Information Management in Times of Crisis

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Abstract

How does information management and control affect bank stability? Following a national bank holiday in 1933, New York state bank regulators suspended the publication of balance sheets of state-charter banks for two years, whereas the national-charter bank regulator did not. We use this divergence in policies to examine how the suspension of bank-specific information affected depositors. We find that state-charter banks experienced significantly less deposit outflows than national-charter banks in 1933. However, the behavior of bank deposits across both types of banks converged in 1934 after the introduction of federal deposit insurance.

Keywords: Information Management, Bank Opacity, Banking Crisis, Great Depression, Depositor Confidence

JEL classification: G21, G28, N22

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1 Introduction

Information management and control often play a central role in ending financial crises. In a crisis characterized as an "*information event*," during which information-insensitive debt becomes information-sensitive, the management of the information environment is especially crucial to restoring confidence in the broader banking sector (Gorton and Ordoñez, forthcoming). In practice, we observe regulators suppressing bank-level information with the goal of restoring the public's confidence in banks; in the national banking era the New York City Clearinghouse Association stopped bank runs on some of 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 we estimate that in a time of crisis, a policy of suppressing information about banks' balance sheets has a significant and positive effect on deposits.

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, 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 (Gorton and Tallman, 2018). Another challenge is the difficulty in disentangling the effect of information management policies from other policies that are implemented simultaneously.

In this paper, we overcome these empirical challenges 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 national four-day 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.[1] 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

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[1]The federal government's attempt to stop the banking crisis in this manner aligns with the framework described in (Gorton and Ordoñez, forthcoming) of treating the crisis as a type of informational failure.

their balance sheet for public consumption.[2] 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 state charter). This policy decision effectively ended the public's ability to observe the balance sheets of 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 state-charter and national-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 we collect data from various sources, our main analysis relies on balance sheet data of NY banks. Given the suspension of the call reports by the NY state bank regulator, we use an alternate source of balance sheet data provided by Rand McNally. Using this data source, we construct a semiannual panel data set on all commercial banks and trust companies in New York from 1931 to 1935. 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 the *Rand McNally Bankers Directory* because it was a subscription service directed at bankers seeking to manage their counterparty risk arising from the check clearing process. As such, we argue that the Rand McNally directory did not undo the information suppression policy of the NY state banking regulator.

We measure the impact of the information suppression policy on deposits using a difference-in-differences approach where state-charter banks are defined as being treated and national-charter banks are the controls. We exclude banks located in New York City as well as 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.[3]

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[2]See Silber (2009) for details on this national bank holiday and the immediate aftermath on the banking system.

[3]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.

In the regression specification, we allow for the information-suppression policy 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 we are studying.[4]

Our 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 percent higher.

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

The identifying assumption behind our analysis is that deposit growth of national-charter and state-charter banks are on parallel trends prior to the introduction of the information-suppression policy in 1933. Our filtering of the data to only include banks outside of major financial centers results in a set of national-charter and state-charter banks which are similar in observable balance-sheet characteristics. Further, when looking at NY banks by charter type, the aggregate level of deposits track one another quite closely up to 1933. Both these features of the data provide confidence that we are accurately estimating that, relative to national-charter banks, state-charter banks had a significantly higher growth rate in deposits in 1933, but not in 1934.

A potential criticism of our interpretation of the mechanism is that the difference in deposit growth is related to the different charters of the banks, rather than to the NY state banking regulator's policy. Indeed, a major difference between the two is that national-charter banks have access to the Federal Reserve's discount window whereas only those state-charter banks that choose to join the

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[4]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.

Federal Reserve and meet its eligibility requirements, gain access to the discount window.

Fortunately, we observe which state-charter banks are members of the Federal Reserve and find that our results hold for both those state-charter banks that are Federal Reserve members as well as those that are not. Consequently, access to the discount window does not play an important role in our results.

More generally, however, an argument may be made that the other policy initiatives passed in the Banking Act of 1933 could somehow have a differential impact on the depositors of state-charter versus national-charter banks. Our reading of the Banking Act of 1933 and knowledge of the existing regulations that applied to NY banks did not identify any other relevant policy initiatives.[5] Nevertheless, to address this general point we run a placebo test using deposit growth in New Jersey over the same period of time. If the results using NY banks stem from federal regulations introduced by the Banking Act of 1933, then we would expect to see a similar difference in deposit growth across state-charter and national-charter banks in NJ (a neighboring state to New York which is quite similar in terms of the banking environment and economic conditions).

Using the *Rand McNally Bankers Directory* deposit data on NJ banks, we estimate the same difference-in-differences regression and find that state-charter banks in New Jersey did not have significantly different growth in the log level of deposits in 1933 or 1934 compared to national-charter banks in New Jersey. Consequently, the mechanism behind our results does not seem to have originated from other financial reforms.

