, in the event its assets are insufficient to pay in full all of its liabilities, shall be by category as follows:
  (1) The costs and expenses of the receivership and real and personal property taxes assessed against the bank pursuant to applicable law;
  (2) claims which are secured or given priority by applicable law;
  (3) claims of unsecured depositors;
  (4) all other claims exclusive of claims on capital notes and debentures;
  (5) claims on capital notes and debentures.

Should the assets be insufficient for the payment in full of all claims within a category, such claims shall be paid in the order provided by other applicable law or, in the absence of such applicable law, pro rata.

Further particulars and coinciding factors

There are no notable news items in the media about banks in Kansas.

Appendix B: Details on the introduction of depositor preference laws for each state

<u>**Maine**</u>

Date of depositor preference enactment: 16th April 1991

Party control

<u>Governor:</u> R   <u>Party control upper and lower house:</u> D

Legal provision

Procedures in liquidation.

> *When the superintendent appoints the Federal Deposit Insurance Corporation as receiver, federal law prescribes the procedures that the Federal Deposit Insurance Corporation follows in liquidation of the insolvent bank. When an insolvent stock institution or an insolvent mutual institution is liquidated, assets must be distributed in the following priority:*
>
> A. *First, the payment of the costs and expenses of the liquidation:*
> B. *Second, the payment of claims for deposits, including, but not limited to, the claims of depositors in a mutual institution for the return of their deposits;*
> C. *Third, the payment of all debts, claims and obligations owed by the institution and not accorded priority pursuant to paragraphs A and B;*
> D. *Fourth, the payment of claims otherwise proper that were not filed with the prescribed time; and*
> E. *Fifth, the payment of any obligation expressly subordinated to deposits and to claims entitled to the priority established by paragraphs A and B.*

Further particulars and coinciding factors

There is an emergency preamble which highlights that supervisory powers are to be enhanced to deal with presently volatile economic conditions which warrant prompt responsive action by the Superintendent of Banking. Acquisitions may also be facilitated by determination of the Superintendent of Banking if he deems this is important to protect depositors.

Maine was affected by the New England banking crisis. Several press items focus on the Bank of New England and problems in the real estate market.

Appendix B: Details on the introduction of depositor preference laws for each state

Minnesota

Date of depositor preference enactment: 24ᵗʰ April 1990

Party control

Governor: R   Party control upper and lower house: D

Legal provision

> *Subd. 9. [DIVIDENDS ON CLAIMS.] At any time after the expiration of the date fixed for the presentation of claims the commissioner may, out of the funds remaining on hand after the payment of expenses and amounts due to depositors, declare one or more dividends, and after the expiration of one year from the first publication of notice to creditors, may declare a final dividend, such dividends to be paid to such persons in such amounts as may be directed by the district court.*

Further particulars and coinciding factors

A small number of news items indicate improved performance of Minnesota based banks.

Appendix B: Details on the introduction of depositor preference laws for each state

Missouri

Date of depositor preference enactment: 15th May 1986

Party control

Governor: R   Party control upper and lower house: D

Legal provision

> *Claims entitled to priority, liquidation or insolvency. – In case of the insolvency or voluntary or involuntary liquidation of any corporation to which this chapter is applicable, the following claims shall have priority in the order herein specified:*

> *(1) All unpaid charges lawfully assessed against it by the director and all unpaid penalties and forfeitures incurred by it under any section of this chapter, and all expenses of liquidation;*
> *(2) The depositors having an approved claim against the general liquidating account of the bank;*
> *(3) The general creditors having an approved claim against the liquidating account of the bank;*
> *(4) The claims otherwise proper which were not filed within the time prescribed in this chapter;*
> *(5) The stockholders of the bank.*

Further particulars and coinciding factors

There are no notable news items in the media about banks in Missouri.

