The Effect of Enhanced Supervision on Banking Stability

Haelim Anderson* Edward T. Kim†

First Draft: March 2025

Abstract

In the 1920s, Virginia State bank supervisors grew concerned about overreliance on interbank borrowing and began monitoring banks' short-term funding practices. Using newly digitized data from bank examination reports, we find that the introduction of stricter supervisory standards achieved limited success: while it reduced the volume of interbank borrowing, it did not eliminate continuous borrowing behavior among banks. Banks that rely on interbank borrowing were more likely to fail during the Great Depression, suggesting that supervisors accurately identified key financial risks. Overall, this study highlights the role of supervisory bank examinations in promoting banking sector stability.

The views and opinions expressed in this article reflect those of the authors and do not necessarily reflect those of the Bank Policy Institute. For helpful commaents, the authors thank seminar participants at Michigan Ross. Daniel Dancuta, Raj Hanson, Laura Suhr Plassman, Jose Tapia, and Victoria Yin provided excellent research assistance. We acknowledge the financial support of the Mitsui Life Financial Research Center.

*Bank Policy Institute. Email: handerson@bpi.com

†Stephen M. Ross School of Business, University of Michigan. Email: etkim@umich.edu

1 Introduction

The collapse of Silicon Valley Bank (SVB) in March 2023 underscored the importance of bank supervision in maintaining financial stability. In its aftermath, questions arose about whether supervisors had identified key risks in time to prevent failure. Indeed, supervisory agencies – including the Federal Reserve and the Federal Deposit Insurance Corporation – released reviews assessing how supervisory actions may have influenced the outcome and reaffirming the critical role of bank supervision in stabilizing the financial system. While policymakers and researchers widely acknowledge the importance of supervision for financial stability, little empirical work has been done to measure the contribution of bank examinations and evaluate how effectively supervisors fulfill their mandate.

Several challenges limit existing studies. First, supervisory data is confidential, making it difficult to determine the quantitative and qualitative criteria examiners use and how banks respond to their assessments. Second, troubled banks generally receive more supervisory attention, creating the appearance that intensive supervision leads to problems. Given these difficulties, previous studies have estimated the relationship between supervision and performance using proxies for "supervisory attention," such as the number of examinations, the distance from supervisory offices, and the hours spent on bank examinations.

In this paper, we address these challenges by examining the Virginia State Banking Department's introduction of enhanced supervisory requirements in 1922. At the time, state bank supervisors were concerned that an increasing number of banks had become too dependent on interbank borrowing to manage liquidity. The rapid growth of "habitual" borrowing was seen as a threat to financial stability because supervisors saw overreliance as a sign of financial weakness. In response, the Virginia State Banking Department introduced a qualitative assessment of habitual borrower status during on-site bank examinations to achieve its two main objectives: (1) reducing the amount of interbank borrowing and (2) eliminating habitual reliance upon borrowings from other banks. Beginning in 1922, examiners started recording each bank's habitual borrowing status and updated this information annually.

The behavior of Virginia state banks under enhanced supervisory requirements provides a unique setting to examine the effectiveness of bank supervision. First, to address data challenges, we construct a dataset of Virginia state banks listed in annual call reports and examination reports from 1920 to 1932. These data include the habitual borrowing status recorded by examiners each

year, allowing us to assess whether the state banks' borrowing behavior changed in response to enhanced supervision.

Second, the banking environment at the time allows us to examine whether supervisory bank examinations affected banking stability. Understanding this relationship is challenging because supervisors tend to focus more on troubled institutions that are already at higher risk of failure. To address this, we exploit the introduction of enhanced supervisory standards in 1922, which required examiners to classify banks as habitual or non-habitual borrowers. We study how examiner monitoring influenced the behavior of habitual versus non-habitual borrowers and assess how effectively supervisors carried out their mandate. Notably, supervisors did not increase exam frequency or extending examination hours during the Depression period. The consistency of supervision across banks during these years allows us to better isolate the relationship between examinations and bank distress.

We begin by examining how the monitoring of habitual borrowing behavior by examiners affected the health of the banking system. We compare the balance sheet ratios of banks identified as habitual borrowers to those of non-habitual borrowers before and after the introduction of this classification. Additionally, we assess whether banks labeled as habitual borrowers continued to rely heavily on correspondent borrowing in the year following their assessment under a panel regression setting. Lastly, we compare failure outcomes of banks identified as habitual borrowers in 1929 to those that were not and evaluate whether habitual borrowers were more likely to fail during the Great Depression.

For this study, we construct several datasets. First, we collect state call reports from 1920 to 1933. The state banking department required banks to file condition reports covering basic balance sheet information four times a year, with the June call included in its published annual report. Second, we collect state bank examination reports from 1922 to 1932, which record soft information based on examiners' expertise. Specifically, we use data on whether a bank was classified as a habitual borrower after examiners reviewed each bank's borrowed funds. We rely on balance sheet data from the annual report because it provides standardized data for all banks at the same time, reducing concerns about spurious differences due to seasonal or other time-related factors. Lastly, we use the list of "Discontinued Banks" from the January 1935 edition of the Rand McNally Bankers' Directory to determine if and when each state-chartered bank failed.

