Monitoring Matters: Debt Seniority, Market Discipline and Bank Conduct

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Abstract

We examine if debtholders monitor banks and if such monitoring constrains risk-taking. Leveraging an unexplored natural experiment in the U.S. that changes the priority structure of claims on banks' assets, we provide novel insights into the debate on market discipline. We document asymmetric effects for monitoring effort depending on whether a creditor class moves up or down the priority ladder. Conferring priority to depositors causes declines in deposit rates but increases interest rates for non-deposit liabilities, suggesting greater incentives for junior debtholders to exert monitoring effort. Consistent with the idea that senior claims require lower risk premiums, banks increasingly rely on deposit funding following changes in the priority structure. More intensive monitoring also influences conduct: subordinating non-depositor claims reduces risk taking. Our results inform the debate about bail-ins and highlight that changes in the priority structure are a complementary tool to regulation which has received little attention in prior work.

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1.   Introduction

Modern finance theory states that debt priority has important implications for monitoring incentives. Conferring priority on one group of debtholders exposes junior claimants to greater losses in the event of bankruptcy, leading them to increase monitoring efforts. These changes in monitoring intensity induce creditors to alter their behavior.

Market discipline, the idea that participants in financial markets can monitor bank conduct and constrain risk taking, has been a cornerstone of the regulatory framework for many years. The concept of harnessing market forces for regulatory purposes has also received considerable attention in the literature (e.g., Flannery (2001)). The mechanism works as follows: Private investors, in particular holders of large debt claims have strong incentives to monitor banks' risk exposure because their claims are not protected by deposit insurance. Consequently, they have more to lose if a bank fails and are therefore more likely to respond to impending problems. Such responses may come in the form of withdrawal of funds, refusing to roll over funds, demanding a higher risk premium, demanding collateral, or combinations thereof. Ultimately, these actions put constraints on the risk-taking behavior of banks, in particular asset allocation choices. However, as our review of the literature below shows, the jury is still out on whether private sector agents reliably engage in risk monitoring and preventative influence of bank behavior.[1]

In this paper, we exploit a hitherto unexplored natural experiment in the U.S. banking industry to provide novel insights into the unresolved debate about market discipline. At the heart of our identification strategy lies the staggered introduction of depositor preference legislation in 15 U.S. states between 1983 and 1993, explained in Section 2 below. Depositor preference laws change the claim structure on a failed bank's assets by assigning a priority claim to depositors and subordinates non-depositors.

We investigate if debt seniority differentially affects monitoring incentives of different creditor classes and if monitoring by creditors also influences bank conduct. Prior work by Birchler (2000) suggests this is the case. Subordinating claims of general creditors to those of depositors eradicates costly duplication of monitoring effort when investors differ with respect to privately known information costs because non-depositors have more efficient monitoring technologies. That is, the introduction of depositor preference laws and the concomitant changes in claim structure give rise to a rich set of empirical predictions for funding costs, liability structure, profitability, and soundness. This is the focus of our study.

Importantly, the various creditor classes are likely to respond in different ways to the change in claim structure. While insured depositors' position remains unaffected, uninsured depositors will require a lower interest rate which reduces funding costs and translates into higher bank profits. Moreover, these depositors may also provide additional funding. Simultaneously, non-depositors will require compensation for bearing more risk, they may provide less funding, and the increased monitoring by this creditor class should incentivize bank management to adopt less risky strategies.[2]

However, these predicted creditor responses consider only the supply side of bank funding and ignore general equilibrium effects stemming from banks adjusting their capital structure. Banks may seek to move towards cheaper funding sources. While risk-averse uninsured depositors may increase supply in response to depositor preference laws, in equilibrium banks may increase demand for uninsured deposits due to increases in the price of substitutes, i.e. non-deposit funds. Similarly, demand for non-deposits may adjust to the lower supply of this type of funds. Ultimately, the net effect of changes to the priority structure on monitoring and any corresponding influence on bank behaviour are ex ante uncertain. One important contribution of our paper is to provide empirical evidence that accurately "signs" the general equilibrium effect of debt priority changes.

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1   The debate about market discipline has received renewed attention in the aftermath of the recent financial crisis. Several observers note that the widely deployed government interventions such as blanket guarantees, liquidity support, capital support measures, and nationalizations undermine market discipline (e.g., Acharya and Kulkarni, 2014; Acharya, Anginer, and Warburton (2014); Calderon and Schaeck (forthcoming)).

2   This heterogeneity in "types" reflects the different monitoring costs incurred by depositors and non-depositors when monitoring bank performance.

Our setting is uniquely suited to draw causal inferences for the effect of the seniority of debt claims on bank conduct by exploiting variation across states over time in the introduction of depositor preference laws. The successive adoption of depositor preference by 15 states constitutes a plausibly exogenous change in the monitoring incentives of non-depositors that only applies to state-chartered but not to nationally-chartered banks. This fact, together with the panel structure of our data with quarterly frequency, aids construction of the implied counterfactual.

We use difference-in-difference estimations that compare the evolution of the key dependent variables among state-chartered banks with an observationally similar control group of nationally-chartered banks headquartered in the same state but unaffected by the laws. We include bank fixed effects that rule out unobserved time-invariant effects in the cross-section, and we include state-quarter fixed effects that net out any time-varying unobservable heterogeneity on the state-quarter level. In other words, our treatment effect simply represents the average difference between state-chartered and nationally-chartered banks in the same state-quarter, i.e., banks that operate in an identical macroeconomic environment. These design choices ensure that, conditional on additional covariates, the key identifying assumption that banks in the treatment and control groups are only randomly different is met.

One may ask whether the introduction of depositor preference is exogenous with respect to bank behavior. To alleviate concerns about the exogeneity of treatment, we survey state legislative councils, read legislative councils' digests, concurrencies of the state amendments and assembly laws in all 15 U.S. states that adopt depositor preference during the sample period prior to embarking upon our econometric analyses. In addition, we screen press sources to gain an overview on the macroeconomic setting and the driving forces behind the adoption of depositor preference. This preliminary investigation decisively refutes the idea that banking sector conditions affect the introduction of depositor preference. We also do not find that macroeconomic developments correlate with the adoption of these laws. The plausible exogeneity of depositor preference is also reflected in a set of empirical tests that model the adoption of depositor preference laws as a function of variables that provide information about the soundness and other characteristics of the 15 states' banking systems. A set of further tests rejects the view that private-interest groups lobby for the introduction of depositor preference.

However, demonstrating that adopting depositor preference is orthogonal to the outcomes we study is not sufficient to establish causality. We must also show that our control group constitutes a valid counterfactual. We present visual evidence that our data support the assumption of parallel trends between treatment and control group. Subsequent tests lend further support to this assumption.

We obtain the following key findings. Depositor preference laws provoke asymmetric monitoring responses depending on whether a creditor class moves up or down the priority ladder. Conferring seniority upon uninsured deposits causes a significant decrease in deposit interest expenses. By comparison, interest on non-deposits increase, reflecting their more junior status and greater incentive to monitor bank behavior to curtail losses in the event of bankruptcy. The overall effect of these changes is a 1.5% reduction in funding costs due to the composition of liabilities being more heavily weighted toward deposits.

Beyond documenting an important pricing effect for banks' cost of funds, we also isolate the quantity effects of priority changes. Consistent with the fact that insured depositors' position in the priority queue is unaffected by the law, we observe no change in state-chartered banks' market share of insured deposits. However, we uncover a significant increase in state-chartered banks' share of uninsured deposits post treatment. This effect is consistent with uninsured depositors demanding a lower risk premium following their elevation in priority and a corresponding increase in the supply of uninsured deposits to state-chartered banks by risk-averse agents. Interestingly, we find that depositor preference laws have no effect on state-chartered banks' non-deposit market share. This suggests that part of the reason non-depositors increase monitoring is because they have the same amount of skin in the game. Put differently, had we found the laws to cause a decrease in non-deposits' market share it would be difficult to claim that non-depositors engage in more monitoring given they divest their holdings.

Do these changes in monitoring influence bank behavior in terms of risk taking and profitability? Our tests suggest they do. The average state-chartered bank's Z-score (ln) increases by 22%, and non-

performing loans ratios and leverage also improve.[3] We also find improvements in profitability: the average state bank's return on equity increases by 4%.

Are the effects we attribute to changes in the priority of the claim structure really causal? Using bank-fixed effects that net out any unobserved time-invariant bank-specific heterogeneity mitigates omitted variable concerns. Likewise, state-quarter-fixed effects capture time-varying shocks, such as declines in demand and changes to tax rates and regulation that are common to both treated and untreated banks but differ across states, further alleviate problems that originate from omitted variables. In addition, time-varying bank-specific control variables purge the remaining realistic omitted variable threats. However, isolating the effect of depositor preference requires that the changes in bank behavior can only be observed when depositor preference is introduced, and, moreover, that no other developments coincide with the adoption of depositor preference that could also trigger adjustments in behavior. To address these issues, we offer a set of placebo regressions, where we randomly assign placebo depositor preference laws to nationally-chartered banks located in states where state-chartered banks were subject to depositor preference and find indeed that our placebo tests remain statistically indistinguishable from zero. The fact that we have 15 different instances of treatment occurring at different points in time makes it challenging to identify other potential confounds. Any omitted variable would have to temporarily coincide with the adoption of depositor preference and simultaneously only affect state-chartered banks. We discuss such potential confounds that occur simultaneously with the introduction of depositor preference and present tests that rule out these alternative explanations. Specifically, we document that the banking turmoil in the S&L industry, regional banking problems in Texas and New England, and the regulatory changes that come in the form of FIRREA and FDICIA do not drive for our findings. We also rule out that the wave of branching deregulation on the interstate and the intrastate level and charter switches play a role for our inferences, and we can also rule out that survivorship issues drive our findings. Tests that exploit the introduction of national depositor preference in 1993 help us demonstrate the external validity of our inferences.

Our findings are important for two reasons. First, the direct evidence that monitoring by junior claimholders translates in a corresponding improvement in bank soundness provides a rationale for market discipline being an integral component in the regulatory framework. Our inferences are consistent with Flannery (1998, 2001) who advocates that private sector agents can effectively monitor financial firms. Furthermore, our evidence mirrors findings in the corporate finance literature by Rajan and Winton (1995). They show loan contracts need to be structured so as to provide incentives for the lender to monitor the borrower.[4] We illustrate that assigning priority claims to depositors can be viewed as an alternative to contractual devices to motivate such monitoring in the context of banking regulation.

Second, the findings we obtain provide timely new insights for policy and regulation. Assigning priority to some or all deposits in case of bankruptcy of a bank has been one of the early ways of protecting depositors but this policy tool received little attention in the past few decades. However, a lively debate about the pros and cons of such legislation was sparked off in the aftermath of the financial crisis with policymakers and academics advocating the use of bail-in provisions where debtholders contribute to bank resolutions (Flannery (2010)). The European Central Bank called for the introduction of depositor preference laws in all member states of the European Union, and the Independent Commission on Banking in the UK also recommended the introduction of such laws. The new resolution framework in the European Union, signed into law recently, foresees a preference for all deposits of natural persons and small- and medium-sized enterprises regardless of their amount.[5] Policy makers favor adopting such laws on the grounds that they prevent bank runs, improve market discipline, and enhance soundness. However, in the run-up to the signing into law of depositor preference in Europe, policy makers met fierce resistance from the banking industry whose representatives were

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[3] In this study, we define leverage as the ratio of debt to equity.

[4] The corporate finance literature has a long tradition of establishing the usefulness of debt priorities. Stulz and Johnson (1985) and Hart and Moore (1994) show that debt priorities provide optimal incentives to shareholders and managers. One implication of these models is that an insolvent debtor should be able to raise senior debt if this allows her to finance positive net present value projects.

[5] The new resolution framework must be implemented in all member states of the European Union by the end of 2014. The decision to enact depositor preference was reached after many hesitations by the European Commission and the legislator because the original proposal contained a *pari passu* ranking at non-preferential level.

concerned that such laws increase funding costs. In the absence of prior conclusive evidence on these questions, our work sheds new light into this debate and aids policy formulation.

Prior to summarizing our contribution, we briefly reflect on the fact that our inferences are based on data for U.S. banks obtained during the 1980s and early 1990s. We also discuss the extent to which we can generalize from our findings. Beyond highlighting that the banks in the 15 states that adopt depositor preference are statistically indistinguishable from the population of U.S. banks, we point out that our experiment also matters quantitatively. Banks in the 15 states that enter our main analysis account for 53 percent of total banking system assets in the U.S. State-chartered banks hold 47 percent of total banking system assets in these 15 states. The share of uninsured deposits in these banks is 9 percent of total liabilities, and non-deposits account for more than 14 percent of total liabilities.[6] In other words, more than 24 percent of the liability side of a banks' balance sheet is affected by these laws.

In addition, we believe that there are other reasons for why our results are useful to inform the debate about market discipline in the U.S. and abroad. In fact, our experiment sheds light on how a banking system with many small and medium sized banks which operate in relatively small geographic markets on the one hand and a limited number of very large institutions on the other hand responds to an exogenous shock that increases monitoring by non-depositors. Many countries in Europe, primarily Germany, Austria, Switzerland, Italy, and Spain, have similarly structured banking systems with institutions that operate with comparable business models. Moreover, these smaller European institutions, just as their U.S. counterparts, typically do not rely extensively on wholesale funding and are often privately held, suggesting subdued levels of market discipline in general.

We offer three key contributions to the literature. First, we illuminate the debate about market discipline. In particular, we demonstrate, unlike most of the literature, that private sector agents not only monitor banks, but also causally influence bank conduct in terms of risk taking. The legal changes we focus on motivate non-depositors to collect information about banks' risk profiles and act upon it. Early work by Gorton and Santomero (1990), and Avery et al. (1988) does not find strong associations between bondholders' ability to price bank risk but subsequent studies conclude that investors and depositors are indeed able to do so (Flannery and Sorescu (1996); Flannery (2001); Goldberg and Hutchins (2002); Krishnan, Ritchken, and Thomson (2005); Martinez Peria and Schmukler (2001)). Further work in this area by Billett, Garfinkel, and O'Neal (1998) also challenges the capability of market participants to discipline banks. They show that market discipline deteriorates as banks become more risky because declines in bank health correlate with increasing use of insured deposits. In contrast to our work, these studies offer at best only evidence for the monitoring dimension of market discipline.

The intuition for why regulatory frameworks also try to harness market forces to constrain bank risk taking is the expectation that monitoring by market participants results in a corresponding influence on conduct. In other words, what really matters is if increased scrutiny by private sector agents that are exposed to losses in case of bankruptcy limits risk taking. Except for Ashcraft (2008), who shows holders of subordinated debt exert preventative influence on conduct if they can impose real constraints via covenants, there is little support in the literature for the view that private sector agents can influence bank conduct (Bliss and Flannery (2000)) In contrast to Ashcraft (2008), our setting does not require covenants to be in place. For our analysis, it is sufficient to have an increase in monitoring which is attributable to changes in priority claims mandated by law. This approach is more efficient than relying on covenants as priority rules can be considered to be a substitute for private covenants that would be costly to write in the presence of transaction costs.