In addition to quantifying the importance of suppressing information about individual banks in a crisis, our study has important implications for new financial reforms that call for greater transparency in the financial system. Following the financial crisis of 2007-09, policymakers have attempted to enhance public disclosure, with the goal of improving financial stability, by promoting the market discipline of financial institutions. Even with the FDIC's deposit insurance program, public disclosure of the portfolio of assets held by banks is an important tool today because banks issue significant amounts of informationally-insensitive debt.[6] In an information-event crisis effecting a bank or set of banks, our results demonstrate the value of having regulators suppress

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[5]Our understanding is that except for those reforms we have already noted, the nationwide financial reforms resulting from the Banking Act of 1933 did not have a meaningful impact on NY commercial banks because similar regulations were already in effect.

[6]For example, in the United States, uninsured deposits were about 40 percent of total deposits in the second quarter of 2019 (FDIC Quarterly, Second Quarter of 2019, p. 24).

bank-specific information as a way to stem runs on those banks by depositors and other types of investors.

Our 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 banks when a sufficiently bad signal is received, where the threshold of what is sufficiently bad depends upon the aggregate state. Further, Eisenbach (2017) shows that in the bad aggregate state, a bank is much more susceptible to runs.

During the turmoil of the Great Depression, the NY state banking regulator was trying to decrease run probabilities on state-charter banks by suppressing information about individual banks. As a result, depositors would have only general information about a bank's assets, for example average asset quality, which, as evidenced by the historical record, was encouraging enough to limit runs and stem the outflow of deposits. In other words, by doing so, the regulator can prevent a coordination failure between depositors in a solvent bank.

Our paper is also closely related to the literature focused on the informational view of financial crises. These theoretical studies emphasize information asymmetry regarding debt and show that bank panics are caused by a shift in the information sensitivity of debt (Gorton and Ordoñez, 2014; Dang, Gorton, and Holmström, 2019). As such, one way to manage the information environment during a crisis is to reduce transparency. Indeed, Gorton and Ordoñez (forthcoming) show that reducing transparency of banks' balance sheets can help maintain the information-insensibility of their short-term debt and so avoid a financial crisis. This literature though, focuses on banking systems and considers informational management policies that impact all banks. The policy examined in this paper, in contrast, applied to only a subset of banks. Nevertheless, our results demonstrate the importance of managing information about individual banks in a time of crisis.

Related empirical work includes the study of clearinghouses and how these institutions 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 a bank run on some of its members by replacing the publication of individual bank balance sheets with an aggregate balance sheet. This change made an individual bank's balance sheet more opaque and also emphasized the solvency of

the clearinghouse and its members. Although the New York City clearinghouse was concerned about coordination failures among depositors in the banking system, the NY state bank regulator was concerned about a coordination failure of depositors in a solvent bank. Our work complements this work, by considering a different crisis and providing a formal econometric analysis to underpin the connection between more opacity and deposit growth.

Other related empirical work focuses on managing information around lender-of-last-resort facilities. Work that is closest to ours also focuses on the Great Depression period and quantifies the effect of publicly releasing the identities of banks that recently accessed an emergency lending facility (Anbil, 2018; Vossmeyer, 2019; Anbil and Vossmeyer, 2017). Although those works and our paper are related at the general level of assessing the importance of bank-level information to households in times of crisis, we differ in our focus. The existing works are focused on measuring the stigma associated with accessing a lender-of-last-resort type of facility, whereas our work considers the value of making the portfolio assets of banks more opaque.

Finally, there is a literature focused on measuring by how much the opaqueness of bank balance sheets helps banks issue deposits in normal times.[7] Empirically, Morgan (2002) establishes that banks are more opaque than other firms and Chen, Goldstein, Huang, and Vashishtha (2019) find links between a bank's opacity and, among other things, deposit flows and rates. Although this paper also considers the importance of opacity on a bank's ability to issue deposits, our work differs in that we focus on the effect of information suppression policies in times of crisis, rather than the effect of opaqueness in normal times.

The remainder of the paper is organized as follows. Section 2 gives a historical background. Section 3 introduces the data and provides summary statistics. Sections 4 describes empirical specifications and present results. Section 5 concludes.

2 Depositors' Access to Information Following a National Bank Holiday

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 re-

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[7]For example, see Diamond and Dybvig (1983), Gorton and Pennacchi (1990), Hanson, Shleifer, Stein, and Vishny (2015),and Dang, Gorton, Holmström, and Ordoñez (2017).

quired to report summary statistics of their balance sheet on a periodic basis (aka call reports) since the free banking era. In the 1930s, the United States had a unit banking system, which meant that the vast majority of depositors were local.[8] Hence an effective way to disclose balance sheet information, and what the OCC and NY state banking departments required, was for banks to periodically publish these data in local newspapers (for an example, see online Appendix A).[9]

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:

> "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 of being able to choose between banks with starkly different levels of transparency around their balance sheet.

3   Data and Summary Statistics

We construct a semiannual bank-level data set of balance sheet variables from June 1931 to December 1935 using the *Rand McNally Bankers Directory*. Rand McNally collected and disseminated

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[8]For the larger banks in central reserve and reserve cities that attract deposits from other banks, local depositors may be less relevant. These larger banks, however, are excluded from our analysis.

