The Economics of Market-Based Deposit Insurance

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Abstract

We examine the financial stability implications of deposit insurance using reciprocal deposits, a recent financial innovation through which banks can break up large deposits and place them with others in an offsetting manner. Using a regulatory change that incentivized some banks to join the network as a source of exogenous variation, we show that higher insurance coverage allowed banks to stem deposit outflows following the 2023 banking crisis. Network banks paid lower interest rates on deposits, grew larger, and increased their local deposit market share, while taking on additional interest rate risk. Overall, we provide novel evidence of the trade-off between financial stability and moral hazard due to deposit insurance and discuss its potential impact on the industrial organization of the banking sector.

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1 Introduction

Using a recent financial innovation that allows banks to increase deposit insurance coverage well beyond the regulatory limit, we ask one of the most fundamental questions in banking: how does access to deposit insurance affect depositor and bank behavior? Most countries around the world use some form of deposit insurance to promote financial stability (Demirgüç-Kunt et al., 2014). The theoretical literature has emphasized two principal trade-offs of this policy tool: improved financial stability and excessive risk-taking incentives of insured banks (Diamond and Dybvig, 1983; Kane, 1985; Bhattacharya et al., 1998; Goldstein and Pauzner, 2005). Despite the theoretical importance and policy relevance of these questions, causal empirical evidence on the effect of deposit insurance coverage on financial and real outcomes remains elusive. Even less is known about the costs and benefits of market-based alternatives to a blanket increase in the insurance limit by regulators. Our paper attempts to fill this gap in the literature.

The key challenge of teasing out the costs and benefits of deposit insurance is that there is practically no variation in access to deposit insurance coverage across banks. Regulators such as the United States' Federal Deposit Insurance Corporation (FDIC) set nationwide coverage limits, providing depositors the exact same insurance benefits irrespective of their banking relationship. Depositors, as a result, have no preference for banks in terms of how much insurance coverage they can get. The lack of variation in deposit insurance coverage renders a simple cross-sectional analysis empirically undesirable. Any attempt to relate the observed amount of a bank's insured deposits to depositor or bank behavior is fraught with identification challenges. While there are occasional changes in the coverage limit over time, comparing outcomes across time with varying levels of deposit insurance coverage is also likely to be biased; these changes correlate with other attributes such as the strength of the economy and regulations that can independently affect bank and depositor behavior. A similar critique applies to cross-country analyses as countries differ across a host of regulatory and economic factors that likely correlate with the structure of their deposit insurance programs.

We study a recent financial innovation in the U.S. banking sector – reciprocal deposits – to overcome this empirical challenge. Even though the insurance limit of $250,000 per depositor per bank remains the same for every bank in the U.S., banks on the reciprocal deposit network ("network banks") can obtain much higher insurance limits for their depositors. They are able to do so by breaking up their large deposits into smaller amounts, each within the insurance limit of \$250,000, and placing them with other banks in a reciprocal, i.e., offsetting, manner. In other words, participating banks effectively help insure a piece of each other's large deposits so that they stay within the FDIC's insurance limit. Depositors of participating banks can thus obtain insurance coverage on the entirety of their deposits through this market-based arrangement, irrespective of the amount deposited with their relationship bank.

Using access to the reciprocal deposit network as a source of variation in insurance coverage during the regional banking crisis of early 2023 (also referred to as the "SVB crisis" after the collapse of Silicon Valley Bank), we study the implications of insurance on depositor and bank behavior during a crisis. The regional banking crisis provides an attractive setting for our study because it amplified depositors' concerns about the safety of their uninsured deposits in the banking system (Drechsler et al., 2023; Chang et al., 2023). At the same time, only some banks had access to the reciprocal deposit network at the onset of the crisis primarily due to historical regulatory reasons (a fact we later exploit for identification). Since joining the network requires a setup period of several months, banks that were not already on the network could not obtain higher insurance for their depositors in the immediate aftermath of the crisis. Therefore, we can compare the differences in depositor and bank behavior across these two groups of banks around the crisis to establish a causal link between enhanced insurance coverage and economic outcomes.

We begin our analysis by providing some key descriptive statistics of this fast-growing, yet relatively unknown, market-based mechanism of insurance coverage. These statistics uncover three stylized facts relating to: (a) the time-series evolution of reciprocal deposits, (b) the cross-sectional pattern in the usage of this product across banks, and (c) the characteristics of depositors that use reciprocal deposits.

While reciprocal deposits have existed since the early 2000s, it came into prominence only after a FDIC ruling in 2018 that lowered the regulatory cost of these deposits levied on banks. Before the ruling, reciprocal deposits were considered "brokered deposits," which carried higher deposit insurance premiums compared to core deposits. The ruling exempted reciprocal deposits from being classified as brokered deposits up to certain limit, making them a more attractive form of financing. Only about 18% of banks were on the network before 2015 when discussions and consultations of these rule changes began – a number that increased steadily to over 32% by 2022Q4. Commensurately, the amount of reciprocal deposits increased from \$33 billion in 2014Q4 to \$157 billion in 2022Q4. Another significant shift occurred around the SVB crisis. Within weeks of SVB's collapse in early March of 2023, the dollar amount of reciprocal deposits in the banking system shot up by 41% to over $222 billion (representing 1.2% of total U.S. deposits). Interestingly, the number of banks on the network increased by a modest 7% over this time period, suggesting that most of the increase in reciprocal deposits came from banks that were already on the network in 2022Q4. These trends highlight two key economic drivers of the reciprocal deposit market: regulation and concerns about depositor flight.

In the cross-section, reciprocal deposits are held by banks of all sizes, with small banks (assets below $10 billion) and midsize banks (assets between $10 billion and $100 billion) being the more frequent users. This broad pattern is consistent with the idea that the very large banks enjoy implicit too-big-to-fail guarantees and are less inclined to use reciprocal deposits. In terms of the geographic distribution, participating banks are spread out all over the country, with slightly higher concentrations in the Midwest and Northeast regions.

Finally, the reciprocal deposit base covers high net worth individuals, businesses, and public entities (e.g., municipalities, school districts, public universities, and police departments). Public entities have been one of the prominent users of reciprocal deposits: even though they represent only about 4% of total deposits in the U.S. banking system, about 30% of reciprocal deposits belonged to public funds prior to the SVB crisis.[1] This is mainly due to regulation; when depositing funds at a bank, public entities are required by state law to either back the funds with specific collateral or obtain deposit insurance. Over time, various states amended their laws to allow reciprocal deposits as an acceptable form of insured deposits for public funds. These changes made insurance much less costly to obtain, as the alternative was establishing deposit relationships at multiple banks (for example, a $10 million fund would have to be split up across 40 banks). Public entities became a major component of the reciprocal deposit market following these state deregulations, while the 2018 FDIC ruling made it also desirable for banks to offer the product. Indeed, banks began to use reciprocal deposit services as a means to retain and attract public funds, a fact that we exploit later for our identification strategy.

We first conduct cross-sectional analysis linking higher insurance access to the behavior of depositors and banks. In theory, the reciprocal deposit arrangement can provide insurance for the entire deposit base of the banking sector. There are, however, considerable frictions in doing so because banks must find other banks to enter into the reciprocal arrangement with. Furthermore, some of the largest banks in the country may not be inclined to participate because of the advantage they already enjoy due to their too-big-to-fail status. As search and matching costs can

[1]https://www.ohioapt.org/wp-content/uploads/2012/02/7-Stanic-Basics-of-Investing-Public-Funds.pdf

be substantial, a technology-enabled intermediated solution has emerged: networks operated by independent firms such as IntraFi work as a coordinating device across banks. While any bank can join and use the network, it entails considerable time and upfront costs. To start, banks need to set up their internal control framework and integrate their system with the network provider. The bank also needs to maintain a detailed record of reciprocal arrangements and report the key details to their customers on a regular basis. There are other setup costs such as training bank branch managers about the product, creating customer awareness, and managing reporting costs and compliance issues such as KYC verification. Due to these frictions, the time to join the network can be as long as 3 to 6 months based on our conversation with industry experts.

Motivated by these features of the market, we use a bank's presence on the network prior to the regional banking crisis as a proxy for access to higher insurance coverage during the crisis. Due to the aforementioned setup costs, a bank that was not already on the network could not immediately join it to access higher limits for their depositors. Indeed, we find that banks on the reciprocal deposit network in 2022Q4 increased their insured deposits by 5.67 to 7.80 percentage points between 2022Q4 and 2023Q4 compared to those that were not on the network. The increase in insured deposits was not simply a reshuffling of deposits from uninsured deposits to insured ones; the total deposits of network banks grew by 2.65 to 3.97 percentage points as well. In fact, network and non-network banks had markedly different paths in terms of total deposit growth over this time period; while the dollar amount of total deposits declined sharply at the non-network banks following the crisis, it grew considerably at network banks. This implies that network banks were able to grow their deposit both through higher retention of existing depositors as well as through the inflow of new depositors. We are not aware of any other group of banks that saw an absolute increase in their deposit base during the SVB crisis as the banks on the network, underscoring the importance of enhanced access to deposit insurance during this period. These results cannot be explained by bank characteristics such as size, security holdings, equity capital, duration risk, and profitability.

The price elasticity of the deposit supply curve is a key parameter with implications for a broad range of banking policies and theoretical models (Fama, 1985). If banks supply insured deposits perfectly elastically, an increase in the demand for insured deposits should not have any effect on their deposit interest rates. Contrary to this prior, we find that compared to the non-network banks, network banks paid considerably lower interest rates (8 to 16 basis points) on their insured certificate of deposits (CDs) in the post-crisis period. The increase in the amount of insured deposits at network banks, in conjunction with the increase in its price to depositors (i.e., lower interest rate), is consistent with the interpretation that our results are driven by demand-based factors. Further, the increased price of insured deposits implies that the supply curve for insured deposits is not fully elastic: every 1 basis point decrease in the interest rate (price) is associated with 0.45% increase in the quantity of CDs supplied by the banks. Our elasticity estimates have direct implications for several theoretical models of banking, their structural estimation, and policy design issues such as deposit insurance pricing (Duffie et al., 2003; Egan et al., 2017, 2022).

How did banks respond to the increased deposit inflows as a result of enhanced coverage? We focus on measures of interest rate risk since the SVB crisis was predominantly triggered by this source of risk (Jiang et al., 2023; Granja et al., 2024; Granja, 2023). Moreover, it is relatively straightforward to assess the interest rate risk of a portfolio based on the maturity of underlying assets as opposed to credit risk, which requires ex-post default information. We show that network banks took on additional interest rate risk by increasing holdings of longer maturity securities; the average maturity of their security portfolio increased up to 3.97% and the probability of a larger mismatch in the maturity of assets and liabilities, as measured by the one-year maturity gap (Purnanandam, 2007), increased by 5.8%. This implies that banks with higher deposit insurance access took on more interest rate risk as they received inflows of new deposits. Documenting an increase in observable measures of risk is a critical first step towards detecting the moral hazard effects of deposit insurance.

Are these results causal in nature? There are two key threats to identifying the effect of insurance on bank and depositor behavior. First, it is possible that network and non-network banks (and their depositors) behaved differently due to inherent differences in underlying bank risk, as opposed to variation in access to insurance. Second, depositors at network banks may inherently be less likely to run in the event of a crisis. Our results cannot be explained by observable differences in bank size, leverage, profitability or exposure to interest rate risk as we control for these variables in the estimation. In addition, our results cannot be attributed to differences in the stickiness of the depositor base, given that network banks attracted new deposits following the crisis.

We address these endogeneity concerns more directly with two complementary identification strategies. In the first strategy, we use the fact that a riskier bank's uninsured deposits are more at risk of a run than its insured deposits (Egan et al., 2017). If non-network banks are riskier than network banks, we can expect higher outflows of uninsured deposits at non-network banks after the SVB crisis. Therefore, the risk-difference channel predicts higher insured deposits relative to uninsured deposits after the crisis at non-network banks, compared to the corresponding difference at network banks. In contrast, if our results are driven by the access to insurance channel, we can expect the opposite: insured deposits should grow at a faster rate at network banks. We implement this model using a panel of bank-quarter observations and include bank-quarter fixed effects to soak away the effect of time-varying differences across banks (e.g., differential risk exposure to the crisis). Consistent with the deposit insurance channel, we find that network banks have 10% higher insured deposits than uninsured deposits in the post-crisis period, compared to the corresponding difference at non-network banks.

Our second test for identification compares a set of banks that joined the network in response to a key regulatory change with a set of banks that did not. While several factors can potentially drive a bank's decision to join the reciprocal deposit network, regulatory concerns are among the most important. One key motivation for banks to join the network relates to state laws on the management of public entity deposits. These public funds can be deposited at a bank only if they are insured or backed by adequate collateral. The advent of reciprocal deposits drastically lowered the cost of taking deposits from public entities as banks could avoid collateral constraints mandated by states. Over time, states passed laws throughout the 2000s and 2010s to allow reciprocal deposits as an acceptable form of insured deposits for public entities; as a result, more banks in each affected state joined the network after the passage of these laws.

However, many banks with public entity deposits were still reluctant to join the network due to an additional regulatory burden. Reciprocal deposits have historically been treated as brokered deposits – a classification that attracts higher insurance premiums and supervisory scrutiny. Banks expressed direct concern for these considerations via public outlets leading up to the adoption of FDIC's proposed rule; during the comment period, several banks suggested that the FDIC "eliminate all limits on the acceptance of reciprocal deposits."[2] After the FDIC ruled in 2018 that a capped amount of reciprocal deposits can be exempted from being treated as brokered deposits, a large number of banks joined the network. We argue that regulatory factors explain this discontinuous increase in the slope of network participation growth around 2018, a period of relative stability throughout the banking sector. This growth was also likely aided by reciprocal deposit intermediaries such as IntraFi, which held regular seminars and awareness sessions for banks to take advantage of the rule change. In sum, banks with public entity deposits that joined

[2] https://www.fdic.gov/sites/default/files/2024-03/2018-12-18-notice-sum-h-fr.pdf.

the network around this period enjoyed improved deposit management efficiency and customer satisfaction.[3]

Banks with public funds that joined the network around the passage of the FDIC brokered deposit exemption rule are classified as "switcher" banks and form our treated group. We compare their outcomes against the set of banks who also had public deposits but never joined the network. Our key identifying assumption is that switchers joined due to regulatory concerns about the brokered deposit rule, and not due to unobserved differences in their risk characteristics or depositor base. Since they joined the network around the FDIC ruling, it is reasonable to assume that regulatory change was the key driver for their decision. If their incentive to join the network are driven by unobserved differences in risk or depositor base, they would have switched once state laws allowed them to do so – many years before the FDIC rule change in most cases – even if reciprocal deposits were considered brokered. The identification assumption is strengthened by the fact that depositor base or the inherent business model of a bank is unlikely to change at the same time as the FDIC rule change. Additionally, since all these banks have some amount of public funds in their liability structure, the difference in their behavior cannot be explained away by whether a bank is active in the public funds market.