Appendix B: Details on the introduction of depositor preference laws for each state

New Hampshire

Date of depositor preference enactment: 10th *June 1991*

Party control

Governor: R   Party control upper and lower house: R

Legal provision

> *Distribution of Assets. Payments of dividends under RSA 395:19 and any other proceeds of the property of a closed or insolvent New Hampshire depository institution shall be distributed according to the decree of the court in the following priority:*
> I.   *The payment of the costs and expenses of the liquidation.*
> II. *The payment of wage, salary and other claims of employees to the same extent such claims would be accorded priority under federal bankruptcy law.*
> III. *The payment of claims for deposit accounts including but not limited to "deposits" as defined in 12 U.S.C. section 1813(l), or as it may be later amended from time to time.*
> IV. *The payment of liens accorded priority under New Hampshire law.*
> V.   *The payment of all debts, claims, and obligations filed in accordance with RSA 395:13, not accorded priority in the preceding paragraphs.*
> VI. *The payment of delayed claims in accordance with RSA 395:16.*
> VII. *The payment of capital debentures issued under RSA 384:14-a and any other obligations expressly subordinated to deposits and to claims entitled to the priority established in the preceding paragraphs.*
> VIII. *Any funds remaining shall be divided in the case of a stock institution among the stockholders according to their respective interests or, in the case of a mutual institution, among the depositors in proportion to the respective amounts of their deposits.*
> IX. *Interest shall be given the same priority as the claim on which it is based, but no interest shall be paid on any claim until the principal of all claims within the same class and all higher-priority classes have been paid or adequately provided for in full.*

Further particulars and coinciding factors

New Hampshire was affected by the New England banking crisis. Newspapers report on declining bank earnings, and woes about banking problems are increasing. Several news items link the banking problems to collapsing real estate markets.

Appendix B: Details on the introduction of depositor preference laws for each state

North Dakota

Date of depositor preference enactment: 1ˢᵗ July 1987

Party control

Governor: D   Party control upper and lower house: Split between R and D

Legal provision

Priority of expenses and claims.

> The order of paying the expenses of and claims against an insolvent bank is:
> 1. Administrative expenses, including salaries and expenses of receivers pursuant to section 6-07-20, and expenses incurred by the commissioner during possession or in the course of proceedings under this chapter including the compensation of deputy examiners, agents, and clerks employed by the commissioner and reasonable fees for BANKS AND BANKING CHAPTER 108 267
> 2. counsel, accountants, or consultants employed by the commissioner or on the commissioner's behalf; Unsecured claims for wages, salaries, or commissions earned by an individual within ninety days before the date of the commissioner's possession in an amount not exceeding five thousand dollars for each individual;
> 3. Claims of depositors, except that notwithstanding sections 6-03-67 and 41-04-27, if a depositor is indebted to an insolvent bank, the insolvent bank has a right to setoff against the depositor's account;
> 4. All other unsecured claims and claims of secured creditors to the extent the amount of their claims exceeds the present fair market value of their collateral;
> 5. Claims for debts that are subordinated under the provisions of a subordination agreement or other instrument; and
> 6. Equity capital of shareholders.

Further particulars and coinciding factors

There are no notable news items in the media about banks in North Dakota.

Appendix B: Details on the introduction of depositor preference laws for each state

Rhode Island

Date of depositor preference enactment: 8th *February 1991*

Party control

Governor: D   Party control upper and lower house: D

Priority of claims – Federally insured financial institutions or credit unions. – In a receivership, or a conservatorship under chapter 11 of this title, of a financial institution or credit union whose deposits are insured by the federal deposit insurance corporation, the national credit union administration or any other agency or instrumentality of the United States, the allowed expenses and claims against the financial institution or credit union shall have priority in receiving distributions, out of the assets of the financial institution or credit union in the following order:

(1) The payment of costs and expenses of the administration of the receivership estate.
(2) The payment of claims for "deposits", as that term is defined in 12 U.S.C. § 1813(I), including, but not limited to, the claims of depositors in a mutual savings bank for return of their deposits.
(3) Unsecured claims of any local, state, or federal taxing authority entitled by law to priority in distribution from the receivership or conservatorship estate, to the extent of such priority.
(4) Claims of salaried employees of the financial institution or credit union for wages or salaries earned but unpaid as of the commencement of the receivership or conservatorship.
(5) Claims for all other general liabilities not specified herein.
(6) Claims otherwise proper that were not filed within the prescribed time.
(7) Claims for obligations expressly subordinated to deposits and general liability claims.