[9]Both regulators required the publication of these call reports in local newspapers at roughly the same time (see the online Appendix B for dates). After the passage of the Federal Reserve Act, Federal Reserve member banks (which includes all national-charter and some state-chartered banks) were required to submit financial reports to the appropriate Federal Reserve Bank on dates to be fixed by the Federal Reserve Board. These dates generally coincided with the dates chosen by the OCC. The Federal Reserve Act did not, however, include the requirement to publicly report financial statements.

information about all banks in the United States. 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, we compared total deposits from the *Bankers Directory* to figures published in regulatory reports and found them roughly equal, attesting to the accuracy of the *Bankers Directory* (see online Appendix C).

It is important to emphasize that bankers, as opposed to households, were the consumers of the *Bankers Directory*.[10] 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 the analysis in this paper, given our focus on the benefits to suppressing information by not requiring the publication of balance sheet information in local newspapers.

We do not use all NY commercial banks listed in the *Bankers Directory*. Rather, in order to compare banks with similar characteristics, we exclude banks in central reserve and reserve cities (New York City, Albany, and Buffalo).[11] This is because banks in these cities were often larger in size and had a different business model with different types of depositors. After excluding banks located in those cities, the remaining banks in our sample are mostly those that accept deposits and issue loans in local markets. In June of 1931, there are 771 banks in our data. The number of banks decreased as the Great Depression deepened. In June of 1933, there are 661 banks in our sample.

For this set of banks, we compute summary statistics of balance sheet items of national-charter and state-charter banks, where we separate those state-charter banks into those with and without Federal Reserve membership (see Table 1). Over 1931 and 1932, national-charter and state-

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[10]See online Appendix A for an example of such advertisements.

[11]Albany lost its reserve city status on July 1, 1929, so banks in Albany were considered as country banks thereafter. However, we removed these banks from our analysis because the behavior of Albany banks differed from that of other country banks.

nonmember banks are quite similar in terms of total deposits, whereas state-member banks are substantially larger. Nevertheless, the composition of banks' portfolio of assets are quite similar across all three types of banks. Indeed, the average ratio of cash holdings over total assets falls within a tight range of 8.5 to 9.8 percent. Similarly, the average share of securities held over the sum of securities held and loans originated is slightly less than half across the three bank types.

Mirroring the similarities in the portfolio of assets, banks' capital structures do not vary much across national-charter and state-charter banks. As illustrated in Table 1, deposits and equity make up roughly 80 percent and 14 percent of total liabilities, respectively, for each bank type.

[Insert Table 1]

Before turning to the detailed empirical analysis, we consider the aggregate dynamics of deposits for national-charter and state-charter banks in New York. As highlighted in Figure 1, deposits for both types of banks continued to fall even after the proclamation of the national bank holiday in March 1933 and only began to increase in 1935. The change in deposits was similar for both types of banks up until 1933, when national-charter banks experienced a sharper decline in deposits relative to state-charter banks. Deposit movements then converged again starting in 1934.

[Insert Figure 1]

These aggregate movements foreshadow the empirical analysis detailed in the following section. Up until December 1932, NY national-charter and state-charter banks in our sample were facing similar declines in aggregate deposit outflows. State-charter banks then fared much better in June 1933, an effect we attribute to the NY state bank regulator's policy of information suppression. The difference in deposits lasted through 1933, before disappearing in June 1934. This disappearance aligns with theory, because the introduction of federal deposit insurance provided by the FDIC makes irrelevant the gains from making state-charter banks' balance sheets more opaque.

4 Empirical Analysis and Results

4.1 Empirical Specification

To formally test whether the NY state bank regulator's policy of information suppression had a casual impact on bank deposits, we employ a difference-in-differences estimator. Our sample period

is from 1931 to 1934, and we define the treatment to be the introduction of the policy in 1933.[12] The treated group includes both types of state-charter banks, those that are members of the Federal Reserve (state-member) and those that are not (state-nonmember), and the control group are national-charter banks. We begin by estimating the average effect of the policy in the latter half of the sample. Letting i denote a bank and t a period of time, our specification is:

$$
\begin{aligned}
\log(Dep_{i,t}) = \alpha + &\beta_1 * STATE\ MEMBER_i * YEAR\ 1933 - 1934_t \\
+ &\beta_2 * STATE\ NONMEMBER_i * YEAR\ 1933 - 1934_t \\
+ &\Omega * X_{i,t-1} + \eta_i + \gamma_t + \varepsilon_{i,t},
\end{aligned}
\tag{1}
$$

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 variables *STATE MEMBER* and *STATE NONMEMBER* take on the value of one for state member and nonmember banks, and the dummy variable *YEAR 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.[13] 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 includes 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. We include these valuables to control for liquidity, quality of investment, equity, and bank size, respectively. Finally, η is a vector of bank fixed effects to control for unobservable heterogeneity at the bank level which is constant over time and γ is a vector of time fixed effects. In the regression we do not include the *STATE MEMBER*, *STATE NONMEMBER* and *YEAR 1933-1934* dummy variables separately because they are not identified once we include bank and time fixed effects. We cluster error terms at the bank level in order to account for the serial correlation of error terms.