Another factor that distinguishes our research from previous work on market discipline is the fact that we pay attention to the mechanism that makes debtholders engage in monitoring and influencing of bank conduct. While many of the earlier studies we discuss above hone in on relationships between bond prices and bank risk, we are the first to show that shocks induced by changes in legislation that affect priority claims on banks' assets have wide ranging implications for bank behavior. The magnitude of the effects we document in this work suggests potential for depositor preference from the perspective

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[6] Note that state depositor preference laws do not distinguish between domestic and foreign deposits. Foreign deposits account for less than 7 percent of state-chartered banks' balance sheets.

of improving the institutional framework in banking which does not seem to have been sufficiently recognized in previous work.

The second contribution of our work is to shed new light on the role of depositor preference, an issue of timely relevance for the policy community in the aftermath of the financial crisis which has triggered a massive overhaul of the regulatory framework.

Previous research has also focused on depositor preference in the U.S. In stark contrast to our work, Hirschhorn and Zervos (1990), Osterberg (1996), Osterberg and Thomson (1999, 2003) exclusively examine the introduction of national depositor preference in 1993 in the U.S., and largely limit themselves to analyses of the pricing effects of depositor preference, how depositor preference affects failure rates, and the losses incurred by the deposit insurer. The importance of our experimental setup becomes obvious when we compare our results with those of previous studies. Earlier work reports mixed evidence for the effect on funding costs as their empirical tests cannot disentangle the adoption of national depositor preference from other coinciding events. Moreover, Hirschhhorn and Zervos (1990) only examine the thrift industry. Unlike these papers, our experiment permits isolating the effects from state-level depositor preference legislation that predates the introduction of national depositor preference. A further aspect that delineates our work from the earlier research is the finding that once national depositor preference law was enacted, state-chartered banks that were already subject to preferential treatment of depositors no longer display changes in conduct.

Most importantly, however, our empirical work can "sign" the ex-ante ambiguous effects that arise from the increase in monitoring. As we discuss above, the equilibrium effects of the changes in priority structure depend on both supply and demand for different types of funds. Our results support theoretical predictions regarding lower cost of deposit funding, higher cost for non-deposit funding, increases in the quantity of uninsured deposit funding, the unchanged quantity of insured deposit funding but do not fully support the idea that the volume of non-deposit funding should decrease.

Related to these early studies on depositor preference is work by Hardy (2013). He develops predictions arising from depositor preference for funding costs, profitability, and the probability and cost of bankruptcy. He argues that claimants to the residual assets of failed banks lobby to assert claims to the share of residual assets, where lobbying is increasing in the volume of residual assets. The lobbying process increases bankruptcy costs as it extends the resolution period. Moreover, if one claimant takes legal action, the Nash equilibrium is for other claimants and the receiver to also take legal action. Since depositors enjoy a preferred status under depositor preference, no resources need be deployed to establish this position. In turn, the volume of residual assets non-deposit creditors fight over is reduced and so are bankruptcy costs. The implication for the probability of bankruptcy is straightforward: If depositor preference lowers banks' overall funding costs, *ceteris paribus*, the probability of bankruptcy will endogenously decrease. In contrast to his work which is exclusively theoretical, we take these issues to the data.

The third contribution is that we are the first to exploit a so far neglected natural experiment that causes a switch in monitoring intensity by different groups of debtholders to study market discipline. Our experiment represents a useful source of plausibly exogenous variation in the monitoring activities by junior claimholders on a bank's assets. Such a switch in monitoring effort is also of relevance for other questions in banking, e.g., whether the additional monitoring by junior claimants produces new information that can be exploited for the allocation of supervisory resources and prudential regulation.

Finally, our study also advances the literature on bank capital structure and funding choices. This debate is relevant because bank funding models have been criticized for their vulnerability in the aftermath of the crisis (Demirgüç-Kunt and Huizinga (2010); Huang and Ratnovski (2011); Le Lesle (2012)). Importantly, regulating bank capital and developing rules that focus on banks' liability composition have received a massive overhaul in the past few years. A substantial body of literature exists on banks' capital choices. Froot and Stein (1998) establish the association between risk management, capital budgeting, and capital structure in banks, and Cebenoyan and Strahan (2004) show that credit risk management is a key determinant for capital structure. Peura and Keppo (2006) report that differences in returns volatility and in the level of capital market imperfections are also important determinants of cross-sectional capital ratios. Berger et al. (2008) investigate how bank holding

companies manage their capital structure, and Gropp and Heider (2010) echo results in the corporate finance literature by showing that bank-fixed effects explain most of the variation in bank capital ratios. The role of regulatory innovation is investigated by Flannery and Rangan (2008). They examine changes in bank capital structure and conclude that changes in regulation increased bank counterparties' monitoring incentives and price risk more adequately. Recently, Admati et al. (2013) propose that higher minimum capital ratios are the best possible way to improve soundness, and Flannery (2014) discusses how regulators can ensure that banks maintain adequate levels of loss-absorbing capital, stressing that credible bail-in provisions lead junior debtholders to provide market signals when bank soundness deteriorates. Our paper differs from these two related strands of literature about capital structure and funding mix by paying particular attention to how different components of bank debt respond to an exogenously triggered switch in monitoring intensity by junior claimholders.

The paper proceeds as follows. Section 2 provides an overview about the legislative history of depositor preference. Section 3 describes the data. Our identification strategy and the main results are presented in Section 4. Section 5 deals with identification concerns, shows further sensitivity tests, and discusses the external validity. Section 6 concludes.

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

The regulatory framework in the U.S. prescribes guidelines for the resolution of failed banks. The assets of a failed institution are transferred to a receivership, represented by the Federal Deposit Insurance Corporation (FDIC) whose task it is to identify and satisfy creditors, and maximize the net present value of recoveries for the receivership claimants. We first provide a synopsis of the legislative history of the claim structure for a failed bank's deposits. Subsequently, we present empirical support for the exogeneity of depositor preference laws with respect to bank behavior, and we also rule out that interest-groups lobby for adoption of depositor preference.

2.1 History of depositor preference legislation

The FDIC pays off claimants in line with the guidelines for receiverships of banks established by the Banking Act of 1935. The FDIC assigns priority claims to the receiver who obtains part of the proceeds as compensation for administrative expenses. Next in line are secured claimants who have collateralized claims.[7] They are followed by depositors with account balances below the deposit insurance coverage limit, with uninsured depositors whose account balances exceed the deposit insurance coverage limit and non-depositors coming thereafter.[8] The latter two groups have claims of equal priority. Last in the queue are holders of subordinated debt, and shareholders.

Several states depart from the provisions laid out in the Banking Act of 1935, and change the priority structure of claims for state-chartered banks in their respective state banking laws. Starting in 1909, Nebraska established that depositors have a priority claim over the claims of general, i.e., non-deposit creditors. In the following years, 29 other states also adopted what has become known as "depositor preference laws", thus elevating the claims of all depositors, both insured and uninsured ones. Of those 29 states, 15 states (Arizona, California, Colorado, Connecticut, Florida, Hawaii, Kansas, Louisiana, Maine, Minnesota, Missouri, New Hampshire, North Dakota, Rhode Island, Texas) adopted depositor preference during our sample period 1983Q1 – 1993Q2.

Table 1, Panel A, highlights the staggered nature of the adoption of state depositor preference laws.

[INSERT TABLE 1: THE POLITICAL ECONOMY OF DEPOSITOR PREFERENCE ADOPTION]

How are these legal provisions embedded in state laws? To obtain the original text of the law, we contact the legislative council archives and the chartering authority in each one of these 15 states. Appendix A presents the codified law at that time for each one of these states that enter our empirical analysis.[9] Typically, these provisions are found in a section entitled "*Involuntary Liquidation*

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[7] Secured claims receive priority only for the value of the collateral securing the claim. If the value of the collateral is less than the amount of the claim, the unsecured portion falls into the priority scheme according to the type of claim (Marino and Bennett (1999)).

[8] Non-depositors include: trade creditors, beneficiaries of guarantees, foreign depositors, holders of bankers' acceptances, unsecured lenders, landlords, suppliers of Fed funds, and counterparties to swaps and other contingent liabilities.

[9] 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.

Procedure", "*Payment of Claims*", or "*Distribution of Assets*". While the wording and some details differ across states, the priority structure for the claims on failed banks' assets with a state charter that emerges looks as follows:

1. administrative expenses of the receiver;
2. secured claims;
3. deposits, both insured and uninsured;
4. other general creditor claims;
5. subordinated creditor claims; and
6. shareholders.

Why did not all states introduce such legislation? Table 1, Panel A, and Figure 1 do not suggest any geographic clustering of states which are prone to adopt depositor preference. To gain a deeper insight into the motivation behind the introduction of depositor preference, we also screen the legislative council's digest, concurrencies of the state amendments, and assembly laws from the legislative council's archives. We also run keyword searches in the Journal State Legislatures, Lexis/Nexis, Factiva, and American Banker using a one year time window with 6 months on either side around the day of the introduction of depositor preference.[10]

The key result from our investigation of the documents from the legislative councils is that adopting depositor preference did not get much attention from the policy community. If anything, these changes are considered necessary to rectify omissions in previous legislation. California is an illustrative example. The concurrency of the state amendment mentions that the current law did at that time not specify a priority for the payment of depositors and creditors and liquidation expenses and instead requires pro rata settlement. The new legal provisions address this lack of a priority order. In addition, assigning priority to depositors' claims is believed to facilitate the use of purchase and assumption transactions, and allows depositors to access their funds more quickly relative to liquidating a bank. In a limited number of other instances, the legislative council's digest highlights amendments for the reorganization and dissolution of state banks, and emphasizes that changes are being made to the order of priority claims in a bank's liquidation without providing a reason behind it.

Our keyword search of the media sources, limited again to one year centered on the event day of the adoption of depositor preference, does not provide any indication that the media paid much attention to depositor preference. The exception are sources reporting that the then FDIC Chairman, William L. Seidman, gave testimony to the Senate Banking Committee in 1986 recommending to adopt federal depositor preference to reduce failure cost.[11] However, it took until 1993Q3 before depositor preference was codified in federal law, applying to all banks, irrespective of their charter type.

Appendix A provides further details about the political and economic environment at the time the individual states adopted depositor preference. We conduct an additional keyword search in American Banker, Lexis/Nexis and Factiva to identify any other events that may have coincided temporarily with the changes in priority claims to understand whether particular episodes of banking strain or political economy considerations play a role for the introduction of depositor preference.[12]

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 key events yields no consistent pattern. In several states, the news search produces no

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[10] 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 be paid before those of general creditors", "pari passu with general creditors", "deposit rank", "depositor rank".

[11] See American Banker, 14th March 1986 "FDIC offers plan to protect uninsured depositors". Similar news reports occur in the same week in the Chicago Sun Times, the New York Times, and on Dow Jones Newswire.

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

relevant information that would have any bearing on the motives to introduce depositor preference. Occasionally, the media pays attention to bank mergers (Arizona, California) or reports that banks are performing well in Florida, Hawaii, and Minnesota. On the other hand, there is also evidence that banks in the South West (Texas, California) and in the North East (Main, New Hampshire, Connecticut, Rhode Island) experience considerable strain arising from collapsing real estate and energy prices.

In 1993, the legislative history takes another turn on 10 August when the Clinton administration amends the Federal Deposit Insurance Corporation Act regarding the priority of claims on assets of a failed bank and introduces national depositor preference as part of the Omnibus Budget Reconciliation Act. This law is sometimes also referred to as the Deficit Reduction Act. It is the first budget of the then President Bill Clinton, this law proposed the highest peace-time tax increases, cut appropriations spending, and renewed the Budget Enforcement Act of 1990 with the sole aim to reduce the budget deficit.

As a result, claims on failed state-chartered banks in states that previously did not have depositor preference and claims on nationally-chartered banks now also had priority above those of general creditors. 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 also not driven by concerns about bank safety and soundness. Instead, national depositor preference was principally introduced to save money in the federal budget rather than to facilitate the resolution of ailing banks via purchase and assumption transactions or increasing market discipline by providing stronger incentives for non-depositors to monitor banks. These reasons are put forward by the FDIC which has been lobbying since the mid-1980s for such guidelines. In fact, the budgetary purpose of the law received attention in the media while the bill was moving through Congress, in contrast to any mentioning of safety and soundness considerations. Legal scholars such as Curtis (1992, p. 244) are more explicit in their assessment of the motivation behind this law stating,

> *"[…] 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."*

2.2 Exogeneity of depositor preference legislation and bank conduct

Our survey of the legislative history and motivation behind the introduction of state depositor preference laws does not suggest that the health of the state banking systems was a key force behind the adoption of this legislation. However, to claim causality, we need to establish the exogeneity of these laws with respect to the outcomes our research focuses on.

To this end, we estimate linear probability models in which state depositor preference laws are a function of private interest-group, public interests, and political-institutional factors to understand how changes in these variables over time and across states affect the likelihood of depositor preference. Our strategy entails estimating the following reduced form

$$DPL_{st} = \alpha + \beta Private_{st} + \gamma Public_{st} + \delta Political_{st} + \gamma_s + \gamma_t + \varepsilon_{st} \,, \tag{1}$$

where DPL_{st} is a dummy variable equal to 1 if state s has enacted depositor preference law in quarter t, 0 otherwise; $Private_{st}$ is a vector of private-interest variables such as the share of bank assets held by state-chartered banks within the state-quarter; $Public_{st}$ contains a proxy for the extent to which a state is affected by the S&L crisis (measured as the ratio of assets in failed thrifts to total bank assets), total assets in failed banks (ln), and the mean profitability of banks in the state; $Political_{st}$ contains a dummy variable equal to 1 if a democrat is state governor, 0 otherwise, to capture differences in regulation propensity between political parties (Kroszner and Strahan (1999)). State and quarter-fixed effects are denoted by γ_s and γ_t, respectively, and ε_{st} is the error term. The sample window corresponds to that used in our subsequent main empirical analyses, 1983Q1 to 1993Q2, for the 15 states that adopt depositor preference law. We cluster standard errors at the state level.

The results of this exercise, shown in Panel B of Table 1, substantiate our previous argument. Specifically, we find *no* evidence that private, public, or political factors systematically predict whether depositor preference is in force. Irrespective of whether we include each interest vector sequentially (Columns 1 to 3) or simultaneously (Column 4) in the equation, none of the explanatory variables assume significance at conventional levels. In sum, the enactment of depositor preference laws for state-chartered banks appears to be as good as random.