In a difference-in-differences setting, we show that switcher banks' total deposits grew by a significant 1.64% after the SVB crisis. The increase came from both the retention of existing deposits and inflow of new insured deposits: insured deposits grew by 4.85% relative to non-switcher banks around the crisis period. These differences cannot be explained by the differential effect of bank size, amount and maturity of security holdings, equity capitalization, the level of public entity deposits, or profitability. We control for the interaction of these characteristics with post-crisis time dummies to soak away the differential effect of these variables around the crisis period. The two groups exhibit parallel trends in the amount of deposits before the crisis, providing additional support for the validity of our research design. In robustness checks, we further show that our results are not driven by the inflow or outflow of public entity deposits. In fact, our estimates become modestly stronger if we focus on non-public entity deposits.

We also provide consistent results on the reduction of deposit rates under the difference-in-differences model; switcher banks paid 10.60 basis points lower interest than non-switcher banks off a baseline parallel trend. Importantly, our estimates show that the supply of bank CDs is not

[3]See the following quote from the Chairman and CEO of Catskill Hudson Bank, NY: "Our public funds customers appreciate knowing that when they place their funds through [reciprocal deposits], those funds are eligible for FDIC protection beyond $250,000 and earn interest."

perfectly elastic: every 1 basis point increase in price is associated with a 0.44% higher quantity of insured deposits supplied by banks. In terms of interest rate risk exposure, switcher banks increased their security holdings by 3.88% compared to non-switchers. In fact, switchers' holdings of very long dated securities, defined as securities with more than 15 years remaining to maturity, increased by 4.84% relative to non-switchers. Consistent with this finding, the overall maturity of their securities increased by 3.70% and they were 8.30% more likely to increase their asset-liability maturity gap. Overall, these results confirm that banks with enhanced access undertook more interest rate risk and the allocation of interest rate risk in the banking sector shifted towards banks with higher deposit insurance. All of our difference-in-differences results are mediated through the use of reciprocal deposits by network banks, providing further confidence in our causal interpretation.

In the final part of the paper, we study the implications of deposit insurance on the industrial organization of the banking sector. Our finding that switcher banks' total assets grew proportionately with total deposits following the crisis and the fact that midsize and small banks are the main users of the reciprocal deposit network jointly suggest that access to deposit insurance can change the relative attractiveness of larger banks compared to their smaller counterparts. A key implication of the market-based deposit insurance product, therefore, is that it can lower the value of the implicit guarantees that depositors and markets place on the largest "too-big-to-fail" banks of the country (O'hara and Shaw, 1990; Flannery and Sorescu, 1996; Flannery, 2010; Iyer et al., 2019). Consistent with this view, we show using branch-level data that large regional banks – the main target of uninsured depositor runs during the crisis – did not lose market share in areas where they had greater access to the reciprocal deposit network.

In sum, we establish that enhanced access to deposit insurance allows banks to attract depositors at a lower rate of interest. Banks take more risk in response; the allocation of interest rate risk shifts towards these banks as they grow bigger. While some of these predictions have been discussed widely in the literature, our paper provides one of the first pieces of causal empirical evidence relating deposit insurance to depositor and bank behavior. Further, we are not aware of any study that analyzes the impact of market-based deposit insurance, a financial innovation with potentially large economic implications in the coming years.

This paper relates to a large literature on financial stability and deposit insurance. More closely, it is related to Iyer and Puri (2012) and Martin et al. (2018), who study the run behavior of depositors at failing or distressed banks. Our study is distinct because we focus on cross-sectional differences in access to deposit insurance across banks, and not across depositors of one bank. Iyer et al. (2019) study a related but different problem: the importance of implicit too-big-to-fail guarantees at large banks on retail deposits using Danish data. At a broader level, the key contribution of our paper is to provide novel empirical analysis on how differential access to deposit insurance affects bank and depositor behavior throughout the entire banking sector and during a time of crisis. Furthermore, to the best of our knowledge, the implications of deposit insurance on the industrial organization of the banking sector has not been documented before. Finally, our paper is the first to study the implications of a market-based arrangement for deposit insurance. Understanding these implications is critical for regulators around the world as they debate the costs and benefits of alternative deposit insurance systems to a blanket economy-wide increase.

Our paper also contributes to the ongoing debate on the causes and consequences of the regional banking crisis of 2023 (Jiang et al., 2023; Meiselman et al., 2023; Chang et al., 2023; Granja et al., 2024; Cookson et al., 2023; Granja, 2023). Broadly speaking, our work is related to the literature on the economics of deposit insurance, including analysis of the pricing of deposit insurance, the effect of deposit insurance on bank portfolio holdings, and the determinants of deposit interest rates (Merton, 1977; Marcus and Shaked, 1984; d'Avernas et al., 2023; Pennacchi, 1987; Kim and Rezende, 2023; Egan et al., 2017).

2 Institutional Background

The reciprocal deposit market allows banks to offer FDIC insurance coverage that extends beyond the usual limit of $250,000 per depositor. This is accomplished through a network of financial institutions facilitated by an intermediary such as IntraFi.[4] Prior to the introduction of reciprocal deposits, households, businesses, and public entities hoping to maximize insurance coverage had to open separate accounts – each with under $250,000 – at multiple banks. At the basic level, reciprocal deposits significantly reduced the frictions associated with this endeavor (e.g., time and set-up costs) while providing the same liquidity and interest-earning properties.[5]

To provide enhanced coverage to depositors via reciprocal deposits, banks must complete

[4]For more details, visit: https://www.intrafinetworkdeposits.com/how-it-works/. There are two types of reciprocal deposit networks: CDARS (Certificate of Deposit Account Registry Service) for certificates of deposits and ICS (Insured Cash Sweep) for demand deposits.

[5]Many network banks advertise these benefits in their promotional material; see an example here: https://www.cbhou.com/Portals/CentralBankHouston/PDF/ICS_CDARS.pdf.

several crucial steps. The key participants in the system are: (a) the depositor; (b) the relationship bank, which is where the depositor initially places their funds; (c) issuing institutions, which receive portions of the depositor's money in FDIC-insured amounts through reciprocal arrangements; (d) network providers like IntraFi, who manage the communication and transactions within the network; and (e) custodians or independent institutions (e.g., Bank of New York Mellon) that are responsible for record-keeping and maintaining asset custody for deposited funds.

To begin offering these services to depositors, banks must first undergo an onboarding process, which involves signing a contract with a network provider. This step requires integrating with the network's platform to ensure smooth communication and transaction processing. Banks must also train their staff to guide depositors effectively and market the product to attract those seeking enhanced FDIC coverage. For banks not already on the network, this onboarding process can take two to three months. This friction can inhibit swift adoption of this market-based deposit insurance mechanism.

When depositors place a large sum with their relationship bank, they lock in an interest rate set by that bank (the relationship bank). The relationship bank then uses the network to divide the large deposit into smaller FDIC-insured amounts and place them at other network banks. To maintain transparency and control, depositors sign a Deposit Placement Agreement (DPA) that authorizes this distribution. This agreement often allows depositors to exclude specific banks if they wish. Our conversations with industry professionals suggest that this exclusion option is frequently used.

A critical aspect of reciprocal deposits is rate management. Since different issuing banks might offer varying interest rates, a "rate-bridge" agreement is used to ensure consistency. This agreement requires a network bank offering the higher rate to compensate the other bank for the difference, ensuring depositors have a consistent experience regardless of which bank holds their funds.

3 New Facts on the Reciprocal Deposit Market

We begin our empirical analysis by uncovering several new insights on the historical development of the reciprocal deposit market. First, we show that the reciprocal deposit market is a major source of deposit funding for banks today (Figure 1). In the beginning of 2011, the total amount of reciprocal deposits in the U.S. banking system was $25 billion representing 0.3% of total deposits. Today, these figures are $380 billion or 2% of total deposits, representing a cumulative growth rate of 666%. While reciprocal deposits have existed since the early 2000s, they were not commonly used by banks due to their classification as brokered deposits; brokered deposits are generally unattractive because they carry higher deposit insurance premiums compared to standard deposits. This changed after May 2018, when the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA) prompted a series of bank deregulation measures, one of which was the FDIC's new rule to exempt reciprocals from being classified as brokered deposits under certain criteria.[6] The rule made reciprocal deposits a relatively attractive form of financing, and we thus observe a steady increase in the volume of these deposits after June 2018. Specifically, the total amount of reciprocal deposits increased from $48 billion in the beginning of 2018 to $157 billion by the end of 2022, representing an annual growth rate of around 19%. For comparison, the total amount of reciprocal deposits increased from $25 billion to $46 billion from 2011 through 2017, representing an annual growth rate of 9%.

While these findings indicate that reciprocal deposits play a more salient role in funding markets today, it is unclear whether this increased utilization is driven by the intensive margin or by the extensive margin. To address this, we examine the fraction of U.S. network banks in Figure 2. While the percent of banks on the network remains around 20% from 2011 through 2018, we observe a notable increase from the beginning of 2018 through the end of 2022; 32% of banks are on the network by the end of 2022. Since the SVB crisis, there has been a sharp increase in the number of network banks to 42% by the end of 2023. Still, the increase in network membership during this period was not instant; assuming that growth would have remained at constant levels absent the bank failures, we only observe a 1 to 2 percentage point increase in network membership in the two weeks immediately following SVB's failure. June 2023 marks the first strong period of growth (around 3%), with participation continuing to rise through the end of 2023. This supports the industry insight that onboarding may take several months.

Second, we show that reciprocal deposits are utilized primarily by small (assets below $10 billion) and midsize (assets between $10 billion and $100 billion) banks; the largest banks of the country (assets above $100 billion) persistently exhibit low usage of reciprocal deposits. Prior to the BD exception, reciprocal deposits accounted for less than 2% of total deposits for small banks and less than 1% for midsize banks, with the largest banks reporting negligible amounts (less than 0.05%). The usage of reciprocal deposits increased across the bank size distribution following the

[6]See the Federal Register for more details.

regulatory change; small banks saw their share rise to around 3.1% by 2022Q4, whereas midsize banks reached 1.6%, and large banks continued to report minimal utilization. After the SVB crisis, we observe a significant rise in reciprocal deposits as a proportion of total deposits, particularly for midsize banks. Midsize banks' share of reciprocal deposits jumped from 1.6% in 2022Q4 to 5.8% by 2023Q4. Smaller banks also saw an increase, with their share growing from around 3.1% to 6.0% over the same period. The largest banks, however, only experienced a modest increase in this ratio (0.16% to 0.29%). These trends suggest that banks have increasingly turned to reciprocal deposits following the crisis, but that usage is not uniform across bank size groups.

Overall, we provide evidence that midsize and small banks are the primary users of reciprocal deposits, with midsize banks showing the largest uptick in reliance after the crisis. For illustration, none of the global systemically important banks (G-SIBs) are ranked among the top 8 banks by total amount of reciprocal deposits or share of reciprocal deposits in 2017Q4, 2022Q4, and 2023Q4, as shown in Appendix Tables A.2 and A.3, respectively. High reciprocal deposit usage from banks above $100 billion in assets are first observed in 2022Q4, namely UBS Bank (foreign) and First Republic Bank (now defunct), Huntington National Bank, and Citizens Bank. Of note, none of the large institutions are included in the top banks list when ranked using the share of total deposits measure. Large banks are even less represented after the crisis – the only exceptions are Citizens Bank with assets of $221 billion and $8.2 billion in reciprocal deposits (3.7% of total assets) and First Citizens Bank with assets of $214 billion and $7.6 billion in reciprocal deposits (3.6% of total assets).[7] These findings are consistent with the idea that at the margin, smaller banks value access to deposit insurance more than their larger counterparts, perhaps due to the lack of implicit guarantees that the largest banks enjoy.

Third, we document that reciprocal deposits are an important financial innovation that provides enhanced insurance for banks nationwide. Figure 3 illustrates the geographic expansion of the reciprocal deposit network from 2011 to 2022. Across both periods, we observe significant dispersion of network banks both in terms of location and the concentration of reciprocal deposit shares. While there tend to be more network banks in the midwest and northeast regions, this is in part driven by the higher number of banks incorporated in those areas. Overall, access to the network is close to universal; network banks are not necessarily concentrated in the coastal regions or in the most populous counties, nor are they growing at different rates over time. This

[7] For reference, domestic G-SIBs reported zero reciprocal deposits in 2023Q4, with the exception of Morgan Stanley ($1.1 billion) and Bank of America ($653 million).

pattern can be explained by the nature of the technology-enabled platform, which allows banks to connect with others nationwide[8]

In the next sections, we describe the data used in this study and document how network access impacted depositor and bank behavior.

4 Data and Descriptive Statistics

Reciprocal Deposits and Network Status. We define the network status of a bank using data from the quarterly Call Reports (FFIEC 031/041). Reciprocal deposits were originally classified as brokered deposits, which have historically been associated with increased regulatory costs. In 2018, the EGRRCPA rule exempted reciprocal deposits from being considered brokered deposits up to a cap. To account for reporting rule changes associated with EGRRCPA, we take either the sum of RCONJH83 and RCONJH84 (Total reciprocal deposits) or RCONG803 (Reciprocal brokered deposits) to construct a consistent series of reciprocal deposits at the bank-quarter level. We define "network" banks as those with positive reciprocal deposits and "non-network" banks as those with zero reciprocal deposits in a given quarter.

Insured Deposits and Public Entity Deposits. Bank-level estimates of the fraction of insured deposits are collected from the Call Reports and supplemented with FDIC's Statistics on Depository Institutions (SDI). The SDI is an advanced feature of the Institution Directory (ID) that provides detailed financial reports. Importantly, it provides estimates for banks with total assets less than $1 billion, which can be missing in the corresponding Call Reports data. We construct the fraction of uninsured deposits by subtracting insured deposits from total deposits. Public entity deposits are also obtained from the Call Reports and are defined as deposits of states and political subdivisions in the U.S., both in transaction accounts (RCON2203) and nontraction accounts (RCON2530).

Deposit Rates. We obtain deposit rate data from the S&P Global's RateWatch database. We focus on the 12-month certificate of deposit accounts with a minimum of $10,000 due to its comprehensive reporting coverage. To mitigate bias from misreporting, we first calculate the quarterly average CD rate at the branch level and then aggregate these rates across all branches of each

[8]See the Online Appendix for a more detailed county- and state-level analysis of the network's geographic expansion.

commercial bank.

Bank Locations and Branch Deposit Holdings. We compile location and deposit holdings information for bank branches using data from the FDIC's Summary of Deposits (SOD). In other words, we construct an annual measure of bank-level branch counts and average deposits per branch. To study implications for the industrial organization of banks, we additionally identify the street address and state of incorporation for each bank using the Call Report's Panel of Reporters.

Other Bank Characteristics. Quarterly bank data on the level of total assets, loans, deposits, equity, and securities, are obtained from the Call Reports. We additionally use the Call Reports to calculate interest rate risk; the average maturity of securities is calculated as the weighted-average maturity of holdings across maturity types, using the midpoint of each maturity bucket. Deriving from Purnanandam (2007), we also measure the average maturity gap as the absolute difference between short-term assets (sum of loans and leases, securities, and federal funds sold with less than one year remaining until maturity) and short-term liabilities (federal funds purchased and other borrowed money).

Sample and Descriptive Statistics. The sample period for our study is 2011Q1 through 2023Q4. The maximum deposit insurance limit was permanently raised from $100,000 to $250,000 in July 2010, which motivates the use of 2011 as the starting point of our sample. The unit of observation used in the study is a bank-quarter pair. In our main analysis, we study the cross-section of commercial banks that were in operation between 2022Q4 and 2023Q4, the period around the 2023 regional banking crisis. In 2022Q4, the quarter prior to SVB's failure, our sample consists of 4,756 banks, of which 1,539 were classified as network banks.