We then build upon the above by examining how the introduction of federal deposit insurance in 1934 affected depositors in conjunction with the information suppression policy. We accomplish this by allowing for separate interaction terms in 1933 and 1934. Let YEAR 1933 be a dummy

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[12]The policy was introduced in March 1933 and our data provide balance sheet snapshots as of June and December of each year.

[13]These variables are not indexed by time because none of the banks in our sample changed their charter-status or Federal Reserve membership status over our sample period.

variable equal to 1 when an observation is recorded in 1933, and similarly define YEAR 1934. Our second regression specification is then,

$$
\begin{aligned}
\log(Dep_{i,t}) = \alpha & + \beta_1 * STATE\ MEMBER_i * YEAR\ 1933_t \\
& + \beta_2 * STATE\ NONMEMBER_i * YEAR\ 1933_t \\
& + \beta_3 * STATE\ MEMBER_i * YEAR\ 1934_t \\
& + \beta_4 * STATE\ NONMEMBER_i * YEAR\ 1934_t \\
& + \Omega * X_{i,t-1} + \eta_i + \gamma_t + \varepsilon_{i,t}
\end{aligned}
\tag{2}
$$

In our first specification, the coefficients β_1 and β_2 capture the effect of the information policy on deposits, whereas in the second specification the coefficients β_1, β_2, β_3, and β_4 capture this effect. 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. As a result, we expect β_1 and β_2 to have positive signs in both specifications. The introduction of federal deposit insurance, however, should at least partially offset the NY state banking regulator's policy, and so we expect smaller effects in 1934, resulting in $\beta_3 < \beta_1$ and $\beta_4 < \beta_2$ in the second specification.

4.2 Threats to Inference

There are four major concerns about the identification of β_1, β_2 in the first specification and β_1, β_2, β_3, and β_4 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 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). (An exception of course 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

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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.

The second concern is that the estimated differences in the growth rate of bank deposits between national-charter and state-charter banks may reflect differences in the demand for deposits between the two types of banks. Indeed, a potentially salient difference across the two types of banks is that national-charter banks have access to the Federal Reserve's discount window, whereas only those state-charter banks who are members of the Federal Reserve have access. As indicated in our regression specification, however, we observe which state-charter banks are members of the Federal Reserve. As a result, we can condition on membership and determine whether this feature is important in our analysis.

Another possible difference in demand across the types of banks is pricing. Perhaps national-charter and state-charter banks offered systematically different deposit rates to households. This is unlikely for two reasons: 1) Anderson, Barth, and Choi (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 members. As such this concern does not apply to our estimates, which condition on state-member banks. The third concern is that national-charter and state-charter banks may have different compositions of depositors, which may lead to different deposit growth rates between two types of banks. Banks accepted household deposits as well as deposits due to other banks. Hence, changes in bank deposits may be driven by due-to deposits rather than household deposits. Our 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, when we examine the composition of deposits for both national-charter and state-charter banks in our sample, we find that banks in our sample have only a small amount of due-to deposits (see online Appendix D).

The fourth and last concern is that the growth of bank deposits might have been driven by the introduction of the other financial reforms during the Hoover and Roosevelt administrations, rather than the NY state banking regulator's information suppression policy. To address this point, we compared the new regulations introduced by the Banking Act of 1933 to the existing regulations for NY state-charter banks and national-charter banks and do not see examples of such reforms that have not already been addressed above. Further, we conduct a formal placebo test using data on

banks' deposits in New Jersey.

The NJ state bank regulator did not implement an information suppression policy in our sample period. As such, an analysis of deposit growth in NJ reveals if there were other reforms implemented in 1933 that differentially impacted deposit growth at state-charter and national-charter banks. New Jersey provides an apt comparison because over our sample period, the state had a deposit clientele similar to that of New York, and New Jersey's banking industry was made up of medium-sized banks with active manufacturing and industrial bases and small banks in rural areas. Lastly, like their NY brethren, NJ banks often maintained correspondent relationships with New York City banks.[14] As a result, the behavior of both due-from and due-to deposits was similar for NY and NJ banks. Given all these similarities between NJ and NY banks, if the estimated coefficients using NY banks are being driven by the introduction of new federal regulations, then we would expect see a similar effect when using data on banks in New Jersey.[15]

4.3   Results

In Table 2, we report the results from the difference-in-differences estimation. In column (1) we report the estimates for the specification described in equation (1). We find that both interaction terms, *STATE MEMBER * YEAR 1933-1934* and *STATE NONMEMBER * YEAR 1933-1934*, are positive and significant. Further, the effect of the NY state bank regulator's information suppression policy is similar across both state member and state nonmember banks; both types of state-charter banks experienced about 2.6-2.8 percent increase in the level of deposits compared to national-charter banks.