We briefly also explore as to whether the banks in the treatment and control group differ in terms of the key observables prior to the introduction of depositor preference legislation. Panel C in Table 1 illustrates that the *t*-statistics for differences in means for total interest expenses, interest on deposits, interest on non-deposits, bank size (in terms of total asset), and the capital ratio remain insignificant at conventional levels. This snapshot suggests our control group is observationally very similar to the treatment group.

Our final diagnostic test uses Cox proportional hazard models to examine whether movements in our variables of interest precipitate enactment of depositor preference laws. If so, the assumption of treatment exogeneity would cease to hold. However, the results in Table 2 confirm that the dependent variables we use in the regression analysis do not explain implementation of the state laws, adding further credence to the argument that these are exogenous shocks.

[INSERT TABLE 2: EXOGENEITY TESTS - COX PROPORTIONAL HAZARD MODELS]

3.   Data and methodology

In this section, we first describe our data. Next, we then discuss our econometric setup, paying particular attention to the identifying assumptions of difference-in-difference estimation.

3.1 Data description and representativeness

We obtain quarterly data for commercial and savings banks in the U.S. from their Quarterly Report on Condition and Income (Call Report), available from the Federal Reserve Bank of Chicago.

Our sample window covers the period 1983Q1 to 1993Q2. This time span is chosen because banks were not obliged to submit Call Reports on a quarterly basis before 1983 and because the Omnibus Budget Reconciliation Act was signed into law in 1993Q3, resulting in all banks being subject to depositor preference laws. This results in a sample containing 528,522 observations for 15,392 banks from all 50 states. However, most of our inferences are based on a smaller sample consisting of banks headquartered in the 15 states that enacted depositor preference law between 1983Q1 and 1993Q2. This results in a cleaner sample of 199,698 observations for 5,506 banks.

We exclude banks operating in New York state due to their size and specific regulatory environment (Osterberg (1996)). To ensure that we have a sufficiently large number of observations for each individual bank, we only include institutions that operate in at least four quarters prior to and following the introduction of state depositor preference laws.[13]

Panel A of Table 3 presents summary statistics. The average bank in our sample has 108,969 TUSD total assets, a Z-score of 72.793, and a return on assets of 0.3%.

To establish representativeness, we also compare the banks in our 15-state sample with the average bank in the U.S. using the entire population of banks in 1993. The mean asset size for all banks in the U.S. is 130,943.5 TUSD, with a Z-score 120.6, and return on assets of 0.3%. Panel B of Table 3 presents Wilcoxon rank tests for the equality of means between the banks in the sample and the population of all banks in the U.S. for selected variables measuring asset size, profitability, and soundness. Except for a weakly significant difference at the ten percent level for bank soundness, these tests suggest that there are no significant differences in terms of asset size and profitability.

[INSERT TABLE 3: SUMMARY STATISTICS AND REPRESENTATIVENESS]

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[13]   The results are however 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 almost identical.

3.2 Identification strategy

We turn to difference-in-difference estimations that exploit plausibly exogenous variation in depositor preference law across U.S. states and across time. This setup enables us to retrieve the average treatment effect of depositor preference laws by comparing the evolution of funding costs, liability structure, soundness, and profitability between the treatment group (i.e., the state-chartered banks) and the control group (the nationally-chartered banks) through time.

Except for the first set of tests in Section 4.1 below which use banks from all U.S. states to include the largest possible control group of banks with similar pre-treatment trends during the 1983Q1-1993Q2 period, our estimations are constrained to the 15 states that adopted depositor preference legislation. This setup facilitates identification. These banks operate within the same environment, resulting in a cleaner economic laboratory because all confounding effects that simultaneously affect both groups can be eliminated. For the main regressions we focus on the period 1983Q1 to 1993Q2, and estimate

$$y_{ist} = \alpha + \beta Charter_{it} + \varphi DPL_{st} * Charter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist} \qquad (2)$$

where y_{ist} is a dependent variable for bank i in state s at time t, capturing either the cost of funds or liability structure, bank soundness, or profitability; DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of depositor preference law or zero otherwise; $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, 0 for nationally-chartered institutions. X_{ist} is a vector of bank-time varying control variables defined in Section 3.3 below; γ_i and γ_{st} are bank and state-quarter effects, respectively. This battery of dummy variables allow us to rule out all unobservable time-invariant bank-specific factors, and state-time-varying forces at the state and national levels, that might drive changes in the dependent variables and coincide with the introduction of depositor preference laws. Moreover, the inclusion of state-quarter fixed effects provides very clean identification of the average treatment effect as we exploit cross-charter variation within the state-quarter dimension of the data set. The term ε_{ist} is the error term. Our coefficient of interest is φ. Its magnitude provides information about the effect of depositor preference laws for state-chartered banks. We cluster heteroskedasticity-adjusted standard errors on the bank level to account for serial correlation within each panel (Bertrand, Mullainathan, and Duflo (2004)).

3.3 Variable definitions

To establish whether assigning priority to depositors' claims in a bank insolvency changes monitoring activities and also triggers changes in bank conduct in terms of risk taking, our empirical tests focus on three key outcomes.

First, we examine the monitoring dimension of market discipline. Several previous papers have attempted to provide evidence of market discipline by examining interest rates paid by commercial banks (Goldberg and Hudgins (2002)). If depositor preference lowers the risk of all depositors they should demand a lower interest rate. In contrast, since non-deposit claimants face a higher risk in case of failure, they are likely to demand compensation for bearing more risk and will therefore demand a risk premium. Thus, depositor preference legislation should trigger a pricing response, depending on the seniority of the debt claim.

Our first set of tests therefore examines different components of banks' funding costs. Specifically, we use a variable measuring average interest expenses on all liabilities (Total interest expenses), calculated as the ratio of total expenses on liabilities to total liabilities. We also focus on the costs of deposits, using the ratio of interest paid on deposits to total deposits held by banks (Interest on deposits).[14] The costs of non-deposit funds (Interest on non-deposits) are captured by the average interest expenses on non-deposits divided by total non-deposits. This variable encompasses both Federal Funds purchased, and other non-deposit funds. The former are computed as expenses on Federal Funds purchased, and the latter are calculated as expenses on other non-deposits.

Second, it is plausible to anticipate not only price but also quantity effects. We therefore explore how state-chartered banks' market share of insured deposits, uninsured deposits, and non-deposits (all scaled

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[14] Since data on expenses on deposits above 100,000 USD are not available for our sample period total interest expenses is a measure of average costs of total deposits both secured and unsecured deposits.

by the total of this variable held by both state- and nationally-chartered banks in that state-quarter) respond to the laws.

The third set of analyses is concerned with the influencing dimension of market discipline. Assuming non-depositors are efficient monitors, we should be able to observe changes in bank conduct in terms of banks' propensity to take risk, reflected in lower Z-scores, lower non-performing loans, and reduced leverage. The Z-score is an accounting-based measure of banks' distance to default, calculated as the sum of return on assets and the equity-to-asset ratio divided by the standard deviation of the return on assets, calculated over a four-quarter rolling time window. This time window allows for sufficient variation in the denominator of the Z-Score, and avoids that Z-Scores are driven exclusively by variation in the levels of capital and profitability. The skewed distribution of the Z-score necessitates a log transformation, and all tests are based on Z-score (ln). A higher Z-Score (ln) implies a lower probability of insolvency. As part of the analysis of banks' risk taking, we also decompose the Z-score into its three components and subsequently also examine alternative measures of profitability by analyzing return on assets, and the ratio of total interest income to total loans (TIINC) which is measured in logarithms, and return on equity (ROE).

The vector of time-varying control variables, X_{ist}, includes total assets (ln) to measure bank size, and we also use the ratio of equity capital to total assets as a measure for the capitalization of the bank. To avoid that the S&L crisis confounds our inferences, we also add a proxy for the intensity of the S&L crisis, measured by the ratio of failed thrift assets to total bank assets in the state, in the regressions that exclude state-quarter fixed effects. Depending on the regression specification, the vector of control variables may also contain two dummies that take on the value of one if a state has deregulated interstate or intrastate branching, respectively.

3.4 Do nationally-chartered banks constitute a valid counterfactual? Parallel trends

We have already documented that treatment status is plausibly exogenous with respect to the outcomes we study. However, the validity of difference-in-difference estimation also requires that nationally-chartered banks constitute a valid counterfactual. That is, in the absence of treatment the behavior of the state-chartered banks in the treatment group would have evolved in similar fashion to the behavior of the nationally-chartered banks in the control group. In other words, the treatment and control groups should have parallel trends in the period prior to treatment. This section provides empirical support for the existence of such parallel trends.

Figure 2 graphically examines the extent to which cost of funds, liability structure, soundness, and profitability evolve similarly over the three quarters prior to the introduction of depositor preference.[15] State-chartered banks are the treatment group and are represented by a blue triangle, and nationally-chartered banks (the control group) are denoted by a red square. The close fit between the movements in the two groups suggests that nationally-chartered banks are a good counterfactual.

[INSERT FIGURE 2: PARALLEL TRENDS]

In addition to illustrating the evolution of bank behavior graphically, we conduct *t*-tests to verify the assumption of parallel trends. Following Lemmon and Roberts (2010), we examine whether there are significant differences in the quarterly growth rate of each variable between the treatment and control group during each pre-treatment quarter. Note that this assumption does not require identical levels between treatment and control groups, they are differenced out (Lemmon and Roberts (2010)). The diagnostics in Table 4 support the assumption of parallel trends: the null of equality of means cannot be rejected in any cell in the table, except for one.

[INSERT TABLE 4: PARALLEL TRENDS TESTS]

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[15] In Section 4.5.2 we conduct placebo tests to examine whether the path of the dependent variable in the control group changed following treatment to rule out the possibility that our average treatment effect is confounded by bias in the implied counterfactual.

4. Empirical results

We first discuss the pricing effects of depositor preference on banks' funding costs, and then present the findings for the quantity effects and focus on market share. Next, we provide a long term perspective, and our final set of results considers bank soundness and profitability.

4.1 Pricing effects: Cost of funds

The difference-in-difference regressions shown in Panel A of Table 5 present the results for the pricing effects from depositor preference using the 15 states that introduce preferential treatment of depositors. This is the most appropriate setup in terms of identification. The comparison within the same state-quarter offers the best possible counterfactual because our control group is constrained to nationally-chartered banks headquartered in the same macroeconomic environment.[16]

Our tests highlight that assigning priority to bank deposits lowers overall funding costs. At the same time, we also find compelling evidence for increases in market discipline because the costs for non-deposit funding increase. The key coefficient of interest on the interaction term between the charter dummy and the dummy variable for depositor preference enters significantly with intuitive signs across all specifications. Note that the decline in overall funding costs suggests that bank debt becomes safer. This interpretation is consistent with increase in market discipline and the corresponding concomitant increase in bank soundness which we document in greater detail in Section 4.4 below.

Specifically, Column 1 shows that state-chartered banks' total funding costs decline, reflected in the ratio of total interest expenses to total liabilities. Our tests indicate that interest expenses to total liabilities fall by 0.0192 following enactment of depositor preference: equivalent to a 1.5% decrease in average interest expenses holding total liabilities constant.[17]

Which liability components drive this effect? Column 2 confirms the prediction by Hardy (2013) that depositor preference laws reduce interest payments to (insured) depositors (t-statistic -4.56). However, Column 3 highlights that other creditors require compensation in return for having their claims subordinated to the FDIC with higher interest payments (t-statistic 6.31). The coefficient indicates that the increase in interest payments to non-depositors is approximately seven times larger than the coefficient for the decrease in interest payments to depositors. This appears reasonable: Non-deposit funds which account for more than 14 percent of total liabilities are moving down the queue of debt claimants and consequently face a lower probability of being paid out in the event of bankruptcy. Moreover, the large magnitude of this effect could be affected by banks' demand for non-deposits which is highly inelastic.[18] Therefore, a change in the supply of non-deposits provokes a more than proportional price change.

Among the control variables, we find that bank size correlates positively with all types of funds, whereas better capitalized banks pay lower interest, except for non-deposits, where we obtain a positive and significant effect.

[INSERT TABLE 5: PRICING AND QUANTITY EFFECTS OF DEPOSITOR PREFERENCE]

4.2. Quantity effects: market share analysis

Panel B of Table 5 focuses on the corresponding quantity effects. Column 4 indicates that changes to the debt priority structure have no effect on state-chartered banks' market share of insured deposits. This makes sense given that insured depositors position in the pay-out ladder is unaffected by depositor preference laws. However, in Column 5 we find a statistically significant 13 percent increase in state-

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[16] Appendix B, Table B.1 presents results with all 50 states. While this is a less clean setup as it includes banks from a control group located in non-depositor preference states, these tests also confirm our inferences. This table also includes regressions which omit the control variables for bank size and capitalization. Our results are unaffected from this change in specification.

[17] Note that we obtain virtually identical results if we include a charter time trend to capture the time trend that affects all state-chartered banks equally across the US. The results are presented in Appendix C, Table C.1.

[18] In fact, also the magnitude of our key coefficient in the tests for quantity effects supports this interpretation. The average treatment effect on the quantity of non-deposit funding is relatively small.

chartered banks' market share of uninsured deposits. This increase is sizeable in terms of its economic magnitude and suggests that risk-averse uninsured depositors increase supply to state-chartered banks. A rightward shift of the uninsured deposits supply curve is also consistent with the previous result that conferring seniority on this creditor class leads them to demand a lower risk premium.

In Column 6 we do not find a statistically significant average treatment effect for the market share of non-deposits. Non-depositors do not divest their holdings in state-chartered banks post treatment. However, once their claims are subordinated they face greater exposure to losses in the event of bankruptcy. As a result, non-depositors demand a higher ex ante interest rate in compensation because they have "skin in the game".

4.3. Do the effects persist in the long run?

Our results so far indicate both statistically and economically large effects of the introduction of depositor preference. We now focus specifically on the question of whether the impact of depositor preference is only observable in the short run, or, alternatively, if the effects are permanent and can be observed over longer periods of time.

We augment the regression specification from our main tests with nine dummy variables corresponding to the quarter in which the legislation was enacted and a dummy variable for quarter i where $i =\in (0,...,9)$ denotes the quarter after enactment. $i = 0$ is the quarter of enactment. The additional dummy variables are interacted with the charter dummy. Panel B of Table 6 shows that the effects of depositor preference persist in the long run. There is an immediate and permanent decline in total interest expenses and interest payments on deposits, and the effects are also similar in terms of the economic magnitude. The previously documented increase in interest on non-deposits is also of permanent nature but it takes one quarter to materialize. Our findings are intuitive. The funding cost advantage arising from depositor preference is persistent, enshrined in law, and therefore lowers the probability of bankruptcy in all future periods.

