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journal homepage: [www.elsevier.com/locate/jmoneco](http://www.elsevier.com/locate/jmoneco)Information management in times of crisis<sup>☆</sup>Haelim Anderson<sup>a</sup>, Adam Copeland<sup>b,\*</sup><sup>a</sup> Federal Deposit Insurance Corporation, 550 17th St NW, Washington, DC 20429, USA<sup>b</sup> Federal Reserve Bank of New York, United States

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## ABSTRACT

How does information management and control affect bank stability? Following a national bank holiday in 1933, NY state bank regulators suspended the publication of balance sheets of state-charter banks for two years, whereas the national-charter bank regulator did not. This divergence in policies is used to examine how the suspension of bank-specific information affected depositors and the portfolio of assets held by banks. State-charter banks benefited, experiencing less deposit outflows than national-charter banks in 1933. Further, the behavior of bank deposits across both types of banks converged in 1934 after the introduction of the Federal Deposit Insurance Corporation.

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## 1. Introduction

Information management and control typically play a central role in ending financial crises, which are often considered information events (Gorton and Ordoñez, 2020). In these instances, the management of the information environment is crucial to restoring confidence in the banking sector. In practice, regulators try to restore the public's confidence in banks by suppressing bank-level information; in the national banking era the New York City Clearinghouse Association stopped bank runs on its members by suspending the publication of individual bank's balance sheets, and during the Great Depression the federal government suspended the March 1933 Call Report for all banks as part of a suite of policies to stop bank runs. Despite the perceived importance of managing information about individual banks during a financial crisis, we are not aware of any empirical work that quantifies the effect of such policies. This paper is novel then, in that it demonstrates that in a time of crisis, a policy of suppressing information about banks' balance sheets has a significant and positive effect on deposits and, subsequently, on loan and bond holdings.

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Several challenges make it difficult to identify how a policy related to managing the information environment affects financial stability. One such challenge is the lack of detailed bank-level data during these times of crisis. This is because regulators often choose not to collect information or halt regular information dissemination activities in order to protect weak financial institutions from a negative information spillover. Another challenge is the difficulty in disentangling the effect of information management policies from other policies that are implemented simultaneously.

These empirical challenges are overcome by examining the New York banking system following the banking panics of the Great Depression. To help quell the nationwide bank panics building up at the beginning of 1933, the federal government declared a four-day national bank holiday from March 6th to 9th. During this period, the government implemented two major programs to manage the information environment so as to build public confidence in the banking system.<sup>1</sup> First, it asserted that only solvent banks would be allowed to re-open after the holiday. Second, it suspended the March 1933 call, which allowed banks to avoid publishing statistics about their balance sheet for public consumption.<sup>2</sup> NY state bank regulators built upon this federal effort by extending the length of time that NY state-charter banks remained opaque.

To convince “panic-stricken” households in New York that their deposits would remain liquid and safe, the NY state bank regulator suppressed bank-specific information by not collecting and mandating the publication of call report data in 1933 and 1934 for those banks under its oversight (banks with a NY state charter). This policy decision effectively ended the public’s ability to observe the balance sheets of NY state-charter banks for two years. In contrast, following the aforementioned suspension of the March 1933 call, the Office of the Comptroller of the Currency (OCC) went back to collecting and mandating the publication of balance sheet statistics for banks under its oversight (banks with a national charter). Because national and state-charter banks operated side by side in New York, this difference in a households’ ability to observe a bank’s balance sheet provides a unique opportunity to measure the impact of information suppression on deposits.

Although data are collected from various sources, the main analysis relies on balance sheet data of NY banks. Using *Rand McNally Bankers’ Directory*, a semiannual panel data set on all commercial banks and trust companies in New York is constructed from 1931 to 1934. Rand McNally published information on banks’ portfolio of assets and their capital structure as of June and December of each year. Importantly, local depositors had, at best, limited access to this directory because it was a subscription service directed at bankers seeking to manage their counterparty risk arising from the check clearing process. As such, the Rand McNally directory did not undo the information suppression policy of the NY state banking regulator.

The analysis begins by measuring the impact of the information suppression policy on deposits and then turns to the asset side of the balance sheet. A difference-in-differences approach is taken where state-charter banks are defined as being treated and national-charter banks are the controls. Banks located in New York City are excluded, as are those in reserve cities, to arrive at a set of relatively homogeneous banks whose business model is to attract deposits from local households and make loans to small manufacturing and agricultural businesses.<sup>3</sup>

In the regression specification, the information-suppression policy is allowed to have a different effect in 1933 and 1934. This is because at the start of 1934 the Federal Deposit Insurance Corporation (FDIC) was established and began its policy of insuring household deposits. For households with insured deposits, there is no need to monitor the bank’s balance sheet. As such, the creation of the FDIC should offset the advantage state-charter banks had over national-charter banks in terms of the degree of opaqueness of their balance sheet. This informational advantage still exists with regard to households with uninsured deposits, but these types of deposits are a small share of total deposits for the set of banks studied in the sample.<sup>4</sup>

The first key result is that with the introduction of the NY state banking regulator’s policy of information suppression in 1933, state-charter banks attracted deposits to a greater degree relative to national-charter banks. Reflecting the general outflow of deposits during this time period, the estimates imply that state-charter banks stemmed the outflow of deposits to a greater extent than national-charter banks, and so end up with a level of deposits about 4 to 5 percent higher. This difference in deposits is economically substantial, equal to about 20 percent of the total contraction in deposits by banks in the sample period of December 1929 to June 1933.

The second key result is that this advantage in maintaining deposits disappeared in 1934; there is no longer a robust difference in the level of deposits across national and state-charter banks. The interpretation of this result is that the introduction of the FDIC reduced household’s incentives to monitor the set of banks in the sample to such a degree that the national and state-charter banks are back on an equal footing in terms of the information environment.

Turning to banks’ assets, the same difference-in-differences approach is taken to look for effects of the information suppression policy on loans, bonds, and cash holdings. The results imply that state-charter banks held about 7 percent more bonds in 1933 as a result of the policy. Further, there are heterogeneous treatment effects in that weaker state-charter banks

<sup>1</sup> The federal government’s attempt to stop the banking crisis in this manner aligns with framework described in [Gorton and Ordoñez \(2020\)](#) of treating the crisis as an information event.

<sup>2</sup> See [Silber \(2009\)](#) for details on this national bank holiday and the immediate aftermath on the banking system.

<sup>3</sup> The National Banking Act of 1863 created three-tiered reserve requirements for national banks based on their location. Small “country” banks could use interbank deposits with “reserve city” banks in major financial centers to meet reserve requirements. Reserve city banks, in turn, could make interbank deposits in larger “central reserve city” banks (those in the nation’s money centers of New York, Chicago, and St. Louis) to meet reserve requirements. The central reserve city banks had to keep all their reserves in vault cash. State regulators passed similar laws.

<sup>4</sup> State-charter banks could also maintain an informational advantage over national-charter banks if households did not believe the FDIC would provide deposit insurance in an effective manner.

(as defined by the ratio of cash holdings to total assets in the second half of 1932) substantially benefited from the informational suppression policy, holding 9–11 percent higher loans levels in 1933 and 1934 relative to weaker national-charter banks. These gains are evidence that the information suppression policy worked well by allowing state-charter banks to both hold more productive assets and also maintain their lending operations and so avoid the costly early-termination of long-term projects.

The identifying assumption behind the analysis is that national and state-charter banks are on parallel trends prior to the introduction of the information-suppression policy in 1933. A formal analysis of the time-series of deposits confirms that national and state-charter banks were following a similar trend before the policy intervention. On the asset-side of the balance sheet, however, there were some notable differences across both types of banks at the beginning of the sample period. This hurdle is overcome with the use of a propensity score method to match national and state-charter banks based on observable characteristics, which resulted in a sample of banks with parallel trends in asset holdings before the policy intervention.

The robustness of the results is tested in a number of ways. The analysis was re-done for national and state-charter banks which are members of the Federal Reserve System, a sub-sample of banks which have discount window access and the same supervisor. With this sub-sample, the main results of the paper continue to hold. In addition, for the analysis focused on deposits, two noteworthy checks were employed. First, a difference-in-differences analysis was performed that compared NY state-charter banks to NJ state-charter banks, and the results continued to show that state-charter banks in NY held higher level of deposits in 1933.<sup>5</sup> Second, a placebo test was performed by re-running the analysis on national and state-charter banks in New Jersey. As expected, there were no significant results for NJ state-charter bank deposits in 1933 or 1934.