Table 1 reports summary statistics of network and non-network banks as of 2022Q4. On average, network banks tend to be larger than non-network banks while having similar profitability. Network banks also exhibit a larger loan portfolio and lower leverage. Importantly, network banks have lower holdings and higher average maturity in terms of securities than non-network banks. Network banks also generally tend to have lower insured deposit ratios, marginally higher reliance on public entity deposits, and larger branch networks. These statistics collectively imply that operations and investment decisions may have been different across the two groups prior to the crisis. In our main empirical analysis, we provide specifications that directly control for several of these covariates, especially light of the outsized role of interest rate risk during the SVB crisis.

Figure 4 plots the evolution of eight bank characteristics in the pre-BDE (2011Q4 and 2017Q4), Pre-SVB (2022Q4), and Post-SVB (2023Q4) periods. While baseline differences across groups persist, we do not find that the average characteristic and their relationship across the two groups evolve in a notable manner throughout our sample period.

In our main difference-in-differences analysis, we restrict our sample to switcher and non-switcher banks. Switchers are defined as banks with positive public entity deposits and not on the network in 2014Q4 that subsequently joined the network around the FDIC ruling (between 2015Q1 and 2020Q2).[9] Non-switchers are non-network banks that also had positive public entity deposits in 2014Q4 but never joined the network during the switching period.

Table 6 tabulates summary statistics of switcher and non-switcher banks as of 2022Q4, the quarter immediately preceding the SVB crisis. Across all variables with the exception of leverage, there are statistically significant differences between the means of covariates (e.g., size, profitability, leverage, security holdings, interest rate risk). While it is plausible that switchers joined the network around the FDIC rule for reasons unrelated to bank risk and depositor base characteristics following the crisis, we control for these key covariates in our preferred difference-in-differences specification.

5 Main Results

We ask three main questions in the paper: (a) how does enhanced access to deposit insurance affect depositor behavior?, (b) how does it affect banks'investment decisions?, and (c) what implications does it have for the industrial organization of the banking sector? We begin our analysis by relating these outcomes to our main proxy for enhanced access to deposit insurance, measured as reciprocal deposit network participation in 2022Q4. After showing these baseline results, we exploit regulation-driven incentives to join the network to establish a causal link.

We focus our attention on our outcomes of interest around the regional banking crisis for one simple reason: it was during this time that safety concerns about deposits became a first order

[9] While the FDIC brokered deposits exemption was enacted in 2018, the initial announcement and the public comment period began in early 2015. The 2015Q1 to 2020Q2 window allows for the fact that banks may have joined the network in anticipation of the ruling and does not incorporate banks that joined two full years after the rule took effect.

concern for many depositors.[10] Therefore, our empirical analysis teases out the effect of deposit insurance during a period of banking crisis, which directly maps to the theoretical models in the literature: does increased access to insurance limit the outflow of depositors?

In the baseline analysis, we use a bank's presence on the reciprocal deposit network in 2022Q4 as a proxy for enhanced access to deposit insurance. This is motivated by one key assumption: banks could not immediately join the network once the crisis began, since joining the network requires significant setup costs and delay. This institutional feature provides us the variation needed for our analysis.

5.1 Depositor Behavior

We begin by documenting the evolution of reciprocal deposit network participation as well as stability-related outcomes during the crisis. Figure 5a shows that network adoption is sticky; we begin with all banks in 2022Q1 that were on the network during that quarter and follow them over time (blue bars). Almost all banks remain on the network by the end of our sample period in 2023Q4. In contrast, the orange bars show that few non-network banks in 2022Q1 end up on the network by the end of the sample period despite the heightened benefits of access to insurance. Specifically, while we observe a gradual increase in network membership among non-network banks, the growth is slow not only in 2022 but also throughout the banking crisis of 2023; 3.3% and 5.7% of pre-crisis non-network banks join the network by 2023Q1 and 2023Q2, respectively, and only 18% of non-network banks joined the network by 2023Q4. These findings are consistent with our assumption that joining the network is not a trivial process, and it can take several months to join it. Therefore, banks that were already on the network had a tangible advantage in terms of accessing higher insurance limits in the immediate aftermath of the regional banking crisis.

Panel 5b plots the difference in reciprocal deposit growth between network and non-network banks around the SVB crisis. The total value of reciprocal deposits for banks already on the network by 2022Q1 remains relatively stable at around $120 billion throughout 2022. Starting in 2023Q1, however, network banks' reciprocal deposit volume increases significantly; the total volume almost doubles to $233 billion by the end of June, and continues to rise throughout the year, indicating that existing members took advantage of the network's deposit insurance benefits during the crisis. Indeed, we observe that the surge in reciprocal deposit activity directly translates

[10]Indeed, overall bank deposits fell by 2.4% in the immediate aftermath of the crisis. See here: https://www.wsj.com/articles/state-street-schwab-see-deposits-drop-4b0438ac

to a significant increase in both the amount and the proportion of insured deposits for network banks but not for non-network banks (Panels 5c and 5d). Notably, Panel 5d shows that there was a remarkable increase in insured deposits (as a percentage of total deposits) for the network banks compared to the non-network banks.

We formally test these relationships using the following cross-sectional regression model:

$$\Delta ln(D)^{j}_{2023Q4,2022Q4} = \alpha + \beta \mathbb{1}_{Network,j,2022Q4} + X_j + \epsilon_j \tag{1}$$

$\Delta ln(D)^{j}_{2023Q4,2022Q4}$ measures the log change in deposits for bank j from 2022Q4 to 2023Q4. $Network^{j}_{2022Q4}$ equals one if a bank is on the network on 2022Q4, zero otherwise. X_j is a vector of control variables such as bank's asset size, security holdings, and profitability. Our model allows us to establish a correlation between higher access to insurance, as measured by presence on the network just before the crisis, to depositor behavior during the crisis. Table 2 presents the results of our estimation.

Column 1 uses the log change in insured deposit as the dependent variable. Banks on the network in 2022Q4 experienced 7.81% higher growth in insured deposits compared to the non-network banks. During the crisis period, depositors run to the largest banks of the economy to avail of the implicit too-big-to-fail guarantee. In addition, banks with large securities holdings were subject to greater scrutiny during the SVB crisis. These forces can independently affect the growth of deposits at a bank. Therefore, we control for bank size, securities holdings, equity capitalization, and profitability in Column 3 to separate out the effect of these forces on our estimates. All control variables are measured as of 2022Q4, i.e., just before the crisis. Our results remain similar: banks on the network have 5.67% higher growth in insured deposits compared to the non-network banks. Given the quarterly growth rate of 1.04 percentage points for total insured deposits of all U.S. banks from 2010, our estimate of 7.81 or 5.67 percentage points over the course of 4 quarters is economically significant.

We explore this result further by looking at the dynamics of insured deposits over a longer period of time as shown in Figure 6. Panel 6a shows the quarter-by-quarter growth rate of insured deposits for network and non-network banks from 2022Q1 to 2023Q4. Both groups had very similar growth rate till 2022Q4, after which a stark pattern emerges: network banks experienced significantly higher growth in insured deposits in 2023Q1, i.e., soon after the crisis. The data reveals a substantial divergence between the quarterly growth rate in insured deposits across network and non-network banks between 2023Q1 to 2023Q3. By 2023Q4, as concerns about the crisis subsided, the quarterly growth rates for both groups began to converge again. Despite this, the cumulative difference in growth between network and non-network banks over this period remained substantial, as depicted in Figure 6b. From 2022Q1 to 2023Q4, network banks achieved insured deposit growth of 17.9%, compared to just 7.1% for non-network banks – a gap of 10.8%. This gap highlights the pronounced impact that network membership has on insured deposit growth, particularly during times of financial uncertainty. Further, the dynamics of deposit growth across the two groups provide support to our argument that access to higher insurance affected depositor behavior during crisis.

A key question arises: is the observed increase in insured deposits merely a reshuffling of previously uninsured deposits into insured status for network banks, or does it indicate a broader ability to attract more deposits overall? We address this question by estimating the impact of network status on the growth rate of total deposits from 2022Q4 to 2023Q4. The regression result, shown in column 2 of Table 2, indicates that the total deposits for network banks increased at a 3.96 percentage points higher rate compared to non-network banks. As shown in column 4, the increase in total deposits is not explained away by the bank's size, security holdings, equity capital, or profitability. Even after controlling for these variables, the network banks experienced a 2.65% higher growth in their total deposits compared to the non-network banks. Access to enhanced deposit insurance coverage through the network not only helps these banks retain existing deposits but also attract additional deposits overall. The result suggests that it is not the difference in the run behavior of existing depositors of these two groups of banks that explain our results: it is the broader effect of deposit insurance access that attracted depositors of other banks to these banks as well.

Figures 6c and 6d plot the quarterly and cumulative growth of total deposits to provide a closer look at the dynamics of deposit evolution. Network banks gained a significant amount of deposits compared to non-network banks after the SVB crisis, a difference that persisted until the end of our sample period. In fact, network banks experienced an increase in total deposits whereas non-network banks experienced a decline in total deposits, a result that is more prominent in the immediate aftermath of the crisis. This finding highlights the heterogeneous response of depositors to a sudden shift in the importance of insurance coverage. Banks with access to reciprocal deposits were able to grow their deposits in absolute terms despite the heightened scrutiny on banking sector risk. We are not aware of any other group of banks that experienced an increase in their deposit base, in absolute terms, during the crisis period. The significant difference in the deposit growth trajectories of network and non-network banks has a notable cumulative impact. As shown in Panel 6d, network banks had a cumulative growth advantage of 5.5% in total deposits compared to non-network banks by the end of 2023 (off the baseline in 2022Q1).

Overall, these results demonstrate that the depositors of network banks were less likely to leave because of the enhanced access to deposit insurance.

5.1.1 Interest Rates on Deposits:

We now investigate how access to enhanced deposit insurance coverage affects the interest rates banks offer on their insured deposits using the same cross-sectional regression analysis we employed earlier for the quantity of deposits. Interest rates on deposits are influenced by a combination of factors including the market rate on safe assets, the competitiveness of the banking sector, and the availability of deposit insurance. For insured deposits, the interest rates should not be sensitive to bank risk. Further, if banks supply these deposits elastically, then we should not observe any difference in interest rates offered by network or non-network banks. However, with an upward sloping supply curve for insured deposits, increased quantity of insured deposit will also results in higher prices, i.e., lower interest rate, in equilibrium.

Estimation of the elasticity of supply curve for insured deposits, a primitive parameter, has wide-ranging implications for our understanding of how banks compete, several structural models of banking market that requires a model of supply behavior of banks, and policy design such as pricing of deposit insurance. For example, if banks compete in a local market as in a Bertrand-Nash equilibrium, they should supply insured deposits elastically and even a handful of banks can achieve a perfectly competitive equilibrium. On the other hand, if banks differentiate their product by offering varying degree of service and convenience by incurring additional costs, for example, through a larger network of ATMs, then the supply curve can be upward sloping. In that case, we should observe an increase in the price of insured deposits at the network banks after the crisis.

We examine changes in interest rates for a specific product: 12-month Certificates of Deposit (CDs) with a minimum deposit size of $10,000, an amount well below the FDIC insurance limit. These CDs are particularly appealing to risk-averse savers, and interest rates on these products can be obtained precisely from the Rate Watch database. The estimation results are provided in Table 3 of the paper. Column 1 shows that banks on the network lowered their interest rate by 16 basis points compared to the non-network banks around the crisis period.[11] Since our dependent variable is changes in deposit rate for the same product by the same bank, these estimates are not affected by time-invariant bank characteristics such as their management style. Column 3 shows that the effect of network status on interest rates cannot be explained away by bank size, security holdings, equity capitalization, or profitability. The estimated coefficient is still significant with a coefficient of -8.99 basis points.

Table 3 also presents the corresponding estimates for the quantity of deposits on the sample sample for which we estimate the interest rate regression. We focus on time deposits since our estimates for interest rates are for the time deposits of a bank. We find that banks on the network grew their insured deposit base by 4.06% around the crisis period based on this sample. Together, these results show an increase in quantity of 4.06% and an increase in price of 8.99 basis points. Increase in the quantity of deposits along with increase price of deposits to the depositors show that our effects are driven by an upward shift in the demand curve for insured deposits. Relating the two regression coefficients, we can get an approximate estimate of the supply semi-elasticity of the insured deposits. For every percentage point increase in the amount of insured deposit, banks lower the interest rate by 2.25 basis points. These estimates are consistent with a model of banking where banks provide differentiated products to their depositors and incur higher marginal costs to supply higher amounts of insured deposits.

5.2 Bank Behavior

Does higher deposit insurance lead to higher risk-taking by the insured banks? We investigate the effect of enhanced deposit insurance on banks' risk-taking behavior using the same framework we employed to study depositor behavior. We first focus on interest rate risk since exposure to interest rate risk was a major concern for market participants and regulators during the SVB crisis. Therefore, a bank's exposure to this risk and its evolution over time is economically important in our sample period. Further, unlike credit risk, interest rate risk can be measured more precisely at the time of the event. For example, interest rate risk can be measured by analyzing the maturity structure of a bank's assets and liabilities, which provides a direct assessment. In contrast, reliable measures of credit risk require observing actual borrower repayment behavior, often resulting in a time lag.

[11] Our sample size for the interest rate result is smaller than the sample for quantity results because we require coverage on the RateWatch dataset to get interest rates.

We use two measures to quantify interest rate risk: (a) the duration of securities held by banks and (b) the one-year maturity gap between a bank's assets and liabilities. Call Reports break securities in broad buckets such as securities due to mature within 3 months, or between 1 to 3 years. We calculate the duration of securities by taking a weighted average of the volume of securities in each maturity category, with weights based on the average maturity within each category. The one-year maturity gap is calculated according to Purnanandam (2007), by subtracting the total liabilities that are due to reprice or mature within a year from the corresponding total for assets. Since our focus is on risk-taking behavior linked to deposit insurance, we exclude deposits from the maturity gap calculation.

Results are presented on Table 4. Column 1 shows that banks on the network increased their security holdings by 2 percentage points around the crisis period. After controlling for the effects of other control variables, Column 4 shows an increase of 1.33 percentage points in their security holdings. Columns 2 and 3 present the estimation result for measures of interest rate risk. The dependent variable in Column 2 is the log change in the duration of securities from 2022Q4 to 2023Q4. Therefore, it measures the change in the level of interest rate risk undertake by the bank around the SVB crisis. We find that network banks increased the duration of their securities holdings by 3.97 percentage points around the crisis. Column 5 of the Table controls for the other covariates and shows a significant increase of 1.73 percentage points for the network banks. Unlike our earlier regressions, we do not control for securities holdings in this specification because our key dependent variable is itself about the maturity of these securities.

Columns 3 and 6 use the maturity gap between the assets and liabilities of the bank as the dependent variable. The dependent variable equals one for banks that increased the mismatch in the maturity of their assets and liabilities that are due to mature or reprice within a year, and zero otherwise. Therefore, the regression coefficient measures the effect of network status on the likelihood of increasing maturity gap by the bank. As shown in Column 3, banks on the network were 5.52% more likely to increase their maturity gap compared to the non-network banks. Results become stronger in Column 6 where we also control for the other covariates.