Any funds remaining shall be paid to the stockholders of the financial institution or credit union, or, in the case of a mutual financial institution in which there are no stockholders, to the depositors in proportion to the respective amounts of their stock or deposits.
Interest shall be given the same priority as the claim on which it is based, but no interest shall be paid on any claim until the principal of all claims within the same class has been paid or adequately provided for in full.

Further particulars and coinciding factors

Rhode Island was affected by the New England banking crisis. One of the main lenders in Rhode Island, First Financial Corp. of Providence, reports a substantial drop in earnings. Other news items report on poor performance of banks in Rhode Island, making them a vulnerable target for acquisitions.

Appendix B: Details on the introduction of depositor preference laws for each state

<u>**Texas**</u>

Date of depositor preference enactment: 26th August 1985

Party control

<u>Governor: D</u>   <u>Party control upper and lower house:</u> D

Legal provision

Art. 4a. PRIORITY OF CLAIMS-PAYMENT. On liquidation of a state or private bank claims for payment have the following priority:

> *(1) obligations incurred by the Commissioner, fees and assessments due to the Department, and expenses of liquidation, all of which may be covered by a proper reserve of funds;*
> *(2) claims of depositors having an approved claim against the general liquidating account of the bank;*
> *(3) claims of general creditors having an approved claim against the general liquidating account of the bank;*
> *(4) claims otherwise proper that were not filed within the time prescribed by this Code;*
> *(5) approved claims of subordinated creditors; and*
> *(6) claims of stockholders of the bank.*

Further particulars and coinciding factors

Texas experienced a series of bank failures. The state repealed its depositor preference provisions shortly prior to the introduction of national depositor preference in 1993 as a result of the FDIC's resolution of the First City banks that had been closed in 1992.

The media reports that several banks experience problems with loans provided to the energy industry.

Table C.1
Political economy environment and the exogeneity of depositor preference laws

Panel A: Discrete time constant hazard model for the adoption of depositor preference laws

Dependent variable: Hazard of depositor preference law adoption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
State chartered bank assets	-2.1625						-0.5706
	(-0.95)						(-0.10)
S&L crisis	-1.3300						-1.2073
	(-1.22)						(-1.48)
Assets in failed banks	0.0510						0.0342
	(1.50)						(0.97)
Bank profitability	-0.6111						0.0012
	(-0.18)						(-1.03)
Democratic governor		-0.0573					-0.0459
		(-0.11)					(-0.06)
Intrastate deregulation			0.2562				0.8125
			(0.41)				(1.35)
Interstate deregulation			-0.1509				-0.3793
			(-0.28)				(-0.52)
Unit banking				-0.0420			0.1158
				(-0.18)			(0.21)
Herfindahl-Hirschman index					-3.5016		-2.1535
					(-0.88)		(-0.73)
Interest on Jumbo CDs						0.0719	-0.0682
						(0.54)	(-0.25)
Interest expenses on non-deposits						-0.5984	-0.5203
						(-1.23)	(-0.87)
Observations	356	356	356	356	356	356	356

Panel B: Exogeneity tests based on a discrete time constant hazard model

Key explanatory variable	Total interest expenses	Interest on deposits	Interest on Jumbo CDs	Interest on non-deposits	Insured deposit market share	Uninsured deposit market share	Non-deposits market share
Coefficient	0.0000	0.0000	0.0000	0.0000	-12.7395	-4.5294	2.6233
Z-statistic	(0.73)	(1.01)	(0.96)	(0.13)	(-1.54)	(-1.39)	(0.81)
Controls	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
Observations	1,196	1,196	1,196	1,196	1,196	1,196	1,196

Key explanatory variable	Z-Score (ln)	Non-performing Loans (NPL)	Leverage Ratio (LEV)	ROA (ln)	Capital ratio (ln)	ROASD (ln)
Coefficient	1.3519	0.3021	0.0007	0.7713	2.5412	-0.3531
Z-statistic	(1.55)	(1.64)	(0.93)	(0.32)	(0.81)	(-0.27)
Controls	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	1,196	1,196	1,196	1,196	1,196	1,196

