Emergency Lending and Moral Hazard

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Abstract

In recent decades, central banks have increasingly addressed potential and emerging financial crises by establishing emergency lending facilities. Although these facilities may often be justified if they interrupt negative feedback loops that result in financial and real economic losses, concomitant moral hazard issues can have destabilizing effects that increase the likelihood and severity of future crises. In this paper, we examine the moral hazard associated with the emergency response to the banking turmoil that erupted in the U.S. in March of 2023. Specifically, we estimate how banks' access to the Federal Reserve's Bank Term Funding Program (BTFP) affected their subsequent funding diversification and resilience to liquidity shocks. We find that banks with more access to the BTFP were less likely to follow policymakers' directives to expand their access to different types of funding and boost their contingency funding preparedness. To obtain causal estimates, we measure bank access to the BTFP with the confidential volume of collateral placed at the facility, and instrument for this access with the amount of BTFP-eligible collateral that banks had previously placed at the Discount Window. Our IV estimates reveal that banks with less access to the BTFP increasingly tapped private funding markets relative to other banks by issuing more time deposits, boosting brokered deposits and wholesale funding, and engaging in more reciprocal deposit arrangements. Further, although one goal of the BTFP was to help banks avoid selling (underwater) securities, we find that BTFP access led banks to draw down their securities portfolios via sales. Finally, we observe relatively less contingency funding preparedness among the banks that were more able to rely on the BTFP. These banks were less likely to boost their collateral pledged to the discount window, and less likely to perform a test of discount window borrowing in the months after SVB's failure. In sum, our results demonstrate the moral hazard consequences of emergency lending. Policymakers should consider these consequences when evaluating future emergency facilities, and our results argue in favor of bolstering standard crisis-prevention tools, including standing lender-of-last-resort backstop facilities and certain microprudential standards.

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1 Introduction

Since the Global Financial Crisis, central banks around the world have turned to emergency lending and liquidity facilities with increasing regularity. Along with their potential benefits, these facilities entail costs including threats to central bank independence, operational risk, inequity, legal challenges, and moral hazard. The risk of moral hazard accompanies virtually all emergency backstops and is particularly troublesome because it can increase the likelihood and severity of future crises, as financial institutions and investors come to expect government backstops and do not self-insure against a range of tail risks (Bernanke, 2010). Consequently, moral hazard presents policymakers considering emergency measures with a long-run tradeoff against the short-run benefit of preventing potential damage to the financial system and the broader economy (Mester, 2024). Although many studies have evaluated these short-run benefits since the proliferation of interventions over the last two decades, the costs of emergency facilities are less well studied. The relative dearth of evidence on the costs of these facilities at least in part reflects substantial empirical challenges posed by the difficulty in measuring costs, self-selection into the programs, and the endogeneity of the facilities' introduction to banking and financial market conditions.

In this paper, we investigate the presence of adverse moral hazard effects of emergency central bank facilities. Specifically, we examine the experience with the Bank Term Funding Program (BTFP), which was established immediately after the failures of Silicon Valley Bank (SVB) and Signature Bank in March 2023. The BTFP was designed to offer funding to depository institutions to help ensure that they could meet the demands of depositors during the heightened uncertainty following the bank failures. Importantly, the BTFP offered term funding against securities valued *at par*, which marked a substantial difference between this facility and the Fed's standing discount window. Even while BTFP loans were on offer, however, policymakers and regulators publicly called on banks to internalize the lessons from the March 2023 bank failures by diversifying their private funding sources and otherwise ensuring contingency preparedness.

Therefore, our investigation proceeds by assessing the extent to which banks with more access to the BTFP were less likely to heed the regulatory direction to diversify, prepare, and test contingency funding sources. To measure access to the BTFP, we use confidential data to determine the total collateral pledged to the facility. The total collateral pledged equals the effective line of credit that the Fed committed to provide, because the BTFP lent against the par value of collateral without applying a haircut. We relate this measure of BTFP access to banks' subsequent use of alternative and contingency sources of funding, including time deposits, reciprocal deposits, wholesale funding, brokered deposits, and liquid asset buffers. In addition, we use confidential information on discount window activity to assess whether banks with more access to the BTFP were less likely to prepare for future borrowing at the Fed's discount window, even as policymakers and regulators encouraged such preparation.