Overall, these results suggest that banks receiving higher inflows of insured deposits during the crisis period took higher levels of interest rate risk. While we do not assess whether this increase in interest rate risk is efficient or not, the increase in the level of risk in itself is an important object of banking regulation.

5.3 Identification

The key endogneity concern for our empirical analysis arises from the non-random selection of banks on the network. Are banks on the network systematically different from the non-network banks in a manner that make them less susceptible to a crisis like SVB for reasons independent of insurance coverage? Two economic forces are of particular concern: (i) are banks on the network different in terms of their underlying risk exposure such that they retain and attract more depositors compared to the non-network banks?, and (ii) are the depositors of the network bank more "sticky" such that they are less likely to leave these banks at the time of crisis?

As discussed earlier, our results cannot be explained by differences in size or observable interest rate risk, such the maturity of their security holdings, because we control for these attributes in our linear regression. Therefore, the key identification concerns come from unobserved differences across the two groups. For example, if banks on the network are systematically safer on hidden dimensions that the depositors observe but we don't, then our results can be explained away by differences in risk exposure and not deposit insurance. Our finding that the change in outcome for the network banks is mediated through the use of reciprocal deposits further ameliorates the endogeneity concern since it is the use of reciprocal deposit, a directly observable metric of increase in insurance coverage, that explains our main findings.

We now provide two tests to address these concerns more directly, as discussed below.

5.3.1 Within Bank-Quarter Regression

Our first test is motivated by a simple observation: if non-network banks are riskier than the network banks, then non-network banks should experience a greater decline in their uninsured deposits after the crisis than their insured deposits, as compared to the corresponding decline for the banks on the network. Egan et al. (2017) provide evidence supporting our assumption that as a bank's financial distress increases it loses uninsured deposits, whereas there is no response response on their insured deposits.[12] Said differently, after the crisis a non-network bank's insured deposits should increase by more compared to its uninsured deposits, compared to the corresponding difference for the network banks. Therefore, the risk-difference channel predicts a relatively larger increase in insured deposits of a non-network bank compared to its uninsured deposits after the crisis. The access to insurance channel that we focus on predicts just the opposite:

[12]As an example, see Figure 1 of Egan et al. (2017) where they show the responsiveness of uninsured deposit to bank risk using an example of CitiBank and JP Morgan Chase.

the difference between a bank's insured and uninsured deposits should increase for the network banks compared to the corresponding difference for the non-network banks. The contrasting prediction that we obtain from these two channels can be tested using the following bank-quarter fixed effect regression model:

$$Y^i_{b,q} = \alpha_{b,q} + \beta_1 \cdot \mathbb{1}_{Network_b} \times \mathbb{1}_{post_q} \times \mathbb{1}_{Ins_i} + \beta_2 \cdot \mathbb{1}_{Network_b} \times \mathbb{1}_{Ins_i} + \beta_3 \cdot \mathbb{1}_{post_q} \times \mathbb{1}_{Ins_i} + \epsilon^i_{b,q}. \quad (2)$$

For each bank in the dataset we create two observations per quarter: one for the insured deposit and one for the uninsured deposit of the bank in the quarter. $Y^i_{b,q}$ measures the log value of the deposit of either type i, insured or uninsured, for bank b in quarter q. $\mathbb{1}_{Ins_i}$ is an indicator variable that equals one for the insured deposit, and zero for the uninsured ones. The inclusion of bank-quarter fixed effects, $\alpha_{b,q}$ soaks away the time varying bank specific factors such as their hidden risk or depositor characteristics. The coefficient of interest is β_1, the triple interaction term, that measures the effect of network membership on differential increase in insured deposits compared to uninsured deposits after the crisis. β_2 measures the difference in the level of insured deposits compared to uninsured deposits for network banks. β_3 measures the average level of increase in insured deposits after the crisis for the banking sector as a whole.

Table 5 presents the estimation results. As expected we find a strong positive coefficient on the interaction term of $\mathbb{1}_{Post} \times \mathbb{1}_{insured}$, showing that the level of insured deposits increased by 8.33% for the average bank in the country. However, as shown by the coefficient on the triple interaction term, banks on the network received an even larger inflow of insured deposits compared to their uninsured portion over this time period. The estimated coefficient of 10% is economically large and statistically significant. The finding is inconsistent with the risk channel, and in line with our argument that it is access to insurance coverage that resulted in higher inflow of deposits into these banks.

5.3.2 Regulatory Incentives

In our second test, we exploit a source of variation in a bank's incentive to join the reciprocal deposit network that arises due to historical banking regulation that is plausibly exogenous to a bank's other risk taking incentives or depositor base. We first discuss the institutional details of this variation and then present our regression results.

5.3.3 Regulation on Public Funds and Brokered Deposits

Government or public institutions such as local municipalities, school districts, public hospitals and police departments have fiduciary responsibilities to protect their public funds, called the public funds. Therefore, they face state specific regulations on the deposit of public funds in a bank. While the details vary somewhat across different states, there are primarily two methods for investing public funds in a bank: either a collateralized investment or an insured investment.[13] The advent of reciprocal deposit network relaxed the collateral constraint on the deposit of public funds – Banks were no longer required to hold specific collateral to protect their public funds.

To join the reciprocal deposit network to attract or retain public funds, however, required state's approval. States needed to pass legislation allowing public institution to invest in reciprocal deposit.[14] As states passed these laws and the reciprocal deposit network spread through the country, several bank managers begin to join the network to attract public funds. Yet, the regulatory cost of holding these funds was higher than core deposits because the FDIC treated them as brokered deposit till 2018. After the FDIC changed its legislation in 2018, these funds were treated as core deposits as long as they were within a certain limit (Ryfe and Saretto, 2023). As a result of this regulatory change, several banks with public funds joined the network since reciprocal deposit now became more attractive compared to the alternative method of securing public deposits, namely by pledging collateral.

Figure 8 presents the share of banks in a state that are on the reciprocal deposit network over time. We present two graphs: one for states that passed the regulation allowing reciprocal deposits as an acceptable form for investing public deposit early, and the other for states that were late in doing so. We define early and late based on whether the state had passed this ruling

[13]As an example, the state of Minnesota in its statement of position on the deposit of public funds writes that: "All public funds on deposit in a bank or credit union must be protected by deposit insurance, a corporate surety bond or pledged collateral. Most institutions choose to pledge collateral for amounts not covered by the deposit insurance. The process involves the depository placing securities it owns within an account in the trust department of a commercial bank or a restricted account at the Federal Reserve, and pledging these securities to the government entity. If the depository fails, the government entity can take the securities pledged to make up for any loss to its deposited funds." see https://www.osa.state.mn.us/media/4zibjp05/depositspublicfunds1102statement.pdf Every state of the country has equivalent requirements: public deposits have to be either secured by collateral or be backed by the FDIC insurance.

[14]For example, the state of Michigan passed this law in 2008 under its section 307 and 308.[15] During the decade of 2010s, gradually all the states passed legislations to allow the use of reciprocal deposits as an acceptable form of public fund investment. For example, see the following comment from an industry observer:"Most states have passed legislation allowing local subdivisions, including school districts, to use these reciprocal networks as an alternative to collateralization. https://www.bankingdive.com/news/reciprocal-deposits-community-banks-save-small-business/576309/"

by 2010 or not. Two patterns emerge clearly from the figure: (a) state laws matter and it has a persistent effect as evidenced by the persistent difference between the number of banks on the network across the two groups, and (b) the passage of the FDIC BD rule had a significant effect of a bank's incentive to join the network, as evidenced by a sharp increase in the number of banks around the BD exemption rule. are clear from the figure.

We argue that banks with public funds that joined the network after the passage of the FDIC brokered deposit rule did so primarily for the relative costs of these two methods of securing public funds, and not for other confounding forces such as their hidden risk characteristic or depositor base. Therefore, comparing banks that joined the network around the passage of the FDIC ruling with those that did not allows us to compare outcomes across two groups of banks that differed in terms of the assessment of their regulatory costs, and not other unobserved characteristics. Banks that find it optimal to join the network for these unobserved reasons should have joined it even before the passage of the FDIC ruling.

Since regulatory changes happen after a lengthy process of rule-making, we consider all banks that joined the network around a wide window of rule-making as the "switcher" banks. Serious policy discussions on the treatment of reciprocal deposit as core deposit began in 2015.[16] All banks with non-zero amount of public deposit as of December 2014 enter the sample. This is the set of banks that face constraint imposed by regulations surrounding the safety of public deposits. If a bank joined the network during 2015-2020, i.e., in a window surrounding the ruling, we classify it as a "switcher" and they form our treatment group. The remaining banks form the control group.

We estimate the following difference-in-differences model to estimate the effect of enhance insurance coverage on outcomes:

$$Y_{b,q} = \alpha_b + \delta_q + \beta \cdot switcher_b \times post_q + \Sigma\gamma(X_b \times post_q) + \epsilon_{b,q}. \tag{3}$$

We estimate the model on all bank-quarter observations from 2022Q1 to 2023Q4. Our results remain similar if we extend the sample back in time, but the use of 2022Q1 as the starting quarter is motivated by the fact that it is sufficiently after the FDIC BD rule and before the crisis period, which allows us to analyze parallel trends assumption before the crisis. $Y_{b,q}$ is the outcome variable for bank b in quarter q. The model includes bank and quarter fixed effects. *post* equals one

[16] https://www.federalregister.gov/documents/2016/02/04/2016-01448/assessments

for all quarters including and after 2023Q1, and *switcher* is an indicator variable that equals one for banks that joined the network in response to the FDIC ruling, zero otherwise. We include a rich set of control variables and their interaction with the *post* indicator to soak away the independent effect of characteristics such as bank size and interest rate risk on post-crisis performance. Specifically, we include the following variables, measured as of 2022Q4, and their interaction with *post*: log of assets, securities-to-total assets ratio, log of the average maturity of security holdings, equity-to-asset ratio, deposits from public funds as a fraction of assets, and return on assets.

5.3.4 DID regression for Depositor Behavior

Table 7 presents the estimation result with the quantity of deposits as the dependent variable. Our main results are in columns 2 and 4, where we use the log amount of total deposits as the dependent variable. As shown in column 2, the switcher banks experience an increase of 3.73% in their total deposit after the SVB crisis compared to the corresponding change for the non-switchers. Once we use all the control variables in Column 4, the estimate remains economically and statistically significant at 1.64%. Columns 1 and 3 confirm that the increase comes from an increase in insured deposits for the switchers over this period. Their insured deposit increased by a significant 4.85% after the crisis in a model that includes all the control variables.

Figure 7 plots the quarterly estimates from the following regression model to check for any preexisting trend in total deposits of these two sets of banks:

$$Y_{b,q} = \alpha_b + \delta_q + \Sigma\beta^{q-2023Q1} \cdot switcher_b \times Q_{q-2023Q1} + \Sigma\gamma(X_b \times post_q) + \epsilon_{b,q}. \quad (4)$$

The model estimates separate coefficient for each quarter in the sample. As show in the figure there is a significant increase in the total deposit amount for the switchers starting with 2023Q1, but there is no evidence of any trend across the two groups before the crisis. The increase is steepest during the first three quarters after the crisis, after which the differential effects stabilize.

Table 8 presents the estimation results for interest rates offered on time deposits. Switcher banks paid 10.60 basis points lower interest rate in the post period compared to the corresponding change in non-switchers, based on the estimation model that includes all the control variables. Further, for the same sample, we find that time deposits increased by 4.38% for the switcher banks. Therefore, the results document an outward shift in the demand curve for insured deposits. The estimates show that every 1% increase in deposit supply corresponds to an decrease of 2.42 basis points in interest rates.

Figure 7 presents the estimate for quarterly trend in the difference in interest rate between the switcher and non-switcher banks. There is no differential trend in the interest rates offered by them to their depositors prior to the crisis. But a remarkable shift occurred starting a quarter after the crisis. Combined with Figure (a) where we plot the quarterly estimate for the quantity of deposits, a stark pattern emerges: switcher banks attracted more deposits at a lower rate soon after the SVB crisis.

5.3.5 DID Regression for Bank Risk

We now analyze the difference in bank's risk-taking behavior across switchers and non-switchers using the same difference-in-differences regression analysis. Results are provided in Table 9. Switcher banks increased their security holding by 3.88% after the SVB crisis as shown in column 1. Results on measures of interest rate risk are provided in columns 2 to 4. Switchers increased the holdings of very long-dated security, measured by security with more than 15 years maturity, by 4.84%. The overall maturity of their security holdings increased by 3.70%. And, they were also more likely to increase the mismatch in the maturity of their assets and liabilities, as measured by one-year maturity gap. Figure 7 presents the estimate for quarterly trend in the maturity gap of the switcher banks compared to the non-switchers, confirming the absence of parallel trend in their risk-taking behavior before the crisis.

Overall, these regression estimates establish a causal link between enhanced deposit insurance access and depositor and bank behavior around the crisis. We now analyze the implications of deposit insurance on the industrial organization of the banking market.

5.4 Banking Market

Market-based financial innovation in deposit insurance has the potential to reshape the industrial organization of the banking sector by reducing the advantage of the too-big-to-fail guarantee enjoyed by the largest banks. If smaller banks can retain their depositors through reciprocal deposits, it could have significant implications for the economy. Depositors could build deeper relationships with one or two banks instead of maintaining multiple banking relationships solely for higher insurance coverage. This could, in turn, influence the volume and type of loans banks issue.

However, the impact of reciprocal deposits on the overall banking market remains an empirical question. Some might argue that access to higher deposit insurance simply redistributes existing liabilities within a bank, leaving its overall asset size unchanged. For example, a bank might use the network to shift uninsured deposits to the insured category, with no net change in total assets. On the other hand, enhanced insurance could enable banks to grow by issuing more loans and holding additional securities.

To formally assess the influence of deposit insurance access on asset growth, we employ the same difference-in-differences empirical strategy across switchers and non-switchers. Table 10 reports the results. The dependent variable is the log of total assets for a bank in a given quarter. The estimates in columns 2 and 3 differ in terms of the inclusion of a control for the size of the bank prior to the crisis. Our results indicate that network banks experienced an additional 1.53% to 1.55% growth in assets during this period. These estimates are statistically significant at the 1% level. They are economically meaningful as well: the average quarterly growth rate of bank assets is about 1.04% between 2021Q4 and 2022Q4 based on the Call Report sample. Therefore, banks with access to higher insurance grew at a rate up to 0.02% higher compared to the average growth rate of a U.S. bank.

Access to insurance can alter the relative size distribution of banks in the economy, which in turn can have implications for market power of very large banks and the competitiveness of the entire banking sector. These results are important for policy debates as well as for understanding the effect of deposit insurance on market structure. We revisit these issues later in the paper where we directly assess the implications of network access on the market share of banks.

5.5 Mediation through Reciprocal Deposits

Our difference-in-differences results so far show that banks that switched around the FDIC BD ruling received more deposits during the crisis period, increased their interest rate risk exposure and grew larger. Are these results mediated through the use of reciprocal deposits that we propose? We directly answer this question by estimating a difference-in-differences IV model using *switcher* $\times$ *post* as an instrument for the use of reciprocal deposits by a bank. In that context, the difference-in-differences results presented so far correspond to the reduced form estimates of our model, linking the instrument to the outcome variables.