Notes: We show in Panel A discrete time constant hazard models for the adoption of depositor preference laws to examine whether political economy factors or banking conditions, and bank market characteristics drive the introduction of these laws. The dependent variable is the hazard of adoption of depositor preference laws. The discrete time constant hazard model we estimate is $h(t|X_s) = h_0(t)^{exp(X\beta)}$ where $h(t|X_s)$ is the probability that a state with covariate values X_s will enact depositor preference up to quarter t; $h_0(t)$ is the baseline survival function; X_s is a vector of explanatory variables (Shumway (2001)). The explanatory variables are: state chartered bank assets, S&L crisis, assets in failed banks, bank profitability, democratic governor, intrastate deregulation, interstate deregulation, unit banking, a Herfindahl-Hirschman index, interest expenses on Jumbo CDs, and interest expenses on non-deposits. Panel B presents discrete time constant hazard models to verify that the adoption of depositor preference law is exogenous with respect to banks' costs of funds, market shares, soundness, and the components of the Z-Score (ln). The estimating equation is $h(t|X_s) = h_0(t)^{exp(X\beta)}$ where $h(t|X_s)$ is the probability that a state with covariate values X_s will enact depositor preference up to quarter t; $h_0(t)$ is the baseline survival function; X_s is a vector of explanatory variables containing both the key explanatory variable and the controls listed below. Failure is defined as enactment of depositor preference law. A state drops out of the sample in the period after it enacts depositor preference law. The key explanatory variables of interest are listed in the top row (total interest expenses, interest on deposits, interest on non-deposits, interest on Jumbo CDs, insured deposit market share, uninsured deposit market share, non-deposit market share, Z-Score (ln), non-performing loans ratio (NPL), leverage ratio (LEV), return on assets (ROA, ln), capital ratio (ln), and ROASD (ln). Total interest expenses, interest on deposits, interest on Jumbo CDs, and interest on non-deposits are reported in % of its respective total, i.e., the denominator for total interest expenses is total liabilities, the denominator for interest on deposits is total deposits, the denominator for interest on Jumbo CDs is total Jumbo CDs, and the denominator for interest on non-deposits is total non-deposits. In addition, a vector of control variables is included in the estimations. This vector includes the share of assets held by state-chartered banks within the state-quarter, the S&L crisis variable, defined as the ratio of assets in failed thrifts to total bank assets in the state-quarter, the amount of failed bank assets, bank profitability, measured by ROA, a dummy for democratic governors, a dummy for intrastate deregulation, a dummy for interstate deregulation, a dummy for unit banking states, the concentration of bank deposits measured by the Herfindahl-Hirschman index, interest on Jumbo CDs, and interest on non-deposits, measured at the state-quarter level. All control variables are aggregated at the state level. A state is dropped from the analysis in the quarter after it adopts depositor preference law. Robust *z*-statistics are reported in parentheses and standard errors are clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix D: Empirical tests addressing identification concerns