To connect our measure of BTFP access to the outcomes of interest, we confront an endogeneity challenge presented by banks' selection into BTFP participation and the possibility that such participation was caused by a separate factor, which can in turn affect the willingness or ability to tap alternative funding sources. To break the endogenous link between BTFP access and our outcomes of interest, we instrument for total collateral pledged to the BTFP using BTFP-eligible collateral pledged to the discount window prior to SVB's failure. The relevance of this instrument is underpinned by the relative ease with which institutions could place discount window collateral at the BTFP compared to institutions without either collateral prepositioned at the discount window or discount window eligibility at the outset of the BTFP. To support the exogeneity of the instrument, we show that BTFP-eligible collateral placed at the discount window is unrelated to bank characteristics as well as bank-level deposit growth both before and after the 2023 banking crisis. Further, we subject our main results to placebo tests using the mix of BTFP-*ineligible* collateral placed at the discount window to demonstrate that the amount of pre-positioned collateral itself cannot explain our results. These placebo tests offer support for the exclusion restriction,

which requires that the mix of collateral placed at the discount window in 2022 was unrelated to the outcomes of interest except through the influence on the ease of BTFP access.

We find that banks with more access to the BTFP exhibited a lower propensity to amass private funding and make preparations for contingency borrowing, contrary to regulatory guidance. Although policymakers generally aim to design emergency lending facilities in a manner that will ensure financial institutions return to private markets for liquidity when financial conditions normalize (Bernanke, 2010), we show that the BTFP undermined this goal. Specifically, banks that were less exposed to the BTFP were comparatively more likely to use or test alternative and contingency funding sources, including time deposits, wholesale funding, and reciprocal deposits. Institutions with less BTFP access also maintained larger liquid (cash and securities) asset buffers. Moreover, despite the stated aim of the BTFP to help banks avoid selling their underwater securities, we find evidence that institutions with more liquidity cover from the BTFP were more inclined to sell their securities. Lastly, we investigate whether banks with more BTFP access followed the guidance to maintain operational access to the discount window through test loans and collateral placement. The BTFP evidently suppressed banks' discount window testing frequency and reduced total collateral positioned with the Fed. These results reveal how ad hoc lending facilities can undermine efforts to reduce the stigma of standing lending facilities like the discount window.

We demonstrate robustness of these results to three different samples of banks throughout: banks that pledged any collateral to the discount window prior to the 2023 banking turmoil, banks that had paperwork on file to use the discount window, and banks with a nonzero pledge amount to the BTFP. Furthermore, we show that our results hold—and are in fact slightly stronger in economic and statistical significance—when we measure outcomes as of year-end 2024 when BTFP borrowing was nearly nonexistent. Finally, we show that discount window collateral pledging *per se* does not explain the results, as BTFP-ineligible collateral is unrelated to banks' ultimate BTFP pledge and the contingency funding outcomes.

A few features of the experience with the BTFP allow us to credibly identify the moral hazard costs of emergency lending facilities. First, although moral hazard effects can manifest in a multitude of ways, the lessons from the regional banking crisis prompted clear official guidance for banks to diversify their private funding sources and to test and prepare contingency borrowing capabilities. This guidance provides clear direction in our search for moral hazard effects of the BTFP. Because moral hazard can take many forms, it is often insufficient to merely test for divergent behavior across banks with different capital adequacy. Instead, it is important to consider the exact types of risks financial institutions may shift to the government as a result of a particular intervention.[1] Second, as described above, the terms of the BTFP allow us to overcome a common endogenous selection concern presented by access to emergency facilities. If a bank's participation decision is related to the realization of an important development—for example, depositor flight as a response to perceived bank health—then participation in the emergency facility *and* a bank's ability to secure private funding could be caused by this third factor. To draw a causal link between BTFP access and the subsequent manifestation of moral hazard, we use the fact that only certain types of collateral (acquired before a certain date) were eligible for the BTFP. The bank-level variation in BTFP-eligible collateral positioned at the Fed's standing discount window prior to the regional banking crisis offers a plausibly exogenous instrument for access to the facility.

Our work contributes to empirical studies that aim to document the causal effect of the expectation of bank-specific bailouts on moral hazard. In particular, prior work considered variation in the likelihood of firm-specific bailouts based on political affiliation, as in Dam and Koetter (2012), or a credit rating agency's assessment of the government's willingness to let a given firm fail, as in Mariathasan et al. (2014). Both of these studies—which consider a bailout concept closely related to the too-big-to-fail problem that featured prominently in the GFC—find that banks with greater odds of government support in the event of failure tend

[1]Moreover, strong supervisory ratings and adequate capitalization can be prerequisites for borrowing at emergency lending facilities, as was the case with the BTFP. As a result, differences in capital adequacy can be immaterial in explaining risk-shifting among the set of banks with reasonable access to lending facilities.

to operate with smaller capital buffers. By contrast, we examine the effects of ad hoc and broad-based emergency facilities to understand the costs associated with these increasingly common backstops. These facilities do not necessarily constitute a bailout or depend on the extent of distress of any particular institution, and their creation can produce moral hazard in wide swath of firms simultaneously. In this way, our paper offers empirical support for the theoretical result of Farhi and Tirole (2012), in which support that is imperfectly targeted to distressed institutions can distort incentives and sow the seeds of a future crisis.