[Insert Table 2]

In column (2), we report results from the specification described in equation (2), where we allow for different effects in 1933 and 1934. Interestingly, we find the differential growth in deposits only in 1933. Both the interaction terms *STATE MEMBER * YEAR 1933* and *STATE NONMEMBER * YEAR 1933* are positive and significant. The estimates imply that state-charter banks experienced

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[14]New Jersey did not have any reserve cities during our sample period.

[15]Prior to 1935 each Federal Reserve Bank implemented its own monetary policy and thus affected local conditions. Although the entire state of New York is in the second district, northern New Jersey is in the second district, and southern NJ is in the third district. Our placebo results are robust to using only banks in northern NJ (contact authors directly for those results).

an increase of about 3.4-4.4 percent in the level of deposits compared to national-charter banks. Further, the interaction terms, *STATE MEMBER * YEAR 1934* and *STATE NONMEMBER * YEAR 1934*, are not significant. State-charter banks, then, were able to increase deposits to a greater degree relative to national-charter banks in 1933, but their advantage disappears in 1934 with the introduction of deposit insurance.

[Insert Table 3]

In Table 3, we report the results of our placebo test, where we estimate the same regression described in equations (1) and (2), but using data on NJ banks. Unlike Table 2, none of the interaction terms are significant. These results suggest that other financial reforms did not cause the divergence in the behavior of deposits between national-charter and state-charter banks in 1933.

Taken together, our study indicates that the NY bank regulator's information policy helped state-charter banks to grow their deposits relative to national-charter banks.[16] The effect was of similar magnitude across both state member and state nonmember banks, and so the gains from the information suppression policy did not depend upon membership in the Federal Reserve and, consequently, access to the discount window.

This positive response by depositors to a policy of information suppression is consistent with the theoretical predictions of the global games with strategic complementarities literature cited earlier (e.g., Eisenbach (2017)); by suppressing information about individual state-charter banks, the NY banking state regulator was able to stem the outflow of deposits from state-charter banks. Further, our results support the theoretical work focused on managing information during a crisis (e.g., Gorton and Ordoñez (2014), and Gorton and Ordoñez (forthcoming)), by demonstrating that policies that suppress information about banks' portfolio of assets have significant effects on deposits, and so the stability of banks. In addition, our results show that the information suppression policy became ineffective after federal deposit insurance was introduced in 1934. Consistent with previous studies, our results show that deposit insurance makes depositors insensitive to information.[17] As a

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[16]Reflecting the general outflows of deposits during the early 1930s, the result implies that state-charter banks were better able to stem the outflow of deposits with the result that they ended up with a higher level of deposits.

[17]Several papers document that the introduction of deposit insurance reduces depositors' incentives to monitor bank health (Martinez Peria and Schmukler, 2001; Demirgüç-Kunt and Detragiache, 2002; Demirgüç-Kunt and Huizinga, 2004; Iyer and Puri, 2012; Karas, Pyle, and Schoors, 2013; Iyer, Puri, and Ryan, 2016; Iyer, Jensen, Johannesen, and Sheridan, 2017; Egan, Hortaçsu, and Matvos, 2017).

result, the behavior of deposits between national-charter and state-charter banks converged in 1934 even though the NY state bank regulator's suppression policy was still in effect.

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.

In this paper, we study how information management affects depositors. We study how the NY state bank regulator's information suppression affected the behavior of depositors. Between 1933 and 1934, the NY state bank regulator decided not to formally collect call report data, affecting the public's ability to access state-charter banks' balance sheets. In contrast, the Office of the Comptroller of the Currency, the national-charter bank regulator, continued to collect and publish balance sheets of national-charter banks. We exploit this unique opportunity and compare the behavior of banks and depositors of state-charter banks to that of national-charter banks to measure the impact of information suppression on bank deposits. We allow for the information-suppression policy to have a different effect in 1933 and 1934 because at the start of 1934 the Federal Deposit Insurance Corporation as established and began its policy of insuring household deposits.

We find that deposits of state banks grew after state regulators implemented information suppression policy. Even though the proportion of loans against total assets increased for state banks, banks were able to increase deposit funding. In other words, these results imply that whether banks that did not have to reveal their portfolios were able to issue deposits more easily and therefore fund their loans more cheaply than banks that revealed their portfolios.

This paper is novel then, in that we present formal econometric evidence which demonstrates that in a crisis, suppressing information about banks' balance sheets leads to higher rate of deposit growth. Further, we show that this benefit is offset by the introduction of federal deposit insurance. Once again, in line with the theory, households care much less about monitoring banks once deposits are insured.

Our study has important implications for policy today. Following the financial crisis of 2007-

09, policymakers have attempted to enhance public disclosure, with the goal of improving financial stability, by promoting the market discipline of financial institutions. Our 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.

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Table 1: Summary Statistics, 1931-1934.