Although the analysis is specific to New York, the results are informative generally for two main reasons. First, NY banks were central to the U.S. banking system in this period, and so reducing the risk of households rapidly withdrawing their deposits was important for the US banking sector as a whole.<sup>6</sup> Second, the NY banking system at this time was representative of the state banking systems throughout the U.S., and so lessons learned from examining NY banks are generally applicable.

The results from this study have implications for today's modern banking system. In the U.S., banks issue significant amounts of informationally-insensitive debt (see, e.g., recent estimates in Egan et al., 2017, and Jiang et al., 2020). In addition, public disclosure of the portfolio of assets held by banks remains an important regulatory tool, supporting market discipline on bank behavior in normal times. The results, then, remain applicable, demonstrating that in an information event, there is value to having regulators suppress bank-specific information as a way to stem runs on those banks. Given the potential for contagion (Iyer and Puri, 2012), preventing individual bank runs is beneficial to the banking system as a whole.

To gain a sense of the economic importance of the results in today's banking system, consider that uninsured deposits, known to be particularly sensitive to bank-specific information, totaled \$9.12 trillion in the fourth quarter of 2020.<sup>7</sup> The results imply that a policy of information suppression would reduce the outflow of these deposits by 4 to 5 percent, or \$364 to \$456 billion. Further, banks would hold more productive assets in lieu of cash. Indeed, the results show that increased opacity allows weaker banks to maintain substantially more loans than otherwise (10–17 percent), and so avoid the costly early-termination of long-term projects.

Finally, the results raise a note of concern about current initiatives to enhance public disclosure of financial firms' balance sheets. In particular, following the financial crisis of 2007–09, bank holding companies became subject to a new suite of liquidity-based regulations. The results imply that the firm-level information generated by these regulations could be problematic in a crisis; an open question is how sensitive depositors are to changes in a bank's liquidity profile in a time of crisis. As such, policymakers should consider suppressing public information about an individual financial firm's liquidity profile as a tool to navigate the next crisis.

This paper is closely related to the theoretical literature focused on the connections between bank runs and economic fundamentals (e.g., see Goldstein and Pauzner, 2005) because these models best motivate the NY state banking regulator's actions. Perhaps the closest work is Eisenbach (2017), which analyzes run probabilities in a general equilibrium environment where depositors receive a signal about a bank's assets and learn about the aggregate state of the world. In this setting, depositors run on a bank when a sufficiently bad signal is received, where this threshold depends upon the aggregate state. Importantly for this paper, Eisenbach (2017) shows that in the bad aggregate state, a bank is much more susceptible to runs. This theory well motivates the NY state banking regulator actions of trying to decrease run probabilities on state-charter banks amid the turmoil of the Great Depression by suppressing information about individual banks.

<sup>5</sup> New Jersey is a state neighboring New York with similar banking and economics conditions in which the state-banking regulator did not introduce an information-suppression policy.

<sup>6</sup> In the sample period, the NY banking system was the largest in the United States and one of the largest in the world. Between 1929 and 1935, commercial banks in New York held more than 30 percent of all U.S. deposits. Although most NY deposits were held in NYC-based banks, the rural banks considered in the analysis account of 17 percent of deposits in NY (as calculated using June 1931 data from the Annual Report of the Comptroller of Currency and the Annual Report of the Superintendent of New York).

<sup>7</sup> For instance, Martin et al. (2018) show that uninsured deposits contracted by more than 50 percent during the financial crisis of 2007–2009. Uninsured deposits remain an important source of funds for banks, making up more than 40 percent of total deposits in recent years (see numbers reported in FDIC Quarterly).

The paper is also closely related to the literature focused on the informational view of financial crises where one way to manage the information environment during a crisis is to reduce transparency (Dang, Gorton and Holmström, 2020; Gorton and Ordoñez, 2014). Indeed, Gorton and Ordoñez (2020) show that reducing transparency of banks' balance sheets can help maintain the information-insensitivity of their short-term debt and so avoid a financial crisis. Although this literature focuses on banking systems whereas this paper focuses on a subset of banks, the results presented here reinforce the importance of managing information about banks in a time of crisis.

Related empirical work includes the study of clearinghouses and how they dealt with runs on their members. In particular, Gorton and Tallman (2018) describe how a New York City clearinghouse in the national banking era successfully stopped bank runs on its members by replacing the publication of individual bank balance sheets with an aggregate balance sheet. This paper builds upon Gorton and Tallman (2018) by considering a different crisis and uses formal econometric analysis to identify and measure the effect of a policy of opaqueness on deposits during a crisis.

Other related empirical work examines the management of information around lender-of-last-resort facilities. Works closest to this paper focus on the Great Depression and quantify the effect of publicly releasing the identities of banks that recently accessed an emergency lending facility (Anbil, 2018; Anbil and Vossmeier, 2021; Vossmeier, 2019). These papers measure the stigma associated with accessing a lender-of-last-resort type of facility. In contrast, this paper considers the value of increasing the opaqueness of a bank's balance sheet in a time of crisis.<sup>8</sup>

Finally, there is a literature focused on measuring by how much the opaqueness of bank balance sheets helps banks issue deposits in normal times.<sup>9</sup> Empirically, Morgan (2002) establishes that banks are more opaque than other firms and Chen et al. (2022) find links between a bank's opacity and, among other things, deposit flows and interest rates. These papers consider cases during periods of normalcy where the bank controls the opacity of its balance sheet and studies how this choice affects a bank's ability to issue deposits. In contrast, this paper studies how a regulator's actions to increase the opaqueness of banks during a crisis affects the ability of those banks to issue deposits.

The remainder of the paper is organized as follows. Section 2 provides historical background and introduces the data. Section 3 describes the empirical specifications and present results on deposits. Section 4 contains the empirical results on banks' assets and Section 5 concludes.

## 2. Historical background and data

This section provides information on disclosure regulation during the sample period and introduces the data.

### 2.1. Disclosure policy events in 1933

During normal times, regulators have long recognized that disclosure is an important tool that helps the market discipline of banks. As such, there is a history in the United States of banks being required to report summary statistics of their balance sheet on a periodic basis (call reports) since the free banking era. During the 1930s, the United States had a unit banking system which meant that the vast majority of depositors were local. As a result, an effective way to disclose balance sheet information, and what the OCC and NY state banking department required, was for banks to periodically publish these data in local newspapers.<sup>10</sup>

Although disclosure is viewed as helpful during normal times, regulators have always been concerned that disclosure could play an adverse role during moments of crisis. During the banking panics of the Great Depression the federal government sought to manage the information environment by declaring a 4-day national bank holiday from March 6th to March 9th of 1933, and then passing the Emergency Banking Act on March 9th. This legislation provided a mechanism for reviewing banks and selectively reopening solvent banks. Indeed, President Roosevelt ordered the comptroller of the currency and the Federal Reserve to perform emergency examinations of all national-charter banks (and state-charter banks which were members of the Federal Reserve System), and if they were declared solvent, they could reopen. By doing so, the government was able to reveal information about the aggregate solvency of the banking system. In addition, the government was able to convince the public that specific banks which might appear weak and vulnerable, were in fact, healthy and solvent. The bank holiday and the subsequent bank review succeeded in rejuvenating public confidence in the banking system as a whole.

In March 1933, following the declaration of a national bank holiday, national and state bank regulators did not collect the March call reports. Despite this nationwide effort, the NY state bank regulator determined that depositors and creditors of banks remained "panic-stricken" and likely to withdraw their deposits. As a result, the regulator suspended the rendering and publication of call reports for state-charter banks until 1935. From the Annual Report for the year 1933, p. 41:

<sup>8</sup> Other related work are empirical studies which examine on how investors with different levels of information sensitivity produced and used private information during the 2007–09 financial crisis (e.g., see Gallagher et al., 2019 and Brancati and Macchiavelli, 2019).

<sup>9</sup> For examples of theoretical work, see Diamond and Dybvig (1983), Gorton and Pennacchi (1990), Andolfatto (2010), Hanson et al. (2015), and Dang et al. (2017).

<sup>10</sup> For more details on disclosure regulation during this period, see online Appendix A. Both regulators required the publication of these call reports in local newspapers at roughly the same time (see online Appendix B for dates).

“In the opinion of this Banking Board, the interests of depositors and stockholders and the public generally in banking institutions subject to the supervision of the Banking Department will best be protected by eliminating the rendering and publication of the quarterly reports referred to in the Banking Law...”