Table D.1
Pricing effects and confounding effects

Dependent variable	Total interest expenses	Interest on deposits	Interest on Jumbo CDs	Interest on non-deposits
Panel A: Banking Crisis in New England				
State charter*Depositor preference	-0.0113***	-0.0145***	-0.0330**	0.1289***
	(-4.12)	(-4.99)	(-2.07)	(8.05)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	195,010	195,010	167,358	195,010
R-squared	0.7737	0.7875	0.2449	0.2559
Panel B: Banking Crisis in Texas				
State charter*Depositor preference	-0.0189***	-0.0218***	-0.0351**	0.1201***
	(-5.54)	(-6.17)	(-2.31)	(7.63)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	180,344	180,344	152,064	180,344
R-squared	0.7602	0.7734	0.2548	0.2669
Panel C: S&L Crisis				
State charter*Depositor preference	-0.0178***	-0.0214***	-0.0320**	0.1354***
	(-5.33)	(-6.18)	(-2.09)	(8.45)
State charter*S&L crisis	-0.0237*	-0.0163	-0.1279***	-0.0377
	(-1.86)	(-1.28)	(-2.63)	(-0.57)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	199,731	199,731	171,361	199,731
R-squared	0.7563	0.7693	0.2450	0.2583
Panel D: Excluding FIRREA Period				
State charter*Depositor preference	-0.0066**	-0.0084**	-0.0402**	0.1090***
	(-2.07)	(-2.44)	(-2.00)	(5.17)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	137,230	137,230	109,670	137,230
R-squared	0.7176	0.7335	0.2045	0.2842
Panel E: Excluding FDICIA Period				
State charter*Depositor preference	-0.0111***	-0.0133***	-0.0356**	0.1131***
	(-3.72)	(-4.17)	(-2.00)	(6.37)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	172,692	172,692	144,714	172,692
R-squared	0.6973	0.7195	0.1849	0.2713
Panel F: Intrastate Bank Deregulation				
State charter*Depositor preference	-0.0164***	-0.0192***	-0.0325**	0.1239***
	(-4.47)	(-5.09)	(-2.06)	(6.71)
State charter*Intrastate deregulation	-0.0064	-0.0074*	-0.0117	0.0253
	(-1.56)	(-1.83)	(-1.10)	(1.53)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	199,731	199,731	171,361	199,731
R-squared	0.7563	0.7693	0.2450	0.2583
Panel G: Interstate Bank Deregulation				
State charter*Depositor preference	-0.0136***	-0.0182***	-0.0327*	0.1073***
	(-3.29)	(-4.23)	(-1.95)	(5.64)
State charter*Intrastate	-0.0089**	-0.0067	-0.0070	0.0451**
	(-2.03)	(-1.50)	(-0.55)	(2.40)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	199,731	199,731	171,361	199,731
R-squared	0.7563	0.7693	0.2450	0.2583
Panel H: Regulation Q				
State charter*Depositor preference	-0.0181***	-0.0211***	-0.0451***	0.1260***
	(-5.02)	(-5.83)	(-2.91)	(7.37)
State charter*Regulation Q	0.0010	0.0017	-0.0484**	-0.0475**
	(0.20)	(0.31)	(-2.24)	(-2.13)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	199,731	199,731	180,731	199,731
R-squared	0.7564	0.7693	0.2332	0.2578
Panel I: Competitive Equality Banking Act				
State charter*Depositor preference	-0.0099***	-0.0141***	-0.0255*	0.1271***
	(-2.95)	(-4.01)	(-1.70)	(6.82)
State charter*CEBA	-0.0159***	-0.0140***	-0.0101	0.0179
	(-4.05)	(-3.52)	(-1.01)	(1.22)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES
Observations	199,731	199,731	180,731	199,731
R-squared	0.7565	0.7693	0.2331	0.2578

Notes: We present difference-in-difference regressions examining the robustness of the results in Table 4. Total interest expenses, interest on deposits, interest on Jumbo CDs, and interest on non-deposits are reported in % of its respective total, i.e., the denominator for total interest expenses is total liabilities, the denominator for interest on deposits is total deposits, the denominator for interest on Jumbo CDs is total Jumbo CDs, and the denominator for interest on non-deposits is total non-deposits. Panel A shows regressions that omit observations for Connecticut, Maine, New Hampshire, and Rhode Island, and we remove observations for Texas in Panel B. Panel C focuses on the S&L crisis and includes an additional interaction term between the dummy for state charters and our proxy for the S&L crisis. Panel D removes observations between 1989Q4 and 1993Q2 to consider the effect of FIRREA, and Panel E removes observations between 1991Q4 and 1993Q2 to consider the effect of FDICIA. Panel F examines the robustness of the results to including interstate deregulations, and Panel G shows the corresponding tests for intrastate deregulation interactions. Panel H focuses on Regulation Q using interactions between the State charter dummy and the dummy for Regulation Q, and Panel I shows the tests with the interactions between the State charter dummy and the dummy for the CEBA. All regressions include the control variables included in Table 4. Note that the number of observations for the test on Interest on Jumbo CDs is smaller because data on Jumbo CDs is available only from 1984Q1 onwards. Robust *t*-statistics are reported in parentheses and standard errors are clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix D: Empirical tests addressing identification concerns