[INSERT TABLE 6: LONG-RUN EFFECTS]

4.4 Effects on bank soundness and profitability

Beyond the immediate pricing and quantity effects that arise from increased monitoring, it is critical to document whether the increase in market discipline also influences bank risk taking, a key concern among bank regulatory agencies. The importance of this test is reflected in the fact that the lobbying by the FDIC for the introduction of national depositor preference prior to 1993Q3 paid close attention to the argument that depositor preference will incentivize banks to operate safe and sound.

To test this prediction of whether an increase in monitoring explains the variation in banks' risk taking, we run regressions in Table 7, Panel A. Here, we use the Z-score (ln) as a dependent variable to test these ideas.[19] We also use the ratio of non-performing loans and the leverage ratio as dependent variables in Panel A. Subsequently, we also examine the effect of depositor preference laws on the three components of the Z-score (ln) to understand the driving forces behind the effects we uncover.

State-chartered banks' Z-scores (ln) increase significantly following the announcement of depositor preference laws, supporting the idea that harnessing market discipline improves bank health. The magnitude of this effect is economically large at 22%. The findings for non-performing loans and leverage reinforce the soundness-enhancing effects of depositor preference laws.

Our analysis of the components of the Z-score (ln) shows that this finding is driven by higher profits (t-statistic 3.20) although there is no change in the volatility of profits. This increase in profitability, reiterated in Panel B when we examine return on equity, and the ratio of total interest income to total loans (ln) as alternative measures of profitability, ties in with the result for lower levels of non-performing loans and points towards increased asset quality. Consistent with improved behavior, we also find reductions in the non-performing loans ratio and leverage, although the effects are only significant at the 10 percent level.

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[19] Note that of the 5,506 banks in the sample, only a small proportion of banks is publicly listed. For this reason, we only rely on accounting based measures of bank soundness.

[INSERT TABLE 7: BANK HEALTH AND PROFITABILITY]

5. Identification concerns, sensitivity tests, and external validity

This section provides a detailed discussion of potentially confounding effects and also presents a set of additional robustness analyses and tests that document the external validity of our findings.

5.1 Potential confounds and omitted variables

We now deal with the remaining concern: Omitted variables and confounding events. If the enactment of depositor preference legislation coincides temporarily with other factors that are not accounted for or unobservable to the econometrician and only affect state banks but not nationally-chartered banks then we would misattribute the effects we document to the passing of state depositor preference laws when in fact other factors are responsible for the observed changes in bank conduct.

Dummy variables can only bulletproof observational data to omitted variable problems to a certain extent. Importantly, our tests are based on within state-quarter comparisons of state and nationally-chartered banks for 15 states which adopt depositor preference legislation in a staggered manner. All regressions include time-varying controls, bank-fixed effects which net out omitted variables that are time-invariant on the bank level, and state-quarter-fixed effects to net out unobserved heterogeneity on the state-quarter level. This setup makes it unlikely that regional macroeconomic conditions, demand conditions, or changes in regulation which affect all banks equally drive the behavior of our key coefficient. Any omitted variable that could confound our inferences has to differentially affect state and nationally-chartered banks within the same state. Moreover, such an omitted variable would have to coincide with enactment of depositor preference in 15 instances. Finding such a coinciding factor is less likely in our context than in a study with just one treatment.

Our first candidate for such a change in bank characteristics over time which may systematically correlate with the outcomes of interest and coincide with the adoption of depositor preference is bank size. The analyses above show that funding costs correlate with size in a systematic manner. We therefore include in Table 8, Panel A, an interaction between size in terms of total assets and a dummy for state-chartered banks (zero otherwise) because the behavior of state and nationally-chartered banks could differentially be affected by size. Similarly, we add to this specification an interaction between size in terms of total assets and our dummy for depositor preference (zero otherwise).

While the former interaction term remains insignificant, the latter interaction enters consistently negatively and significantly. However, our key coefficient on the interaction term between the charter dummy and the depositor preference law dummy remains very similar.

Next, we deal with the challenge that banks may have been concerned about the potential implications for their funding costs and therefore switch charters to circumvent the increase in monitoring from non-deposit claimants associated with depositor preference. Rosen (2005) documents that approximately 10% of banks switch their charter between 1977 and 2003, and that switching banks tend to be riskier. During our sample period 3.8% of banks change charter[20]

To rule out that concerns about funding costs drive changes in bank conduct, we present in Panel B of Table 8 linear probability regressions that model charter switches as a function of introducing depositor preference laws, bank-fixed effects, quarter-fixed effects, and the time-varying control variables we use in the main regressions. The key coefficient in these regressions, the dummy for the introduction of depositor preference, remains statistically indistinguishable from zero. Charter switches are not related to priority for depositors in the resolution process.[21]

In a second step, we remove banks that change their charter from the sample. The results, shown in Panel C of Table 8, fully reinforce our previous findings.

[INSERT TABLE 8: INTERACTIONS WITH BANK SIZE AND CHARTER SWITCHES]

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[20] During the sample period, 118 banks switch from state to national charters (77 after depositor preference), and 92 banks change charter from national to state charters (77 after depositor preference).

[21] In unreported regressions, we also estimate difference-in-differences regressions using linear probability and probit models that include the interaction of the dummy variables for state-chartered banks with the dummy for depositor preference. This interaction term also remains insignificant. The results are available upon request.

Next, we review a series of events and regulatory changes that occur throughout our sample period, and discuss whether or not they qualify as confounding events. For each one of these events, we additionally present tests to rule out empirically that they have any bearing on our inferences.

The 1980s and 1990s are characterized by a series of banking problems caused by maturity mismatches, fraud, and declining real estate and energy prices.

Collapsing real estate prices after a wave of burgeoning growth triggered banking problems in New Hampshire, Connecticut, Massachusetts, and Rhode Island. In New England, 16 banks failed in 1990, 52 in 1991, and 43 in 1992. These failures account for a large proportion of failed bank assets at the time, resulted in losses to the FDIC, and culminated in the failure of three subsidiaries of the Bank of New England Corporation, the most significant bank failure in that period. This New England banking crisis, as it became known, coincides with the signing into law of depositor preference laws in 1991 in Connecticut, Maine, New Hampshire, and Rhode Island.

Moreover, Texas also experienced substantial banking problems. The banking industry in Texas which adopted depositor preference in 1985 with its large exposure to the energy industry was hit by a massive decline in oil prices in 1986. In addition, a tax law which reduced the incentive to hold real estate aggravated the economic malaise. In some areas, real estate prices for commercial property dropped by 30% between 1985 and 1987 (Gan (2004)).

The last prominent confounding crisis event is the savings and loan (S&L) crisis with over 1,000 failures of the 3,234 S&L associations across the U.S. between 1986 and 1995. This crisis was largely driven by a large-scale tax reform in 1986 which brought the previous real estate boom to a halt, deregulation of the savings and loans associations which allowed them to enter new business lines, a period of low inflation, and forbearance by regulatory agencies.

While these three crises coincide with the adoption of depositor preference, it is difficult to see how they differentially affect state- and nationally-chartered banks. Nevertheless, we provide empirical support that these three crises do not confound our inferences.

Table 9 presents regressions. The first set of tests in Panel A removes observations for Connecticut, Maine, New Hampshire, and Rhode Island between 1991 and 1993 to focus on the New England crisis, and the second test in Panel B removes all observations for Texan banks from 1986 onwards. In Panel C, we include additional interaction terms between the dummy for state-chartered banks and a proxy for the intensity of the S&L crisis (measured as the ratio of failed thrift assets to total bank assets in that state), and a triple interaction term between the dummy for state-chartered banks, the dummy for depositor preference, and the proxy for the S&L crisis. This approach departs from our method of investigating the role of the crises in Texas and New England because the depth and severity of the crisis differed across states and our method ensures the inferences are not confounded by coincidental S&L shocks within the state-quarter. These tests confirm our expectation that these episodes of banking turmoil do not have an effect on our inferences.

[INSERT TABLE 9: CONFOUNDING EVENTS - BANKING CRISES]

In response to these banking problems, 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 provided the authorities with the resources to close insolvent S&L institutions and pay off depositors. This law also amended the process for establishing receivership claims by providing guidelines as to how the receiver has to give notice of the receivership and when and how creditors can file claims with the intention to harmonize the liquidation process, irrespective of whether claims are filed against state banks, nationally-chartered banks, or S&L associations. However, it did not amend the order of priority in which creditors of a failed institution were paid off.

If FIRREA plays any role for our inferences, removing observations from 1989Q4 to 1993Q2 during which FIRREA was in place should affect the key coefficients. Table 10, Panel A, shows this is not the case.

The FDICIA contained further efforts to increase banking system health. This legislation increased the power of regulators and bolstered the resources of the FDIC. *Inter alia*, it introduced the least cost resolution provision and guidelines for prompt corrective action. While FDICIA does not prescribe changes to the claims structure in bank liquidations, the mandate to resolve banks at the least cost suggests a direct effect on the key coefficients of interest. Purchase and assumption transactions which tend to be associated with lower resolution costs are easier in states with depositor preference because depositor preference avoids the lobbying for claims as discussed by Hardy (2013). Empirically, this suggests that FDICIA should have resulted in treatment effects that are greater in absolute magnitude via the effect on nationally-chartered banks that did not have depositor preference. In other words, a test of the effects of depositor preference prior to the enactment of FDICIA should result in the same direction of the effects, yet at smaller magnitudes.

To examine this conjecture, we omit observations from 1991Q4 to 1993Q2. The results, shown in Panel B of Table 10, confirm our hypothesis and reinforce our findings.

Another confounding effect is the wave of deregulation which concerns the lifting of restrictions on the geographical scope of bank activities. From the 1970s onwards, 38 states removed restrictions on intrastate branching and allowed bank holding companies (BHCs) to convert subsidiaries into branches. States also permitted de novo branching statewide. Similar to the introduction of state depositor preference laws, the branching deregulation comes about in a staggered manner. Simultaneously, several states also started to deregulate interstate restrictions since the 1970s in a staggered manner, culminating in the Riegle-Neal Interstate Banking Act of 1994 which allowed banks and BHCs to acquire banks and BHCs in other states. The deregulation of inter- and intrastate restrictions markedly changed the competitive landscape in the banking industry, primarily by facilitating cross-border mergers. However, these legislative changes do not affect state and nationally-chartered banks differentially, and they also do not affect the priority structure of claims.

Empirical tests help rule out that the two types of deregulation drive our inferences. In Panel C of Table 10, we first interact the charter variable with a dummy variable that takes on the value of one if a state allowed interstate branching (or zero otherwise), and we then also interact this interaction term with the dummy variable for depositor preference laws. Next, we test for the effect of intrastate deregulation by following the same approach using a dummy variable that takes on the value of one if a state also allowed intrastate branching (zero otherwise). The interaction terms remain insignificant, and our main results are unaffected, although the magnitude of the coefficients declines.[22]

[INSERT TABLE 10: CONFOUNDING EVENTS – REGULATION AND DEREGULATION]

5.2 Other sensitivity tests

We first revisit the validity of the parallel trends assumption and present placebo regressions. The intuition is that the changes in conduct we documented can only be observed when depositor preference affects state-chartered banks but they can neither be observed at other points in time, nor can they be observed in other types of banks which are not subject to treatment. Our first set of placebo tests in Panel A of Table 11 randomly assigns placebo treatments to nationally-chartered banks that operate in states where depositor preference was enacted to ensure that the economic environment is comparable. The second set of placebo tests in Panel B focuses on anticipation effects and assigns treatment randomly to state-chartered banks prior to the actual treatment to rule out that banks adjust their behavior in the run up to depositor preference. The placebo tests remain insignificant, showing that our results are not confounded by the reaction within the control group or by anticipation effects.

A key condition for causal inferences is the random assignment of depositor preference laws. Whited and Roberts (2012) argue that the magnitudes of the coefficients in difference-in-difference estimation should remain unaffected irrespective of the inclusion of control variables if treatment can be assumed to be as good as random. Otherwise, random assignment for the treatment variable should be

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[22] Related to the issue of deregulation is an increase in mergers and acquisitions of banks during our sample period which may also give rise to survivorship bias. To rule out that our findings are affected by survivorship issues, we remove in Appendix D, Table D.1 banks that enter or drop our during the sample period and replicate our main regressions from Table 5. Our results remain unaffected in these tests.

questioned. We replicate our main tests in Panel C of Table 11 without the time-varying bank-specific control variables, and find the magnitudes of the key coefficients to remain unchanged.

Another set of sensitivity checks deals with serial correlation in the error terms. This is important because Bertrand et al. (2004) demonstrate that difference-in-differences estimators yield spuriously low standard errors leading to over-rejection of the null hypothesis when the dependent variable is serially correlated through time and there are more than two time periods. So far, we clustered heteroskedasticity-adjusted standard errors on the bank level to account for the structure of the serial correlation within each bank in our tests. As an alternative way Panel D collapses the observations before and the observations following enactment of depositor preference into one period at the mean value. This test does not affect our inferences.

Finally, we jointly consider the correlation in the residuals within panels, i.e., across banks, and over time by replicating in Panel E of Table 11 the main regression with double-clustering of the standard errors at the bank and year level as suggested by Thompson (2011). Our results remain unchanged.[23]

[INSERT TABLE 11: FURTHER SENSITIVITY CHECKS]

5.3 Falsification test and external validity

Prior to closing the loop by discussing the external validity of our tests, we present a falsification exercise.

To this end, we run Monte Carlo simulations with 1,000 replications to check whether state-chartered banks were affected by federal depositor legislation in 1993. For this test, we constrain the sample to state-chartered banks from the 15 states in our main analyses because a suitable control group does not exist. For these tests, 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 1997Q3. Next, we randomly assign banks to a placebo treatment that is equal to 1 in 1993Q3 and all subsequent quarters or zero otherwise. We then estimate

$$y_{it} = \alpha + \beta placebo_{it} + X'_{it}\gamma + \varphi_i + \varphi_t + \varepsilon_{it} \ . \tag{3}$$

Conditional on quarter-fixed effects, this specification estimates how much higher/lower the dependent variable was within the same bank following the introduction of national depositor preference. Because we know this should have had no effect on state-chartered banks, we know that the null of zero effect is true. We should therefore only reject the null by making Type 1 errors. The results of this exercise are shown in Panel A of Table 12 where we repeat this procedure 1,000 times. The rejection rates for all dependent variables are in line with those that would occur through Type 1 errors. This analysis confirms that state-chartered banks affected by state depositor preference law remained unaffected by the subsequent introduction of national depositor preference.

Finally, we discuss the external validity of our findings. As in any quasi-experiment, a key question is to what extent our findings generalize beyond our economic laboratory. The question of generalizability is of particular importance for Europe where the introduction of depositor preference was met by resistance from the banking industry.[24]

The enactment of national depositor preference following the Omnibus Budget Reconciliation Act of 1993 allows us to inspect whether the results are externally valid. This law stipulated that all banks are henceforth subject to depositor preference.