Our first finding is that habitual borrowing was a persistent feature of Virginia's banking system,

even under increased supervisory scrutiny. When examiners first introduced the classification in 1922, 73 of 328 banks (22.3%) were designated as habitual borrowers. While this number declined over time, the percentage of habitual borrowers consistently fluctuated around 20% from 1922 to 1932. Among the 195 banks ever classified as habitual borrowers, 116 were flagged multiple times, and 32 were designated in more than half of the 10 year period. These facts suggest that once a bank relied on interbank borrowing, it was difficult to move away from it entirely. Habitual and non-habitual borrower banks operated with distinct business models, with habitual borrowers relying more on interbank funding and exhibiting different liquidity and investment patterns. These differences highlight the importance of studying the dynamics of supervision's effects in the long run, particularly in the lead-up to the most significant banking crises in history.

Second, enhanced supervision significantly reduced interbank borrowing, with habitual borrowers decreasing reliance on interbank funding by 92.6% in the first year and 66.8% throughout the sample period. Our estimates suggest that these banks partially offset a decline in interbank funding by an increase in deposit funding, while effects on total equity were small and statistically insignificant. There is also evidence that banks adjusted their balance sheets more broadly, though changes in investment and liquid assets were not consistently significant. Using the habitual borrower status in 1929, we additionally compare the failure outcomes of habitual and non-habitual borrower banks during the Great Depression. Indeed, this parametric analysis implies that habitual banks were more likely to fail during the Great Depression – a trend that accelerated as the crisis deepened.

Our findings are relevant to ongoing policy debates on the transparency and effectiveness of bank examinations. While confidential examinations protect sensitive information and maintain regulatory integrity, they also make it difficult to assess the effectiveness of supervision. Pol¬icymakers have considered increasing transparency, including proposals requiring the Federal Financial Institutions Examination Council (FFIEC) to release certain supervisory information and establish a review process for disputed examinations. To the extent that our findings provide empirical evidence that examinations contribute to financial stability, greater transparency could help banks and the public better understand regulatory objectives and reforms.

This paper contributes to several strands of literature. First, it adds to research on banking panics during the Great Depression. Many studies examine the causes of widespread bank failures, finding that bank runs reflected a rational and predictable process of market discipline. Depositors withdrew funds from banks with balance sheet characteristics indicating fundamental weaknesses

(Calomiris and Mason, 1997; Calomiris and Mason, 2003a; Calomiris and Mason, 2003b). Other studies focus on the role of monetary policy in Depression-era bank runs (Carlson et al., 2011; Richardson and Troost, 2009) or how regulations and supervision affected failures (Mitchener, 2005; Carlson et al., 2009). Lastly, several studies show that stigma contributed to the severity of banking panics during this period (Anbil, 2018; Vossmeyer, 2019). We contribute to this literature by examining how supervisory bank examinations influenced the banking crisis of the Great Depression.

Second, our paper relates to the growing literature on bank supervision and its effects on financial stability. However, this literature is constrained by the confidentiality of the examination process. To address this, prior studies have exploited variation in supervisory attention, such as the frequency of inspections or the closure of regulatory offices. These studies find that onsite supervision improves bank efficiency and performance (Barth et al., 2013; Rezende and Wu, 2014; Wilson and Veuger, 2017), reduces risk-taking, leverage, and failures (Kandrac and Schlusche, 2021; Gopalan et al., 2017; Hirtle, Kovner, and Plosser, 2019), and positively affects lending allocation and the real economy (Agarwal et al., 2014; Granja and Leuz, 2017; Bonfim et al., 2020; Passalacqua et al., 2020). We contribute to this literature by directly assessing how bank examinations contribute to financial stability and how effectively supervisors achieved their objectives.

Third, we add to prior works examining banking stability using historical bank examination reports. One strand of literature rely heavily on the detailed information on bank networks and their impact on systemic risk (Calomiris and Carlson, 2016; Anderson et al., 2019; Anderson et al, 2022). The other studies use quantitative information provided by examiners and study banks' risk management (Calomiris and Carlson, 2017, 2022, 2023). While these studies highlight the informational value of examination reports, they use examination reports mainly to obtain private information provided by examiners rather than evaluating the supervision process. In contrast, we study the information provide by bank examiners over a decade leading up to the Great Depression and assess the effectiveness of bank supervision.

Lastly, our paper contributes to research on stigma and its impact on banking stability. Prior studies show that discount window stigma exacerbates liquidity problems, leading central banks to create alternative lending facilities (Armantier et al., 2015; Armantier et al., 2020; Carlson and Rose, 2017). Several studies also find that stigma worsened banking panics during the Great Depression (Anbil, 2018; Vossmeyer, 2019). While this literature focuses on stigma from

investors and depositors, we examine the role of supervisory stigma, assessing how being flagged by regulators affected banks' financial stability.

The remainder of the paper is organized as follows. Section 2 presents institutional background on bank examinations and supervision during the 1920s. Section 3 describes data and summary statistics on the sample of Virginia state banks. Section 4 outlines our econometric approach and presents our main results. Section 5 concludes.

2 Background and Institutional Details

This section examines two key aspects of Virginia's banking sector in the 1920s and 1930s: (1) overreliance on interbank borrowing, which supervisors monitored more closely as they viewed excessive borrowing as a sign of weak fundamentals, and (2) supervisory bank examinations, which required examiners to oversee poorly performing banks and submit recommendations to improve the banking system's stability.

2.1 Overdependence on Interbank Borrowing

During the National Banking Era, the banking system experienced seasonal spikes in loan interest rates and periodic banking panics. Increased demand from the agricultural sector for currency and credit during the spring planting and fall crop-moving seasons led to seasonal fluctuations in short-term interest rates, pushing interest rates up and reserve-to-deposit ratios down. These forces weakened the banking system and caused money supply contractions precisely when demand for money was highest (Kemmerer, 1910).