Table D.2
Placebo tests: Pricing effects

	Panel A: Random assignment of placebo treatment				Panel B: Assignment of placebo treatment to neighboring states			
Dependent variable	Total interest expenses	Interest on deposits	Interest on Jumbo CDs	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on Jumbo CDs	Interest on non-deposits
State charter	0.0062	0.0069	-0.0355	0.0031	0.0121	0.0228	0.0513*	0.0409
	(0.43)	(0.43)	(-1.60)	(0.05)	(0.47)	(0.95)	(2.14)	(0.36)
State charter*Placebo (random)	-0.0002	0.0001	0.0010	-0.0086				
	(-0.13)	(0.07)	(0.14)	(-0.79)				
State charter *Placebo (neighboring state)					-0.0241	-0.0285	-0.0104	-0.0046
					(-1.26)	(-1.37)	(-0.35)	(-0.22)
Bank size (ln)	0.1514***	0.1594***	0.1106***	0.0657**	0.1405***	0.1306***	0.0576*	-0.1045**
	(7.94)	(9.45)	(6.02)	(2.39)	(8.04)	(9.67)	(2.04)	(-2.28)
Capital ratio (ln)	-0.0358***	-0.0383***	-0.0651***	0.0257***	-0.0813***	-0.0879***	-0.0674***	0.0279
	(-10.92)	(-11.89)	(-10.92)	(3.31)	(-3.78)	(-3.70)	(-3.78)	(0.87)
Uninsured Deposits/Total liabilities	0.0104*	0.0079	-0.1341***	0.0409**	-0.0154	-0.0209	-0.2055***	0.0813***
	(1.94)	(1.45)	(-9.71)	(2.25)	(-0.90)	(-1.21)	(-4.98)	(5.10)
Non-Deposits/Total liabilities	-0.0253	0.0010	-0.1197***	0.2034***	-0.0849	-0.0516	-0.1232***	0.1992***
	(-1.13)	(0.04)	(-7.82)	(3.40)	(-1.44)	(-0.83)	(-3.55)	(4.25)
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	180,731	199,731	122,476	122,476	107,495	122,476
R-squared	0.7563	0.7692	0.2822	0.2577	0.6612	0.6610	0.2480	0.2975
Number of banks	5,509	5,509	5,499	5,509	3,624	3,624	3,595	3,624

Notes: We present difference-in-difference regressions examining the robustness of the results in Table 4. Total interest expenses, interest on deposits, interest on Jumbo CDs, and interest on non-deposits are reported in % of its respective total, i.e., the denominator for total interest expenses is total liabilities, the denominator for interest on deposits is total deposits, the denominator for interest on Jumbo CDs is total Jumbo CDs, and the denominator for interest on non-deposits is total non-deposits. Panel A shows regressions that randomly assign placebo treatments across states in the pre-treatment period and interacts a placebo treatment with the State charter dummy. In Panel B, we assign placebo treatments to neighboring states which do not implement the legislation. All regressions include the control variables included in Table 4. Note that the number of observations for the test on Interest on Jumbo CDs is smaller because data on Jumbo CDs is available only from 1984Q1 onwards. Robust *t*-statistics are reported in parentheses and standard errors are clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix D: Empirical tests addressing identification concerns