Provided that state-chartered banks in states that had previously enacted depositor preference were already subject to these provisions, they serve as an ideal control group for an alternative setup using

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[23] In unreported tests, we also considered further alternatives of clustering by state-year and by state-bank-year, but the results remain virtually unchanged. These tests are available upon request.

[24] Several media reports and statements by EU policymakers and bankers suggest that a lively debate on this matter ensured prior to enacting depositor preference in the European Union. While Bloomberg News reports on 8th May 2013 that the "EU sees shocks without bank depositor preference rule", banks in Europe view depositor preference as undesirable. The website thisismoney.co.uk reports that *"Banks complain depositor preference plan will raise costs for customers"* on 1st June 2012, and Angela Knight, Chief Executive of the British Bankers Association, issued a statement on 13th June 2012 that ""[…] depositor preference proposition may work against financial stability and be a turn off for the investors in a bank".

difference-in-differences estimation.[25] For these tests, the sample period again is extended to 1997Q3. The treatment group consists therefore of all banks in states that had not implemented depositor preference law prior to 1993Q3 and nationally-chartered banks in states that had introduced depositor preference legislation. Because we rely on cross-state variation in treatment status to identify the treatment effect, we cannot include state-quarter controls. Panel B of Table 12 presents the results. Using this new treatment, we continue to find the same effect on funding costs as in the main regressions. This test highlights the external validity of our inferences.

[INSERT TABLE 12: FALSIFICATION TEST AND EXTERNAL VALIDITY]

6.   Summary and conclusion

This article exploits an unexplored natural experiment to inform the debate about market discipline. We use the staggered introduction of depositor preference legislation which changes the priority of claims on failed banks' assets in 15 U.S. states between 1983 and 1993 to examine the preventative influence of junior debt. Specifically, we establish whether depositors and, more importantly, non-depositors whose claims are subordinated under depositor preference to those of depositors, monitor and influence bank conduct.

The progressive nature of the introduction of depositor preference for state-chartered banks provides a unique opportunity to overcome the usual identification challenges. The plausible exogeneity of these laws with respect to bank behavior which we document in this paper, and the fact that our setting allows comparing state-chartered banks with nationally-chartered banks that operate in the same federal state enable us to establish a causal link between the seniority of debt claims and bank conduct. This issue is of timely importance for policy and regulation.

While Australia, Argentina, Hong Kong, Malaysia, and the U.S. already have some form of depositor preference in place, the decision about enacting depositor preference in the European Union by the end of 2014 was subject to intensive and controversial discussions between policy makers and the banking industry. The proponents of such legislation argued depositor preference will increase market discipline exerted by non-deposit claimants, increase bank soundness, and reduce the cost of bank failures. However, the banking industry had lobbied against assigning depositors a priority claim on failed banks' assets. The opponents argued that priority for depositors increases banks' cost of funds as non-deposit claimants seek risk premia that would ultimately undermine soundness. The controversial debate in Europe about the introduction of depositor preference reflects that the effects of depositor preference are ambiguous in equilibrium because both price and quantity effects depend on supply and demand for different types of funds. A key contribution of our work is therefore to document these effects empirically and "sign" these ex-ante ambiguous effects.

Our difference-in-difference estimation strategy evaluates these concerns by exploiting within state-quarter differences in the reaction of treated and untreated banks. The results highlight that changes in the priority of debt claims give rise to greater monitoring which has wide-ranging implications for the banking sector in terms of funding cost, liability structure, soundness, and profitability.

The key findings based on 199,731 observations for 5,509 banks operating in 15 states in the U.S illustrate that non-depositors are a credible source of market discipline.

While our regressions show that overall funding costs decline, we document that non-deposit funds become more expensive, supporting the idea that depositor preference increases market discipline. The effect is also economically significant. For the average state-chartered bank in the sample, introducing depositor preference increases the costs on non-deposit funds, scaled by total non-deposits, by 22 percent. If there are direct pricing effects emerging from the introduction of depositor preference, it is also plausible to expect a corresponding quantity effect for uninsured deposits that should coincide with increased monitoring by non-depositors. This is indeed what we find. The treatment groups' market share of uninsured deposits increases by 13 percent. Importantly, there are no changes to their market share in non-deposits which prompts non-depositors to increase monitoring intensity. In sum, our work

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[25]   We exclude state-chartered banks from Arizona, Connecticut, Florida, Maine, Minnesota, New Hampshire, and Rhode Island from the control group because these states introduced depositor preference legislation shortly before federal enactment. Excluding these banks ensures that the implied counterfactual is not biased by banks reacting to state depositor preference laws.

supports theoretical arguments that predict lower cost of deposit funding, higher cost for non-deposit funding, increases in the quantity of uninsured deposit funding, and unchanged quantities of insured deposit funding. However, we empirically reject the view that depositor preference reduces the volume of non-deposit funding.

As the changes in monitoring intensity in this paper are plausibly exogenous, our inferences remain intact across a variety of sensitivity checks and falsification exercises. We also show that a series of potential alternative explanations and possibly confounding factors such as regional and nation-wide banking crises, and a wave of deregulation of banking markets that intensify mergers and acquisitions cannot be responsible for the results documented in this study.

We are not only able to present evidence of increased monitoring by non-depositors, but also find evidence that the increase in monitoring triggers changes in bank conduct. Our tests that focus on bank conduct examine risk taking. We find that Z-scores (ln) increase, and the non-performing loans ratio, and the leverage ratio decline significantly. For the average bank in the sample, the Z-score (ln) increases by 22 percent. The results from this exercise tie in with theories by Fama (1980, 1985), and Rajan and Winton (1995) that predict an inverse association between seniority of debt claims and debtholders incentives to monitor. To this end, this work reiterates the idea to complement regulatory discipline by harnessing market forces. Important in this context is the fact that our paper is one of a limited number of studies that offer evidence for the influencing dimension of market discipline.

In sum, we interpret our results as supportive evidence for monitoring by junior claimants as a result of the introduction of depositor preference laws. From a policy perspective, our findings therefore justify the decision by policy makers to introduce depositor preference in Europe. However, we temper our summary by pointing out some limitations: First, bank business models have undergone changes over the past few decades and the nature of our experimental setting renders it infeasible to use more recent data. Second, while many of the smaller and medium-sized banks in Europe are comparable to the state-chartered banks in the U.S., the large and internationally active European banks that tend to fall under the single supervisory mechanism differ in terms of funding structures from their smaller counterparts and we need to be cautious extending our results to these very large institutions. Third, we do not claim that depositor preference is a panacea to constrain bank risk taking. Yet, embedded in a system of effective government supervision of banking institutions, protecting depositors on the one hand and effectively increasing market discipline on the other hand are appealing features of depositor preference legislation that have potential to contribute to improved banking system soundness.

We conclude by pointing out the benefit of capitalizing on this experimental setting. The advantage of the experimental setup lies in the fact that the treatment effects are simply measured as the average difference between state-chartered and nationally-chartered banks operating in the same macroeconomic environment. To that extent, the step-by-step adoption of depositor preference legislation can be considered a useful source of exogenous variation in the monitoring incentives of debtholders for further empirical work. The interaction of other features of the financial safety net with changes in the priority structure of claims on a failed bank's assets appears a promising area for future research.

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Table 1
The Political Economy of Depositor Preference Adoption

Panel A: Depositor preference law States and Date of Implementation

State	Date Effective	In Sample	Observations
Alaska	10/15/1978	No	
Arizona	9/21/1991	Yes	1,211
California	6/27/1986	Yes	16,433
Colorado	5/1/1987	Yes	15,811
Connecticut	5/22/1991	Yes	3,936
Florida	7/3/1992	Yes	12,960
Georgia	1974*	No	
Hawaii	6/24/1987	Yes	410
Idaho	1979**	No	
Indiana	1943	No	
Iowa	1/1/1970	No	
Kansas	7/1/1985	Yes	23,386
Louisiana	1/1/1985	Yes	10,255
Maine	4/16/1991	Yes	1,472
Minnesota	4/24/1990	Yes	25,431
Missouri	5/15/1986	Yes	23,263
Montana	1927	No	
Nebraska	1909	No	
New Hampshire	6/10/1991	Yes	1,863
New Mexico	6/30/1963	No	
North Dakota	7/1/1987	Yes	6,496
Oklahoma	5/26/1965	No	
Oregon	1/1/1974	No	
Rhode Island	2/8/1991	Yes	482
South Dakota	7/1/1969	No	
Tennessee	1969	No	
Texas	8/26/1985***	Yes	58,890
Utah	1983	No	
Virginia	7/1/1983	No	
West Virginia	5/11/1981	No	

Panel B: Political economy of enacting depositor preference laws

Dependent variable: Depositor preference law dummy

State-chartered assets	-0.2461			-0.2675
	(-0.47)			(-0.53)
S&L crisis		0.5110		0.4901
		(1.25)		(1.18)
Assets in all failed banks		0.0013		0.0013
		(1.15)		(1.10)
Bank profitability		0.0365		0.0330
		(0.61)		(0.53)
Democrat governor			-0.0392	-0.0361
			(-0.82)	(-0.77)
State FE	YES	YES	YES	YES
Quarter FE	YES	YES	YES	YES
Observations	2,056	2,056	2,056	2,056
R^2	0.8080	0.8100	0.8083	0.8112

Panel C: Treatment and control group in quarter prior to depositor preference

	Treatment	Control	Difference	*t*-Statistic
Total interest expenses	0.0145	0.0141	-0.0003	-0.31
Interest on deposits	0.0146	0.0141	-0.0005	-0.46
Interest on non-deposits	0.0069	0.0086	0.0017	1.56
Bank size	11.0949	11.3033	0.2085	0.53
Equity	-0.2645	-2.8834	-0.2589	-1.21

Notes: This table presents in Panel A the date depositor preference law passed into law 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 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 is 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 legislation during 1983Q1. Panel B shows the results of linear probability models examining the reasons for the introduction of depositor preference laws. We estimate the model $DPL_{st} = \alpha + \beta X_{st} + \gamma_s + \gamma_t + \varepsilon_{st}$ where DPL_{st} is a dummy equal to 1 if depositor preference is in force, X_{st} is a vector containing private-interest (the ratio of state-chartered assets to total bank assets), public-interest (the S&L crisis, the natural logarithm of failed banks' assets in the state, mean profitability (ROA) of banks in the state), and political-institutional (democratic governor) variables. *t*-statistics are reported in parentheses and standard errors are clustered at the state level. Panel C shows differences in means between treatment and control group for the key variables of interest and the associated *t*-statistics. *** p<0.01, ** p<0.05, * p<0.1

Table 2
Exogeneity Tests: Cox Proportional Hazards Model

	Total liabilities expenses	Expenses on deposits	Expenses on non-deposits	Insured deposits market share	Uninsured deposits market share	Non-deposits market share
Coefficient	1	1	1	1	1.001	1
Z-stat	(0.99)	(1.27)	(0.34)	(0.86)	(0.93)	(0.35)
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
	Z-score (ln)	Non-performing loans	Leverage Ratio	Return on assets (ln)	Return on equity (ln)	Interest income (ln)
Coefficient	3.177	1.376	1.001	2.565	0.618	1.622
Z-stat	(1.37)	(1.64)	(0.89)	(0.39)	(-0.37)	(1.19)
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: This table presents Cox proportional hazard (Cox PH) models to verify that adoption of depositor preference law is exogenous with respect to banks' costs of funds, liability structure and health. In the Cox PH models, the dependent variable is equal to 1 if depositor preference law has been enacted, 0 otherwise. The main explanatory variables include totals of interest expenses, interest expenses on deposits, interest expenses on non-deposits, liabilities, deposits, non-deposits, the Z-score, non-performing loans, the leverage ratio, return on equity, interest income, total loans, of all banks operating in the state. A state is dropped from the analysis in the quarter after it adopts depositor preference law. The vector of control variables includes the amount of failed banks' deposits, estimated losses resulting from bank failures, number of bank failures, the concentration ratio of bank deposits (log of HHI), the ratio of total bank assets to GDP, and the logarithm of the unemployment rate. All control variables are aggregated at the state level. State and year dummies are included. Robust *z*-statistics are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered on the state level.

Table 3
Summary Statistics and Representativeness

Panel A: Summary Statistics

Variable	N	Mean	SD	Min	Max
Total interest expenses	199,698	1.420	0.423	0.509	7.745
Interest expenses on deposits	199,698	1.430	0.434	0.297	7.797
Interest expenses on non-deposits	199,698	0.635	1.225	0	13.084
Total liabilities	199,698	0.913	0.033	0.763	0.975
Total domestic deposits	199,698	0.973	0.040	0.713	0.999
Total non-deposits	199,698	0.027	0.040	0.001	0.286
Insured deposits	199,698	0.932	0.088	0.501	0.998
Market share of insured deposits	199,698	0.000	0.000	0	0.001
Uninsured deposits	199,698	0.039	0.070	0	0.331
Market share of uninsured deposits	199,698	0.001	0.002	0	0.024
Zscore (ln)	199,698	1.351	4.887	-6.908	10.618
Standard deviation of ROA (ln)	199,698	-6.685	0.839	-12.714	-2.124
Standard deviation of ROA	199,698	0.002	0.003	0.000	0.119
Return on assets (ln)	199,698	-6.129	0.782	-12.619	-1.506
Return on assets	199,698	0.003	0.003	0.000	0.222
Equity to total assets (ln)	199,698	-2.588	0.721	-9.968	-0.047
Equity to total assets	199,698	0.085	0.034	0.001	0.234
Non-performing loans to total loans	199,698	0.017	0.023	0	0.107
Leverage ratio (Debt to equity ratio)	199,698	11.645	4.849	0	30.985
Return on equity (ln)	199,698	-4.394	1.802	-9.399	4.984
Return on equity	199,698	0.039	0.489	0.000	146.000
Total interest income to total loans (ln)	199,698	-3.486	1.204	-6.908	6.535
Total interest income to total loans	199,698	0.043	0.022	0.001	0.128
Bank size (ln)	199,698	10.635	1.183	5.649	18.591
Bank size	199,698	108969.1	324164.4	4825	3130040

Panel B: Sample representativeness

Variable	Banks in treatment state vs. Banks in all other states		Banks in treatment state vs. Banks in all other states (including states with depositor preference prior to 1984)	
	Difference Means	Wilcoxon p-value	Difference means	Wilcoxon p-value
Total interest expenses	0.000	0.961	0.000	0.741
Interest expenses on deposits	0.000	0.936	0.000	0.804
Interest expenses on non-deposits	0.000	0.619	0.000	0.984
Total liabilities	-0.009	0.052	-0.007	0.052
Total domestic deposits	-0.009	0.328	-0.005	0.535
Total non-deposits	0.009	0.312	0.005	0.535
Zscore (ln)	0.372	0.183	0.342	0.193
Non-performing loans to total loans	-0.005***	0.001	-0.003	0.045
Leverage ratio (Debt to equity ratio)	-1.093*	0.028	-0.767*	0.041
Return on assets (ln)	0.069	0.026	0.087	0.005
Return on equity (ln)	0.018	0.183	0.082	0.066
Total interest income to total loans (ln)	0.028	0.936	0.034	0.984

Notes: Panel A presents summary statistics on all variables used throughout the paper. Panel B tests for representativeness between the banks in the 15-state sample and all other banks in the U.S. in 1993.