We also contribute to the literature that examines the effects of emergency central bank facilities introduced to stanch a burgeoning financial crisis. In contrast to numerous studies that assess the (intended) benefits of such programs (Campbell et al., 2011; Duygan-Bump et al., 2013; Acharya et al., 2017; Gilchrist et al., 2024), we focus primarily on the potential costs. Understanding both aspects of emergency backstops is necessary for informed policy making.

Lastly, a related paper is Glancy et al. (2024), who also examine the BTFP. The authors use higher frequency data to demonstrate the ability of the BTFP to support the liquidity positions of vulnerable banks in March 2023. They find that banks with high reliance on uninsured deposits and large unrealized losses on securities holdings suffered larger deposit outflows; that the BTFP helped replace deposit outflows for banks with larger securities losses; and that banks used the BTFP to build cash holdings.

Our results carry important lessons for policymakers. In particular, demonstrating the adverse moral hazard effects of emergency facilities emphasizes the importance of developing a more robust and systematic regime to handle nascent financial disruptions. Rather than resorting to the ad hoc creation of emergency liquidity facilities with increasing frequency, it is worthwhile to focus on establishing permanent lending facilities that exist within the broader framework of a liquidity and capital regulatory regime with clear mechanisms for resolving financial institutions. Integrating standing lending facilities into a coordinated supervisory and regulatory policy framework can help ensure a more stable financial system

that is able to withstand a range of scenarios without introducing severe moral hazard risks that can sow the seeds of the next crisis.

2 Institutional Background

2.1 2023 Banking Turmoil

In response to elevated inflation in the aftermath of the COVID-19 pandemic, the Federal Reserve embarked on a relatively rapid policy tightening cycle in March 2022. As shown in Figure 1, the rise in short-term rates resulted in deposits leaving the banking system. The drawdown of traditional bank deposits is a common phenomenon in rising rate environments given that many banks do not pass through the higher rates to deposit accounts one-for-one (Drechsler et al., 2017; Kang-Landsberg et al., 2023).

[Figure 1 about here]

The deteriorating funding environment led many banks to turn to other liabilities to replace lost core deposits. For example, Figure 2 demonstrates that the number of banks using higher-cost brokered deposits began to rise after the Federal Reserve started to lift interest rates.

[Figure 2 about here]

Higher rates additionally reduced the mark-to-market value of many bank assets, including the numerous securities purchased during the preceding low-rate environment.

Eventually, depositors and investors became worried about the liquidity position of certain banks that coupled a risky funding profile with large mark-to-market losses (Jiang et al., 2024). In particular, Silicon Valley Bank (SVB) faced rapid depositor flight following their 8-K filing outlining a plan to raise capital after selling underwater securities.[2] On

[2]The conventional explanation of the 2023 banking system turmoil has recently been criticized by Kelly and Rose (2025), who contend that bank stress was centered more on a business model that focused on providing banking services to certain flagging economic sectors including crypto-asset firms and venture capital.

March 10, SVB was put into receivership, sparking contagion dynamics that affected other banks (Caglio et al., 2025) and ultimately resulted in the invocation of the systemic risk exception to guarantee all uninsured deposits of SVB and Signature bank (which failed the same weekend as SVB). Despite this guarantee, banks rapidly moved to minimize exposure to uninsured deposits. For example, Figure 3 shows that in the aftermath of SVB, more banks entered into reciprocal deposit agreements, which allow a network of banks to exchange deposits to provide more deposit insurance to their customers.

[Figure 3 about here]

2.2 The Bank Term Funding Program

As part of the emergency policy response to the emerging crisis sparked by the failure of SVB, the Federal Reserve launched the Bank Term Funding Program (BTFP) lending facility. Through the BTFP, the Fed aimed to address the sources of the crisis by offering to lend against collateral eligible for purchase in open market operations, such as U.S. Treasuries, U.S. agency securities, and U.S. agency mortgage-backed securities. Importantly, the lending value of collateral pledged to the BTFP was based on the par value of the securities, with no haircut applied. In this way, the Fed attempted to negate depositors' concerns about banks' liquidity positions stemming from flighty sources of funding and liquid assets that could only be sold at steep discounts.

Loans from the BTFP differed from primary credit loans obtained through the Discount Window in several other ways. In addition to accepting only a subset of collateral types eligible for ordinary Discount Window credit that were valued at par, advances made under the BTFP had a term of up to one year. By contrast, advances under primary credit may be made for a term of up to 90 days, though these loans could be rolled over into new loans at maturity. Second, rather than the primary credit rate, the rate for term advances under the BTFP was initially set at the one-year overnight index swap rate plus 10 basis points. Third, the rate on BTFP loans was fixed for the term of the loan on the day the advance is

made. With primary credit advances, the rate may change if there is an adjustment to the primary credit rate while a loan is still outstanding.