Table 11 presents the result of the corresponding first stage regression with reciprocal deposits to total asset ratio of the bank as the dependent variable. As shown in column 2, switcher banks saw an increase of 1.36% in the reciprocal deposits to total assets ratio following the SVB crisis compared to non-switchers. This is an economically large effect given the unconditional average of the reciprocal deposits to total assets ratio prior to the BD ruling of 0.8%. Our instrument is statistically strong as well, as shown by the F statistics of the instrument.

In Table 12, we produce the second stage estimate for all the outcomes variables used in our reduced form difference-in-differences regression model. These regressions provide us with the estimates of the effect of reciprocal deposits on various outcomes, as instrumented by the $switcher \times post$ variable. Our results, for each of the outcome variable, are strong, statistically and economically. Therefore, the effect of enhanced access to deposit insurance, as proxied by $switcher \times post$ variable, is indeed mediated through our channel: increase in the usage of reciprocal deposits. These results ameliorate endogeneity concerns that the effect of network status on outcome is driven by some unobserved risk factors or depositor heterogeneity.

5.6 Reallocation of Deposits

Can access to insurance through market-based mechanism alter the industrial organization of the banking sector? With the traditional insurance deign, where a nationwide limit is set for all the banks and depositors, smaller banks are likely to face a competitive disadvantage due to the differential access to "implicit" insurance. Reciprocal deposits has the potential to lower the too-big-to-fail advantage of the very large banks of the country because smaller banks can now obtain explicit insurance for their large clients. In turn, it has immediate implications for pricing of financial products in local markets even if there are just a handful of banks in the market, e.g., for banking markets with Bertrand-Nash equilibrium.

In our earlier results, we show that banks with enhanced access grow bigger over the crisis, which is suggestive of a change in the industrial organization of the banking sector. We now provide two direct tests for this hypothesis.

In our first test, we analyze the effect of network membership on the change in local deposit market share of a bank. For every zip code in the country, we compute the market share of a bank by the fraction of local deposits that the bank holds. We measure the change in a bank's market share between 2022Q2 and 2023Q2, i.e., at two points in time when the FDIC data on geographical distribution of deposits is available. The change in this measure reflects the change in the local market share of a bank around the crisis period. The change in market share of a bank is the dependent variable of the model. We include zip code fixed effects in the model, allowing us to soak away any zip code specific trends in deposit growth. In column 1 of Table 13, we show that the network banks increased their market share by 0.22% over this time period. Column 4 controls for the variables used earlier in the study and we find an increase of 0.17% in their market share.

Where are these effects coming from? We break our sample into three new size groups based on their asset size as measured in 2022Q4: “mega” (above $1 trillion), “big” (between $50 billion to $1 trillion) and “moderate” ($50 billion and less). Since we are interested in the effect of enhanced insurance access at the local level, we create a measure of access to enhanced insurance by big (often regional) banks for each zip code. Our goal is to assess whether zip codes with a large share of network banks in the big size category, a size category under additional duress during the SVB crisis, experienced an inflow of deposits. For each size subgroup, we estimate the following regression model with bank-quarter observations:

$$\Delta ms_{j,z} = \alpha_z + \beta \mathbb{1}_{post_q} + \gamma NetworkShare_{2022} \times \mathbb{1}_{post_q} + \epsilon_{j,z} \tag{5}$$

The results are provided in Table 14. We focus on column 2, which provides estimation results for the big banks. Our results show that areas with high presence of big network banks experienced a reshuffling of deposits towards those banks. Even though these banks lost market share overall in the post-crisis period, as evidence by a negative and significant coefficient on the *Post* variable, they were able to gain market share in a relative sense in areas with a higher fraction of network banks.

We document that the increased market share of big banks came from the moderate size banks within the zip code. These results suggest that larger (but not the largest) banks with access to enhanced deposit insurance gained at the expense of smaller banks. More importantly, the loss of deposits from the smallest banks did not flow to the too-big-to-fail banks. Together, our findings imply that access to insurance can partially limit the implicit guarantee advantage of the largest banks of the economy.

5.7 Robustness Tests

As a robustness test, we exclude the largest banks with more than $100 billion in assets from the sample. The main motivation behind this exercise is to address concerns that special circumstances of some of the largest banks of the country may affect our results. For example, soon after the onset of the regional banking crisis, depositors began to move their money towards some of the largest banks for safety. Furthermore, some large banks were implicitly and explicitly providing support to other struggling banks at the time (for instance, JP Morgan Chase acquired First Republic Bank in March 2023). By excluding the largest banks, we ensure that our results are not driven by these considerations. The results of this robustness test are presented in the Online Appendix. Our results are slightly stronger for this specification. Similarly, the effect of enhanced insurance on deposit interest rate is larger for the sample without the largest banks compared to the base case. Overall, all our results remain robust to the exclusion of the largest banks from the sample.

6 Conclusion

A common feature of deposit insurance programs worldwide is that regulators set a national insurance limit, providing the same level of insurance to each depositor at a bank. This uniformity leaves little room for banks to enhance their clients' insurance coverage. A recent financial innovation – reciprocal deposits – has disrupted this system, allowing banks to offer significantly larger insurance coverage without requiring depositors to open multiple accounts with other institutions. In this paper, we study the economic implications of such market-based insurance programs.

While an extensive literature exists on traditional deposit insurance programs, our understanding of market-based provisioning of deposit insurance is limited. Since there is no theoretical limit to the amount of deposits that can be insured under this new system, market-based enhancements in insurance coverage can potentially have positive and negative effects. On the one hand, it could serve as a strong deterrent against depositor runs during times of instability. On the other hand, it could encourage banks to take on greater risks. Moreover, the emergence of a market-based system may alter the industrial organization of the banking sector by reducing the implicit too-big-to-fail guarantees that the largest banks typically enjoy. Finally, this system can change the dynamics of bank-client relationships, as larger clients no longer need to maintain multiple banking relationships to increase insurance coverage. Consequently, market-based deposit insurance could have significant long-term implications for the economy.

Our paper provides one of the first comprehensive analyses of the reciprocal deposit insurance market, using the regional banking crisis as an experimental setting and the presence on the reciprocal deposit network as a proxy for access to enhanced market-based coverage. Our findings suggest that depositors are less likely to withdraw their money from banks with higher access to insurance, and banks with enhanced insurance access pay lower deposit rate to their borrowers. Banks with enhanced access grew their deposit base around the time of the SVB crisis, while those without access experienced deposit outflows. Network banks became larger during this period, indicating that the increased deposits were not necessarily used by these banks to substitute other sources of funding. Instead, we find evidence that these banks invested the additional funds in assets with higher interest rate risk.

Collectively, our results suggest that market-based deposit insurance can be an effective tool for containing depositor runs but may also have lasting consequences for risk-taking and the competitive structure of the banking industry. While we do not evaluate the overall welfare impact of these effects, our findings can inform future analyses and guide policy design for deposit insurance markets.

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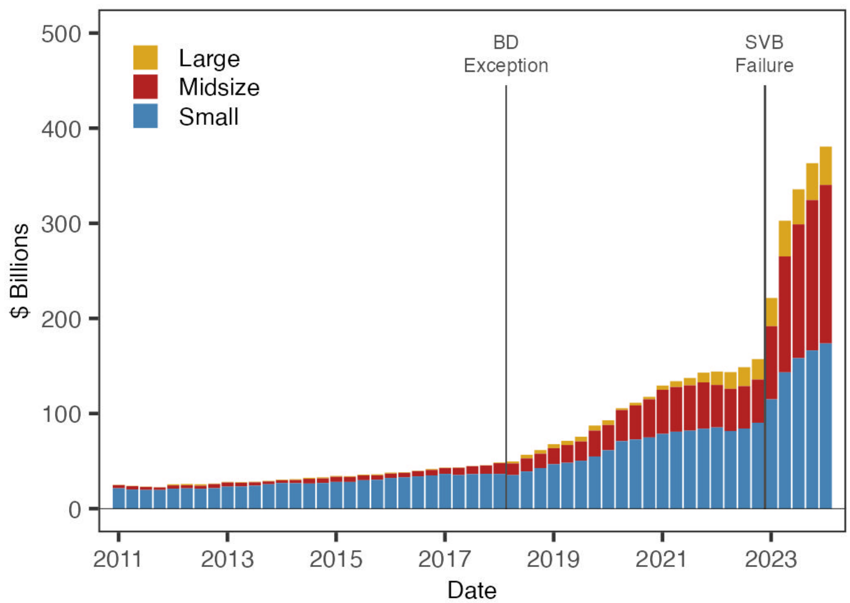
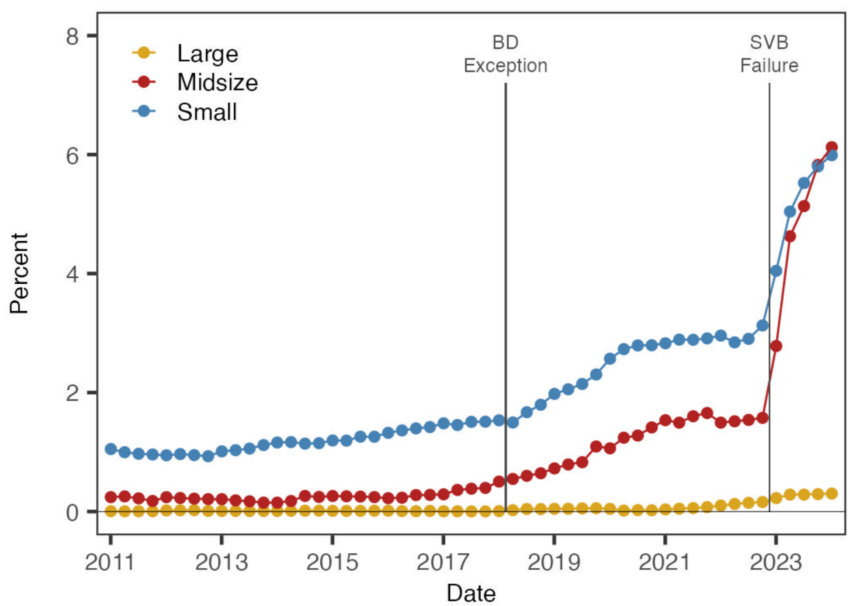
Figure 1: Reciprocal Deposits in the U.S. Banking System

(a) Reciprocal Deposits by Volume

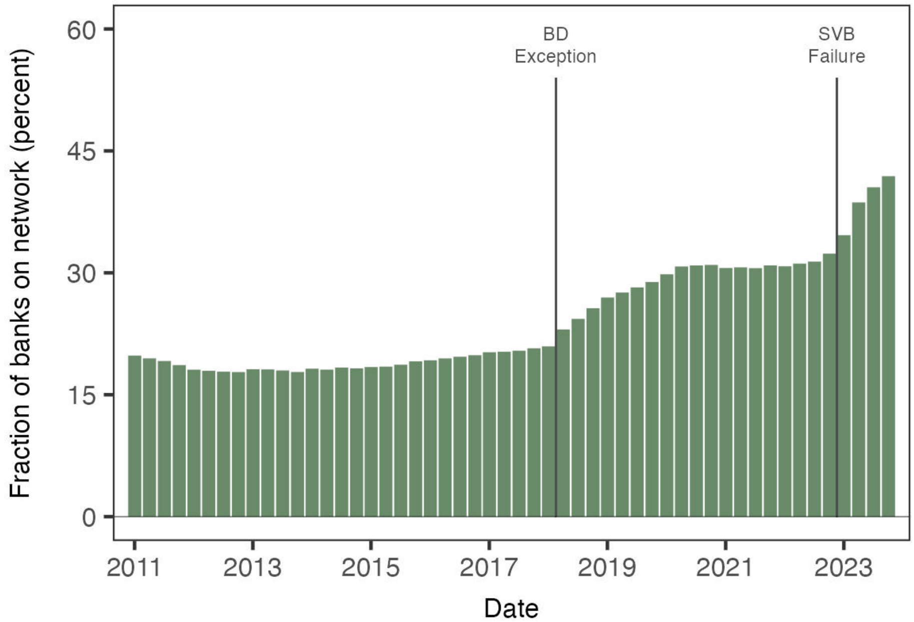


(b) Reciprocal Deposits to Total Deposits



Notes: This figure plots the evolution of reciprocal deposits between 2011Q1 and 2024Q1, both in terms of volume (top panel) and as a share of total deposits (bottom panel). "Large," "Midsize," and "Small" banks refer to banks with more than $100 billion in assets, between $10 billion and $100 billion in assets, and less than $10 billion in assets, respectively. "BD Exception" signifies when the EGRRCPA exempted a capped amount of reciprocal deposits from being treated as brokered deposits, and "SVB Failure" marks the start of the 2023 regional banking crisis.
Source: Call Reports.

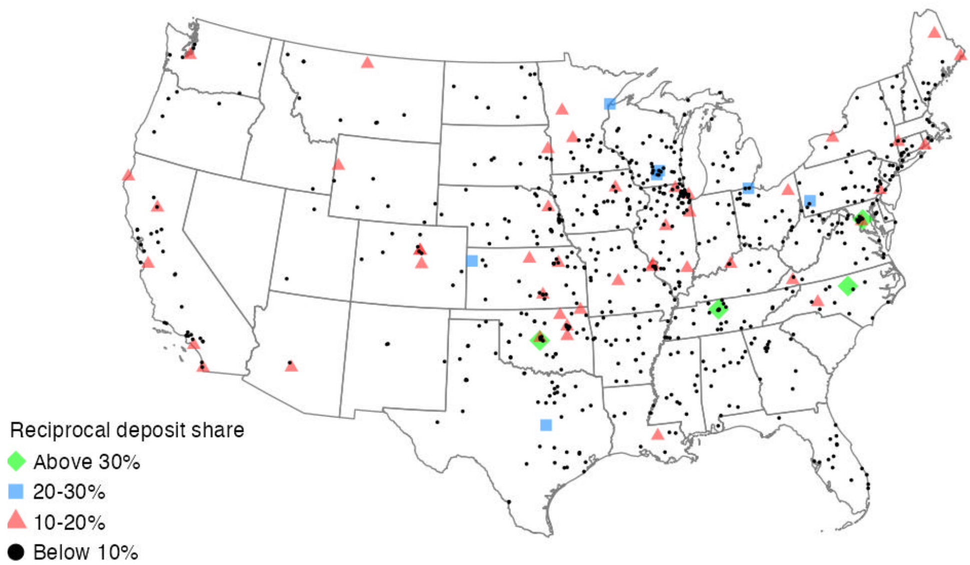
Figure 2: Evolution of the Reciprocal Deposit Network



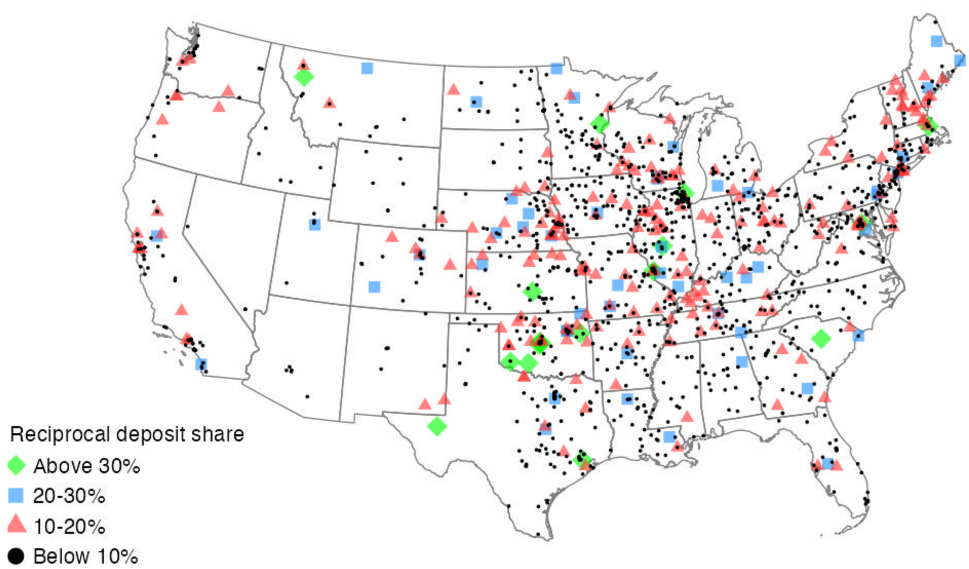
Notes: This figure plots the fraction of banks with positive reciprocal deposits ("network banks") between 2011Q1 and 2024Q1. "BD Exception" signifies when the EGRRCPA exempted a capped amount of reciprocal deposits from being treated as brokered deposits, and "SVB Failure" marks the start of the 2023 regional banking crisis.
Source: Call Reports.