The interbank borrowing system developed as a means for banks to accommodate these seasonal liquidity pressures. Rural banks relied on correspondents in financial centers to fill funding gaps through interbank deposit balances and direct borrowing. When rural banks faced deposit outflows and strong credit demand, they initially met liquidity needs by drawing down deposits held at correspondents. However, once those balances were exhausted, they turned to short-term borrowing. To secure a credit line, respondents were required to maintain compensating balances with lending correspondents, typically amounting to 20 to 25 percent of their seasonal borrowing levels. While correspondents paid 2 percent interest on interbank balances, rural banks paid around 6 percent to borrow funds. Many banks borrowed rather than liquidate loans or sell securities, as doing so would result in losses (Rodenius and Weiman, 2020).

Interbank borrowing commonly took the form of "notes and bills rediscounted" and "bills payable." Banks could borrow from another institution by posting a loan or other security as collateral (bills payable) or by selling a loan to another bank at a discount (rediscounts). While both instruments were widely used, increased reliance on bills payable signaled financial weakness. Banks resorted to bills payable when they could not raise sufficient cash by rediscounting eligible commercial paper. Since bills payable were often a last-resort funding option, frequent reliance on them was seen as a sign of deteriorating financial conditions (Gruchy, 1937).

Interbank borrowing became an increasingly common liquidity management tool. Before the Federal Reserve System was established, state banks primarily held interbank deposits and withdrew interbank balances to maintain liquidity. After its founding, however, banks increasingly borrowed from other banks to cover deposit withdrawals and bolster cash positions. More banks took on substantial short-term loans from their correspondents as a result, deepening their reliance on interbank credit.

By the early 1920s, state bank regulators became concerned about the risks of excessive interbank borrowing. One issue was the prolonged reliance on borrowed funds, as many banks borrowed continuously rather than on a short-term, seasonal basis. Regulators viewed these "habitual borrowers" as particularly concerning, as persistent borrowing indicated financial weakness. More importantly, they were alarmed by the growing number of banks borrowing through bills payable. In response, regulators introduced new guidelines emphasizing a greater "reluctance to borrow" and placed stricter oversight on its use. Beginning in 1922, examiners recorded whether borrowing banks were habitual borrowers, formalizing supervisory attention on the issue.

2.2 Bank Examination and Supervision

An official system of bank examination was first introduced in 1910. Bank supervision relied on examinations to ensure compliance with legal requirements. Examination reports contained rich information about banks that was not included in the publicly released Call Reports. These reports provided detailed balance sheet data, including the composition of loans, securities, and deposits. They also covered broader aspects of bank operations, such as corporate ownership and governance, loan distribution and quality, real estate-related assets, and liability composition. Lastly, the reports included private assessments from examiners after reviewing a bank's records.

The examination reports of Virginia state banks consisted of three sections. The first section contained a financial statement listing all asset and liability items. The second section provided

details on the distribution and quality of key balance sheet components, such as principal loans, past-due notes, and cash items. The third section contained qualitative assessments of the bank's condition, assets and liabilities, and business activities, requiring the examiner to apply subjective expertise.

For our analysis, the most relevant information pertains to interbank borrowings. Examiners closely monitored money borrowed by banks as an indicator of their credit position. The Virginia Bank Act limited interbank borrowings to the bank's capital and surplus and capped pledged collateral at 150 percent of the amount borrowed. If a bank violated these rules, the commissioner of banking ordered compliance. As regulators grew increasingly concerned about overreliance on short-term borrowing, examiners were instructed to assess whether "the bank is a habitual borrower." However, while examiners flagged banks for habitual reliance on borrowed funds, they lacked the authority to prevent it, as continuous borrowing was not explicitly prohibited under the State Bank Act.

Examination reports were analyzed by the State Banking Department, which then sent the results to banks along with recommendations for improving operations. Banks were expected to modify unsound policies promptly and notify the department of their compliance. If recommendations enforced provisions of the State Bank Act, compliance was mandatory; otherwise, banks were not required to follow them. These rules have important implications; banks are required to comply with the recommendation regarding the amount of interbank borrowing, but they were not required to comply with the recommendations regarding the frequency of such borrowing.

3 Data and Descriptive Statistics

3.1 Data Sources

We collect information on Virginia state banks from three sources. First, we use bank Call Reports from 1920 to 1932. The state banking department required banks to submit a report of condition covering basic balance sheet information four times a year and published the June balance sheet in its annual report. After submitting their balance sheets to regulators, banks were also required to publish select line items in a local newspaper, allowing depositors to monitor their condition. A key advantage of the Call Report is that balance sheets were collected for all banks at the same point in time, helping control for seasonal or other time-related factors. Second, we collect Virginia state bank examination reports from 1922 to 1932. These reports were written twice a year by

field examiners hired by the Virginia state banking department. Lastly, we use the January 1935 edition of the *Rand McNally Bankers' Directory* to determine bank outcomes following the Great Depression. The number of state banks declined from 315 in December 1929 to 202 in December 1933. We use the list of discontinued banks to identify whether a bank failed or merged with another institution to avoid failure.

3.2 Habitual Borrowing in the 1920s

Habitual borrower status was recorded by Virginia bank examiners starting in the 1922 examination reports (Figure 1). When supervisory attention was first introduced, 73 of 328 banks (22.3%) were classified as habitual borrowers. In the early years, the number and fraction of habitual borrower banks declined significantly, reaching 47 banks (13.9%) by 1924. Notably, however, habitual borrowing did not completely disappear despite the enhanced scrutiny by examiners.