In contrast, after the March 1933 bank holiday, the OCC resumed the collection and publication of call reports for national-charter banks. Given this divergence in policy over the call reports, households in New York were placed in a unique situation where they became depositors of banks with starkly different levels of transparency around their balance sheet.

## 2.2. Data and preliminary analysis

A semiannual bank-level data set of balance sheet variables from June 1931 to December 1934 was constructed using the *Rand McNally Bankers' Directory*. During this period, Rand McNally published its *Bankers' Directory* in January and July of each year, providing a snapshot of banks' balance sheets in December and June.<sup>11</sup> The company solicited banks to submit their balance sheet information directly to it or obtained the information from other sources, such as call reports. Fortunately, Rand McNally obtained balance sheet information directly from NY banks, and so was able to publish their balance sheets over 1933 and 1934 in its *Bankers Directory*. As a check on the data, total deposits from the *Bankers Directory* was compared to figures published in regulatory reports and found to be roughly equal, attesting to the accuracy of the *Bankers Directory* (see online Appendix D).

It is important to emphasize that bankers, as opposed to households, were the consumers of the *Bankers Directory*.<sup>12</sup> During this period, checks were used as a national payments instrument in the United States. The fragmented nature of the U.S. banking system, however, made it difficult for banks to manage the counterparty risks arising from check clearing. In response, business information publishers such as Rand McNally collected balance sheet information and published the results with a one month lag, on a subscription basis. Bankers subscribed to these directories in order to learn about the health of the banks from which they face exposure as a result of accepting checks from the depositors at those banks. The fact that local depositors did not subscribe or otherwise use these business directories is important for this analysis, given the focus on the benefits to suppressing information by not requiring the publication of balance sheet information in local newspapers.

Not all NY commercial banks listed in the *Bankers Directory* were used in the analysis. Rather, in order to compare banks with similar characteristics, banks in central reserve and reserve cities (New York City, Albany, and Buffalo) were excluded.<sup>13</sup> This is because banks in these cities were often larger and had a different business model. Indeed, large city banks, especially those in New York City, held a large share of deposits due to other rural banks (deposits from institutional depositors). Furthermore, to avoid issues with selection, banks that failed before March 1933 as well as new banks were removed.<sup>14</sup> The remaining banks in the sample are homogeneous in that they mostly accepted deposits and issued loans in local markets.

Removing banks in financial cities also ensures that the analysis focuses on the deposit withdrawals by household depositors. As reported in [Mitchener and Richardson \(2019\)](#), banks in reserve and central reserve cities faced heavy withdrawals by institutional depositors, such as rural state-charter banks (especially those which were not members of the Federal Reserve). In contrast, the rural banks studied here held less than 2 percent of deposits due to other banks and so were exposed almost exclusively to withdrawals by household depositors.

Whether or not a state-charter bank is a member of the Federal Reserve System is also observed, a feature that strengthens the identification of the analysis. All national-charter banks are members of the Federal Reserve System, and so a comparison of national-charter and those state-charter banks which are members of the Federal Reserve System, is an analysis of banks which face the same regulatory and supervisory standards; they had identical reserve requirements, capital requirements, and branching restrictions and were both examined by the supervisory group at the Federal Reserve Bank of New York. Nevertheless, the state banking regulator continued to control the information disclosure policy of state charter banks. As a result, a comparison of national-charter and NY state-charter banks which are Federal Reserve System members allows for a clean identification of the effect of information suppression without a concern over potential differences in regulation or supervision.

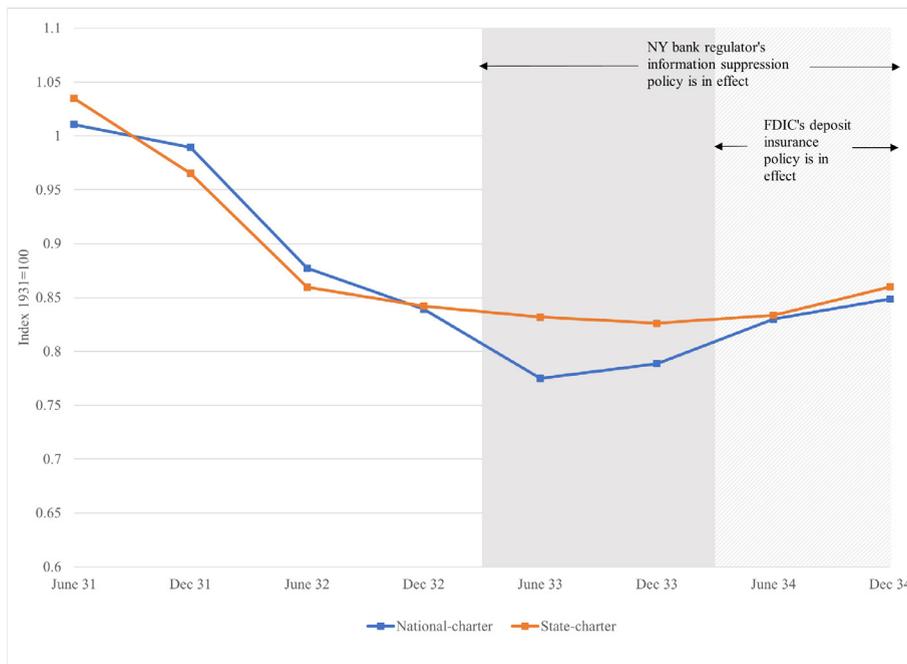
Summary statistics of balance sheet items are computed for national-charter, state-charter banks, and the subset of state-charter banks which are members of the Federal Reserve System (see online Appendix Table F3). Throughout the sample period, state-charter banks are larger than national-charter banks in terms of deposits, driven mainly by the subset of state-charter banks which are Federal Reserve System members. Nevertheless, the composition of banks' portfolio of assets are

<sup>11</sup> Polk published its *Bankers' Encyclopedia* in March and September, focusing on information from the calls at the end of the first and third quarters. These companies consolidated in 1933 during the Great Depression and coordinated on publishing balance sheet information.

<sup>12</sup> See online Appendix A for an example of how this directory was advertised.

<sup>13</sup> Albany lost its reserve city status on July 1, 1929, so banks in Albany were considered as country banks thereafter. However, these banks were removed from the analysis because the behavior of Albany banks most likely differed from that of other country banks.

<sup>14</sup> Information published in the *Rand McNally Bankers Directory* identifies all bank failures and mergers from 1929 to 1935. To ensure its accuracy, this information was cross-checked using the *Annual Report of the Superintendent of Banks* and the *Annual Report of the Comptroller of the Currency* for state-charter and national-charter banks, respectively. Not surprisingly, many of the new banks that appeared over the sample period consequently failed.



**Fig. 1.** Evolution of Deposits of National and State-Charter Banks in NY, 1931–1934. *Note:* This figure displays the aggregate amount of deposits held at national and state-charter banks in NY. Deposits held by banks located in Buffalo, Albany and New York City are excluded. In addition, deposits held by banks that failed before March 1933 are excluded as are deposits held by new banks in the sample. Aggregate deposits are indexed to the average of the June 1931 and December 1931 levels. Source: Rand McNally Bankers Directory and authors' calculations.

quite similar across all three types of banks. Mirroring the similarities in the portfolio of assets, banks' capital structures do not vary much across national-charter and state-charter banks, with deposits making up between 78.5 to 80.6 percent of total liabilities across bank types in the pre-treatment period.

Before turning to the detailed empirical analysis, the aggregate dynamics of deposits are considered for national and state-charter banks in New York and the geographic dispersion of deposits by charter type is illustrated. The aggregate movements in deposits foreshadow the empirical analysis detailed in the following section. As highlighted in Fig. 1, deposits for both types of banks fell in 1931 and 1932. In 1933, however, state-charter banks basically maintained their level of deposits while national-charter banks continued to experience large outflows in the first half of 1933. This difference in deposit flows is attributed to the NY state bank regulator's policy of information suppression. Deposit movements then converged starting in 1934, consistent with the theoretical prediction that the introduction of federal deposit insurance provided by the FDIC makes irrelevant the gains from making state-charter banks' balance sheets more opaque.