In order to borrow from the BTFP, potentially eligible institutions had different administrative, operational, and legal hurdles to clear depending on their pre-SVB Discount Window preparation. Institutions that were eligible for primary credit, had discount window borrowing documentation (Operating Circular #10) in place, and had eligible collateral in their DW pledge account could borrow from the BTFP immediately after moving collateral to the BTFP pledge account via a phone call to Fedwire Services Support or an online pledge submission via FedLine.[3] However, even if a bank had an OC-10 in place, a lack of BTFP-eligible collateral prepositioned at the Discount Window would require an additional step of locating and transferring unencumbered collateral that was owned prior to March 12, 2023. As we discuss in more detail when explaining our identification strategy, there was substantial variation in collateral types pledged to the discount window, with many banks pledging only BTFP-ineligible collateral types prior to SVB's failure.

Activity at the BTFP was robust upon inception. As we show in Figure 4, borrowing from the facility rose to about $100 billion within three months, while the par value of collateral pledged to the facility reached nearly $500 billion. In panel A of Table 1, we show that about 500 banks positioned collateral by the end of March, with that number growing rapidly each month. By the end of Q3 2023, nearly 1,300 banks had placed collateral at the BTFP at some point, and almost 1,000 banks took a loan from the facility. In panel B of Table 1, we report the average (normalized) pledging and borrowing amounts as well as the interquartile range for all BTFP pledgers as of Q3 2023. In the final row of the panel, we report the same borrowing statistics for institutions conditional on borrowing. On average, banks directly accessing the BTFP pledged over 6% of the value of their liabilities, while borrowers drew just over 4% of pre-BTFP liabilities.

[Figure 4 about here]

[3] In some instances, eligible collateral for the BTFP could also be placed through the DTC.

[Table 1 about here]

There was substantial commentary regarding the generosity of the terms of the facility and the potential for moral hazard to arise as a result of the BTFP (NPR, 2023; Murdoch and Mandl, 2023; Vari, 2023), which was established under the emergency Section 13(3) of the Federal Reserve Act and included a Treasury backstop against potential losses.

3 Hypothesis Development

Moral hazard is a central concern with any government backstop facility. Moreover, moral hazard can increase when emergency facilities are used with more regularity in response to financial turmoil because such behavior cements expectations of subsequent interventions. Thus, the frequency of the Fed interventions since 2007 and the relative generosity of the BTFP boost the risk of moral hazard dynamics.[4] Of course, while moral hazard risks should be an important consideration when establishing an emergency backstop, these risks on their own can easily be outweighed by the need to short-circuit negative feedback loops that would result in severe financial disruption and economic losses.

Thus, our primary research question is whether we can identify a *causal* effect of the BTFP on moral hazard. Moral hazard can manifest in myriad types of risk taking by banks, which can frustrate attempts to identify the adverse incentive effects of backstop facilities like the BTFP. In this case, however, we are guided in our search for moral hazard effects by focusing on the bank funding weaknesses exposed during SVB's collapse (Kelly and Rose, 2025) and the statements made by regulators and policy makers about appropriate bank behavior in light of those systemic weaknesses.

In recognition of the potential for bank complacency due to the BTFP, Federal Reserve officials encouraged banks to take proactive steps to self-insure rather than expect government support in the future. For example, even as the BTFP was actively providing

[4]For a list of emergency facilities and special interventions since 2007, see the Appendix Table (TBD).

backstop liquidity, banks were warned that "bank management must take ownership of their operational preparedness before a liquidity crisis occurs," and "Though we tailored a solution under these circumstances, banks would be very unwise to assume the Fed will be able to provide special, individualized attention and creative solutions in the event of another liquidity crisis" (Ostrander, 2023).

An insistence that banks diversify their funding sources and test contingency borrowing alternatives represented a common theme in policymakers' recommendations for banks in the aftermath of SVB's failure (e.g., Barr, 2023; Dobbeck, 2023; Logan, 2023; Ostrander, 2023). Bolstering this less formal direction to banks, the Fed, FDIC, NCUA, and OCC issued official regulatory guidance in the form of an Addendum to the 2010 Interagency Policy Statement on Funding and Liquidity Risk Management.[5] This guidance provided several clear directions and recommendations, including:

1. Depository institutions should maintain a broad range of funding sources.

2. Institutions should regularly test any contingency borrowing lines and funding sources to ensure that staff is well versed in the requisite operational procedure.

3. Depository institutions should incorporate the discount window as part of their contingency funding arrangements.

4. Depository institutions should establish and maintain operational readiness to borrow from the discount window by pre-pledging collateral and conducting small value borrowing tests.