	National			State member			State nonmember		
	1931-1932	1933	1934	1931-1932	1933	1934	1931-1932	1933	1934
Assets	2,343.2	2,052.5	2,029.1	6,717.3	5,756.9	5,492.3	2,907.7	2,589.9	2,542.4
	(3,042.5)	(2,574.1)	(2,594.6)	(13,472.7)	(11,338.1)	(10,855.2)	(6,821.2)	(6,003.8)	(5,728.6)
ln(Assets)	7.261	7.139	7.109	7.871	7.729	7.707	7.257	7.145	7.155
	(0.956)	(0.95)	(0.971)	(1.257)	(1.262)	(1.248)	(1.026)	(1.012)	(1.004)
Cash / Assets	0.0967	0.117	0.137	0.098	0.106	0.135	0.085	0.087	0.102
	(0.044)	(0.078)	(0.064)	(0.056)	(0.066)	(0.067)	(0.059)	(0.055)	(0.054)
Securities / (Loans and Securities)	0.486	0.523	0.572	0.413	0.433	0.468	0.419	0.456	0.473
	(0.173)	(0.165)	(0.161)	(0.159)	(0.156)	(0.158)	(0.167)	(0.171)	(0.186)
Equity / Liabilities	0.138	0.15	0.154	0.141	0.156	0.17	0.148	0.16	0.201
	(0.058)	(0.062)	(0.059)	(0.043)	(0.054)	(0.059)	(0.054)	(0.061)	(0.073)
Deposit / Liabilities	0.781	0.764	0.787	0.804	0.801	0.82	0.792	0.781	0.785
	(0.091)	(0.097)	(0.084)	(0.073)	(0.075)	(0.063)	(0.084)	(0.091)	(0.083)
ln(Deposits)	7.006	6.861	6.863	7.647	7.503	7.505	7.016	6.89	6.906
	(1.001)	(1.005)	(1.022)	(1.279)	(1.283)	(1.273)	(1.051)	(1.049)	(1.045)

Note: National are banks with national charters; State member are banks with state charters that are members of the Federal Reserve System; State nonmember are banks with state charters that are not members of the Federal Reserve System. Means are reported with standard deviation in parenthesis. Assets and deposits are in thousands of dollars.

Source: Rand McNally Bankers Directory and authors' calculations.

Table 2: Effect of the New York's Information Suppression Policy on New York Banks.

	log of deposits	
	(1)	(2)
State member x Year 1933-1934	0.028**	
	(0.01)	
State nonmember x Year 1933-1934	0.026**	
	(0.008)	
State member x Year 1933		0.044***
		(0.012)
State nonmember x Year 1933		0.034**
		(0.011)
State member x Year 1934		0.013
		(0.013)
State nonmember x Year 1934		
		0.017
		(0.009)
Constant	2.215***	2.193***
	(0.139)	(0.139)
Bank controls	Yes	Yes
Half-year fixed effects	Yes	Yes
Bank fixed effects	Yes	Yes
Observations	6,766	6,766
R-squared	0.6217	0.6220

This table presents the DID estimates of the effect of the NY state bank regulators' information suppression policy on log deposits for banks in New York. The dummy variables, State member and State nonmember, take on the value of one for state member and nonmember banks, respectively. The dummy variables, Year 1933 and Year 1934, take on the value of one if the observation is recorded for years 1933 and 1934, respectively. The dummy variable Year 1933-1934 takes on a value of one if the observation is recorded for years 1933 or 1934. 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. Standard errors are clustered at the bank level and presented in parenthesis. Log deposit variable is winsorized at the 1% level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

Table 3: Placebo Test Results Using New Jersey Banks.

	log of deposits	
	(1)	(2)
State member x Year 1933-1934	-0.025	
	(0.024)	
State nonmember x Year 1933-1934	-0.021	
	(0.022)	
State member x Year 1933		-0.001
		(0.021)
State nonmember x Year 1933		-0.039
		(0.032)
State member x Year 1934		-0.051
		(0.037)
State nonmember x Year 1934		
		-0.003
		(0.022)
Constant	4.539***	4.541***
	-0.537	-0.534
Bank controls	Yes	Yes
Half-year fixed effects	Yes	Yes
Bank fixed effects	Yes	Yes
Observations	4,008	4,008
R-squared	0.3973	0.3983

This table presents the DID estimates of the effect of a treatment introduced in 1933 on log deposits for banks in New Jersey. The dummy variables, *State member* and *State nonmember*, take on the value of one for state member and nonmember banks, respectively. The dummy variables, Year 1933 and Year 1934, take on the value of one if the observation is recorded for years 1933 and 1934, respectively. The dummy variable Year 1933-1934 takes on a value of one if the observation is recorded for years 1933 or 1934. 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. Log deposit variable is winsorized at the 1% level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