Figure 2 depicts the locations of habitual borrower banks in 1922 and 1932, the beginning and end of our examination report sample. We show that habitual borrowers are distributed statewide, with a few counties within the Southwest, Central, and Valley regions exhibiting slightly higher concentrations. While the absolute number of habitual borrowers declined from 73 to 39 banks during this period, we do not find notable geographic trends in habitual borrower status across counties. Taken together, these facts imply that supervision was implemented uniformly throughout the state and was not able to eliminate habitual borrowing behavior.

Figure 3 illustrates the distribution of how often banks were flagged by examiners. The vast majority of state (non-member) banks in Virginia never became habitual borrowers, despite close to half of banks reporting positive interbank borrowing at least once during this decade. Among those flagged as habitual borrowers, 79 banks were designated only once, while 116 banks were classified as habitual borrowers on multiple occasions. More persistently, 32 banks were flagged by examiners in more than half of the available examination reports, and Farmers and Merchants Bank of Timberville was classified as a habitual borrower every year except 1927. These figures highlight both the effectiveness and limitations of supervisory scrutiny. While habitual borrower classification was a soft regulatory tool rather than a formal penalty, it generally influenced bank behavior, leading many banks to adjust their borrowing practices to avoid repeated designation. However, the turnover in habitual borrower status suggests that some banks moved in and out of scrutiny, possibly due to fluctuating liquidity needs or the absence of a strict quantitative threshold for habitual borrowing. This variability underscores the challenges banks faced in managing their

borrowing levels within the evolving supervisory framework.

We address the persistence of habitual borrower status more formally by examining the fraction of habitual borrower banks each year that had been flagged before. Indeed, between 60% and 80% of habitual borrower banks are repeat habitual borrowers. This fraction increases over time, providing further evidence that banks reliant on interbank borrowing struggled to actively reduce their dependence.

3.3 Descriptive Statistics

Table 1 reports the baseline balance sheet characteristics of 71 habitual and 254 non-habitual borrower banks in 1922. During this period, bank regulators and depositors paid close attention to three sets of ratios to assess the soundness of the banks: liquid assets-to-deposits ratio, equity-to-deposits ratio, and investment-to-deposits ratio (Gruchy, 1937). Liquid assets include vault cash and reserves in other banks. Equity, or net worth, is measured as the sum of paid in capital plus cumulative retained earnings held as surplus or undivided profits.

In 1922, habitual borrower banks were less liquid and had higher levels of investment than non-habitual borrowers. While habitual borrowers also appear better capitalized, the difference between the two groups is not statistically significant. Importantly, we find that habitual borrower banks relied more on borrowed money, measured both as a fraction of total deposits and total capital; the average borrowings to total capital ratio was 85.77% at habitual borrowers compared to 19.22% at non-habitual borrowers. These findings imply that bank examiners correctly identified habitual borrowing behavior, at least to the extent that borrowing frequency is correlated with the amount borrowed. In addition, the significant differences in borrowing ratios between habitual and non-habitual banks suggest that the classification captured meaningful variation in bank funding strategies; habitual borrowers likely operated with a business model that emphasized interbank borrowing as a key funding source to support higher investment levels despite lower liquidity. This reliance on borrowed funds suggests that these banks were more vulnerable to funding disruptions.

4 Main Results

We examine how enhanced supervision influences bank behavior by analyzing the inclusion of habitual borrowing in examination reports. Using annual data on each bank's habitual borrower status from 1922 to 1931, we directly quantify the impact of supervision on interbank borrowing

and other balance sheet outcomes.

4.1 Effect of Supervision on Banking Stability

Habitual borrowing was recorded for the first time in the 1922 examination reports. As this regulatory shift was unexpected and quickly implemented, it provides a quasi-experimental setting to study the causal effect of enhanced supervision. First, we estimate a cross-sectional regression comparing banks that were flagged as habitual borrowers to non-habitual borrowers with similar levels of interbank borrowing. By employing a propensity score matching approach, we ensure that treated and control banks share comparable pre-supervision characteristics, allowing us to isolate the effect of habitual borrower designation. If supervisory scrutiny effectively discouraged reliance on interbank borrowing, we would expect to see a relative decline in borrowing levels among habitual borrower banks following their classification. Beyond interbank borrowing, we also examine whether flagged banks adjusted other aspects of their balance sheets—such as capital ratios or liquidity holdings—in response to supervision. This analysis provides insight into the extent to which supervisory attention shaped bank stability in Virginia during this period.

We estimate the following regression:

$$Y_i = \alpha + \beta \text{Habitual}_i + X_i'\gamma + \epsilon_t \tag{1}$$

where Y_i represents the percent change in the outcome variable of interest (interbank borrowing, total deposits, total equity, total investment, and total liquid assets) for bank i. Habitual_i is a binary indicator equal to 1 if the bank was classified as a habitual borrower in 1922 and 0 otherwise, and X_i is a vector of pre-supervision bank characteristics included to account for potential confounding factors. The coefficient β captures the estimated effect of habitual borrower designation on the outcome variable.

Table 2 presents the estimation results. We find that enhanced supervision on interbank borrowing in 1922 led to a 92.6% decrease in interbank borrowing among treated banks relative to their counterparts, as indicated by the negative and statistically significant coefficient of -2.60 on the habitual borrower dummy in column (1). This suggests that habitual borrower designation imposed economically meaningful constraints on banks' ability and willingness to borrow. Columns (2) to (5) examine the broader impact of supervision on balance sheet adjustments. Habitual borrower status decreased total deposits and total equity by 8.3% and 5.9%, respectively, implying meaningful

contractions in other funding sources. In terms of asset composition, we find further evidence of supervisory constraints affecting bank operations; investment decreased by 8.5%, although we do not find statistically significant changes in liquid assets. Taken together, these findings indicate that supervision affected multiple aspects of bank operations in a contractionary manner, extending beyond interbank borrowing to influence liability structure and asset composition.