Figure 3: Geographic Expansion of Reciprocal Deposits

(a) 2011

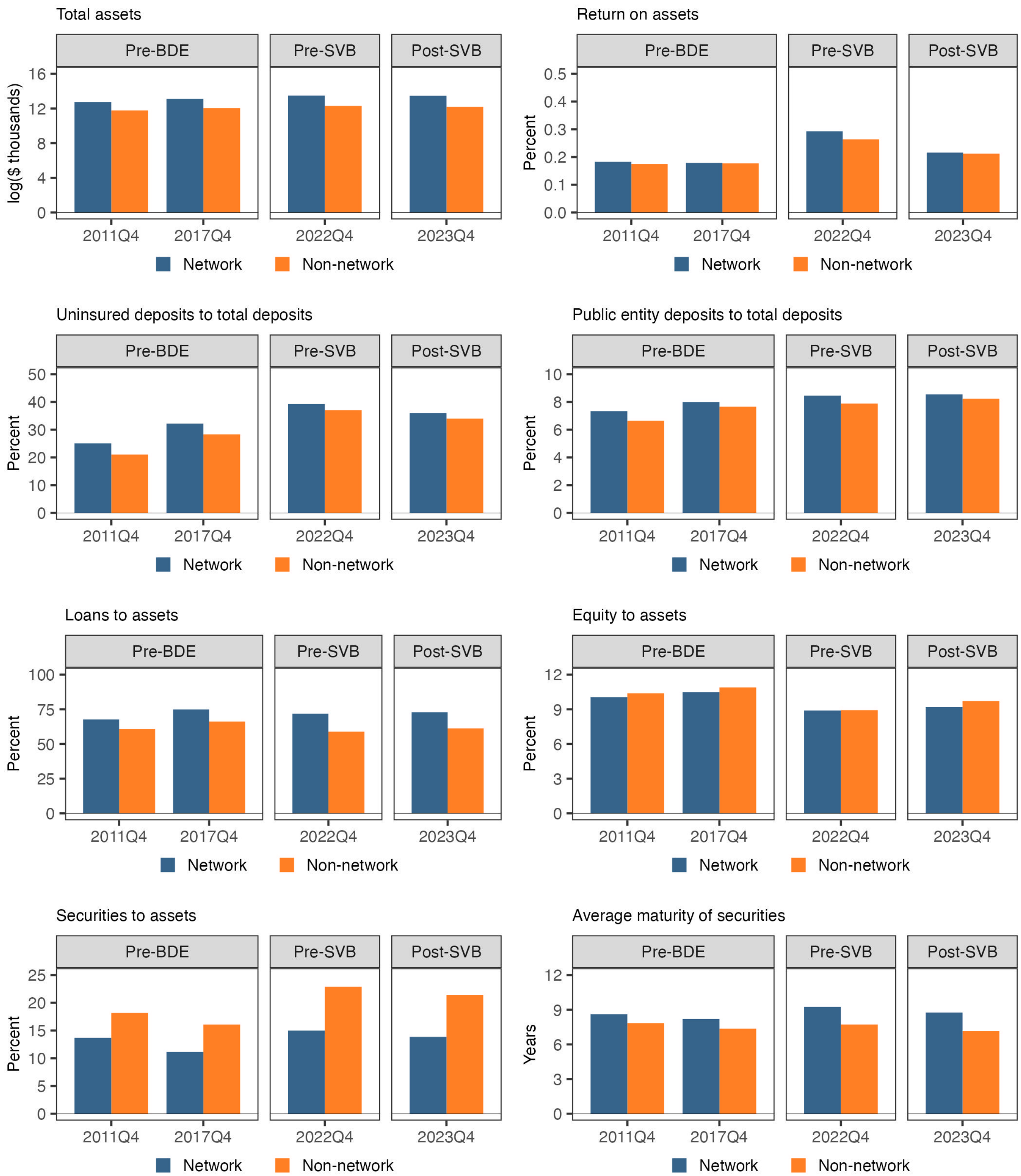


(b) 2022



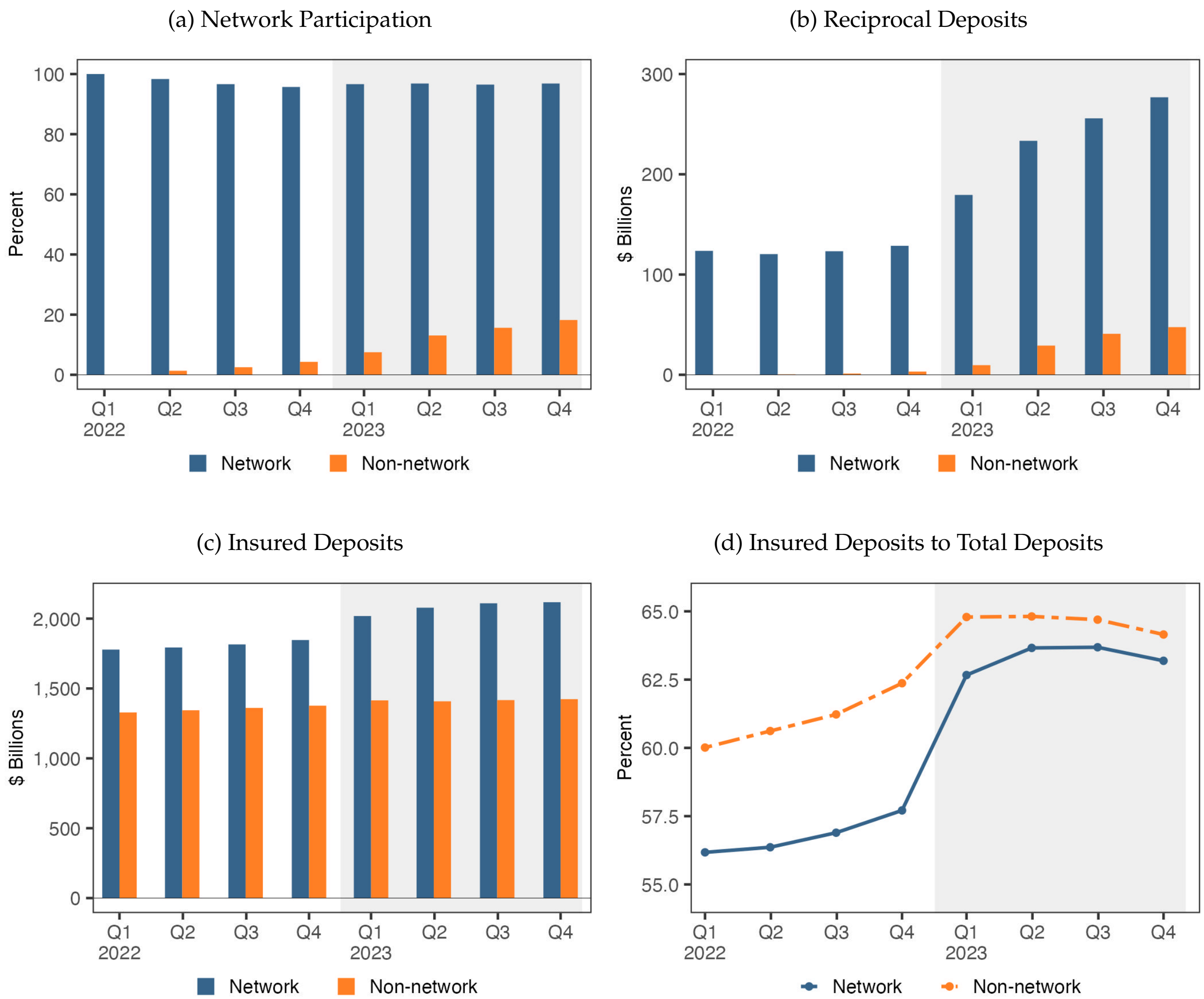
Notes: This figure plots the expansion of network banks between 2011Q4 and 2022Q4, organized by each bank's reliance on reciprocal deposits. Network banks are defined as banks with positive reciprocal deposits. Each point corresponds to the location of a bank's headquarters and represents the reciprocal deposits to total deposits ratio (percent).
Source: Call Reports.

Figure 4: Network Status and Bank Characteristics



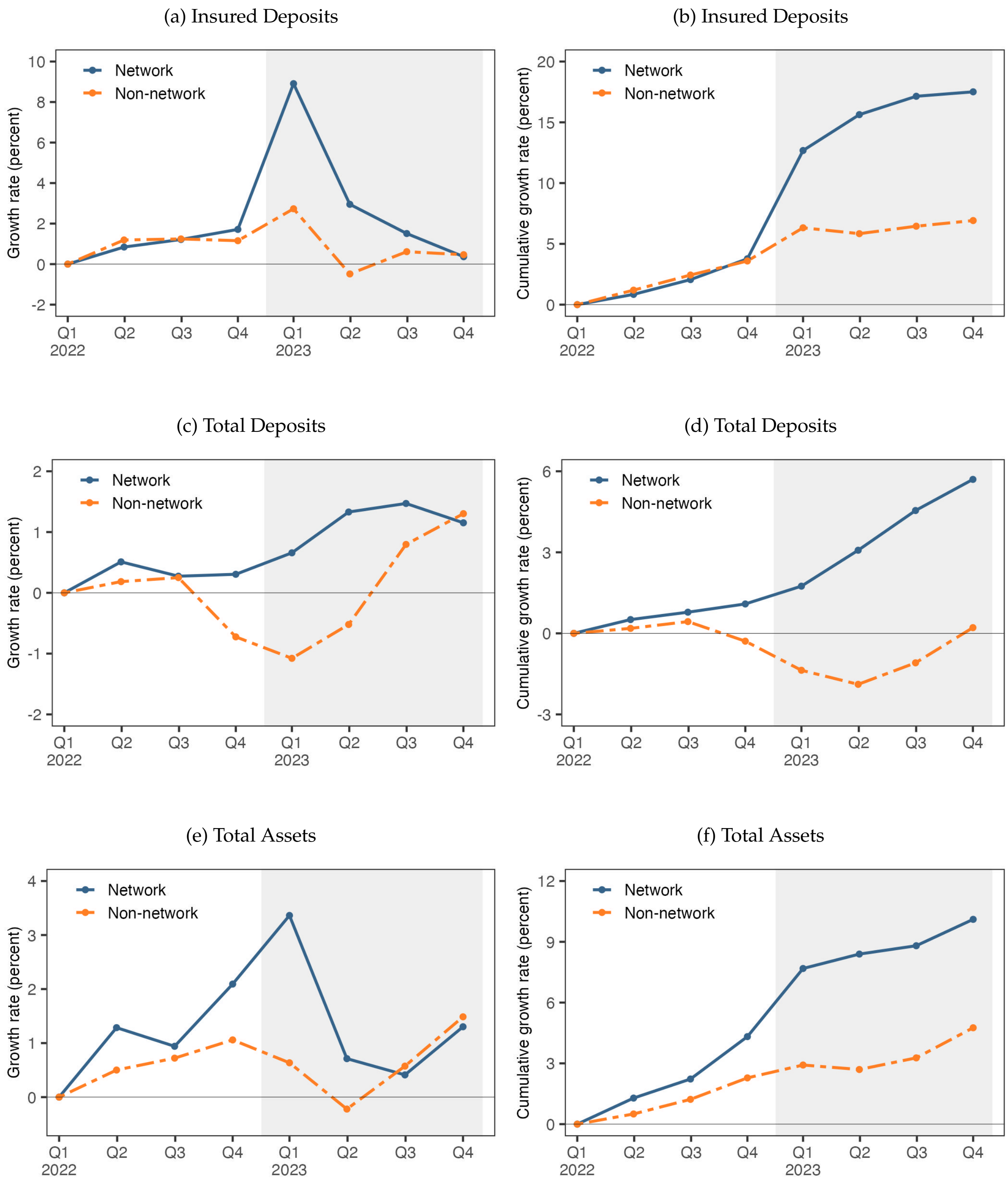
Notes: This figure plots the median of eight characteristics of network and non-network banks in 2011Q4 and 2017Q4 (prior to the brokered deposit exemption), 2022Q4 (pre-SVB crisis), and 2023Q4 (post-SVB crisis). The sample includes small and midsize banks (less than $100 billion in assets) that were active between 2011Q1 and 2023Q4.
Source: Call Reports.

Figure 5: Network Adoption and Reciprocal/Insured Deposit Growth



Notes: The top-left panel plots the transition of network status for network and non-network banks in 2022Q1. The top-right panel plots the growth of total reciprocal deposits by each group. The bottom panels plot the growth of insured deposits, both in terms of dollar amounts and as a share of total deposits. The sample includes small and midsize banks (less than $100 billion in assets) that were active between 2011Q1 and 2023Q4. The grey shaded area denotes the period after SVB's failure.
Source: Call Reports.