Table 4
Parallel Trends Tests

Variable	t-1 to t-3		t-1		t-2		t-3	
	Difference	Wilcoxon p-value	Difference	Wilcoxon p-value	Difference	Wilcoxon p-value	Difference	Wilcoxon p-value
Δ Total interest expenses	-0.002	0.702	-0.003	0.819	0.001	0.788	-0.005	0.724
Δ Interest expenses on deposits	0.000	0.945	0.000	0.984	-0.001	0.756	0.002	0.984
Δ Interest expenses on non-deposits	-0.015	0.984	0.047	0.724	-0.122	0.468	0.031	0.724
Δ Insured deposits market share	0.002	0.193	-0.009	0.191	0.004	0.141	0.020**	0.011
Δ Uninsured deposits market share	0.004	0.869	-0.006	0.439	0.032	0.758	0.002	0.917
Δ Non-deposits market share	-0.005	0.467	0.018	0.917	-0.025	0.633	0.005	0.443
Δ Insured deposits	0.008	0.581	-0.006	0.663	0.002	0.443	0.029	0.395
Δ Market share of insured deposits	0.011	0.707	-0.003	0.373	0.028	0.468	0.008	0.373
Δ Uninsured deposits	0.000	0.977	-0.029	0.439	0.056	0.758	-0.023	0.917
Δ Market share of uninsured deposits	-0.001	0.884	-0.048	0.439	0.059	0.999	-0.024	0.917
Δ Zscore (ln)	-0.128	0.308	-0.072	0.263	-0.251	0.867	-0.061	0.901
Δ Non-performing loans to total loans	0.552	0.977	0.239	0.513	0.002	0.541	1.366	0.600
Δ Leverage ratio (Debt to equity ratio)	0.001	0.818	-0.023	0.548	-0.002	0.951	0.026	0.272
Δ Return on equity (ln)	-0.003	0.268	0.001	0.967	-0.032	0.279	0.021	0.169
Δ Total interest income to total loans (ln)	0.002	0.501	0.007	0.101	0.001	0.885	-0.003	0.885

Notes: This table uses statistical methods to test the parallel trends assumption. Following Lemmon and Roberts (2010) we use *t*-tests to compare the growth rate of each variable in pre-treatment periods.

Table 5
Pricing and quantity effects of depositor preference: Funding costs and market shares

Panel A: Pricing effects – funding costs				Panel B: Quantity effects - market shares		
Dependent variable	Total interest expenses	Interest on deposits	Interest on non-deposits	Insured deposits	Uninsured deposits	Non-deposits
Charter	0.0169	0.0195	-0.0822			
	(1.38)	(1.52)	(-1.39)			
Charter*DPL	-0.0192***	-0.0219***	0.1388***	-0.0080	0.1305**	0.0172
	(-4.06)	(-4.56)	(6.31)	(-0.35)	(2.26)	(0.27)
Bank size	0.1490***	0.1585***	0.0897***	-0.0080	0.1305**	0.0172
	(12.29)	(13.14)	(3.47)	(-0.35)	(2.26)	(0.27)
Capital ratio	-0.0347***	-0.0373***	0.0249**	-0.0080	0.1305**	0.0172
	(-11.33)	(-10.83)	(2.31)	(-0.35)	(2.26)	(0.27)
Bank FE	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	199,731	1,286	1,286	1,286
R^2	0.6797	0.6855	0.0271	0.0959	0.8396	0.0416
Number of banks	5,509	5,509	5,509	30	30	30

Notes: We present the results of difference-in-difference regressions examining the effect of state depositor preference law enactment on banks' costs of funds in Panel A. We use data from the 15 states that enacted depositor preference law between 1983Q1 and 1993Q2. We estimate $y_{ist} = \alpha + \varphi Charter_{it} + \beta DPL_{st} * Charter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The set of bank-time varying control variables X_{ist} include the logarithm of banks' total assets (Bank size), the ratio of equity capital to total assets (Capital ratio). Panel B investigates quantity effects of depositor preference laws by focusing on market shares on the state level for insured, uninsured deposits, and non-deposits. We estimate $y_{ist} = \alpha + \beta DPL_{st} * Charter_i + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes dependent variable of charter type i (state or national charter) in state s at time t, which includes: the market share of insured deposits, the market share of uninsured deposits, and the market share of non-deposits. The unit of analysis is the charter-state-quarter in these tests. The set of time varying control variables X_{ist} include the logarithm of mean banks' total assets (Bank size), and the mean ratio of equity capital to total assets (Capital ratio). The main explanatory variable is in Panel A and Panel B the interaction between the depositor preference law and Charter dummy variable. DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_{it}$ is a dummy variable equal to 1 for state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β provides information about the effect of state depositor preference law adoption. Additionally, the regressions include state-quarter-fixed effects (γ_{st}) and bank-fixed effects (γ_i). *t*-statistics are reported in parentheses and standard errors are clustered on the bank level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6
Long-run effects of depositor preference

Dependent variable	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter	0.0486***	0.0515***	-0.1163**
	(3.27)	(3.30)	(-1.99)
Charter * post quarter0	-0.0571***	-0.0587***	0.0271
	(-7.92)	(-7.95)	(0.75)
Charter * post quarter1	-0.0555***	-0.0595***	0.0789**
	(-7.77)	(-7.54)	(2.10)
Charter * post quarter2	-0.0722***	-0.0758***	0.1073***
	(-9.82)	(-10.03)	(3.19)
Charter * post quarter3	-0.0759***	-0.0803***	0.1751***
	(-11.07)	(-11.36)	(5.90)
Charter * post quarter4	-0.0717***	-0.0763***	0.1370***
	(-10.45)	(-10.99)	(3.99)
Charter * post quarter5	-0.0550***	-0.0587***	0.1148***
	(-7.28)	(-7.77)	(3.11)
Charter * post quarter6	-0.0693***	-0.0708***	0.1534***
	(-9.47)	(-9.37)	(4.61)
Charter * post quarter7	-0.0863***	-0.0891***	0.1062***
	(-11.12)	(-11.17)	(3.28)
Charter * post quarter8	-0.1164***	-0.1197***	0.1152***
	(-13.63)	(-13.78)	(3.48)
Charter * post quarter9	-0.1218***	-0.1255***	0.1682***
	(-16.20)	(-15.87)	(5.67)
Bank size	-0.1152***	-0.1245***	0.2126***
	(-17.34)	(-18.29)	(11.49)
Capital ratio	-0.0994***	-0.1074***	0.0822***
	(-21.65)	(-21.56)	(7.27)
Bank FE	YES	YES	YES
State*Quarter FE	YES	YES	YES
Observations	258,594	258,594	258,594
R2	0.5313	0.5448	0.1583
Number of banks	5,509	5,509	5,509

Notes: This table presents results of difference-in-difference regressions for the long-run effect of state depositor preference law enactment on banks' costs of funds. We estimate $y_{ist} = \alpha + \varphi Charter_{it} + \sum_{j=0}^{j=9} \beta_j\, Charter_{it} * post\ quarter_j + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the depositor preference law dummy and Charter dummy variable. $post\ quarter_j$ where $j = \in (1, ...,8)$ is a dummy variable equal to 1 for each quarter after enactment of depositor preference in state s. $j = 0$ denotes the quarter of enactment. $j = 9$ denotes all quarters two years after the date of enactment. $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β_j provides information about the effect of state depositor preference law adoption. The set of bank-time varying control variables X include the logarithm of banks' total assets (Bank size), and the ratio of equity capital to total assets (Capital ratio. Additionally, the regressions include state-quarter-fixed effects (γ_{st}) and bank-fixed effects (γ_i). t-statistics are reported in parentheses and standard errors are clustered on the bank level. *** p<0.01, ** p<0.05, * p<0.1.

Table 7
Bank health and profitability

Dependent variable	Panel A: Banks' risk and decomposed Z-Score (ln)						Panel B: Banks' profitability	
	ZSCORE(ln)	ROASD(ln)	ROA(ln)	ETA(ln)	NPL	LEV	ROE(ln)	TIINC(ln)
Charter	0.3901**	-0.1105*	0.1033**	0.1416***	-0.0006	0.1080	0.0797	-0.0441***
	(2.45)	(-1.72)	(2.42)	(2.87)	(-0.37)	(0.35)	(1.04)	(-2.77)
Charter * DPL	0.2249***	-0.0310	0.0394***	0.0964***	-0.0009*	-0.1763*	0.0406**	0.0151**
	(5.26)	(-1.58)	(3.20)	(7.12)	(-1.78)	(-1.78)	(1.99)	(2.51)
Bank size	0.2083***	-0.1616***	0.2253***	-0.2877***	-0.0028***	2.8947***	0.5229***	-0.0189
	(2.58)	(-7.76)	(11.91)	(-12.08)	(-6.00)	(14.04)	(12.48)	(-1.28)
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	199,731	199,731	199,731	199,731	199,731	199,731
R-squared	0.9242	0.0925	0.3974	0.1372	0.1888	0.1464	0.6764	0.9526
Number of banks	5,509	5,509	5,509	5,509	5,509	5,509	5,509	5,509

Notes: This table presents the results of difference-in-difference regressions examining the effect of state depositor preference law enactment on banks' health in Panel A and on profitability in Panel B. We estimate $y_{ist} = \alpha + \varphi Charter_{it} + \beta DPL_{st} * Charter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variables of bank i in state s at time t. In Panel A the dependent variables that proxy for banks' health are: the logarithm of the Z-score, the components of the Z-score measure (*ZSCORE(ln)*), the ratio of equity capital to total assets (*ETA (ln)*), the logarithm of return on assets (*ROA (ln)*), the logarithm of the standard deviation of return on assets (*ROASD (ln)*), the ratio of non-performing loans to total loans (*NPL*), and the debt to equity leverage ratio (*LEV*). In Panel B the dependent variables proxy for banks' profitability: the logarithm of return on equity (*ROE (ln)*), and the logarithm of total interest income to total loans (*TIINC*). The main explanatory variable is an interaction between the depositor preference law and Charter dummy variables. DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β provides information about the effect of state depositor preference law adoption. The set of bank-time varying control variables X include the logarithm of banks' total assets (Bank size). Additionally, the regressions include state-quarter-fixed effects (γ_{st}) and bank-fixed effects (γ_i). Robust t-statistics are reported in parentheses and standard errors are clustered on bank level. *** p<0.01, ** p<0.05, * p<0.1

Table 8
Interactions with bank size and switching of bank charters

Panel A: Interactions with bank size	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter	0.2150	0.1191	-0.0885
	(1.40)	(0.78)	(-0.24)
Charter * DPL	-0.0192***	-0.0250***	0.1298***
	(-3.08)	(-3.88)	(5.59)
Bank size	0.1663***	0.1713***	0.1013***
	(11.72)	(12.05)	(2.94)
Capital ratio	-0.0326***	-0.0354***	0.0272**
	(-10.66)	(-10.08)	(2.52)
Bank size * DPL	-0.0163***	-0.0164***	-0.0239***
	(-6.28)	(-5.95)	(-2.84)
Bank size * Charter	-0.0184	-0.0093	0.0006
	(-1.27)	(-0.64)	(0.02)
Bank FE	YES	YES	YES
State*Quarter FE	YES	YES	YES
Observations	199,731	199,731	199,731
R-squared	0.6802	0.6860	0.0272
Number of banks	5,509	5,509	5,509

Panel B: Charter switch		Panel C: Removing banks which switch their charter		
Dependent variable		Total interest expenses	Interest on deposits	Interest on non-deposits
DPL	-0.0003			
	(-1.01)			
Charter * DPL		-0.0121***	-0.0134***	0.1099***
		(-2.66)	(-2.91)	(4.77)
Bank size	0.0004	0.1816***	0.1942***	0.0942***
	(0.88)	(13.00)	(14.02)	(3.34)
Equity	0.0002	-0.0362***	-0.0393***	0.0346***
	(1.00)	(-11.10)	(-10.56)	(3.12)
Bank FE	YES	YES	YES	YES
State*Quarter FE	NO	YES	YES	YES
State FE	NO			
Quarter FE	YES			
Observations	147,367	170,873	170,873	170,873
R-squared	0.0360	0.5642	0.5756	0.0218
Number of banks	5,509	5,454	5,454	5,454

Notes: Panel A appends equation (2) with interactions between bank size and the DPL_{st} and the $Charter_{it}$ dummy variables. Panel B presents results for probit regressions where our dependent variable is a dummy variable equal to 1 when bank switches charter and 0 otherwise. Panel C shows regressions identical to those reported in Table 5 except for the fact that we omit banks which switch their charter. We estimate $y_{ist} = \alpha + \beta DPL_{st} * Charter_i + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the depositor preference law and Charter dummy variables. DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_i$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The set of bank-time varying control variables X includes the logarithm of banks' total assets (Bank size), and the ratio of equity capital to total assets (Capital ratio). Additionally, the regressions in Panels A and C include state-quarter-fixed effects (γ_{st}) and bank-fixed effects (γ_i). Robust *t*-statistics are reported in parentheses and standard errors are clustered on bank level. *** p<0.01, ** p<0.05, * p<0.1.