Second, we assess the impact of supervision by estimating a panel regression with bank and year fixed effects, leveraging the full sample period from 1922 to 1931. This specification allows us to analyze how being flagged as a habitual borrower affects a bank's interbank borrowing and other financial outcomes over time, controlling for unobserved bank-level characteristics and broader macroeconomic trends. If supervision had a persistent effect, we would expect banks to reduce interbank borrowing following their classification as habitual borrowers. Additionally, we may observe adjustments in liquidity management or capital levels in response to supervisory scrutiny.

We estimate the following regression:

$$Y_{it} = \alpha + \beta \text{Habitual}_{it} + X'_{it}\gamma + \delta_i + \lambda_t + \epsilon_{it} \tag{2}$$

where Y_{it} represents the financial outcome of interest for bank i in year t, such as interbank borrowing, liabilities, or asset composition. The key independent variable, Habitual_{it}, is an indicator for whether the bank was classified as a habitual borrower in year t. The vector X_{it} includes time-varying bank-level controls, such as past borrowing intensity, liquidity ratios, and capital structure. Bank fixed effects (δ_i) account for time-invariant heterogeneity across banks, while year fixed effects (λ_t) control for statewide macroeconomic conditions. Standard errors are clustered at the bank level to account for serial correlation in borrowing behavior over time.

Table 3 presents the estimation results from the panel regression. In line with the cross-sectional findings, column (1) confirms that banks classified as habitual borrowers experienced a significant and persistent decline in interbank borrowing. The estimated coefficient of -1.101 suggests that habitual borrower banks reduced their interbank borrowing by approximately 66.8% relative to non-habitual borrowers, reinforcing the view that supervisory scrutiny effectively constrained reliance on interbank funding. In contrast, we now observe a notable shift in the behavior of deposits. Column (2) suggests that habitual borrowers increased total deposits by approximately 5.0%, potentially reflecting an effort to replace lost interbank funding with alternative sources.

However, the effect on total equity, shown in column (3), is small and statistically insignificant, implying that banks did not significantly alter their overall leverage in response to supervision. Columns (4) and (5) show that habitual borrowers did not significantly change their investment holdings or liquid assets, suggesting no strong evidence that banks adjusted liquid assets in response to supervision.

Overall, these findings indicate that while supervision led to a persistent and substantial decline in interbank borrowing, banks partially offset this by increasing deposit funding. These adjustments highlight the broader impact of supervision on bank operations beyond its immediate effect on interbank borrowing.

4.2 Habitual Borrowing and Banking Stability during the Great Depression

In this subsection, we implement a survival analysis using a Cox proportional hazards model to examine the relationship between habitual borrower status between 1929 and 1930 and bank failure during the Great Depression. By leveraging panel data, we estimate whether banks classified as habitual borrowers faced a higher risk of failure relative to non-habitual banks. This approach allows us to assess whether enhanced supervision before the crisis influenced bank survival rates.[1]

Figure 4 presents Kaplan-Meier survival estimates, illustrating the cumulative survival probabilities of habitual and non-habitual borrower banks over time. The results indicate that habitual banks were significantly more likely to fail starting in 1931 ($t = 1$), with their survival probabilities declining at a faster rate as the Depression deepened. These findings suggest that banks reliant on interbank borrowing were particularly vulnerable to systemic distress, reinforcing concerns that habitual borrowing signaled underlying financial fragility. While supervisory efforts may have aimed to curb risky borrowing practices, the persistence of habitual borrowing appears to have contributed to greater instability during the crisis.

5 Conclusion

The failure of Silicon Valley Bank (SVB) in 2023 underscored the role of bank examinations in financial stability and raised questions about the effectiveness of the supervisory process. Despite the importance of understanding the relationship between supervision and banking stability,

[1] Our baseline specification uses a log-logistic survival model to examine the determinants of failure during the Great Depression. We are in the process of furnishing these results, which are similar when using other hazard function distributions or reducing the model to a logit or probit.

assessing the effectiveness of bank examinations remains challenging, particularly due to the confidentiality of supervisory data, which limits empirical analysis.

This paper takes a historical approach by examining how the introduction of enhanced supervisory requirements in 1922 influenced bank behavior and stability. At the time, supervisors were concerned about banks' overreliance on interbank borrowing and instructed examiners to classify banks as habitual borrowers. Using unique data on bank balance sheets and confidential examination reports from 1920 to 1932, we analyze how this monitoring affected interbank borrowing behavior. We find that supervisory oversight reduced both the number of habitual borrowers and the overall reliance on interbank borrowing. Additionally, we show that habitual borrowers were more likely to fail during the Great Depression, suggesting that limiting excessive interbank borrowing through supervision helped mitigate bank failures. These findings highlight the role of supervisory bank examinations in maintaining financial stability during this period.

Our results contribute to the ongoing debate over increasing the transparency and accountability of the bank examination process. The confidentiality of examinations has drawn criticism for making it difficult to evaluate the effectiveness of supervision. Some have advocated for greater transparency, such as disclosing aspects of the examination process after an appropriate delay or updating reporting requirements to reflect modern data collection and analysis methods. Others argue that policymakers should make more active use of the information generated by examiners, rather than shielding supervisory assessments and recommendations. Our findings suggest that insights from the examination process can help regulators refine policies to promote financial stability.