In sum, banks were directed to ensure that they maintained access to different funding sources through operational preparation and testing *even outside of crisis events*. In this context, the 2023 increase in the number of banks using brokered and reciprocal deposits

[5]The Addendum is available at `https://www.fdic.gov/sites/default/files/2024-03/fil23039a.pdf` and the 2010 Interagency Policy Statement is available at `https://www.govinfo.gov/content/pkg/FR-2010-03-22/pdf/2010-6137.pdf`.

evident in Figures 2 and 3 may partly reflect banks following these directions and responding to the lessons of SVB's collapse.

Thus, our primary research question focuses broadly on understanding how access to the BTFP affects banks' willingness to follow the official guidance to diversify private funding sources and prepare for contingency funding scenarios. As a more rigorous descriptive demonstration of this relationship, we show in Table 2 that the banks with less access to the BTFP diversified their portfolio of nonstandard and contingent funding sources more in 2023, as measured by the midpoint percent change in their funding HHI.[6] Similarly, as reported in panel B of Table 2, banks pledging less collateral to the BTFP were not as likely to shed a distinct private funding source during 2023.

[Table 2 about here]

As further evidence of banks' expansion in funding sources following the failure of SVB, Figure 5 shows that more banks filed the OC-10 paperwork required to gain access to the discount window. While this pattern can be partly driven by the introduction of the BTFP itself, we also show that more banks pre-positioned collateral at the discount window, which includes activity by banks that had an OC-10 on file but had not previously pledged any collateral.

[Figure 5 about here]

Using the above fact pattern as our guide to understand the potential manifestation of adverse moral hazard effects in response to the BTFP, we assess the following hypotheses:

- H1: Greater access to the BTFP is negatively related to the accumulation of alternative and contingency funding from the private market.

[6]Funding sources included in the HHI focus on liability categories that are not universally held by the banks in our sample. Specifically, we include federal funds purchased, repurchase agreements, subordinated debentures, trading liabilities, FHLB advances, other borrowed money (excluding FHLB advances and Fed borrowing), interbank deposits, and public deposits.

- H2: Greater access to the BTFP did not result in lasting higher liquid asset buffers.
- H3: Institutions with greater access to the BTFP were less likely to conduct tests of discount window borrowing, and less prone to accumulate discount window collateral (plus any collateral moved to the BTFP).

4 Data

We use three main datasets to measure how banks' access to the BTFP affected their subsequent funding activity. First, we gather a combination of public and confidential information on bank-level BTFP activity, including borrowing volume and pledged collateral types and amounts. While data for borrowing banks was released in March 2025 according to the original terms of the facility, pledging activity among non-borrowing banks was not publicized.

Second, we use data from the Federal Reserve's Discount Window data repository to determine which banks had filed the relevant paperwork—known as Operating Circular 10—to access the standing lending facility. Further, we observe the types of collateral pledged to the Discount Window before and after the BTFP, measured at par and lendable values. We also collect information on banks' Discount Window borrowing before and after the introduction of the BTFP to identify test loans.

Third, we use the FFIEC Call Reports to extract information on changes in banks' funding profile. We identify important sources of funding for banks as they dealt with a decline in traditional deposits, including reciprocal deposits, brokered deposits, time deposits, and wholesale deposits. In addition, we record information on liquid asset buffers maintained by banks, as well as realized gains and losses to proxy for the extent of security sales. We also obtain measures of bank size, such as assets and liabilities, so that we can appropriately scale funding, borrowing, and pledging amounts to make meaningful comparisons between institutions.

Table 3 reports the mean, median, and inter-quartile range for many of the relevant variables not already reported in Table 1, as of December 2022. We present descriptive statistics for three samples of banks that we will use throughout most of our analysis: (1) banks that had collateral pledged to the Discount Window as of February 2023, our preferred sample, (2) banks that had filed Operating Circular 10 before the introduction of the BTFP, and (3) banks that pledged collateral to the BTFP by Q3 of 2023. The first sample comprises banks that have an observably comparable willingness to pledge collateral with their Federal Reserve Bank, while also enjoying an automatically opened BTFP collateral account. The second sample of banks that had filed the legal agreements to place collateral at the discount window, and could theoretically shift collateral to the Fed at will. However, we cannot observe reasons for certain banks' decision to pledge no collateral at the Discount Window, and the sample could thus include banks that have a different institutional disposition towards pledging collateral at the Fed. The final sample consists of only those banks that had pledged collateral to the BTFP, limiting possible concerns in the other samples that selection into BTFP pledging is related to an important unobservable confounder.