Table 9
Confounding events: Banking crises in New England, Texas, and turmoil in the S&L industry

Dependent variable	Panel A: New England			Panel B: Texas			Panel C: S&L Crisis		
	Total interest expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter	0.0018	0.0027	-0.0563	0.0195	0.0223*	-0.0967	0.0185	0.0213*	-0.0829
	(0.16)	(0.24)	(-0.97)	(1.50)	(1.65)	(-1.62)	(1.51)	(1.66)	(-1.40)
Charter*DPL	-0.0111**	-0.0137***	0.1338***	-0.0192***	-0.0216***	0.1250***	-0.0201***	-0.0235***	0.1420***
	(-2.46)	(-2.99)	(6.05)	(-3.82)	(-4.23)	(5.46)	(-4.13)	(-4.78)	(6.23)
Bank size	0.1343***	0.1462***	0.0783***	0.1468***	0.1565***	0.0745***	0.1489***	0.1584***	0.0897***
	(12.13)	(13.08)	(3.38)	(11.41)	(12.38)	(2.74)	(12.28)	(13.14)	(3.47)
Capital ratio	-0.0336***	-0.0364***	0.0250**	-0.0355***	-0.0383***	0.0171	-0.0346***	-0.0372***	0.0250**
	(-11.13)	(-10.69)	(2.35)	(-9.49)	(-9.15)	(1.43)	(-11.30)	(-10.80)	(2.32)
Charter * S&L crisis							-0.1703*	-0.1872**	0.0809
							(-1.72)	(-2.14)	(0.16)
Charter * DPL & S&L crisis							0.1581	0.1840**	-0.1284
							(1.57)	(2.06)	(-0.25)
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	195,010	195,010	195,010	163,471	163,471	163,471	199,731	199,731	199,731
R^2	0.6946	0.7020	0.0256	0.6626	0.6696	0.0273	0.6797	0.6855	0.0270
Number of banks	5,411	5,411	5,411	5,506	5,506	5,506	5,509	5,509	5,509

Notes: This table presents the results of difference-in-difference regressions examining the effect of state depositor preference law enactment on banks' costs of funds. We consider banking crises as confounding events and remove Connecticut, Maine, New Hampshire, and Rhode Island in Panel A from the sample. We remove observations for Texas from the sample in Panel B. Panel C focuses on the S&L crisis by including additional interaction terms between the dummy for state charters and our proxy for the S&L crisis, and a triple interaction term between the dummy for state-chartered banks, the dummy variable for depositor preference, and the proxy for the S&L crisis. We estimate $y_{ist} = \alpha + \varphi Charter_{it} + \beta DPL_{st} * Charter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the depositor preference law dummy and Charter dummy variable. DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β provides information about the effect of state depositor preference law adoption. The set of bank-time varying control variables X include the logarithm of banks' total assets (Bank size), the ratio of equity capital to total assets (Capital ratio), inter- and intra-state deregulation dummy variables, and an S&L crisis proxy (measured as the ratio of failed thrift assets to total bank assets in the state). Additionally, the regressions include state-quarter-fixed effects (γ_{st}) and bank-fixed effects (γ_i). *t*-statistics are reported in parentheses and standard errors are clustered on the bank level. *** p<0.01, ** p<0.05, * p<0.1.

Table 10
Confounding events: Regulation and deregulation of banking markets

Dependent variable	Panel A: Excluding FIRREA period			Panel B: Excluding FDICIA period			Panel C: Deregulation of banking markets		
	Total interest expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter	0.0311	0.0327	-0.0057	0.0065	0.0092	-0.0807	0.0185	0.0210	-0.0968
	(1.28)	(1.30)	(-0.06)	(0.47)	(0.65)	(-1.21)	(1.47)	(1.60)	(-1.61)
Charter*DPL	-0.0313***	-0.0337***	0.1414***	-0.0116**	-0.0132***	0.1161***	-0.0161***	-0.0199***	0.1174***
	(-4.69)	(-4.83)	(5.16)	(-2.51)	(-2.81)	(4.98)	(-3.44)	(-4.17)	(4.23)
Bank size	0.3264***	0.3469***	0.1158***	0.1821***	0.1948***	0.0909***	0.1488***	0.1584***	0.0910***
	(14.75)	(15.52)	(3.26)	(13.26)	(14.30)	(3.23)	(12.29)	(13.14)	(3.51)
Capital ratio	-0.0960***	-0.0999***	0.0135	-0.0366***	-0.0397***	0.0348***	-0.0345***	-0.0372***	0.0240**
	(-16.34)	(-16.21)	(0.98)	(-11.25)	(-10.70)	(3.14)	(-11.26)	(-10.76)	(2.23)
Charter * Interstate							-0.0075	-0.0047	0.0288
							(-0.80)	(-0.49)	(0.79)
Charter * Interstate * DPL							0.0059	0.0056	0.0247
							(0.65)	(0.60)	(0.61)
Charter * Intrastate							-0.0028	-0.0056	0.0614
							(-0.18)	(-0.41)	(1.23)
Charter * Intrastate * DPL							-0.0032	-0.0020	-0.0703
							(-0.21)	(-0.15)	(-1.39)
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	137,401	137,401	137,401	172,696	172,696	172,696	199,731	199,731	199,731
R^2	0.8923	0.8925	0.1619	0.5609	0.5723	0.0215	0.6797	0.6855	0.0271
Number of banks	5,471	5,471	5,471	5,508	5,508	5,508	5,509	5,509	5,509

Notes: This table presents the results of difference-in-difference regressions examining the effect of state depositor preference law enactment on banks' costs of funds. To rule out the role of changes in regulation, we remove in Panel A observations between 1989Q4 and 1993Q2 to consider the effect of FIRREA. Panel B removes observations between 1991Q4 and 1993Q2 to consider the effect of FDICIA. Panel C presents the results of difference-in-difference-in-difference regressions examining the robustness of the results to including interstate and intrastate deregulation interactions. For Panel A and B, we estimate $y_{ist} = \alpha + \varphi Charter_{it} + \beta DPL_{st} * Charter_i + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the depositor preference law dummy and Charter dummy variable. In Panel C, we estimate $y_{ist} = \alpha + \varphi Charter_{it} + \beta DPL_{st} * Charter_{it} + \rho Charter_{it} * Z_{st} + \vartheta DPL_{st} * Charter_{it} * Z_{st} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$. . Z_{st} is a vector containing either interstate or intrastate deregulation dummies taken from Strahan (2003). DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β provides information about the effect of state depositor preference law adoption. The set of bank-time varying control variables X include the logarithm of banks' total assets (Bank size), the ratio of equity capital to total assets (Equity), inter- and intra-state deregulation dummy variables, and an S&L crisis proxy (measured as the ratio of failed thrift assets to total bank assets in the state). Additionally, the regressions include state-quarter-fixed effects (γ_{st}) and bank-fixed effects (γ_i). *t*-statistics are reported in parentheses and standard errors are clustered on the bank level. *** p<0.01, ** p<0.05, * p<0.1.

Table 11
Further sensitivity tests

	Panel A: Random assignment			Panel B: Anticipation effects		
Dependent variable	Total interest Expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter				0.0178	0.0204	-0.0857
				(1.45)	(1.59)	(-1.44)
Charter * DPL				-0.0200***	-0.0228***	0.1422***
				(-4.07)	(-4.59)	(6.27)
Placebo treatment	-0.0000	-0.0000	0.0001	-0.0017	-0.0017	0.0068
	(-0.47)	(-1.26)	(1.13)	(-0.66)	(-0.67)	(0.69)
Bank size	0.0014***	0.0014***	0.0013***	0.1490***	0.1585***	0.0897***
	(8.88)	(8.28)	(3.92)	(12.29)	(13.14)	(3.47)
Equity	-0.0003***	-0.0003***	0.0001	-0.0347***	-0.0373***	0.0249**
	(-9.10)	(-9.30)	(0.77)	(-11.32)	(-10.83)	(2.31)
Bank FE	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES
Observations	69,854	69,854	69,854	199,731	199,731	199,731
R-squared	0.7822	0.7800	0.3230	0.6797	0.6855	0.0271
Number of banks	3,077	3,077	3,077	5,509	5,509	5,509

	Panel C: Regressions excluding time-varying controls			Panel D: Collapsing technique			Panel E: Clustering by state-bank-quarter		
Dependent variable	Total interest Expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter	0.0281**	0.0313**	-0.0704	-0.0530	-0.0531	0.0742	0.0289***	0.0316***	-0.0503
	(2.19)	(2.33)	(-1.19)	(-1.24)	(-1.25)	(0.23)	(4.02)	(4.50)	(-1.55)
Charter*DPL	-0.0370***	-0.0410***	0.1336***	-0.0106**	-0.0122***	0.0633**	-0.0371***	-0.0401***	0.1204***
	(-7.52)	(-8.21)	(6.02)	(-2.50)	(-2.75)	(2.43)	(-15.46)	(-16.79)	(10.91)
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
State*Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	199,731	199,731	199,731	10,541	10,541	10,541	199,698	199,698	199,698
R-squared	0.6683	0.6728	0.0266	0.7507	0.7405	0.0331	0.7451	0.7591	0.3046
Number of banks	5,509	5,509	5,509	5,504	5,504	5,504	5,509	5,509	5,509

Notes: We present difference-in-difference regressions examining the robustness of the main results. Panel A shows regressions that estimate $y_{ist} = \alpha + \rho Placebo_{ist} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). In Panel A we include only national chartered banks in the sample and randomly assign banks to a placebo treatment which is equal to 1 if a depositor preference is in force, 0 otherwise. In Panel B we use the full sample and randomly assign the placebo treatment to state-chartered banks before depositor preference is enacted and estimate $y_{ist} = \alpha + \varphi Charter_{it} + \beta DPL_{st} * Charter_i + \rho Placebo_{ist} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$. The coefficient ρ provides information about the effect of placebo treatment on banks' cost of debt and liability structure. Panel C shows difference-in-difference regressions which omit all time-varying control variables. Panel D collapse all observations prior to treatment into one observation at the mean, and we follow an identical approach for the observations following the treatment. Panel E clusters standard errors by state, bank, and year. We estimate $y_{ist} = \alpha + \varphi Charter_{it} + \beta DPL_{st} * Charter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the depositor preference law dummy and Charter dummy variable. DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β provides information about the effect of state depositor preference law adoption. The set of bank-time varying control variables in Panel D and Panel E include the logarithm of banks' total assets (Bank size), the ratio of equity capital to total assets (Capital ratio), inter- and intra-state deregulation dummy variables, and an S&L crisis proxy (measured as the ratio of failed thrift assets to total bank assets in the state). Additionally, the regressions include state-quarter-fixed effects (γ_{st}) and bank-fixed effects (γ_i). *t*-statistics are reported in parentheses and standard errors are clustered on the bank level unless otherwise stated. *** p<0.01, ** p<0.05, * p<0.1.

Table 12

Falsification exercise and external validity: The effect of national depositor preference (Sample 1983Q1-1997Q3)

Panel A: Monte Carlo simulations for the effect of national depositor preference		
Total interest expenses	**Interest on deposits**	**Interest on non-deposits**
Number of replications:	Number of replications:	Number of replications:
1,000	1,000	1,000
Rejection rate at the 1% level	Rejection rate at the 1% level	Rejection rate at the 1% level
(2-tailed test):	(2-tailed test):	(2-tailed test):
0.7%	1.1%	1.2%
Rejection rate at the 5% level	Rejection rate at the 5% level	Rejection rate at the 5% level
(2-tailed test):	(2-tailed test):	(2-tailed test):
4.0%	5.7 %	4.9%
Rejection rate at the 10% level	Rejection rate at the 10% level	Rejection rate at the 10% level
(2-tailed test):	(2-tailed test):	(2-tailed test):
7.8%	11.0%	9.5%

Panel B: The effect of national depositor preference			
Dependent variable	**Total interest expenses**	**Interest on deposits**	**Interest on non-deposits**
Treatment group	0.0042	0.0065	-0.0418
	(0.62)	(0.89)	(-0.70)
National DPL	-0.8503***	-0.8556***	-0.1747***
	(-155.13)	(-148.97)	(-6.24)
Treatment group * national DPL	-0.0160***	-0.0327***	0.1754***
	(-5.86)	(-9.84)	(5.90)
Bank size	0.1107***	0.1068***	0.1381***
	(25.18)	(22.72)	(7.87)
Capital ratio	-0.0439***	-0.0500***	0.0567***
	(-17.72)	(-18.24)	(5.97)
Bank FE	YES	YES	YES
Quarter FE	YES	YES	YES
Observations	600,910	600,910	600,910
R^2	0.6917	0.6813	0.1269
Number of banks	14,656	14,656	14,656

Notes: This table presents Monte Carlo simulations in Panel A. We estimate the regression $y_{ist} = \alpha + \beta placebo_{ist} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$ using data on state-chartered banks between 1989Q3 and 1997Q3. 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 1997Q3. For all time periods before 1993Q3 $placebo_{ist}$ equals 0. We then estimate the regression and save the *p*-value on the coefficient β and repeat this process 1,000 times and compute the rejection rates of the null hypothesis $\beta = 0$ at the 1%, 5%, and 10% levels. Panel B shows a test of external validity by examining the effect of national depositor preference law, introduced in 1993Q3, on banks' cost of funds. In this test, the treatment group consists of both national and state banks that had not implemented depositor preference prior to 1993Q3. These tests do not include state-quarter controls because we rely on cross-state variation in treatment status to identify the effect of national depositor preference. We use difference-in-difference regressions and estimate $y_{ist} = \alpha + \varphi Treatment\ group_{it} + \vartheta NDPL_t + \beta NDPL_t * Treatment\ group_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the national depositor preference law dummy and Charter dummy variable. $NDPL_{st}$ is a dummy variable equal to 1 for all banks in states and years following introduction of national depositor preference law, and 0 otherwise. The coefficient β provides information about the effect of national depositor preference law. The set of bank-time varying control variables X_{ist} include the logarithm of banks' total assets (Bank size), and the ratio of equity capital to total assets (Capital ratio). Additionally, the regressions include bank-fixed effects and quarter-fixed effects. *t*-statistics are reported in parentheses and standard errors are clustered on the bank level. *** p<0.01, ** p<0.05, * p<0.1.

Figures

Figure 1
Development of state depositor preference laws in the U.S.