References

Calomiris, Charles W., and Joseph R. Mason (1997). "Contagion and Bank Failures During the Great Depression: The June 1932 Chicago Banking Panic." *American Economic Review* 87(5): 863-883.

Calomiris, Charles W., and Joseph R. Mason (2003a). "Fundamentals, Panics, and Bank Distress During the Depression." *American Economic Review* 93(5): 1615-1647.

Calomiris, Charles W., and Joseph R. Mason (2003b). "Consequences of Bank Distress During the Great Depression." *American Economic Review* 93(3): 937-947.

Carlson, Mark, Kris James Mitchener, and Gary Richardson (2011). "Arresting Banking Panics: Federal Reserve Liquidity Provision and the Forgotten Panic of 1929." *Journal of Political Economy* 119(5): 889-924.

Richardson, Gary, and William Troost (2009). "Monetary Intervention Mitigated Banking Panics During the Great Depression: Quasi-Experimental Evidence from a Federal Reserve District Border." *Journal of Political Economy* 117(6): 1031-1073.

Mitchener, Kris James (2005). "Bank Supervision, Regulation, and Instability During the Great Depression." *Journal of Economic History* 65(1): 152-185.

Carlson, Mark, and Jonathan D. Rose (2009). "Credit Availability and the Collapse of the Banking Sector in the 1930s." *Journal of Money, Credit and Banking* 47(7): 1239-1271.

Anbil, Sriya (2018). "Managing Stigma During a Financial Crisis." *Journal of Financial Economics* 130(1): 166-181.

Vossmeyer, Angela (2019). "Liquidity from Two Lending Facilities." *Finance and Economics Discussion Series* 2017-117.

Barth, James R., Gerard Caprio Jr., and Ross Levine (2013). "Bank Regulation and Supervision in 180 Countries from 1999 to 2011." *Journal of Financial Economic Policy* 5(2): 111-219.

Rezende, Marcelo, and Min Wei (2014). "The Effects of Liquidity Regulation on Bank Demand in Monetary Policy Operations." *Finance and Economics Discussion Series* 2014-110.

Wilson, Berry, and Stan Veuger (2017). "Bank Supervision and Risk-Taking: Evidence from a Natural Experiment." *Journal of Financial Services Research* 51(3): 339-360.

Kandrac, John, and Bernd Schlusche (2021). "The Effect of Bank Supervision on Risk-Taking: Evidence from a Natural Experiment." *Journal of Financial Intermediation* 45: 100835.

Gopalan, Radhakrishnan, Vikram Nanda, and Ingrid Werner (2017). "Do Bank Exams Prevent Bank Failures?" *Journal of Financial Intermediation* 29: 1-16.

Hirtle, Beverly, Anna Kovner, and Matthew Plosser (2019). "The Impact of Supervision on Bank Performance." *Federal Reserve Bank of New York Staff Reports* No. 768.

Agarwal, Sumit, David Lucca, Amit Seru, and Francesco Trebbi (2014). "Inconsistent Regulators:

Evidence from Banking." *Quarterly Journal of Economics* 129(2): 889-938.

Granja, João, and Christian Leuz (2017). "The Death of a Regulator: Strict Supervision, Bank Lending and Business Activity."

Bonfim, Diana, Miguel A. Ferreira, and Steven Ongena (2020). "Assessing the Effectiveness of Borrower-Based Macroprudential Policy Measures: Evidence from the Portuguese Loan-to-Value Limit." *Journal of Financial Intermediation* 42: 100837.

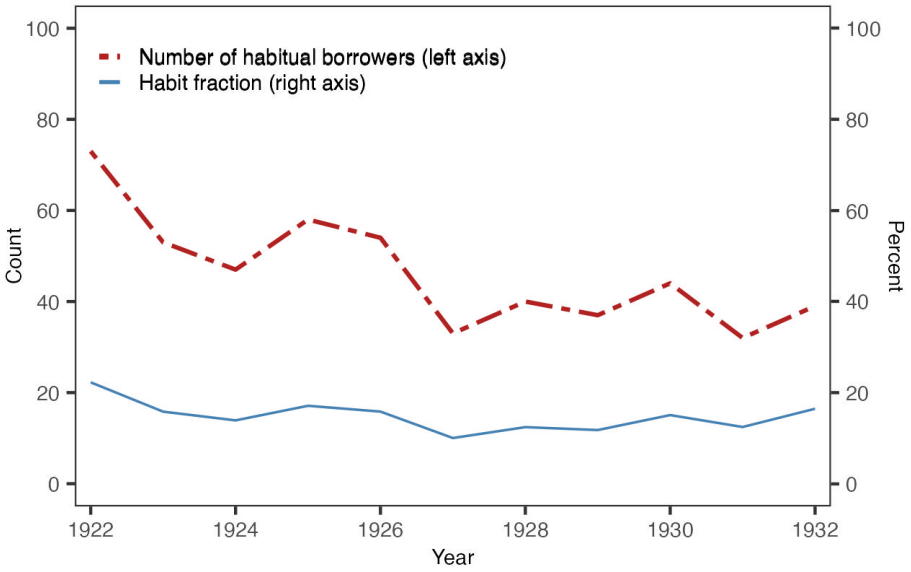
Calomiris, Charles W., and Mark Carlson (2016). "Corporate Governance and Risk Management at Unprotected Banks: National Banks in the 1890s." *Journal of Financial Economics* 119(3): 512-532.

Calomiris, Charles W., and Mark Carlson (2017). "Interbank Networks in the National Banking Era: Their Purpose and Their Role in the Panic of 1893." *Journal of Financial Economics* 125(3): 434-453.