[Table 3 about here]

5 Measurement, Identification, & Methodology

Our measure of BTFP access is based on the effective line of credit offered to each bank by the Fed. We therefore focus on the par amount of collateral pledged to the BTFP, which equals the extent of the funding backstop that the Fed committed to provide based on the terms of the facility. Specifically, we calculate BTFP Access as the maximum par value collateral pledged to the BTFP by Q3 2023, divided by liabilities as of year-end 2022:[7]

[7]As shown in Figure 4, borrowing and pledging at the BTFP had stabilized by Q3 2023. A principal reason to select the maximum pledge prior to Q4 is that an arbitrage opportunity arose in the final months of 2023, which drove pledging and borrowing activity that differed from the purpose of the facility. In January 2024, the Fed changed the rate on BTFP loans to prevent such an arbitrage.

$$\text{BTFP Access}_b = \frac{max(\text{BTFP Collateral}_{b,t} \mid t < 2023Q4)}{\text{Liabilities}_{b,2022Q4}}. \quad (1)$$

As shown in Figure 6, there were substantial differences between banks' maximum borrowing and pledging amounts, with many pledging institutions opting not to borrow at all. In fact, there were more institutions that pledged without borrowing (the points lying exactly on the x-axis of Figure 6) than there were institutions that borrowed 95% or more of their pledged collateral (roughly the points lying on the 45-degree line of Figure 6).

[Figure 6 about here]

The decision to measure BTFP Access using collateral pledged rather than amount borrowed is further rationalized by the fact that accessing the BTFP with pre-positioned collateral was a trivial matter. Conversely, the future pledging procedure and rules governing the BTFP were potentially subject to change. Consequently, the backstop function of the BTFP was in place for institutions that had pledged collateral but did not borrow, possibly because collateral was positioned for precautionary reasons or because banks that pledged but did not borrow would not have their identities released publicly one year after the facility was closed.

Irrespective of the measure of BTFP access, we must overcome substantial endogeneity and selection concerns to retrieve causal estimates of the moral hazard effects of the BTFP. A bank's decision to access the BTFP is an endogenous response to its funding structure, which introduces familiar bias into the β parameter in the following reduced form regression:

$$\Delta Y_b = \alpha + \beta \cdot \text{BTFP Access}_b + \varepsilon_b. \quad (2)$$

In equation (2), ΔY_b is the change in the outcome of interest from December 2022 to December 2023 for bank b. Figure 7 demonstrates an example of the selection concern present in equation (2). BTFP access as measured using the maximum borrowing amount

(panel A) or the maximum collateral pledged (panel B) predicts prior and future uninsured deposit outflow.[8] Therefore, a third variable, such as uninsured depositor withdrawals in this case, can potentially drive *both* a bank's decision to access the BTFP as well as a change in alternative funding sources.

[Figure 7 about here]

Given the endogeneity concerns, we identify a causal effect using an instrumental variables (IV) strategy. Specifically, we instrument for BTFP Access$_b$ in equation (2) with the amount of BTFP-eligible collateral pledged at the discount window prior to the 2023 banking turmoil. Thus, our first-stage regression takes the following form:

$$\text{BTFP Access}_b = \alpha + \beta \cdot \text{BTFP-Eligible Collateral}_b + \nu_b, \text{ where} \tag{3}$$

$$\text{BTFP-Eligible Collateral}_b = \frac{\text{Gov./Agency Discount Window Collateral}_{b,2022Q4}}{\text{Liabilities}_{b,2022Q4}}. \tag{4}$$

This instrument should be relevant, because banks that had collateral pledged to the discount window had a BTFP collateral pledge account automatically opened when the BTFP launched. For these institutions, placing collateral in the BTFP pledge account simply required a phone call or the submission of an online form. Another important identifying assumption lies in the exclusion restriction, which requires that the mix of collateral placed at the discount window in 2022 was unrelated to the outcomes of interest except through the influence on the ease of BTFP access.

In panel C of Figure 7, we show that bank-level uninsured deposit growth from 2022 through 2023 is orthogonal to BTFP-eligible collateral placed at the discount window, which

[8]These figures report point estimates from event-study difference-in-differences specifications using the continuous "treatment" variable indicated by the y-axis label. Nearly identical patterns emerge when using core deposits as the dependent variable.

supports the notion that our instrument is unrelated to confounding bank-level developments such as depositor activity. In Table 4, we present tables of regression results that summarize the lessons of Figure 7. While we find that BTFP collateral placement is related to the realization of uninsured and core deposit losses in the OLS specification, IV estimates obtain inconsistently signed point estimates with no statistically significant relationship. In subsequent analysis, we offer placebo tests that supply further evidence in favor of the exclusion restriction.