Figure 1a

☐ States with depositor preference law prior to 1993
☐ States without depositor preference law prior to 1993

Figure 1b

☐ States included in the sample
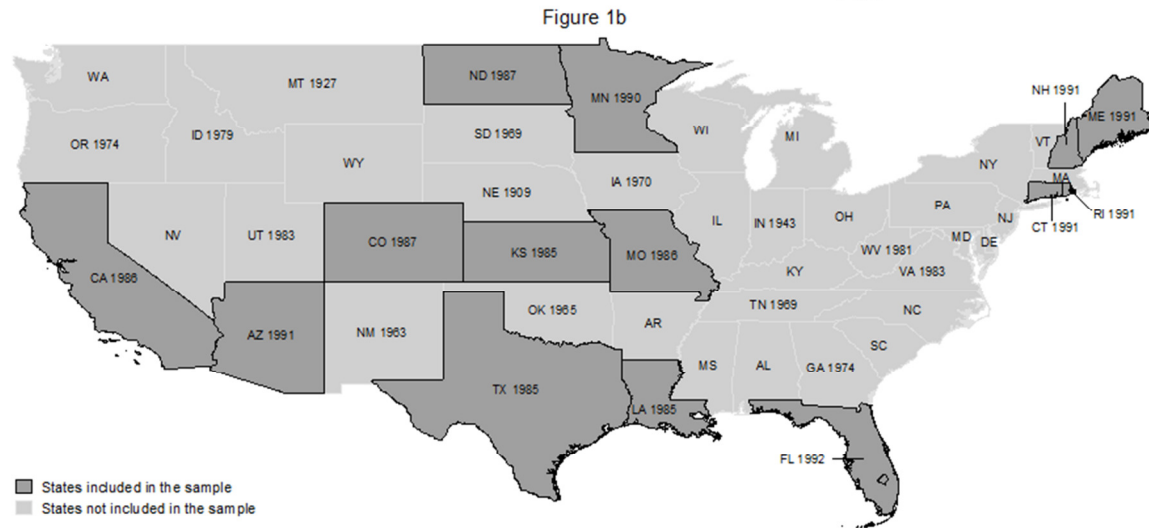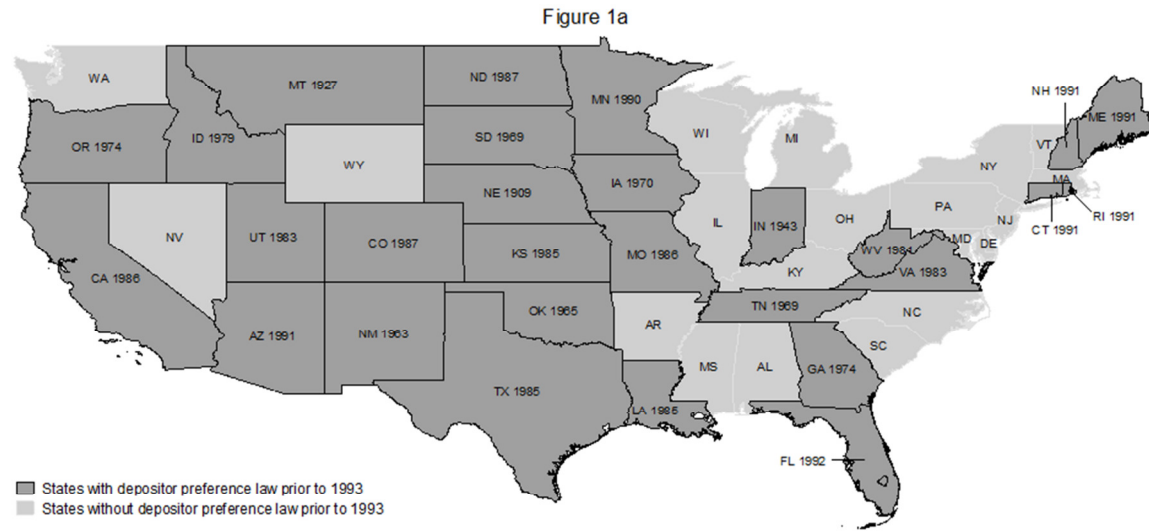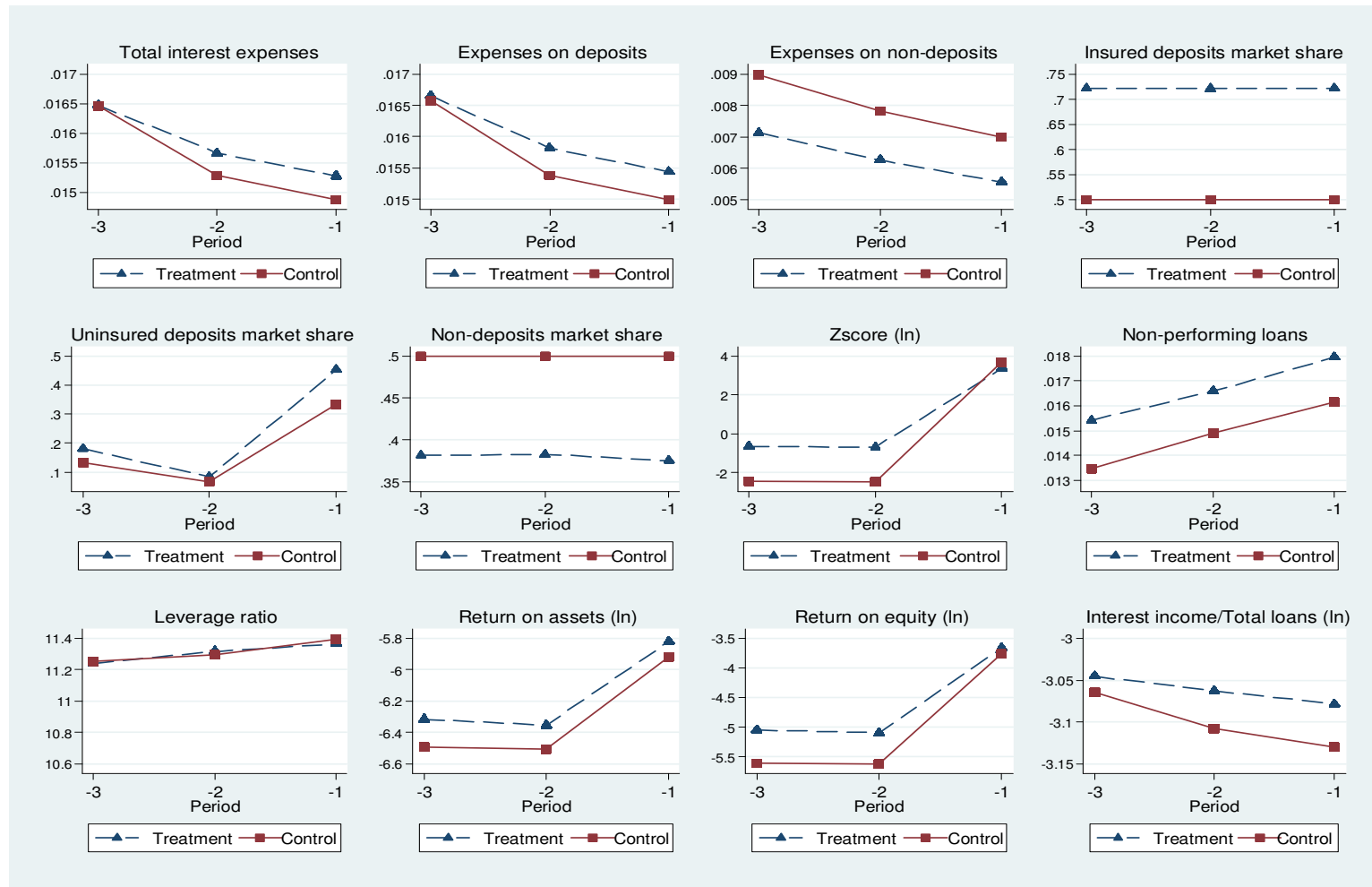☐ States not included in the sample

Figure 2
Parallel trends

Notes: Figure 2 illustrates the behavior of quarterly changes in the dependent variables, for three quarters preceding depositor preference law enactment. State-chartered banks (the treatment group) are represented by a triangle, whereas national-chartered banks (the control group) are depicted by a square.

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

<u>**Arizona (21st September 1991)**</u>

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 receive 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 result in concentrated banking conditions in Arizona as the merger partners operate competing offices there.

<u>**California (27th June 1986)**</u>

Party control

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

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.

Colorado (1st May 1987)

Party control

Governor: D   Party control upper and lower house: 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.

Connecticut (22nd May 1991)

Party control

Governor: Independent Party control upper and lower house: 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.

Florida (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.

Hawaii (24th June 1987)

Party control

Governor: D   Party control upper and lower house: 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 tare 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 intuition;*
(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.

Kansas (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.

Louisiana (1ˢᵗ January 1985)

Party control

Governor: D   Party control upper and lower house: D

Legal provision

Distribution of assets
  A. All claims against the bank's assets, proved to the receiver's satisfaction or approved by the receivership court shall be paid in the following order:
    (1)Administration expenses of the liquidation.
    (2)Claims given priority under other provisions of state or federal law.
    (3)Deposit obligations.
    (4)Other general liabilities.
    (5)Debt subordinated to the claims of depositors and general creditors.
    (6)Equity capital securities.

Further particulars and coinciding factors

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

Maine (16th April 1991)

Party control

Governor: R   Party control upper and lower house: 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.

Minnesota (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.

Missouri (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 ghe time presecribed 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.

New Hampshire (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.

North Dakota (1st July 1987)

Party control

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

Rhode Island (8th February 1991)

Party control

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

Texas (26th August 1985)

Party control

Governor: D   Party control upper and lower house: 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 October 1992.

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

Appendix C: Regressions for pricing effects with all 50 states

Table B. 1 Pricing effects of depositor preference: Funding Costs

Dependent variable	Total interest expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter	0.0444***	0.0516***	-0.2075***	0.0498***	0.0535***	-0.0877***	0.0077	0.0120	-0.0136
	(13.47)	(14.53)	(-16.53)	(14.20)	(14.22)	(-7.78)	(0.97)	(1.43)	(-0.41)
DPL	0.0412***	0.0457***	-0.1418***	0.0338***	0.0374***	-0.1162***			
	(9.10)	(9.77)	(-8.47)	(7.40)	(7.87)	(-7.42)			
Charter*DPL	-0.0418***	-0.0458***	0.1515***	-0.0403***	-0.0433***	0.1186***	-0.0169***	-0.0196***	0.1214***
	(-8.50)	(-8.48)	(7.81)	(-8.13)	(-7.95)	(6.86)	(-3.62)	(-4.16)	(6.30)
Bank size				0.0075***	0.0017	0.2068***	0.1384***	0.1415***	0.0690***
				(4.48)	(0.89)	(47.23)	(18.75)	(18.51)	(4.80)
Capital ratio				-0.0125***	-0.0101**	-0.0560***	-0.0521***	-0.0540***	0.0082
				(-4.30)	(-2.39)	(-8.00)	(-16.86)	(-16.75)	(1.19)
S&L crisis				0.1693***	0.1843***	-0.2160***			
				(16.62)	(17.60)	(-4.24)			
Interstate deregulation				0.0459***	0.0463***	-0.0113			
				(11.07)	(10.87)	(-1.39)			
Interstate deregulation				-0.0095***	-0.0082***	-0.0413***			
				(-3.34)	(-2.79)	(-4.94)			
State FE	YES	YES	YES	YES	YES	YES	NO	NO	NO
Quarter FE	YES	YES	YES	YES	YES	YES	NO	NO	NO
Bank FE	NO	NO	NO	NO	NO	NO	YES	YES	YES
State*Quarter FE	NO	NO	NO	NO	NO	NO	YES	YES	YES
Observations	528,522	528,522	528,522	528,522	528,522	528,522	528,522	528,522	528,522
R²	0.4849	0.4710	0.0395	0.4871	0.4725	0.0832	0.7041	0.7040	0.3512
Number of banks	15,392	15,392	15,392	15,392	15,392	15,392	15,392	15,392	15,392

Note: We present the results of difference-in-difference regressions examining the effect of state depositor preference law enactment on banks' costs of funds using data from all 50 states. We estimate $y_{ist} = \alpha + \varphi Charter_{it} + \vartheta DPL_{st} + \beta DPL_{st} * Charter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the depositor preference law dummy and the charter dummy variable. DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β provides information about the effect of state depositor preference law adoption. The set of bank-time varying control variables X_{ist} include the logarithm of banks' total assets (Bank size), the ratio of equity capital to total assets (Capital ratio), inter- and intra-state deregulation dummy variables, and an S&L crisis proxy (measured as the ratio of failed thrift assets to total bank assets in the state). Additionally, the regressions include either state (γ_s) or state-quarter-fixed effects (γ_{st}) depending on specification and bank-fixed effects (γ_i). *t*-statistics are reported in parentheses and standard errors are clustered on the bank on the bank level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix C: Regressions that include a charter time trend

Table C.1 Charter time trend

Dependent variable	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter*DPL	-0.0002***	-0.0002***	0.0014***
	(-4.05)	(-4.55)	(6.31)
Bank size	0.0015***	0.0016***	0.0009***
	(12.29)	(13.14)	(3.47)
Capital ratio	-0.0003***	-0.0004***	0.0002**
	(-11.33)	(-10.83)	(2.31)
Charter time trend	0.0000	0.0000	-0.0000
	(1.35)	(1.49)	(-1.38)
Bank FE	YES	YES	YES
State*Quarter FE	YES	YES	YES
Observations	199,731	199,731	199,731
R^2	0.6797	0.6855	0.0271
Number of banks	5,509	5,509	5,509

Notes: This table presents the results of difference-in-difference regressions examining the effect of state depositor preference law enactment on banks' costs of funds. We estimate $y_{ist} = \alpha + \beta DPL_{st} * Charter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the depositor preference law dummy and Charter dummy variable. DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β provides information about the effect of state depositor preference law adoption. The set of bank-time varying control variables X include the logarithm of banks' total assets (Bank size), the ratio of equity capital to total assets (Capital ratio), inter- and intra-state deregulation dummy variables, and an S&L crisis proxy (measured as the ratio of failed thrift assets to total bank assets in the state). A charter time trend is also included in the regression equation. Additionally, the regressions include state-quarter-fixed effects (γ_{jt}) and bank-fixed effects (γ_i). t-statistics are reported in parentheses and standard errors are clustered on the bank level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix D: Regressions that consider survivorship bias

Table D.1 Survivorship bias

Dependent variable	Total interest expenses	Interest on deposits	Interest on non-deposits
Charter	0.0310*	0.0377**	-0.0688
	(1.81)	(2.06)	(-0.85)
Charter*DPL	-0.0138**	-0.0185***	0.1341***
	(-2.00)	(-2.71)	(4.52)
Bank size	0.1249***	0.1255***	0.0969**
	(7.23)	(7.70)	(2.30)
Capital ratio	-0.0205***	-0.0228***	0.0137
	(-3.04)	(-3.47)	(0.78)
Bank FE	YES	YES	YES
State*Quarter FE	YES	YES	YES
Observations	114,238	114,238	114,238
R^2	0.7264	0.7314	0.0384
Number of banks	2,728	2,728	2,728

Notes: This table presents the results of difference-in-difference regressions examining the effect of state depositor preference law enactment on banks' costs of funds and these tests additionally account for survivorship bias. We do so by constraining the sample to banks that exist throughout our sample period. We estimate $y_{ist} = \alpha + \varphi Charter_{it} + \beta DPL_{st} * Charter_{it} + \delta X_{ist} + \gamma_i + \gamma_{st} + \varepsilon_{ist}$, where y denotes the dependent variable of bank i in state s at time t, which include ratios of: total interest expenses to total liabilities (Total interest expenses), interest on deposits to total deposits (Interest on deposits), and interest on non-deposits to total non-deposits (Interest on non-deposits). The main explanatory variable is an interaction between the depositor preference law dummy and Charter dummy variable. DPL_{st} is a dummy variable equal to 1 for all banks in states and years following introduction of state depositor preference law, and 0 otherwise; $Charter_{it}$ is a dummy variable equal to 1 for all state-chartered banks, and 0 for nationally-chartered institutions. The coefficient β provides information about the effect of state depositor preference law adoption. The set of bank-time varying control variables X include the logarithm of banks' total assets (Bank size), and the ratio of equity capital to total assets (Capital ratio),. Additionally, the regressions include state-quarter-fixed effects (γ_{jt}) and bank-fixed effects (γ_i). *t*-statistics are reported in parentheses and standard errors are clustered on the bank level. *** p<0.01, ** p<0.05, * p<0.1.