Calomiris, Charles W., and Mark Carlson (2023). "Restoring Confidence in Troubled Financial Institutions After a Financial Crisis." *Journal of Financial Intermediation* 53: 101012.

Carlson, Mark, and Jonathan D. Rose (2017). "Stigma and the Discount Window." *Journal of Money, Credit and Banking* 49(4): 545-572.

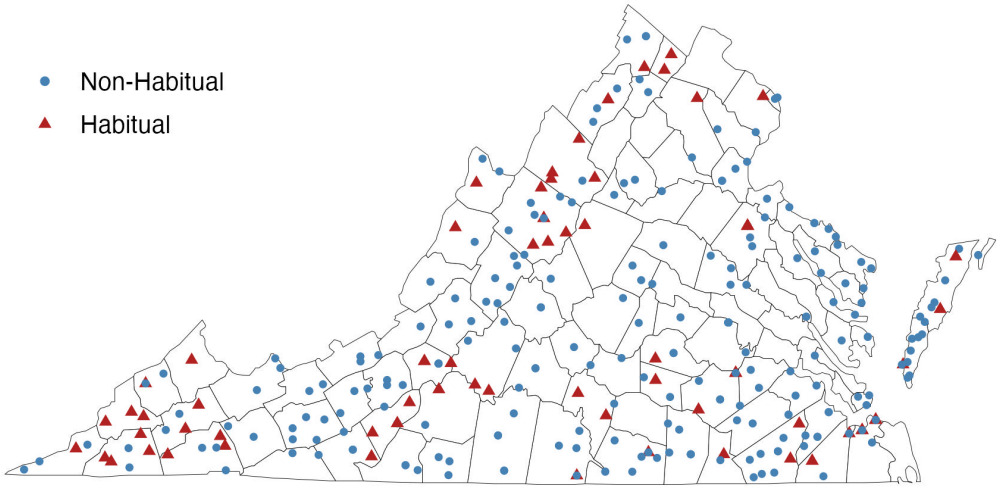
Figure 1: Habitual Borrowing among Virginia State Banks



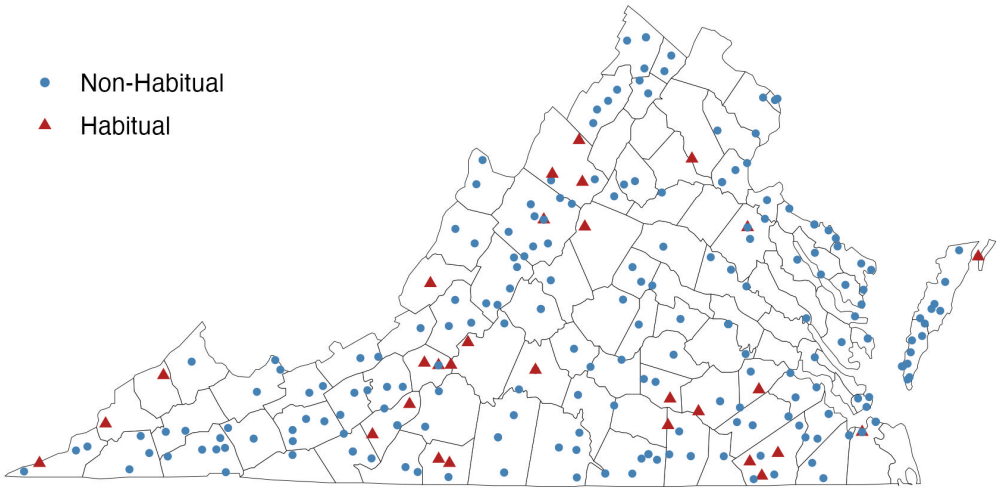
Source: Call Reports, bank examination reports.