[Table 4 about here]

To further support the exogeneity of our instrument based on the 2022 discount window collateral, we regress the instrument on a suite of contemporaneous (i.e., year-end 2022) bank characteristics. The independence assumption could be thrown into question if observable bank attributes such as funding structure, the mix of securities, or unrealized losses differed systematically with our instrument. In Table 5, we show that these factors exhibit virtually no statistical association with the instrument across our samples.[9] In other words, banks with high or low values of the instrument are statistically similar to each other across a host of variables.

[Table 5 about here]

In Figure 8, we plot the mix of BTFP-collateral for the set of banks with collateral pledged to the discount window as of year-end 2022, which is our preferred sample of institutions. There is substantial variation across banks, with many institutions posting no BTFP-eligible collateral in the ordinary course.

[Figure 8 about here]

[9] A lone exception is a relationship between size and our instrument in the sample of discount window eligible banks, which reflects the fact that most institutions with an OC10 on file that have not pledged collateral (and thus have a value of zero for the instrument) tend to be smaller.

6 Results

In Table 6, we report the first stage estimates, which reveal the expected positive relationship between our instrument and the endogenous measure of BTFP access. We also observe relatively high F-statistics, even for the smaller samples that we consider.

Table 7 reports our first set of IV results for alternative and contingency funding sources, estimated as follows:

$$\Delta Y_b = \alpha + \beta \cdot \widehat{\text{BTFP Access}}_b + \varepsilon_b,$$

where ΔY_b measures the 2022Q4–2023Q4 change in a funding source for bank b, divided by total assets as of 2022Q4. Across all samples, we find that as a share of 2022 assets, banks with less proximity to the BTFP increased time deposits, wholesale funding, brokered deposits, and reciprocal deposits relative to banks with more BTFP access. We note that statistical significance is lower for reciprocal deposits (respectively, for panels A-C, $p = 0.02$, $p = 0.17$, and $p = 0.42$) partly reflecting the inefficiency of the IV estimator and the fact that relatively few institutions used reciprocal deposits compared to other funding sources. In the reduced form regression of the change in the reciprocal deposits share on our instrument (not shown), we again achieve universally negative point estimates with much higher levels of statistical significance (respectively, $p = 0.00$, $p = 0.01$, and $p = 0.25$).

These results show that, even well after the SVB crisis subsided, the BTFP undermined the regulatory direction to boost the diversity of funding sources. Consequently, the BTFP—although perhaps justified in the context of the regional bank turmoil at the time—worked against the push to encourage banks to obtain and test a wider range of private funding sources.

[Table 6 about here]

[Table 7 about here]

We next turn to the question of whether banks with BTFP access saw a relative improvement in their longer-term liquid asset buffers. If banks with a higher propensity to pledge assets to the BTFP borrowed more from the Fed than other banks borrowed from private sources for precautionary purposes, we might expect to see a clear increase in cash buffers for the former group of banks. However, this result would not be guaranteed given the result in panel A of Figure 7, which shows that heavier BTFP borrowers had to overcome larger deficits in private funding.

In Table 8, we show that access to the BTFP did not cause longer-term differences in liquid asset buffers, as measured by the change in cash and securities as a share of total assets (where securities are measured at amortized cost to abstract from fluctuations in market values). Decomposing the liquid assets into the cash portion in column 2, we observe no statistically significant difference in cash buffers. This result is even more striking given the finding reported in column 3 that banks with more access to the BTFP in fact ran down their securities portfolios, which is regularly included as a source of liquidity in contingency plans. In the final column, we find that BTFP access led to the reduction in securities portfolios at least in part as a result of *outright sales*, as banks with more BTFP access reported relatively greater realized losses during 2023 (the discount window pledgers sample in panel A does not achieve conventional levels of statistical significance, with $p = 0.11$).

Notably, however one of the stated goals of the BTFP was to serve as a source of liquidity, eliminating banks' need to sell securities and realize losses, as SVB did immediately prior to its collapse (Federal Reserve, 2023). This goal of the facility was explained further in Ostrander (2023), "The thinking was that committed financing of these securities would significantly mitigate any concerns market participants had that a bank would need to realize losses on these securities." Evidently, banks used the promise of inexpensive term funding from the BTFP as cover to restructure their securities portfolios despite the risk that this restructuring entailed during the 2023 banking crisis. While restructuring the securities

portfolios was perhaps desirable for a bank in the longer term, it also exposed the institution to risk via a loss of depositor and market confidence and a reduction in regulatory capital.

[Table 8 about here]

In our final set of results, we examine how BTFP access affected banks' discount window preparation, which was a common goal among policymakers in the months following SVB's failure (citations: Governor Barr's speeches, et al.). In particular, banks were encouraged to place sufficient collateral at the discount window preemptively, and to perform regular borrowing tests to maintain operational readiness.