Figure 1: Evolution of Deposits of National- and State-Charter Banks in New York, 1931-1934.
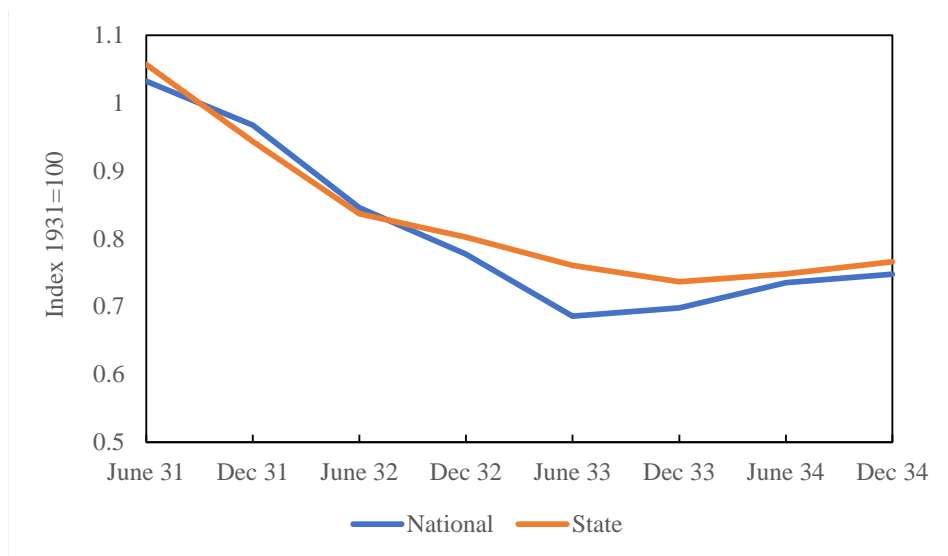
Note: Aggregate deposits are indexed to the average of the June 1931 and December 1931 levels.
Source: Rand McNally Bankers Directory and authors' calculations.

Appendices

A   Pictures from NY newspapers in the 1930s

In this section we provide examples of how banks published information about their balance sheet in local newspapers (see Figure A1). Further, we provide examples of how *Rand McNally* advertised its banking directory (see Figure A2), with the goal of demonstrating that the banking directory was a service aimed at bankers and not depositors.

Figure A1: Balance Sheets Published in Local Newspapers

Figure A2: Subscription Advertisements in Rand McNally Directory.

B Call Dates for National-Charter and NY State-Charter Banks

In order to alleviate the concern that banks' choice of charters might be driven by disclosure regulation, we show that the frequency of reporting was the same across national-charter and New York state-charter banks. Further, the call dates were close in time. This is illustrated in Table B1, which shows dates for reporting for national- and state-charter banks in Panels A and B, respectively.

Table B1: Dates for Call Reports

|	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
National-Charter Banks)												
1929			27			29				4		31
1930			27			30			24			31
1931			25			30			29			31
1932						30			30			31
1933						30				25		30
1934		5				30				17		31
1935		4				29					1	31
1936		4				30						31
1937		31				30						31
1938		7				30			28			31
NY State-Charter Banks												
1929			22			29			27			31
1930			27			30			24			31
1931			25			30			30			31
1932			28			30			30			31
1933												
1934												
1935			30			29			28			31
1936			27			30			30			31
1937			31			30			30			31
1938			31			30			28			31

Source: National-charter banks: Rand McNally Bankers Directory; State-charter banks: Annual Report of the Superintendent of the Bank.

C   Accuracy of Bank Balance Sheets from Rand McNally

We check the accuracy of bank balance sheet information from *Rand McNally Bankers Directory* by comparing it to information published in regulatory reports. We use 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. State-charter bank reports provide balance sheet information for individual banks and trust companies at the quarterly frequency. In contrast, national-charter bank reports provide balance sheet information aggregated at the state level as well as information for country banks and reserve city banks separately. Because banks in Albany and Rochester were considered country banks during the period of our study, we include banks in these cities when we create comparable plots for state-charter banks.

In Figure C3, we plot aggregate deposits at New York national-charter and state-charter banks outside reserve cities from June 1929 to December 1935. We plot data from official reports and Rand McNally in Panels A and B, respectively. Aggregate deposit data from Rand McNally follows the same pattern as the aggregate deposit data from official reports, verifying that Rand McNally collected accurate balance sheet information for banks in New York.