The distribution of deposits by charter-type in NY is important because the analysis depends on national and state-charter banks experiencing similar geographic shocks. To this end, in Fig. 2 the percentage of deposits held by state-chartered banks across counties is plotted for June 1931. Overall, this figure demonstrates that national and state-charter banks are spread across NY. Although there are three counties in western NY with a high concentration of deposits in state-charter banks, there are other counties in western NY with the 0 to 40 percent state-charter bank share of deposits, similar to what is seen in the rest of NY. As a result, these results demonstrate that both the national and state-charter banks in the sample were equally exposed to geographic-specific shocks.<sup>15</sup>

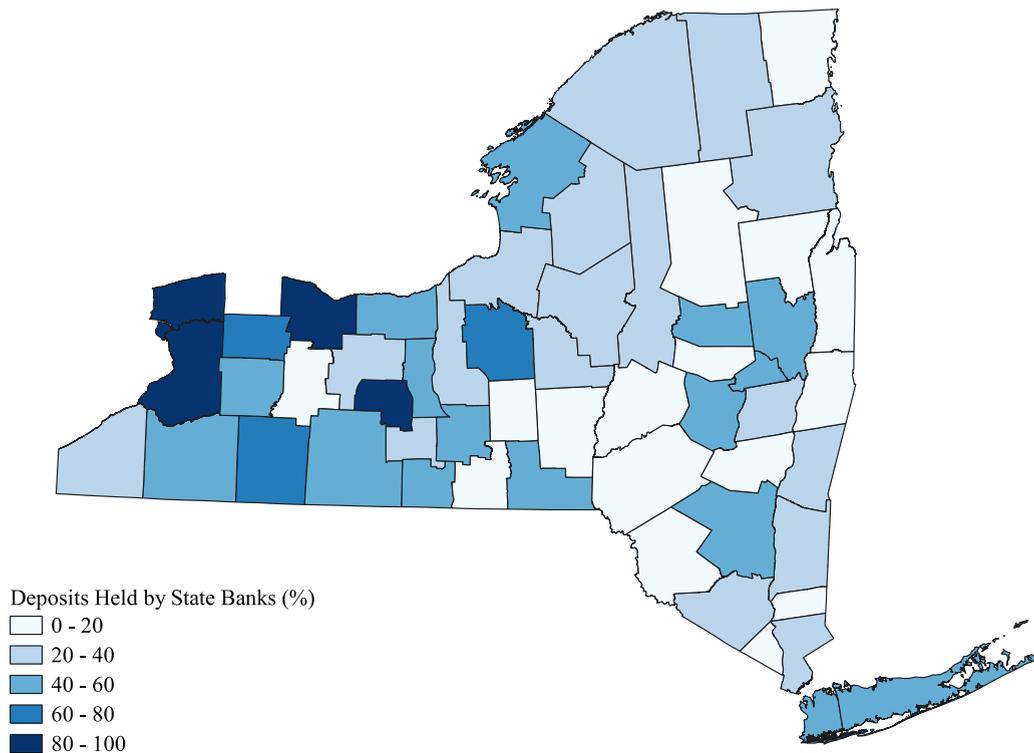
### 3. Empirical analysis and results on bank deposits

In this section the empirical specifications are described, results are presented, and identification is discussed.

#### 3.1. Empirical specification

To formally test whether the NY state bank regulator's policy of information suppression had a causal impact on bank deposits, a difference-in-differences estimator is employed. The sample period is from 1931 to 1934, and the treatment is

<sup>15</sup> In NY at this time, both national and state-charter banks were restricted to providing services in one location. See online Appendix C for a comparison of regulation and supervision across both charter types.



**Fig. 2.** Percent of Deposits Held by State-Charter Banks in New York, June 1931. *Note:* This figure displays the share of total deposits held at state-charter banks by county in New York. Deposits held by banks located in Buffalo, Albany and New York City are excluded. In addition, deposits held by banks that failed before March 1933 are excluded as are deposits held by new banks in the sample. The 5 counties comprising New York City are not displayed on this map. Source: Rand McNally Bankers' Directory and authors' calculations.

defined to be the introduction of the policy in 1933. The treated group is state-charter banks and the control group is national-charter banks. Letting  $i$  denote a bank and  $t$  a period of time, the main specification is:

$$\ln(\text{Dep}_{i,t}) = \alpha + \beta_1 * \text{STATE}_i * 1933\_1934_t + \Omega * X_{i,t-1} + \eta_i + \gamma_t + \varepsilon_{i,t}, \quad (1)$$

where the dependent variable is the log of deposits, which is winsorized at the 1 percent level to avoid outliers driving the estimation results. The dummy variable  $\text{STATE}$  takes on the value of one for state-charter banks, and the dummy variable  $1933\_1934$  takes on the value of one if the observation is recorded in 1933 or 1934, the period during which the NY state banking department implemented the information suppression policy.<sup>16</sup> The variable  $X_{i,t}$ , which enters the specification with a lag, represents a vector of bank-level controls that varies over time and across banks, and is composed of the ratio of the sum of cash to total assets, the ratio of securities to the sum of securities and loans, the ratio of equity to total liabilities, and log of asset size. These variables are included to control for liquidity, quality of investment, equity, and bank size, respectively. Finally,  $\eta$  is a vector of bank fixed effects to control for unobservable heterogeneity at the bank level which is constant over time and  $\gamma$  is a vector of time fixed effects.<sup>17</sup> Error terms are clustered at the bank level in order to account for serial correlation.

In this specification, the coefficient  $\beta_1$  captures the effect of the information policy on deposits. If the management of the information environment is important to households when they are making deposit decisions, then the NY state banking regulator's information suppression policy should increase depositors' confidence in treated banks, leading to comparatively faster deposit growth.

The analysis then employs separate interaction terms in 1933 and 1934 to examine how the introduction of federal deposit insurance in 1934 affected depositors in conjunction with the information suppression policy. The introduction of federal deposit insurance should at least partially offset the NY state banking regulator's policy, and so smaller effects should be seen in 1934 compared to 1933.

To address a variety of potential concerns about differences between national and state-charter banks, the above regression is re-estimated using national-charter banks and only those state-charter banks which are members of the Federal

<sup>16</sup> The  $\text{STATE}$  variable is not indexed by time because none of the banks in the sample changed their charter-status.

<sup>17</sup> In the regression the  $\text{STATE}$  and  $1933\_1934$  dummy variables are not included separately because they are not identified with the inclusion of bank and time fixed effects.

Reserve System. With this filter, all banks have access to the Federal Reserve's discount window, face the same set of regulations, and have a common supervisory experience, in that supervisors at the Federal Reserve Bank of New York review the bank reports generated for all their member banks. These points are discussed in more detail in [Section 3.3](#).

Although the specifications described above identify the effect of the information suppression policy on deposits, they do not reveal whether the policy encourages households to hold more deposits at their state-charter bank than they would otherwise or move their deposits from national-charter banks to state-charter banks. To clarify the mechanism at work, all the towns in which only national-charter or state-charter banks operate are identified. The difference-in-differences regression is then re-estimated on only those banks in towns where one type of bank charter is present and, separately, on only those banks in towns in which both national and state-charter banks are present. The comparison of the estimated coefficients on the interaction terms then reveals whether the effect of the policy on state-charter banks depend on whether there is a national-charter bank in the same local market.

An important assumption behind the analysis presented is that factors underlying a bank's charter choice (national versus state) are not driving the differential dynamics of deposits during the crisis. To demonstrate that these factors are not affecting the results, an analysis considering banks in both New York and New Jersey is considered. The NJ bank regulator did not implement an information suppression policy, and so NJ state-charter banks can be considered a control group and compared to NY state-charter banks. Rather than include all banks in New Jersey, only those banks in northern New Jersey, in the second district of the Federal Reserve, are included. (Banks in southern New Jersey are in the third district.) With this filter, all the banks in this NY-NJ sample are in the same Federal Reserve district.<sup>18</sup> Formally, the following difference-in-differences regression is estimated:

$$\ln(Dep_{i,t}) = \alpha + \beta_1 * STATE_i * 1933\_1934_t + \beta_2 * 1933\_1934_t * NY_i + \beta_3 * STATE_i * 1933\_1934_t * NY_i + \Omega * X_{i,t-1} + \eta_i + \gamma_t + \varepsilon_{i,t}, \quad (2)$$

where  $NY_i$  is an indicator variable equal to 1 if bank  $i$  is located in NY. In this second general specification, the coefficient  $\beta_3$  captures the effect of the information policy on NY state-charter bank deposits by comparing state-charter banks in New Jersey and New York.