Table D.3
Confounding events: Soundness and Z-Score (ln) decomposition

Dependent variable	Soundness measures			Decomposition of Z-Score (ln)		
	Z-Score (ln)	NPL	LEV	ROA (ln)	Capital ratio (ln)	ROASD (ln)
Panel A: Banking Crisis in New England						
State charter*Depositor preference	0.1957***	-0.0013***	-0.0057***	0.0323**	0.0996***	-0.0318**
	(7.88)	(-4.71)	(-8.52)	(2.01)	(7.80)	(-1.98)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	195,010	195,010	195,010	195,010	195,010	195,010
R-squared	0.9029	0.4584	0.7083	0.5153	0.6768	0.4759
Panel B: Banking Crisis in Texas						
State charter*Depositor preference	0.2014***	-0.0010***	-0.0045***	0.0209*	0.0718***	-0.0219
	(7.59)	(-3.44)	(-6.68)	(1.85)	(5.83)	(-1.51)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	180,344	180,344	180,344	180,344	180,344	180,344
R-squared	0.9083	0.4598	0.7143	0.5374	0.7064	0.4846
Panel C: S&L Crisis						
State charter*Depositor preference	0.2057***	-0.0011***	-0.0049***	0.0438***	0.0731***	-0.0278*
	(8.85)	(-3.83)	(-7.41)	(2.75)	(6.81)	(-1.81)
State charter*S&L crisis	0.8984***	-0.0029**	-0.0116***	-0.1017	0.4855***	-0.0915*
	(5.24)	(-2.14)	(-4.39)	(-1.49)	(6.20)	(-1.65)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	199,731	199,731	199,731	199,731
R-squared	0.8934	0.4625	0.7074	0.5132	0.6782	0.4748
Panel D: Excluding FIRREA Period						
State charter*Depositor preference	0.2250***	-0.0023***	-0.0068***	0.0611***	0.1279***	-0.0049
	(6.71)	(-6.00)	(-10.17)	(3.00)	(8.25)	(-0.23)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	137,401	137,401	137,401	137,401	137,401	137,401
R-squared	0.9183	0.5002	0.7464	0.5709	0.6746	0.5436
Panel E: Excluding FDICIA Period						
State charter*Depositor preference	0.2293***	-0.0017***	-0.0063***	0.0421**	0.1153***	-0.0209
	(8.16)	(-4.84)	(-9.26)	(2.38)	(8.41)	(-1.17)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	172,696	172,696	172,696	172,696	172,696	172,696
R-squared	0.9021	0.4608	0.7234	0.5316	0.6733	0.5024
Panel F: Intrastate Bank Deregulation						
State charter*Depositor preference	0.1654***	-0.0009***	-0.0050***	0.0543***	0.0659***	-0.0205
	(6.67)	(-2.81)	(-6.76)	(3.12)	(5.40)	(-1.31)
State charter*Intrastate deregulation	0.2027***	-0.0009***	-0.0009*	-0.0381***	0.0721***	-0.0288**
	(5.85)	(-3.27)	(-1.67)	(-2.79)	(4.95)	(-2.58)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	199,731	199,731	199,731	199,731
R-squared	0.8935	0.4626	0.7073	0.5133	0.6780	0.4749
Panel G: Interstate Bank Deregulation						
State charter*Depositor preference	0.0765**	-0.0008**	-0.0031***	0.0444**	0.0246*	0.0059
	(2.55)	(-2.49)	(-3.99)	(2.12)	(1.87)	(0.34)
State charter*Interstate deregulation	0.2854***	-0.0008**	-0.0038***	-0.0085	0.1180***	-0.0640***
	(8.82)	(-2.21)	(-6.21)	(-0.49)	(8.86)	(-4.72)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	199,731	199,731	199,731	199,731
R-squared	0.8935	0.4626	0.7076	0.5132	0.6784	0.4750
Panel H: Regulation Q						
State charter*Depositor preference	0.2320***	-0.0012***	-0.0051***	0.0390**	0.0892***	-0.0290*
	(8.39)	(-3.95)	(-6.94)	(2.05)	(6.51)	(-1.73)
State charter*Regulation Q	-0.0997**	0.0004	0.0018	0.0001	-0.0360*	0.0146
	(-2.54)	(0.96)	(1.60)	(0.00)	(-1.94)	(0.58)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	199,731	199,731	199,731	199,731
R-squared	0.8930	0.4623	0.7068	0.5132	0.6768	0.4749
Panel I: Competitive Equality Banking Act						
State charter*Depositor preference	0.1397***	-0.0009***	-0.0054***	0.0596***	0.0816***	-0.0083
	(4.13)	(-2.74)	(-7.13)	(3.11)	(5.41)	(-0.45)
State charter*CEBA	0.2170***	-0.0007***	-0.0002	-0.0390***	0.0297**	-0.0454***
	(6.46)	(-2.79)	(-0.40)	(-3.07)	(2.09)	(-4.50)
Controls, Bank FE, State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	199,731	199,731	199,731	199,731
R-squared	0.8931	0.4623	0.7067	0.5133	0.6768	0.4750