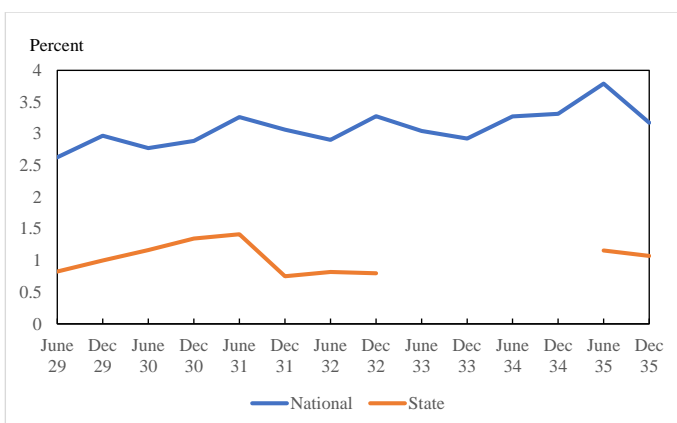Figure C3: Aggregate Deposits in New York over Time by Bank-Charter Type.
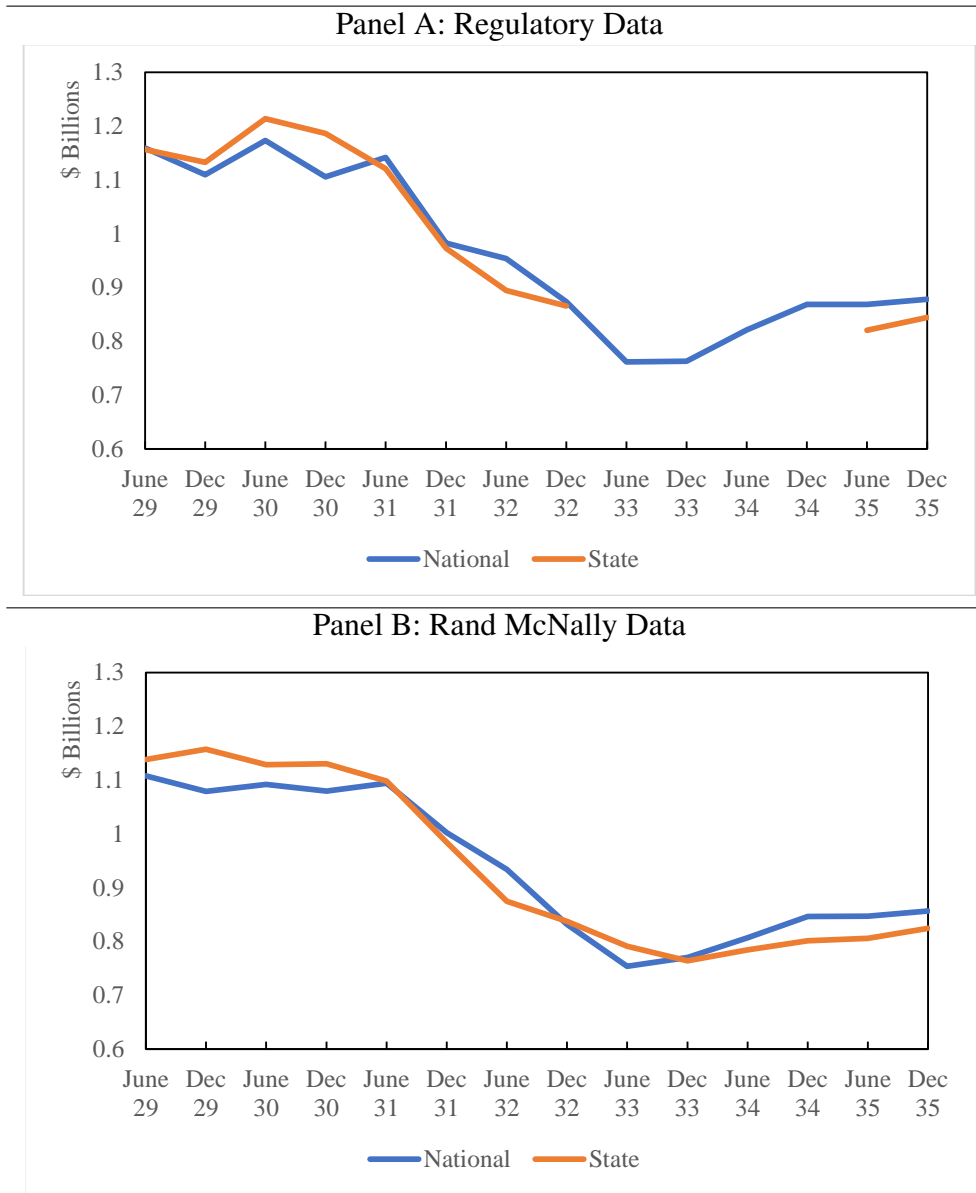
Panel A: Regulatory Data

Panel B: Rand McNally Data

Source: National-charter banks: Annual Report of the Comptroller of the Currency; State-charter banks: Annual Report of the Superintendent of Banks.

D   Composition of Deposits

We examine the composition of total deposits for national-charter and state-charter banks from 1929 to 1935. In the *Rand McNally Bankers Directory* data, interbank deposits due to other banks and retail deposits are summed up and so not distinguishable. In the regulatory data, however, these two types of deposits are separately reported. We find these data in 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. In order to rule out the possibility that the changes in deposits highlighted in our paper were driven by interbank deposits due to other banks rather than retail deposits, we use the regulatory data to study the changes of the ratio of interbank deposits due to other banks against total deposits over time for banks.

Figure D4 plots the ratio of interbank deposits due to other banks against total deposits from June 1929 to December 1935 for banks in New York. The first point to note is that interbank deposits due-to other banks did not comprise a large portion of total deposits. For national-charter banks, due-to deposits comprise about 3 percent of total deposits whereas for state-charter banks they comprise about 1 percent. Second, the ratio of interbank deposits to total deposits is quite stable over our sample period. As a result, it is unlikely that changes in deposits highlighted in our paper are driven by the behavior of interbank deposits rather than retail deposits.

Figure D4: Ratio of Interbank Deposits to Total Deposits in New York by Bank-Charter Type

Source: National-charter banks: Annual Report of the Comptroller of the Currency; State-charter banks: Annual Report of the Superintendent of Banks.