As in the benchmark specification, if the management of the information environment is important to depositors' withdrawal decisions, then the NY state banking regulator's information suppression policy should increase depositors' confidence in the NY state-charter banks, leading to higher levels of deposits. Following the work described above, the above regression is re-estimated (i) allowing for separate effects for 1933 and 1934, (ii) including only those banks which are members of the Federal Reserve System.

## 3.2. Results

In this section, the results comparing national and state-charter banks in New York are presented as well as the results comparing state-charter banks in New York and New Jersey.

### 3.2.1. Analysis of NY banks

The results from the difference-in-differences estimation of log deposits of banks in New York by type of charter are reported in [Table 1](#).<sup>19</sup> Across all the specifications, the effect of the policy of information suppression is consistently found to have increased the deposits of state-charter banks relative to national-charter banks in the range of 3–5 percent. Furthermore, the estimated effect is concentrated in 1933, before the introduction of deposit insurance in 1934.

The estimates for the specification described in [Eq. \(1\)](#) are reported in column (1). The interaction term ( $STATE * 1933\_1934$ ) is positive and significant, and the estimate implies that the effect of the NY state bank regulator's information suppression policy is a 3.3 percent increase in the level of deposits at state-charter banks.

The results which allow for different effects in 1933 and 1934 are reported in column (2) and demonstrate stronger results of the policy's effect on deposits in 1933. The estimates imply that state-charter banks experienced an increase of 4.0 percent in the level of deposits compared to national-charter banks in 1933. In 1934, this effect weakens to 2.4 percent, and becomes less statistically significant. State-charter banks, then, were able to avoid deposit withdrawals to a greater degree relative to national-charter banks in 1933, but their advantage starts to disappear in 1934 with the introduction of deposit insurance.

In columns (3) and (4), the results of the difference-in-differences regressions are reported which only include banks that are members of the Federal Reserve System. As illustrated in the table, the estimated effects of the information suppression policy are stronger under this specification. Over 1933–1934, the results imply that information suppression policy lifted deposits by 3.7 percent. Looking at each year separately, the estimates imply that the policy lifts deposits by 5.4 percent in 1933 and does not have a statistically significant effect in 1934.

<sup>18</sup> Having banks in the same Federal Reserve district results in all banks having the same supervisory as well as facing the same monetary policy. During this period, monetary policy was mainly implemented through discount rates and Federal Reserve Banks would set different rates depending on local economic conditions.

<sup>19</sup> The estimated coefficients for the bank control variables are reported in online Appendix F.

**Table 1**  
Effect of the Information Suppression Policy on Deposits, NY Banks.

|                          | ln(Deposits)           |                       |                       |                       |                       |                       |                      |                       |
|--------------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|
|                          | (1)                    | (2)                   | (3)                   | (4)                   | (5)                   | (6)                   | (7)                  | (8)                   |
| State x 1933–1934        | 0.0326***<br>(0.00967) |                       |                       |                       |                       |                       |                      |                       |
| State x 1933             |                        | 0.0402***<br>(0.0103) |                       |                       | 0.0445***<br>(0.0133) |                       | 0.0442**<br>(0.0195) | 0.0400***<br>(0.0120) |
| State x 1934             |                        | 0.0244**<br>(0.0113)  |                       |                       | 0.0341*<br>(0.0191)   |                       | 0.0261<br>(0.0197)   | 0.0238*<br>(0.0126)   |
| State Member x 1933–1934 |                        |                       | 0.0366***<br>(0.0134) |                       |                       |                       |                      |                       |
| State Member x 1933      |                        |                       |                       | 0.0540***<br>(0.0124) |                       | 0.0545***<br>(0.0157) |                      |                       |
| State Member x 1934      |                        |                       |                       | 0.0187<br>(0.0181)    |                       | 0.0203<br>(0.0287)    |                      |                       |
| Constant                 | 2.448***<br>(0.181)    | 2.424***<br>(0.182)   | 2.515***<br>(0.205)   | 2.493***<br>(0.205)   | 1.845***<br>(0.360)   | 1.637***<br>(0.433)   | 2.046***<br>(0.337)  | 2.565***<br>(0.212)   |
| Bank controls            | Yes                    | Yes                   | Yes                   | Yes                   | Yes                   | Yes                   | Yes                  | Yes                   |
| Half-year fixed effects  | Yes                    | Yes                   | Yes                   | Yes                   | Yes                   | Yes                   | Yes                  | Yes                   |
| Bank fixed effects       | Yes                    | Yes                   | Yes                   | Yes                   | Yes                   | Yes                   | Yes                  | Yes                   |
| Observations             | 4604                   | 4604                  | 3542                  | 3542                  | 4480                  | 3453                  | 1706                 | 2898                  |
| R2                       | 0.602                  | 0.602                 | 0.593                 | 0.593                 | 0.441                 | 0.421                 | 0.603                | 0.610                 |

This table presents the difference-in-differences estimates of the effect of the NY state bank regulators' information suppression policy on log deposits for banks in New York. The first, second and fifth columns include national charter and state charter banks. The third, fourth, and sixth columns include national charter and state charter banks that are members of the Federal Reserve System. The dummy variables, *State* and *State Member*, take on the value of one for state charter banks and for state charter banks that are members of the Federal Reserve System, respectively. The dummy variable *1933–1934* takes on a value of one if the observation is recorded for years 1933 or 1934. The dummy variables, *1933* and *1934*, take on the value of one if the observation is recorded for years 1933 and 1934, respectively. The interaction terms capture the effect of the information suppression policy on New York banks. Banks controls include the ratio of the sum of cash to total assets, the ratio of securities to the sum of securities and loans, the sum of capital and surplus, and log of asset size. In columns (5) and (6), pre-treatment bank controls are used. Column (7) includes all banks in towns which have only one type of charter, and Column (8) includes all banks in towns which have both national-charter and state-charter banks. Standard errors are clustered at the bank level and presented in parenthesis. R-squared is within r-squared. Log deposit variable is winsorized at the 1% level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels respectively.

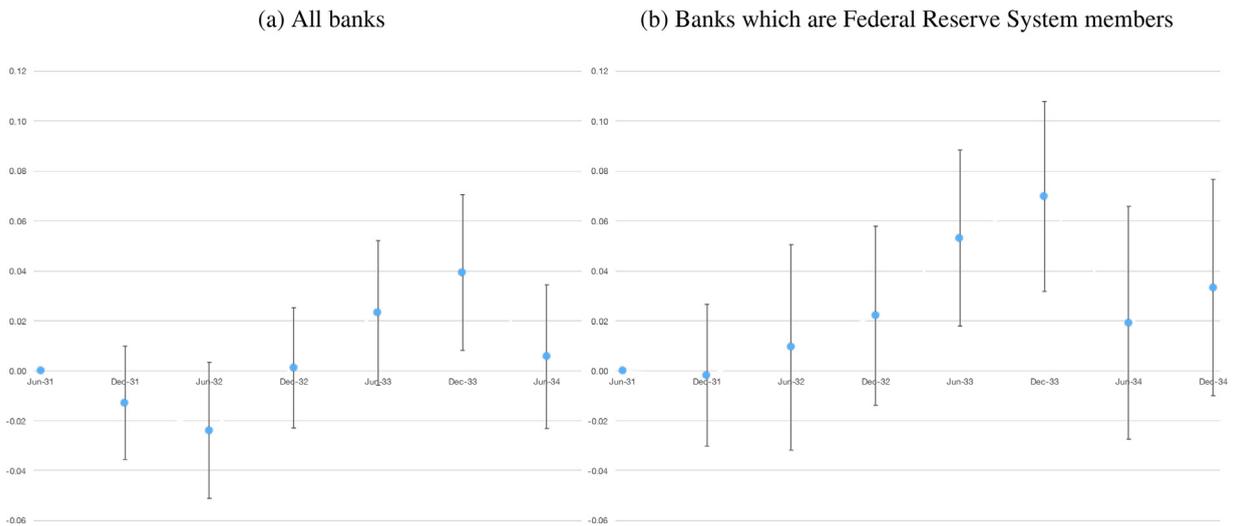
To further illustrate the difference in deposit flows across national and state-charter banks, the time-varying effects of charter type on the log of deposits are estimated by interacting *STATE* with half-year dummies. The resulting estimated coefficients and their 95 confidence interval are plotted in Fig. 3.<sup>20</sup> The left panel includes all national and state-charter banks and the right panel includes only those banks which are members of the Federal Reserve System. Before the implementation of the information suppression policy at the beginning of 1933, the estimated coefficients are statistically insignificant from zero. In contrast, there are positive and significant coefficients in 1933 and, to a lesser extent, in 1934.