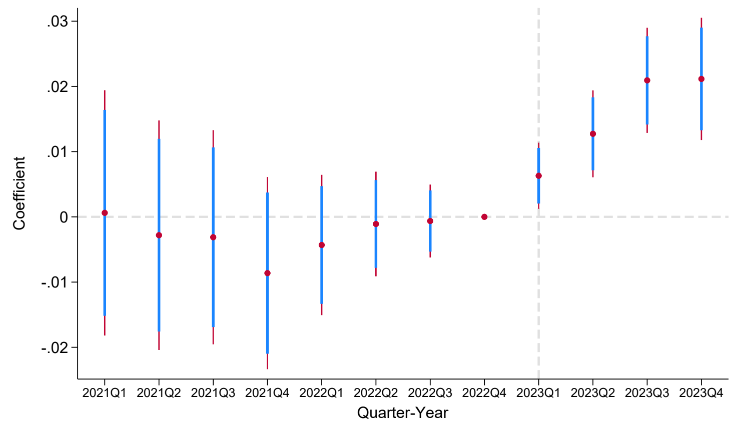
Figure 6: Deposit and Asset Growth by Network Status



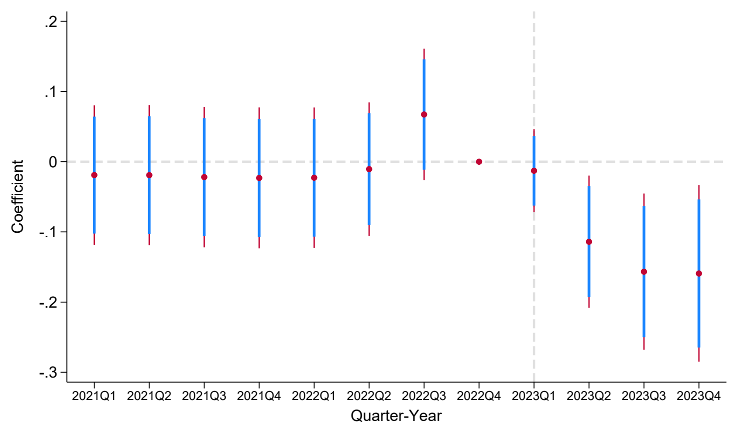
Notes: This figure plots the quarterly change in insured deposits, total deposits, and total assets at network and non-network banks. Panels (b), (d), and (f) plot cumulative growth rates. Network status is measured in 2022Q1. The sample includes small and midsize banks (less than $100 billion in assets) that were active between 2022Q1 and 2023Q4. The grey shaded area denotes the period after SVB's failure.
Source: Call Reports.

Figure 7: Assessment of Parallel Trends

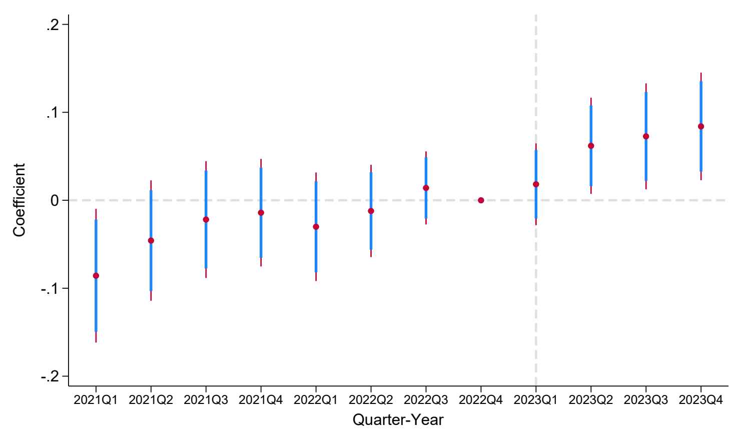
(a) Total Deposits



(b) Deposit Rate



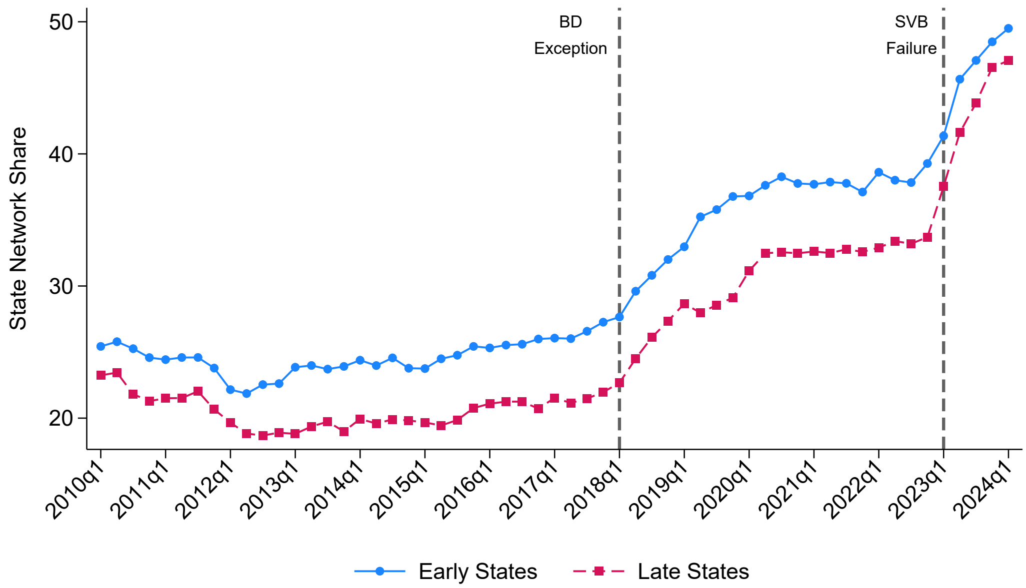
(c) Abs. Maturity Gap



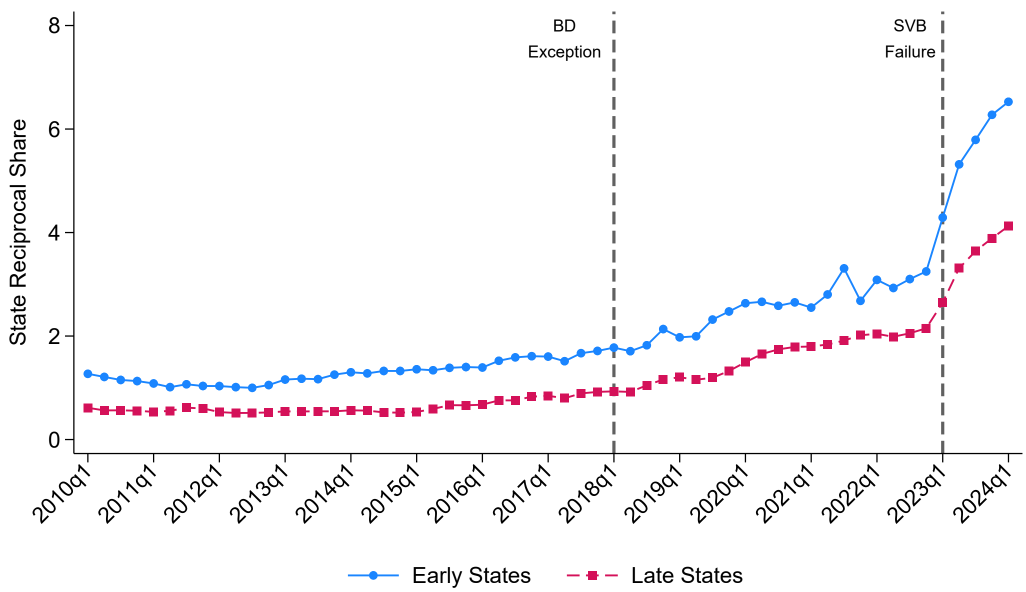
Notes: This figure presents trends in total deposits, deposit rate, and absolute maturity gap from 2021Q1 through 2023Q4. The figure plots the regression coefficients from the following specification $Y_{b,t} = \alpha + \beta \text{Switcher}_b \times \mathbb{1}_t + X_b \times \mathbb{1}_t + \delta_b + \delta_t + \epsilon_{b,t}$. *Switcher* is a binary variable that takes a value of 1 for banks that joined the network during the period surrounding the brokered-deposit ruling (between 2015Q1 and 2020Q2). $\mathbb{1}_t$ is an indicator for the specified quarter. Abs. maturity gap is defined as in Purnanandam (2007). Control variables, X include bank size, capitalization, total state deposits and profitability, measured in 2022Q4, as well as their interactions with $\mathbb{1}_t$. Panels A and B additionally include securities holdings and maturity of the securities portfolio in 2022Q4, as well as their interactions with $\mathbb{1}_t$. The sample is restricted to banks with state deposits on their balance sheet before 2015Q1. Standard errors are clustered by bank. 90^{th} (95^{th}) percentile confidence interval is in blue (red).

Figure 8: Network Adoption and Utilization Among Early and Late Regulators

(a) Network Participation



(b) Reciprocal Deposits



Notes: This figure presents two panels tracing developments from 2010Q1 to 2023Q4. Panel A shows the trend in the state share of banks participating in the network, while Panel B illustrates the state share of reciprocal deposits as a proportion of total deposits. Two significant events occur during this period: the implementation of the Brokered Deposit Exception Rule in 2018Q1 and the collapse of Silicon Valley Bank (SVB) in 2023Q1.

Table 1: Descriptive Statistics

	N	p25	p50	p75	Mean	s. d.
Total assets ($1,000s, log)						
Network	1,524	12.75	13.49	14.43	13.69	1.32
Non-network	3,232	11.58	12.29	13.10	12.42	1.34
Return on assets (pct.)						
Network	1,524	0.20	0.29	0.38	0.28	0.21
Non-network	3,232	0.16	0.26	0.38	0.28	0.32
Total loans/total assets (pct.)						
Network	1,524	62.12	71.84	79.35	69.92	12.87
Non-network	3,232	45.89	58.88	72.13	57.14	20.38
Total equity/total assets (pct.)						
Network	1,524	7.59	8.89	10.59	9.25	3.30
Non-network	3,232	6.85	8.92	11.52	11.14	11.46
Total securities/total assets (pct.)						
Network	1,524	8.59	14.99	23.59	16.74	10.87
Non-network	3,232	11.93	22.88	34.60	24.33	15.86
Average maturity of securities (years)						
Network	1,503	6.19	9.25	12.20	9.24	4.20
Non-network	3,133	4.33	7.72	10.99	7.88	4.29
Insured deposits/total deposits (pct.)						
Network	1,524	51.46	60.77	69.90	59.96	14.71
Non-network	3,180	53.06	62.96	71.47	61.67	15.46
Public entity deposits/total deposits (pct.)						
Network	1,524	4.21	8.45	13.55	9.61	6.90
Non-network	3,180	2.39	7.88	14.60	9.44	8.31
Number of branches (log)						
Network	1,521	1.39	1.95	2.71	2.02	1.15
Non-network	3,168	0.00	1.10	1.79	1.15	0.99

Notes: This table reports summary statistics for network and non-network banks as of 2022Q4. "N" refers to the number of observations. "p25," "p50," and "p75" correspond to the 25th, 50th, and 75th percentiles, respectively. "s.d." denotes standard deviation.
Source: Call Reports, FDIC Summary of Deposits.

Table 2: Total Deposit Growth and Pre-SVB Network Presence

	(1)	(2)	(3)	(4)
	Δln(Ins. Dep.)	Δln(Tot. Dep.)	Δln(Ins. Dep.)	Δln(Tot. Dep.)
Network_{2022Q4}	0.0780***	0.0396***	0.0567***	0.0265***
	(0.0056)	(0.0032)	(0.0060)	(0.0034)
ROA_{2022Q4}			-0.0597***	-0.0321***
			(0.0171)	(0.0108)
$\text{Securities/Assets}_{2022Q4}$			-0.0022***	-0.0017***
			(0.0002)	(0.0001)
$\text{Equity/Assets}_{2022Q4}$			0.0041***	0.0030***
			(0.0009)	(0.0006)
$\ln(\text{Assets})_{2022Q4}$			0.0065***	0.0023**
			(0.0018)	(0.0012)
Constant	0.0476***	0.0078***	-0.0047	-0.0016
	(0.0027)	(0.0019)	(0.0264)	(0.0174)
Observations	4,546	4,546	4,546	4,546
R^2	0.0474	0.0313	0.1194	0.1280

Notes: This table presents the relation between deposit growth from 2022Q4 to 2023Q4 and bank network status in 2022Q4. The dependent variable is the insured deposit growth (Δ ln(Ins. Dep.)) from 2022Q4 to 2023Q4 in columns 1 and 3 and the total deposit growth (Δ ln(Total Dep.)) from 2022Q4 to 2023Q4 in columns 2 and 4. Columns 3 and 4 include controls for bank-level characteristics, including bank size, securities holdings, capitalization, and profitability, as measured in 2022Q4. Heteroskedasticity-robust standard errors are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports.

Table 3: Deposit Rate Change and Pre-SVB Network Presence

	(1)	(2)	(3)	(4)
	ΔDep. Rate	Δln(Time Dep.)	ΔDep. Rate	Δln(Time Dep.)
Network_{2022Q4}	-0.1641***	0.1083***	-0.0899**	0.0406***
	(0.0390)	(0.0113)	(0.0428)	(0.0124)
ROA_{2022Q4}			0.2439**	0.0014
			(0.1098)	(0.0346)
$\text{Securities/Assets}_{2022Q4}$			0.0038**	-0.0021***
			(0.0015)	(0.0004)
$\text{Equity/Assets}_{2022Q4}$			0.0018	-0.0045**
			(0.0057)	(0.0019)
$\text{ln(Assets)}_{2022Q4}$			-0.0420***	0.0446***
			(0.0147)	(0.0044)
Constant	1.0973***	0.3285***	1.4430***	-0.1384**
	(0.0233)	(0.0062)	(0.2076)	(0.0618)
Observations	3,379	3,379	3,379	3,379
R^2	0.0052	0.0283	0.0115	0.0811

Notes: This table presents the relation between network status and the changes in deposit rates and quantities from 2022Q4 to 2023Q4. The dependent variable in columns 1 and 3 is the change in the deposit rate offered on 12-month certificates of deposits with a minimum account size of $10,000. In columns 2 and 4, the dependent variable is time deposit growth. Columns 3 and 4 includes controls for bank-level characteristics, including bank size, securities holdings, capitalization, and profitability, as measured in 2022Q4. Heteroskedasticity-robust standard errors are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: RateWatch, Call Reports.

Table 4: Duration and and Pre-SVB Network Presence

	(1)	(2)	(3)	(4)	(5)	(6)
	Δln(Securities)	Δln(Maturity)	𝟙[Increase MatGap]	Δln(Securities)	Δln(Maturity)	𝟙[Increase MatGap]
Network_{2022Q4}	0.0200***	0.0397***	0.0552***	0.0133*	0.0173**	0.0582***
	(0.0064)	(0.0083)	(0.0155)	(0.0070)	(0.0088)	(0.0168)
ROA_{2022Q4}				0.0507***	0.0331	0.0596**
				(0.0178)	(0.0260)	(0.0287)
$\text{Equity/Assets}_{2022Q4}$				0.0007	0.0012	0.0004
				(0.0005)	(0.0009)	(0.0009)
$\ln(\text{Assets})_{2022Q4}$				0.0060**	0.0193***	-0.0021
				(0.0025)	(0.0032)	(0.0054)
Constant	-0.0761***	-0.1509***	0.5801***	-0.1728***	-0.4134***	0.5851***
	(0.0038)	(0.0053)	(0.0090)	(0.0324)	(0.0425)	(0.0698)
Observations	4,495	4,495	4,495	4,495	4,495	4,495
R^2	0.0021	0.0045	0.0028	0.0099	0.0162	0.0040

Notes: This table presents the relation between duration from 2022Q4 to 2023Q4 and bank network status in 2022Q4. Δln(Maturity) is the change in the weighted average maturity of total securities from 2022Q4 to 2023Q4. 𝟙[Increase MatGap] is an indicator for an increase in the absolute maturity gap from 2022Q4 to 2023Q4, as defined in Purnanandam (2007). Columns 3 and 4 include bank size, capitalization, and profitability in 2022Q4 as control variables. Heteroskedasticity-robust standard errors are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports.