Figure 2: Geographic Distribution of Habitual Borrowers

(a) 1922

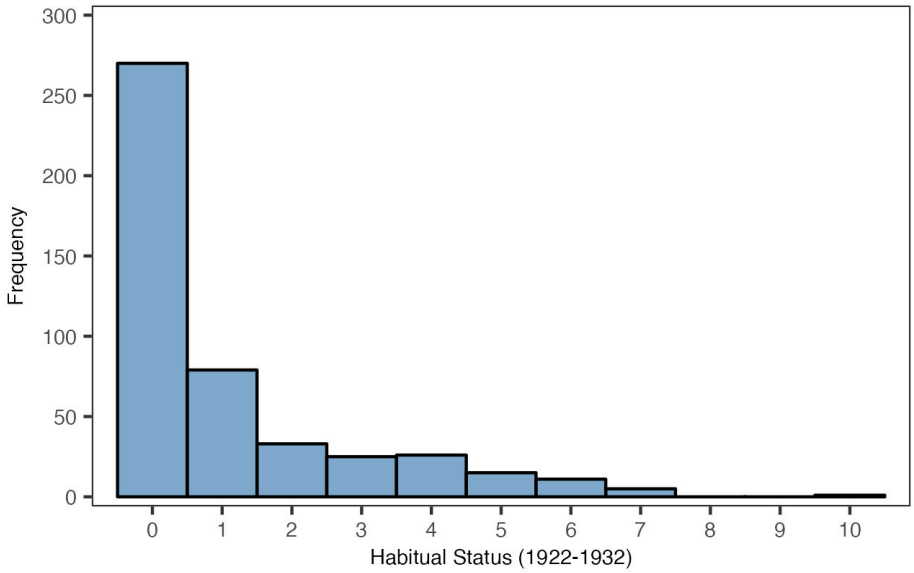


(b) 1929



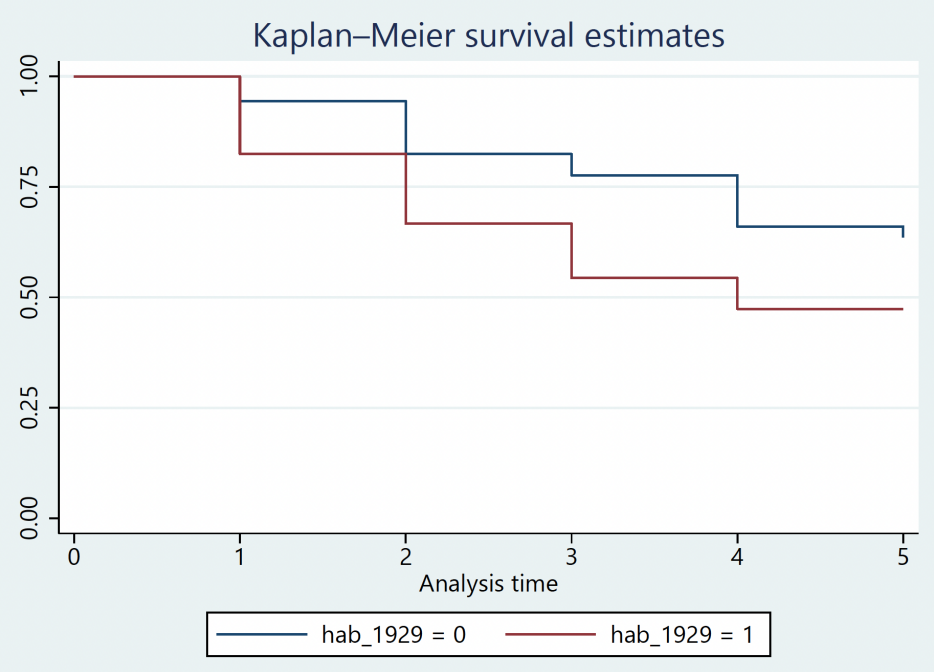
Source: Call Reports, bank examination reports.

Figure 3: Persistence of Habitual Borrowing



Source: Call Reports, bank examination reports.

Figure 4: Habitual Borrowing and Banking Stability



Source: Bank examination reports, Bankers' Directory.

Table 1: Descriptive Statistics

	(1) **Non-Habitual**	(2) **Habitual**	(3) **Difference**
Liquid assets to total deposits	20.79	14.41	6.38***
	(11.20)	(6.389)	(1.39)
Investment to total deposits	106.7	128.9	-22.14***
	(34.33)	(40.40)	(4.80)
Equity to total deposits	29.85	36.29	-6.45*
	(26.60)	(33.24)	(3.78)
Borrowings to total deposits	3.07	17.69	-14.62***
	(7.79)	(17.81)	(1.45)
Borrowings to total capital	19.22	85.77	-66.55***
	(48.40)	(90.43)	(8.06)
Log (Assets)	12.56	12.55	0.01
	(1.11)	(1.06)	(0.15)
Observations	254	71	

Notes: Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$
Source: Call Reports, bank examination reports.

Table 2: Introduction of Enhanced Supervision and Bank Behavior

	(1) $\Delta Borrowing$	(2) $\Delta Deposits$	(3) $\Delta Equity$	(4) $\Delta Invest$	(5) $\Delta Liquid$
Habitual	-2.603**	-0.083***	-0.059***	-0.085***	-0.082
	(1.007)	(0.031)	(0.018)	(0.024)	(0.087)
Constant	2.099	0.119	0.020	0.267	-0.432
	(6.852)	(0.264)	(0.100)	(0.172)	(0.492)
Controls	Y	Y	Y	Y	Y
Observations	130	130	130	130	130
R-Squared	0.461	0.395	0.138	0.397	0.240

Notes: This table presents the relation between habitual borrower status in 1922 and the growth of various balance sheet characteristics. The dependent variables are the percent change in interbank borrowing, deposits, equity, investment, and liquid assets between 1922 and 1923. All columns include controls for bank-level characteristics, including 1922 levels of the borrowing to capital ratio, investment to deposits ratio, liquid assets to deposits ratio, investment to deposits ratio, log total assets, and bank age. Heteroskedasticity-robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports, bank examination reports.

Table 3: Panel Regression: Enhanced Supervision and Bank Behavior

	(1) $\Delta Borrowing$	(2) $\Delta Deposits$	(3) $\Delta Equity$	(4) $\Delta Invest$	(5) $\Delta Liquid$
Habitual$_{it}$	-1.101**	0.050**	-0.010	-0.001	-0.044
	(0.456)	(0.025)	(0.010)	(0.011)	(0.044)
Constant	-16.724	4.234***	1.076***	2.278***	6.672***
	(14.777)	(0.786)	(0.347)	(0.619)	(2.058)
Controls	Y	Y	Y	Y	Y
Bank FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Observations	1116	1116	1116	1116	1116
R-Squared	0.611	0.548	0.280	0.538	0.444

Notes: This table presents the relation between habitual borrower status and the growth of various balance sheet characteristics. The dependent variables are the yearly percent change in interbank borrowing, deposits, equity, investment, and liquid assets. All columns include controls for bank-level characteristics, including lagged levels of the borrowing to capital ratio, investment to deposits ratio, liquid assets to deposits ratio, investment to deposits ratio, and log total assets. All columns include bank and year fixed effects. Heteroskedasticity-robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports, bank examination reports.