Turning back to Table 1, a criticism of using lagged controls of bank characteristics in the regression specification is that these controls (i) are not effective for state-charter banks in 1933–1934 as depositors could not observe these banks' balance sheets and (ii) may be systemically affected by the treatment. To address this concern, an alternative approach is implemented where bank-level controls in 1933 and 1934 are set to their averages in 1932, before the policy of information suppression was put into place.<sup>21</sup> The results of this “pre-treatment” approach are reported in column 5 of Table 1, comparing national and state-charter banks, as well as in column 6, comparing only those banks which are members of the Federal Reserve System. In line with the previous results, the estimated coefficients imply that the policy of information suppression lifted deposits at state-charter banks by 4.4 to 5.5 percent, with the effect concentrated in 1933. As such, there is little concern over the implementation of the control variables or that the results are being driven by the information suppression policy's effect on the control variables.

To more clearly identify the mechanism behind the policy, the data are split into two mutually exclusive sub-samples: (i) only including banks in towns where all local banks have the same type of charter (“solo-charter”), and (ii) only including banks which are *not* in solo-charter towns. The difference-in-differences regression is estimated on both sub-samples and the results are shown in columns 7 and 8 of Table 1. Comparing the estimated coefficients on the two interaction terms, *STATE \* 1933* and *STATE \* 1934*, demonstrates that the effect of the policy of state-charter banks is the roughly the same across both sub-samples, providing evidence against the idea that deposits were flowing from national-charter to state-charter banks in response to the policy of information suppression. Rather, these results are consistent with the idea that the policy convinced households to hold more deposits at state-charter banks than they would have otherwise.

<sup>20</sup> The estimated coefficients are also reported in online Appendix Table F11.

<sup>21</sup> We thank an anonymous referee for this suggestion.



**Fig. 3.** Time-Varying Effects of a State Charter on Deposits, NY Banks. *Note:* These figures report the coefficients and 95 percent confidence intervals from a difference-in-differences regression of log of deposits on half-year time fixed effects interacted with the bank charter-type indicator variable, where bank controls and bank fixed effects are also included. Coefficients are measured relative to the first half of 1931. Panel 3a includes all national-charter and state-charter banks whereas Panel 3b includes national-charter banks and state-charter banks which are members of the Federal Reserve System.

### 3.2.2. Analysis of banks in New York and New Jersey

The results from the difference-in-differences analysis of NY and NJ banks deposits are now presented and discussed. In column (1) of Table 2 the estimates from the specification described in Eq. (2) are reported.<sup>22</sup> In line with the results from Table 1, the interaction term, ( $STATE * 1933\_1934 * NY$ ) is positive and significant. The estimated coefficient implies that relative to their NJ brethren, the information suppression policy boosted the level of deposits at NY state-charter banks by 6.6 percent.

In column (2) the estimates of the specification which allows for different effects in 1933 and 1934 are reported. Similar to the benchmark results, the estimates imply that the information suppression policy was concentrated in 1933. Finally in columns (3) and (4), the results are reported of the difference-in-differences regressions estimated only for banks which are members of the Federal Reserve System. The estimated effect of the information suppression policy over 1933–1934 is 6.9 percent, close to the 6.6 percent estimated using the full sample of banks, but is only weakly statistically significant. Considering 1933 and 1934 separately, the results using this smaller set of banks are quite close to those for the full sample of banks (compare columns 2 and 4); the estimated coefficients imply that the policy of information suppression lifted state-charter banks in New York by 8.5 percent in 1933 and did not affect deposits in 1934, when federal deposit insurance was enacted.

### 3.3. Threats to inference

There are four major concerns about the identification of  $\beta_1$  in the first specification and  $\beta_3$  in the second. The first concern relates to the non-random nature of banks' charter choices. If banks opt for a national charter rather than a state charter in order to avoid stricter disclosure requirements, the estimates of  $\beta_1$  and  $\beta_3$  could be biased. Given the call reports were the primary mechanism by which depositors monitor banks, differences in the frequency of reporting could influence depositors' behavior. The NY state banking regulator, however, required the same frequency of reporting as the OCC. Moreover, the NY regulator required that state-charter banks submit balance sheet reports on dates quite close in time to those mandated by the OCC (see online Appendix B). (The only exception is from 1933 to 1934, when the NY regulator decided not to request call reports.) Given that disclosure regulation did not differ much between national-charter and state-charter banks in New York, it seems unlikely that banks chose a state charter in order to take advantage of lenient or lax rules regarding disclosure regulation.

This point is also formally addressed in two ways. First, the difference-in-differences regression which compares state-charter banks in New York and New Jersey avoids this issue of bank-charter choice. Second, the difference-in-differences regression comparing national and state-charter banks that are members of the Federal Reserve System minimizes concerns about differences in regulation and supervision more generally.<sup>23</sup> Both these specifications provides similar results to the

<sup>22</sup> The estimated coefficients for the bank control variables are reported in online Appendix F. The estimated coefficients of a regression exploring the time-varying effects of charter-type on deposits for this sample of NY and NJ banks is reported in online Appendix Table F11.

<sup>23</sup> State-charter banks which are members of the Federal Reserve System are subject to the regulations set by the OCC for national-charter banks. As a result, state-charter banks in New York and New Jersey which are members of the Federal Reserve System face the same set of regulatory criteria.

**Table 2**  
Effect of the Information Suppression Policy on Deposits, NY and NJ Banks.

|                               | ln(Deposits)         |                       |                     |                      |
|-------------------------------|----------------------|-----------------------|---------------------|----------------------|
|                               | (1)                  | (2)                   | (3)                 | (4)                  |
| State x NY x 1933_1934        | 0.0662**<br>(0.0276) |                       |                     |                      |
| State x NY x 1933             |                      | 0.0849***<br>(0.0284) |                     |                      |
| State x NY x 1934             |                      | 0.0466<br>(0.0316)    |                     |                      |
| State Member x NY x 1933_1934 |                      |                       | 0.0691*<br>(0.0382) |                      |
| State Member x NY x 1933      |                      |                       |                     | 0.0845**<br>(0.0352) |
| State Member x NY x 1934      |                      |                       |                     | 0.0537<br>(0.0459)   |
| Constant                      | 2.772***<br>(0.317)  | 2.749***<br>(0.321)   | 2.722***<br>(0.393) | 2.709***<br>(0.394)  |
| Bank controls                 | Yes                  | Yes                   | Yes                 | Yes                  |
| Half-year fixed effects       | Yes                  | Yes                   | Yes                 | Yes                  |
| Bank fixed effects            | Yes                  | Yes                   | Yes                 | Yes                  |
| Observations                  | 6483                 | 6483                  | 4961                | 4961                 |
| R2                            | 0.540                | 0.541                 | 0.551               | 0.552                |

This table presents the difference-in-differences estimates of the effect of a treatment introduced in 1933 on log deposits for banks in NY and northern NJ. The first and second columns include national and state-charter banks. The third and fourth columns include national and state-charter banks which are members of the Federal Reserve System. The dummy variables, *State* and *State Member*, take on the value of one for state charter banks and for state charter banks that are members of the Federal Reserve System, respectively. The dummy variable *1933\_1934* takes on a value of one if the observation is recorded for years 1933 or 1934. The dummy variables, *1933* and *1934*, take on the value of one if the observation is recorded for years 1933 and 1934, respectively. Lastly, the dummy variable *NY* takes on the value of one if the bank is located in NY. Bank controls include the ratio of the sum of cash to total assets, the ratio of securities to the sum of securities and loans, the sum of capital and surplus, and log of asset size. Standard errors are clustered at the bank level and presented in parenthesis. R-squared is within r-squared. Log deposit variable is winsorized at the 1% level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels respectively.

benchmark result comparing national and state-charter banks in New York, allaying concerns over the endogenous choice of charter type.

The second concern is that the estimated differences in bank deposits may reflect differences in the demand for deposits at national and state-charter banks. Indeed, a potentially salient difference across the two bank types is that all national-charter banks but only some state-charter banks, have access to the Federal Reserve's discount window. This particular concern is addressed by the aforementioned analysis of national and state-charter banks which are members of the Federal Reserve System.