Table 5: Mechanism: Network Banks and Deposits

ln(Dep.)	(1)
Network × Post × $\mathbb{1}_{Insured}$	0.1000***
	(0.0124)
Network × $\mathbb{1}_{Insured}$	-0.0909***
	(0.0226)
Post × $\mathbb{1}_{Insured}$	0.0833***
	(0.0052)
$\mathbb{1}_{Insured}$	0.5269***
	(0.0121)
Bank × Quarter-Year FE	✓
N	68,058
R^2	0.9532

Notes: This table presents the relation between network participation and insured/uninsured deposits, after the 2023 banking turmoil. We construct a deposit type × bank × quarter-year panel data set, where deposit type includes insured and uninsured deposits (ln(Ins. Dep.) and ln(Unins. Dep.)). To estimate the causal effect of network affiliation on deposit levels, we employ a difference-in-differences analysis with a triple interaction. The coefficient of interest is the coefficient on the interaction term: *Network* × *Post* × $\mathbb{1}_{Insured}$. Here, $\mathbb{1}_{Insured}$ is an indicator variable for insured deposit type, *Network* is a binary variable indicating network affiliation in 2022Q4, and *Post* is a binary vdid$_s$*umstatsariableindicatingtimeperiodsafter*2022Q4.*Standarderrors*, *clusteredbybank*, *arereportedinparentheses*.*Statisticalsignificancelev*
∗∗, *representingsignificanceatthe*10%, 5%, *and*1%*levels*, *respectively*.
Source:CallReports.

Table 6: Descriptive Statistics, Difference-in-differences Analysis

	Switcher ($N = 555$)		**Non-switcher** ($N = 2,605$)		
	Mean	s.d.	Mean	s.d.	Diff.
Total assets ($1,000s, log)	13.39	1.27	12.37	1.20	1.03***
					(0.000)
Return on assets (pct.)	0.29	0.20	0.27	0.21	0.02**
					(0.014)
Total loans/total assets (pct.)	69.95	12.91	57.87	17.74	12.07***
					(0.000)
Total equity/total assets (pct.)	9.16	3.33	9.23	4.32	-0.07
					(0.657)
Total securities/total assets (pct.)	16.80	10.76	25.42	15.45	-8.62***
					(0.000)
Average maturity of securities (years)	9.16	4.12	7.91	4.23	1.26***
					(0.000)
Insured deposits/total deposits (pct.)	60.85	13.15	62.17	13.55	-1.32**
					(0.032)
Public entity deposits/total deposits (pct.)	9.70	7.02	10.56	8.35	-0.85**
					(0.012)
Number of branches (log)	1.84	1.04	1.15	0.93	0.68***
					(0.000)

Notes: This table reports summary statistics for switcher and non-switcher banks as of 2022Q4. "Diff." is the difference of means between switcher and non-switcher banks. Statistical significance levels for p-values are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports, FDIC Summary of Deposits.

Table 7: Deposits and Network Adoption

	(1) ln(Ins. Dep.)	(2) ln(Tot. Dep.)	(3) ln(Ins. Dep.)	(4) ln(Tot. Dep.)
Switcher × Post	0.0734***	0.0373***	0.0485***	0.0164***
	(0.0071)	(0.0042)	(0.0073)	(0.0044)
Controls			✓	✓
Bank FE	✓	✓	✓	✓
Quarter-Year FE	✓	✓	✓	✓
N	23,962	23,962	23,962	23,962
R^2	0.9957	0.9972	0.9959	0.9973

Notes: This table presents the relation between deposits and network adopters, after the 2023 banking turmoil. The dependent variable is insured deposits (ln(Ins. Dep.)) in columns 1 and 3 and total deposits (ln(Total Dep.)) in columns 2 and 4. *Switcher* is a binary variable that takes a value of 1 for banks that joined the network during the period surrounding the brokered-deposit ruling (between 2015Q1 and 2020Q2), and 0 for banks that did not join the network through 2022Q2. *Post* is a binary variable that takes a value of 1 from 2023Q1 onwards, and 0 for previous quarters. All columns include bank and quarter-year fixed effects. Columns 3 and 4 include controls for bank-level characteristics, including bank size, securities holdings, maturity of securities portfolio, capitalization, total state deposits and profitability, measured in 2022Q4, as well as their interactions with the *Post* variable. The sample is restricted to banks with state deposits on their balance sheet before 2015Q1 and spans eight quarters. Standard errors, clustered by bank, are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports.

Table 8: Deposit Rates and Network Adoption

	(1) Dep. Rate	(2) ln(Time Dep.)	(3) Dep. Rate	(4) ln(Time Dep.)
Switcher × Post	-0.1468***	0.1162***	-0.1060*	0.0438***
	(0.0551)	(0.0142)	(0.0596)	(0.0150)
Controls			✓	✓
Bank FE	✓	✓	✓	✓
Quarter-Year FE	✓	✓	✓	✓
N	16,932	16,932	16,932	16,932
R^2	0.7471	0.9827	0.7485	0.9837

Notes: This table presents the relation between deposits and network adopters, after the 2023 banking turmoil. The dependent variable is deposit rate offered on 12-month certificates of deposits with a minimum account size of $10,000 deposits (Dep. Rate) in columns 1 and 3 and time deposits (ln(Time Dep.)) in columns 2 and 4. *Switcher* is a binary variable that takes a value of 1 for banks that joined the network during the period surrounding the brokered-deposit ruling (between 2015Q1 and 2020Q2), and 0 for banks that did not join the network through 2022Q2. *Post* is a binary variable that takes a value of 1 from 2023Q1 onwards, and 0 for previous quarters. All columns include bank and quarter-year fixed effects. Columns 3 and 4 include controls for bank-level characteristics, including bank size, securities holdings, maturity of securities portfolio, capitalization, total state deposits and profitability, measured in 2022Q4, as well as their interactions with the *Post* variable. The sample is restricted to banks with state deposits on their balance sheet before 2015Q1 and spans eight quarters. Standard errors, clustered by bank, are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: RateWatch, Call Reports.

Table 9: Duration and and Network Adoption

	(1) ln(Securities)	(2) ln(Sec.>15Y)	(3) ln(Maturity)	(4) ln(Abs. MatGap)
Switcher × Post	0.0388***	0.0484**	0.0370***	0.0830***
	(0.0102)	(0.0230)	(0.0110)	(0.0274)
Controls	✓	✓	✓	✓
Bank FE	✓	✓	✓	✓
Quarter-Year FE	✓	✓	✓	✓
N	18,403	18,403	18,403	18,403
R^2	0.9897	0.9805	0.9920	0.9264

Notes: This table presents the relation between deposits and network adopters, after the 2023 banking turmoil. The dependent variable is the total securities (ln(Securities)) in column 1, total securities with maturity over 15 years (ln(Sec.>15Y)) in column 2, maturity of securities portfolio (ln(Maturity)) in column 3, and abs. maturity gap (ln(Abs. MatGap)) in column 4. *Switcher* is a binary variable that takes a value of 1 for banks that joined the network during the period surrounding the brokered-deposit ruling (between 2015Q1 and 2020Q2), and 0 for banks that did not join the network through 2022Q2. *Post* is a binary variable that takes a value of 1 from 2023Q1 onwards, and 0 for previous quarters. Abs. maturity gap is defined as in Purnanandam (2007). All columns include bank and quarter-year fixed effects. All columns include controls for bank-level characteristics, including bank size, capitalization, total state deposits and profitability, measured in 2022Q4, as well as their interactions with the *Post* variable. The sample is restricted to banks with state deposits on their balance sheet before 2015Q1 and spans eight quarters. Standard errors, clustered by bank, are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports.

Table 10: Bank Size and and Pre-SVB Network Presence

	(1) ln(Assets)	(2) ln(Assets)	(3) ln(Assets)
Switcher × Post	0.0382***	0.0153***	0.0155***
	(0.0040)	(0.0041)	(0.0042)
Controls (exc. Size)		✓	
Controls (inc. Size)			✓
Bank FE	✓	✓	✓
Quarter-Year FE	✓	✓	✓
N	23,962	23,962	23,962
R^2	0.9976	0.9977	0.9977

Notes: This table presents the relation between bank size and network adopters, after the 2023 banking turmoil. The dependent variable is bank size (ln(Assets)) in columns 1 through 3. *Switcher* is a binary variable that takes a value of 1 for banks that joined the network during the period surrounding the brokered-deposit ruling (between 2015Q1 and 2020Q2), and 0 for banks that did not join the network through 2022Q2. *Post* is a binary variable that takes a value of 1 from 2023Q1 onwards, and 0 for previous quarters. All columns include bank and quarter-year fixed effects. Column 3 includes controls for bank-level characteristics, including securities holdings, maturity of securities portfolio, capitalization, total state deposits and profitability, measured in 2022Q4, as well as their interactions with the *Post* variable. Column (4) builds upon the specifications in column 3 by adding two additional controls: a bank size control, measured in 2022, and an interaction term between bank size and the *Post* variable. The sample is restricted to banks with state deposits on their balance sheet before 2015Q1 and spans from 2022Q1 through 2023Q4, spanning eight quarters. Standard errors, clustered by bank, are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports.

Table 11: Mechanism: Validation of Network Utilization

Recip. Dep./Assets	(1)	(2)
Switcher × Post	0.0154***	0.0136***
	(0.0015)	(0.0016)
Controls		✓
Bank FE	✓	✓
Quarter-Year FE	✓	✓
N	16,918	16,918
R^2	0.8828	0.8837
KP LM Statistic	85.624	62.033
CD Wald F Statistic	1116.880	751.498
KP Wald F Statistic	99.340	68.016

Notes: This table presents the relation between banks' share of reciprocal deposits and network adopters, after the 2023 banking turmoil. The dependent variable is banks' share of reciprocal deposits (Recip. Dep./Assets) in columns 1 through 3. *Switcher* is a binary variable that takes a value of 1 for banks that joined the network during the period surrounding the brokered-deposit ruling (between 2015Q1 and 2020Q2), and 0 for banks that did not join the network through 2022Q2. *Post* is a binary variable that takes a value of 1 from 2023Q1 onwards, and 0 for previous quarters. Columns 2 and 3 include bank and quarter-year fixed effects. Column 3 includes controls for bank-level characteristics, including bank size, securities holdings, maturity of securities portfolio, capitalization, total state deposits and profitability, measured in 2022Q4, as well as their interactions with the *Post* variable. The sample is restricted to banks with state deposits on their balance sheet before 2015Q1 and spans from 2022Q1 through 2023Q4, spanning eight quarters. Standard errors, clustered by bank, are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports.

Table 12: Mechanism: Mediation through Reciprocal deposits

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln(Ins. Dep.)	ln(Tot. Dep.)	Dep. Rate	ln(Time Dep.)	ln(Securities)	ln(Maturity)	ln(Abs. MatGap)	ln(Assets)
Recip. Dep./Assets	3.4638***	1.5201***	-8.0139*	3.2196***	2.2639**	2.2823**	5.2684***	1.4046***
	(0.5732)	(0.3507)	(4.5282)	(1.1580)	(1.0561)	(1.1324)	(1.8249)	(0.3437)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Bank FE	✓	✓	✓	✓	✓	✓	✓	✓
Quarter-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
N	16,918	16,918	16,918	16,918	16,918	16,918	16,918	16,918

Notes: This table presents the 2SLS estimates between various bank outcomes and network adopters, after the 2023 banking turmoil. The dependent variable is insured deposits (ln(Ins. Dep.)) in column 1, total deposits (ln(Dep.)) in column 2, deposit rate offered on 12-month certificates of deposits with a minimum account size of $10,000 (Dep. Rate) in column 3, time deposits (ln(Time Dep.)) in column (4), total securities (ln(Securities)) in column 5, maturity of securities portfolio (ln(Maturity)) in column 6, abs. maturity gap (ln(Abs. MatGap)) in column 7, and bank size in column 8. The independent variable, reciprocal deposits share, is instrumented according to a DiD specification, see Table 11. Abs. maturity gap is defined as in Purnanandam (2007). All columns include bank and quarter-year fixed effects and control for bank-level characteristics, including bank size, capitalization, total state deposits and profitability, measured in 2022Q4, as well as their interactions with the *Post* variable. Columns 1, 2, 3, 4, and 8 additionally include securities holdings, maturity of securities portfolio, measured in 2022Q4, as well as their interactions with the *Post* variable. The sample is restricted to banks with state deposits on their balance sheet before 2015Q1 and spans from 2022Q1 through 2023Q4, spanning eight quarters. Standard errors, clustered by bank, are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: Call Reports.

Table 13: Network Banks and Local Market Share

Δ Market Share	(1)	(2)	(3)	(4)
Network_{2022Q4}	0.0022***	0.0021***	0.0021***	0.0017***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
$\ln(\text{Assets})_{2022Q4}$		-0.0004***	-0.0004***	-0.0003***
		(0.0001)	(0.0001)	(0.0001)
ROA_{2022Q4}			-0.0054***	-0.0058***
			(0.0015)	(0.0015)
$\text{Securities/Assets}_{2022Q4}$				-0.0002***
				(0.0000)
Zip Code FE	✓	✓	✓	✓
N	55,968	55,968	55,968	55,968
R^2	0.2472	0.2476	0.2479	0.2489

Notes: This table presents the relation between the change in local bank market share from 2022Q4 to 2023Q4 and bank network status in 2022Q4. The dependent variable is the bank's market share ($\Delta \frac{\text{Bank Deposits}_{b,z,2023Q4-2022Q4}}{\text{Total Deposits}_{z,2023Q4-2022Q4}}$) in zip-code z from 2022Q4 to 2023Q4. All columns include zip code fixed effects. Columns 2 to 4 successively add controls for bank-level characteristics, including bank size, profitability, and securities holdings as measured in 2022Q4. Heteroskedasticity-robust standard errors are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: FDIC Summary of Deposits, Call Reports.

Table 14: Reallocation of Deposits

	(1)	(2)	(3)
	Mega Share	Big Share	Moderate Share
Zip Network Share$_{2022}$ × Post	0.0023	0.0561***	-0.0577***
	(0.0015)	(0.0066)	(0.0068)
Post	-0.0018***	-0.0054***	0.0065***
	(0.0005)	(0.0007)	(0.0007)
Zip Code FE	✓	✓	✓
N	36,048	36,048	36,048
R^2	0.9896	0.9766	0.9877

Notes: This table examines the relationship between the local deposit market share of mega, big, and moderate banks in a zip code from 2022Q4 to 2023Q4, the proportion of big banks participating in the network within a zip code, and a post-indicator for the period following the SVB crisis. The dependent variable is the market share of big banks in column 1 (Total Assets \$1T), market share of big banks in column 2 (\$50B $\leq$ Total Assets <\$1T), and market share of small banks in column 3 (Total Assets $\leq$\$50B). Zip Network Share is defined as the network participation rate of big banks ($\frac{\text{\# Big Banks on Network}_{z,2022}}{\text{Total \# of Banks}_{z,2022}}$). Post takes a value of 1 in 2023 and 0 otherwise. All columns include zip code fixed effects. We restrict the sample to the years of 2022 and 2023, i.e., there are two cross-sections. Heteroskedasticity-robust standard errors are reported in parentheses. Statistical significance levels are indicated by *, **, and ***, representing significance at the 10%, 5%, and 1% levels, respectively.
Source: FDIC Summary of Deposits, Call Reports.