Notes: We present difference-in-difference regressions examining the robustness of the results in Table 7. Panel A shows regressions that omit observations for Connecticut, Maine, New Hampshire, and Rhode Island, and we remove observations for Texas in Panel B. Panel C focuses on the S&L crisis and includes an additional interaction term between the dummy for state charters and our proxy for the S&L crisis. Panel D removes observations between 1989Q4 and 1993Q2 to consider the effect of FIRREA, and Panel E removes observations between 1991Q4 and 1993Q2 to consider the effect of FDICIA. Panel F examines the robustness of the results to including interstate deregulations, and Panel G shows the corresponding tests for intrastate deregulation interactions. Panel H focuses on Regulation Q using interactions between the State charter dummy and the dummy for Regulation Q, and Panel I shows the tests with the interactions between the State charter dummy and the dummy for the CEBA. All regressions include the control variables included in Table 7. Robust *t*-statistics are reported in parentheses and standard errors are clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix D: Empirical tests addressing identification concerns

Table D.4
Placebo tests: Soundness and Z-Score (ln) decomposition

Panel A: Random assignment of placebo treatment

	Soundness measures			Decomposition of Z-Score (ln)		
Dependent variable	**Z-Score (ln)**	**NPL**	**LEV**	**ROA (ln)**	**Capital ratio (ln)**	**ROASD (ln)**
State charter	0.5810**	-0.0018	-0.0029	0.1268***	0.2025**	-0.1294
	(2.29)	(-0.79)	(-1.37)	(2.93)	(2.19)	(-1.68)
State charter*Placebo (random)	-0.0098	0.0001	0.0000	0.0029	0.0008	0.0043
	(-1.08)	(1.15)	(0.30)	(0.79)	(0.27)	(1.08)
Bank size (ln)	-0.0516	-0.0026	0.0340***	0.2220***	-0.2998***	-0.1613***
	(-0.44)	(-1.67)	(9.20)	(5.30)	(-5.38)	(-3.41)
Uninsured Deposits/Total liabilities	0.1820***	-0.0006**	-0.0017***	-0.0052	0.0526***	-0.0019
	(4.15)	(-2.43)	(-3.53)	(-0.72)	(4.58)	(-0.22)
Non-Deposits/Total liabilities	0.2402**	-0.0036***	-0.0037**	0.0113	0.0616*	0.0275
	(2.15)	(-3.82)	(-2.36)	(0.59)	(1.77)	(0.96)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	199,731	199,731	199,731	199,731	199,731	199,731
R-squared	0.8933	0.4593	0.7099	0.5131	0.6770	0.4748
Number of banks	5,509	5,509	5,509	5,509	5,509	5,509

Panel B: Assignment of placebo treatment to neighboring states

	Soundness measures			Decomposition of Z-Score (ln)		
Dependent variable	**Z-Score (ln)**	**NPL**	**LEV**	**ROA (ln)**	**Capital ratio (ln)**	**ROASD (ln)**
State charter	0.1309	-0.0020	-0.2768	0.1592***	0.0052	0.0212
	(0.86)	(-1.40)	(-0.64)	(4.33)	(0.10)	(0.19)
State charter*Placebo (neighboring state)	0.0886	0.0000	-0.0418	0.0072	0.0220	-0.0585
	(1.42)	(0.02)	(-0.22)	(0.40)	(1.57)	(-1.62)
Bank size (ln)	0.6690**	-0.0008	2.1587***	0.2875***	-0.2778***	-0.2280***
	(2.86)	(-1.15)	(6.51)	(8.95)	(-4.47)	(-3.15)
Uninsured Deposits/Total liabilities	0.0554	-0.0010*	-0.0310	0.0006	0.0284**	-0.0677**
	(0.98)	(-2.02)	(-0.40)	(0.11)	(2.23)	(-2.72)
Non-Deposits/Total liabilities	0.1158	-0.0033**	0.0453	0.0002	0.0310	-0.1763***
	(0.85)	(-2.73)	(0.16)	(0.01)	(0.93)	(-3.60)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	122,476	122,476	122,476	122,476	122,476	122,476
R-squared	0.7758	0.4786	0.7020	0.5837	0.7870	0.4695
Number of banks	3,624	3,624	3,624	3,624	3,624	3,624

Notes: We present difference-in-difference regressions examining the robustness of the results in Table 7. Panel A shows regressions that randomly assign placebo treatments across states in the pre-treatment period and interacts a placebo treatment with the State charter dummy. In Panel B, we assign placebo treatments to neighboring states which do not implement the legislation. All regressions include the control variables included in Table 7. Robust *t*-statistics are reported in parentheses and standard errors are clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.