Another possible difference in demand across the bank types is pricing, in that national and state-charter banks could have offered systematically different deposit rates to households. This is unlikely for two reasons: 1) Anderson et al. (2018) demonstrate that during this period when there were steady outflows of deposits from banks, household depositors paid little attention to deposit rates; and 2) the Banking Act of 1933 introduced Regulation Q, which imposed ceilings on the payment of interest on deposit accounts for banks that are Federal Reserve System members. This concern over pricing is thus allayed by the robustness of the main results to the analysis focused on only banks which are members of the Federal Reserve System.

The third concern is that national and state-charter banks may have different compositions of depositors, which may lead to different deposit growth rates between the two bank types. In particular, banks in this period accepted household deposits as well as deposits due to other banks. The filtering of the data to remove all banks in reserve and central reserve cities helps alleviate this concern—as it is those banks that attract large due-to deposits. Indeed, an examination of the composition of deposits for both national and state-charter banks in the sample finds that banks have only a tiny amount of due-to deposits (see online Appendix E).

The fourth and last concern is that differences in bank deposits might have been driven by the introduction of other financial reforms during the Hoover and Roosevelt administrations, rather than the NY state banking regulator's information suppression policy. A careful comparison of the new regulations introduced by the Banking Act of 1933 to the existing

Furthermore, given the focus on northern NJ banks, which are in the same district of the Federal Reserve as NY banks, these state-charter banks in New York and New Jersey share a common supervisor, the staff at the Federal Reserve of New York.

regulations for NY state-charter banks and national-charter banks, however, does not reveal examples of such reforms (that have not already been addressed in the discussion above).

Nevertheless, this point is formally addressed with a placebo test using data on banks' deposits in New Jersey, a state in which the bank regulator did not implement an information suppression policy during over same period. An analysis of deposits in New Jersey will reveal if there were other national reforms implemented in 1933 that differentially impacted deposits at national and state-charter banks.

In this placebo test, the same regression described in Eq. (1) is estimated using data on banks in northern New Jersey, in the second district of the Federal Reserve System. As in the analysis of NY banks, the specification which compares national and state-charter banks as well as the one which compares only banks which are members of the Federal Reserve System are estimated. In the results, none of the interaction terms are statistically significant, suggesting that the benchmark results are not driven by financial reforms other than the information suppression policy (see the estimated coefficients in online Appendix Table F4).

#### 4. The effect on assets

In this section the information suppression policy's affect on banks' assets is analyzed. In the first step, the average effect by type of bank charter is estimated. In the second step the heterogeneous effects of the policy across banks are estimated.

##### 4.1. Average effects across national and state-charter banks

The vast majority of banks' assets in the sample are comprised of loans, bonds and cash holdings, and so those are the objects of the analysis. The focus is on the comparison of national and state-charter banks in NY and the difference-in-differences approach specified in Eq. (1) is employed, where there are separate treatment effects in 1933 and 1934. In addition to analyzing loans, bonds, and cash holdings, total assets and equity are considered so as to determine whether there are differences in the size of the balance sheet across bank types, and differences in losses or gains to equity.<sup>24</sup>

The pre-trend analysis of each asset class by charter type revealed some notable differences in asset holdings in 1931, the beginning of the sample. To navigate this hurdle, a propensity score method is employed to match national and state-charter banks based on the ratio of the sum of cash to total assets, the ratio of securities to the sum of securities and loans, the ratio of equity to total liabilities, and the log of asset size, in the pre-treatment period. Although this refinement decreases the number of observations used in the analysis, it strengthens identification and so allows for a better comparison of outcomes across these two types of banks.

As done with the analysis of deposits, the trend dynamics are analyzed by estimating the time-varying effects of charter-type on the log of loans, bonds, and cash holdings. (As before, this is implemented by interacting the charter-type indicator variable with half-year dummies.) The resulting coefficients are reported in online Appendix Table F12 and are illustrated in online Appendix Figure F5 along with their 95 percent confidence intervals.

The estimated coefficients from the difference-in-differences regressions are reported in Table 3. The estimates imply that the information suppression policy does not have much of an effect on loans. Rather, the asset-side impact of the policy shows up in 1933 with sizeable effects of 7.3 and -7.6 percent in the level of bond and cash holdings, respectively. In addition to this compositional change in assets, the estimated coefficients imply that state-charter banks' total assets were 3.6 and 3.3 percent larger in 1933 and 1934 respectively, relative to national-charter banks. In 1934, the results also find a relatively higher level of total equity for state-charter banks, likely reflecting that state-charter banks faced relatively smaller net losses during this difficult macroeconomic period.

Overall, these results have two implications. First, the effect of the information suppression policy on bolstering deposits led to state-charter banks having both higher total assets holding and higher levels of bonds relative to the national-charter banks. The second implication is that state-charter banks decreased their cash holdings with the introduction of the information suppression policy, and as a result these banks decreased the liquidity of their portfolio of assets. This shift in asset holdings is not surprising given that depositors could no longer observe the balance sheets of state-charter banks and that bonds generate higher economics returns relative to cash.

This analysis is repeated on the subset of national and state-charter banks which are members of the Federal Reserve. The results have weaker statistical significance but are in-line with those presented above in that state-member banks have both a higher level of bonds and total assets in 1933 (see online Appendix Table F8).

##### 4.2. Heterogeneous effects across national and state-charter banks

Whether the informational suppression policy had a heterogeneous impact is then considered by analyzing whether weaker state-charter banks experienced relatively stronger treatment effects. Weak banks are identified by the ratio of their cash-holdings to total assets as during the Great Depression, depositors were sensitive to this measure of cash holdings due to the first-come first-serve constraints banks faced with deposit holders (Calomiris and Mason, 1997; 2003). Using data

<sup>24</sup> Cash holdings are considered the most liquid asset, followed by bonds and then loans.

**Table 3**  
Effect of the Information Suppression Policy on Assets.

|                         | ln(Loans)           | ln(Bonds)            | ln(Cash)              | ln(Assets)            | ln(Equity)           |
|-------------------------|---------------------|----------------------|-----------------------|-----------------------|----------------------|
| State x 1933            | 0.0405<br>(0.0270)  | 0.0731**<br>(0.0293) | -0.0759**<br>(0.0372) | 0.0357**<br>(0.0161)  | 0.0181<br>(0.0172)   |
| State x 1934            | 0.0342<br>(0.0229)  | 0.0133<br>(0.0263)   | 0.00229<br>(0.0466)   | 0.0326***<br>(0.0109) | 0.115***<br>(0.0229) |
| Constant                | 1.203***<br>(0.375) | 1.138*<br>(0.675)    | 2.327***<br>(0.679)   | 2.564***<br>(0.204)   | 1.372***<br>(0.287)  |
| Bank controls           | Yes                 | Yes                  | Yes                   | Yes                   | Yes                  |
| Half-year fixed effects | Yes                 | Yes                  | Yes                   | Yes                   | Yes                  |
| Bank fixed effects      | Yes                 | Yes                  | Yes                   | Yes                   | Yes                  |
| Observations            | 2401                | 2401                 | 2401                  | 2402                  | 2402                 |
| R2                      | 0.531               | 0.290                | 0.154                 | 0.677                 | 0.338                |

This table presents the difference-in-differences estimates of the effect of a treatment introduced in 1933 on log loans, bonds, cash holdings, total assets and equity for banks in New York. The dummy variable *State* takes on the value of one for all state charter banks. The dummy variables, *1933* and *1934*, take on the value of one if the observation is recorded for years 1933 and 1934, respectively. Included in the estimation, but not reported above, is a vector of bank controls as well as time and bank fixed effects. The bank controls include the ratio of the sum of cash to total assets, the ratio of bonds to the sum of bonds and loans, the sum of capital and surplus, and log of asset size. The regressions are estimated using a propensity score method and balance-sheet information. Standard errors are clustered at the bank level and presented in parenthesis. R-squared is within r-squared. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels respectively.

from the second half of 1932, the average ratio of cash holdings to total assets is computed across all banks, and then those banks with ratios below this mean are labelled as “weak”. Specifically, an indicator variable, denoted  $LOW\ CASH_i$ , is set equal to 1 if bank  $i$  has a cash holdings ratio in the second half of 1932 below the mean. This indicator variable is then interacted with the other indicator variables, charter type and the treatment effect, so that a triple difference-in-differences regression is estimated. Formally:

$$\begin{aligned} \ln(Y_{i,t}) = & \alpha + \delta_1 * STATE_i * 1933_t + \delta_2 * 1933_t * LOWCASH_i + \delta_3 * STATE_i * 1933_t * LOWCASH_i \\ & + \delta_4 * STATE_i * 1934_t + \delta_5 * 1934_t * LOWCASH_i + \delta_6 * STATE_i * 1934_t * LOWCASH_i \\ & + \Omega * X_{i,t-1} + \eta_i + \gamma_t + \varepsilon_{i,t}, \end{aligned} \quad (3)$$

where  $Y_{i,t}$  denotes the level of loans, bonds, cash holdings, total assets, and equity for bank  $i$  in period  $t$ .<sup>25</sup>

The estimated coefficients on the interaction terms are reported in Table 4. The estimates associated with the interaction terms of  $1933 * LOW\ CASH$  and  $1934 * LOW\ CASH$  demonstrate that weak banks fared relatively poorly in the treatment period, with significantly lower levels of loans, bonds, and total assets. Of particular interest, heterogeneous treatment effects are found for loans. The estimates imply that weak, state-charter banks held 8.9 and 11.1 percent higher levels of loans in 1933 and 1934, respectively, relative to weak, national-charter banks (see column 1 in Table 4).<sup>26</sup>

For the regressions focused on bonds, the effect highlighted previously in Table 3 continues to be seen, where the informational suppression policy results in state-charter banks holding relatively higher levels of bonds in 1933 (see the estimated coefficients on  $STATE\ x\ 1933$  in column 2). Unlike in the previous result, this effect is also found in 1934. Interestingly, a heterogeneous effect is found in 1934, whereby weak state-charter banks hold lower levels of bonds (see the coefficient associated with  $STATE\ x\ 1934\ x\ LOW\ CASH$  in column (3)). By itself, this negative effect is puzzling because the treatment effect should help weaker banks more than stronger banks. In conjunction with the regressions on loans, however, the negative coefficient on bond holdings of weak state-charter banks is evidence of risk-shifting towards loans. Hence, the information suppression policy’s effect on weak state-charter banks is shifting of assets from bonds to loans in 1934, relative to weak national-charter banks. This shift was economically large—bonds are 13.5 percent lower and loans are 11.1 percent higher.

Turning to the regression focused on banks’ cash holdings, a heterogeneous treatment effect is not found (see column 3 in Table 4). Rather, the results continue to show an average treatment effect, where all state-charter banks benefited from the informational suppression policy by holding 9.5 percent less cash in 1933.

Turning to total assets, the results show that the gains of a higher level of assets is concentrated in weak state-charter banks in 1933, whereas in 1934 all state-charter banks have relatively higher total assets. Finally, the analysis of equity levels does not find any heterogeneous effects. Unlike in the above analysis, state-charter banks are found to have 4.1 percent higher levels of equity in 1933, relative to national-charter banks. Consistent with previous results, state-charter banks are

<sup>25</sup> The interaction term between  $STATE_i$  and  $LOWCASH_i$  is subsumed into the bank fixed effects.

<sup>26</sup> The 0.0892 coefficient in 1933 has a  $p$ -value of 0.118.

**Table 4**  
Effect of the Information Suppression Policy on Assets for Weak and Strong Banks.

|                         | ln(Loans)            | ln(Bonds)            | ln(Cash)             | ln(Assets)            | ln(Equity)            |
|-------------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|
| State x 1933            | 0.000498<br>(0.0237) | 0.0592*<br>(0.0343)  | -0.0947*<br>(0.0509) | 0.00933<br>(0.0138)   | 0.0410**<br>(0.0177)  |
| State x 1934            | -0.0238<br>(0.0338)  | 0.0958**<br>(0.0411) | -0.0720<br>(0.0647)  | 0.0276*<br>(0.0167)   | 0.0790***<br>(0.0274) |
| Low Cash x 1933         | -0.0933*<br>(0.0521) | -0.0964*<br>(0.0509) | 0.0414<br>(0.0607)   | -0.0785**<br>(0.0324) | 0.0151<br>(0.0305)    |
| State x 1933 x Low Cash | 0.0892<br>(0.0569)   | 0.0460<br>(0.0595)   | 0.0220<br>(0.0755)   | 0.0627*<br>(0.0341)   | -0.0411<br>(0.0346)   |
| Low Cash x 1934         | -0.0606*<br>(0.0338) | -0.0150<br>(0.0356)  | 0.0685<br>(0.0675)   | -0.0382**<br>(0.0168) | 0.0498<br>(0.0312)    |
| State x 1934 x Low Cash | 0.111**<br>(0.0467)  | -0.135**<br>(0.0528) | 0.108<br>(0.0902)    | 0.0171<br>(0.0228)    | 0.0478<br>(0.0434)    |
| Constant                | 1.243***<br>(0.369)  | 1.149*<br>(0.669)    | 2.232***<br>(0.694)  | 2.590***<br>(0.206)   | 1.314***<br>(0.288)   |
| Observations            | 2401                 | 2401                 | 2401                 | 2402                  | 2402                  |
| R2                      | 0.535                | 0.302                | 0.161                | 0.682                 | 0.349                 |

This table presents the triple difference-in-differences estimates of the effect of a treatment introduced in 1933 on log loans, bonds, cash holdings, total assets and equity for 'weak' and 'strong' banks in New York. The weak banks are characterized as having cash holdings below the mean, in the second half of 1932 and the dummy variable *Low Cash* takes on the value of one for all weak banks. The dummy variable *State* takes on the value of one for all state charter banks. The dummy variables, *1933* and *1934*, take on the value of one if the observation is recorded for years 1933 and 1934, respectively. Included in the estimation, but not reported above, is a vector of bank controls as well as time and bank fixed effects. The bank controls include the ratio of the sum of cash to total assets, the ratio of bonds to the sum of bonds and loans, the sum of capital and surplus, and log of asset size. The regressions are estimated using a refined data set in which state-charter banks are matched to national-charter banks using a propensity score method and balance-sheet information. Standard errors are clustered at the bank level and presented in parenthesis. R-squared is within r-squared. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels respectively.

found to have 7.9 percent relatively higher levels of equity in 1934. As discussed before, these differences are likely driven by relatively smaller net losses at state-charter banks due to the informational suppression policy.

As before, this analysis is repeated for the subset of national and state-charter banks which are members of the Federal Reserve. Weak state-charter banks are found to have both higher loan levels and total assets levels relative to weak national-charter banks in 1933 and 1934. The estimated coefficients on loans are sizeable at 19.4 and 16.8 percent in 1933 and 1934, respectively, suggesting these banks substantially benefited from the information suppression policy. These regression results are in online Appendix Table F10.

The results from the triple difference-in-differences approach reveal that weaker state-charter banks saw strong benefits from the informational suppression policy. These banks were able to hold higher levels loans compared to weak national-charter banks, and so better able to maintain their lending operations and avoid costly early-termination of long-term projects. These gains were sizeable: 9–11 percent for weak state-charter banks and 17–18 percent for weak state-member banks in 1933 and 1934.

## 5. Conclusion

Information management plays a crucial role in ending financial crises. In line with that theory, regulators have historically been careful to manage the production and dissemination of information during a crisis in order to restore confidence in the financial system. Despite the perceived importance of managing information to end financial crises, there is little empirical work quantifying the effect of these policies.

This paper studies how information management affects depositors by examining the effect of the NY state bank regulator decision to not collect call reports between 1933 and 1934, affecting the public's ability to observe state-charter banks' balance sheets. In contrast, the OCC continued to collect and mandate the publication of balance sheet information of national-charter banks. This unique opportunity is exploited to compare the behavior of depositors of national and state-charter banks so as to measure the impact of information suppression on bank's balance sheets. The results show that the suppression policy led state-charter banks to experience less deposit outflows than national-charter banks. Further, state-charter banks are found to have held higher levels of bonds, and that weaker, or more run-prone, state-charter banks substantially benefited from the policy by being able to maintain their lending operations during this period to a much larger extent.

These results have important implications for policy today. Following the global financial crisis, policymakers have attempted to enhance public disclosure, with the goal of improving financial stability, by promoting the market discipline of financial institutions. This work highlights, however, that after implementing rules requiring greater public disclosure during

normal times, regulators should bear in the mind the value of suppressing information about individual institutions in times of crisis.

### Data availability

Data will be made available on request.

### Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.jmoneco.2023.01.008](https://doi.org/10.1016/j.jmoneco.2023.01.008).

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