Table 9 reports results for measures of banks' discount window preparedness. In the first column, we show the results using an indicator outcome variable that takes a value of one if a bank performed a small-dollar test of discount window borrowing after the BTFP was introduced. We find that banks with more BTFP access as measured by collateral pledged to the BTFP were less likely to perform a discount window test, despite regulators' strong encouragement to maintain readiness via test loans.[10] Given the statistical power issues presented by the relatively small number of banks that perform discount window tests, we also report the reduced-form regression results for each outcome. We consistently find that banks with more BTFP access were less likely to test and prepare for discount window borrowing.

In the second column of Table 9, we further restrict the binary outcome to take a value of one for only those post-BTFP discount window testers that did not conduct a test in the pre-BTFP sample. Although this outcome suffers from even stronger power issues, we find consistently signed point estimates in the IV results, and achieve statistical significance in the reduced form regressions (with all point estimates close to -0.005). Overall, we find evidence that banks with less access to the BTFP were more likely to heed regulators' encouragement to perform discount window tests.

[10]SVBs lack of discount window preparation complicated efforts to provide emergency funding and resolve the bank in an orderly manner (cite Barr/Fed SVB report), which helps explain the strong recommendations to ensure discount window readiness from the Fed and other agencies.

Lastly, in the final columns of Table 9, we show that banks with less access to the BTFP also posted more collateral to the discount window. This is the case whether we use the midpoint percent change in the par value of discount window collateral (column 3) or, to a lesser degree, the midpoint percent change in the value of discount window collateral that is ineligible for the BTFP (column 4). In calculating the change in total discount window collateral for banks that pledge to the BTFP, we add the BTFP pledge amount to discount window collateral, which helps avoid a mechanical relationship between BTFP access and total discount window collateral. This finding provides an important corroboration of our results on test loans, because if BTFP pledgers are more likely to borrow, these institutions may view BTFP borrowing as a de facto test of discount window borrowing. In summary, banks with less BTFP access responded to the crisis and regulatory encouragement by more forcefully ensuring discount window contingency preparedness.

[Table 9 about here]

6.1 Robustness

In Tables 10–12, we repeat the analysis from Tables 7–9 with a "placebo" instrument that is constructed using the BTFP-*ineligible* collateral posted to the discount window at year-end 2022. Point estimates from this exercise are inconsistently signed and not statistically different from zero. This exercise rules out a concern that discount window pledging itself is sorting banks in a manner that predicts future funding changes and discount window preparation, which bolsters the plausibility of the exogeneity of the instrument and helps address potential exclusion restriction violations that work through the stock of encumbered collateral.

[Tables 10–12 about here]

In Tables 13 and 14 we repeat the main analysis for funding sources and liquidity buffers using a two-year window ending Dec. 2024, when total BTFP borrowing was nearly

nonexistent. The results are qualitatively very similar to the main (one-year) sample, though the absolute value of point estimates and statistical significance is generally a bit higher across both sets of results. These results help address a concern that the decline in funding sources somehow reflects a "mechanical" response to higher BTFP borrowing among banks with greater BTFP access. Contrary to this concern, however, we observe that banks with more BTFP access have persistently lower use of alternative funding sources and lower liquidity buffers.

[Tables 13 and 14 about here]

7 Conclusion and Policy Implications

In this paper, we presented novel evidence on the adverse moral hazard effects of emergency lending facilities. Using the experience with the Fed's BTFP that was created in response to the failure of two large banks, we show that emergency backstops can work against efforts to encourage banks to self insure against the risks that were laid bare by the very failures that led to the introduction of the BTFP.

In this episode, we show that banks were relatively less willing to diversify their funding sources and make preparations for borrowing at the standing lending facility if they had more access to the BTFP. Thus, our results also demonstrate how the use of emergency lending facilities can contribute to the stigma problems associated with the standing lending facilities that might have otherwise helped prevent the potential crisis.

Although emergency guarantees and backstops may well be warranted if they interrupt a would-be financial crisis, documenting evidence of moral hazard as we have done in this paper carries important policy implications. Most notably, our results argue in favor of developing a more systematic approach to supervision and regulation that allows policymakers to commit to longer-run goals of promoting stability and resilience. For example, policies to reduce or eliminate stigma of standing lending facilities could be enacted to ensure

that institutions have ready access to liquidity under a broad range of scenarios. Further, countercyclical policies that require larger capital and liquidity buffers in good times—while unpopular among regulated institutions—could help policymakers commit to their longer-run goals and lead banks to internalize more of their risks.

In this way, it could be possible to establish permanent lending facilities that exist within the broader framework of a liquidity and capital regulatory regime with clear mechanisms for resolving financial institutions, which would in turn help ensure a more stable and resilient financial system.

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Figure 1: Total Bank Deposits
This figure depicts a time series of total bank deposits.
Source: Federal Reserve H.8 Release

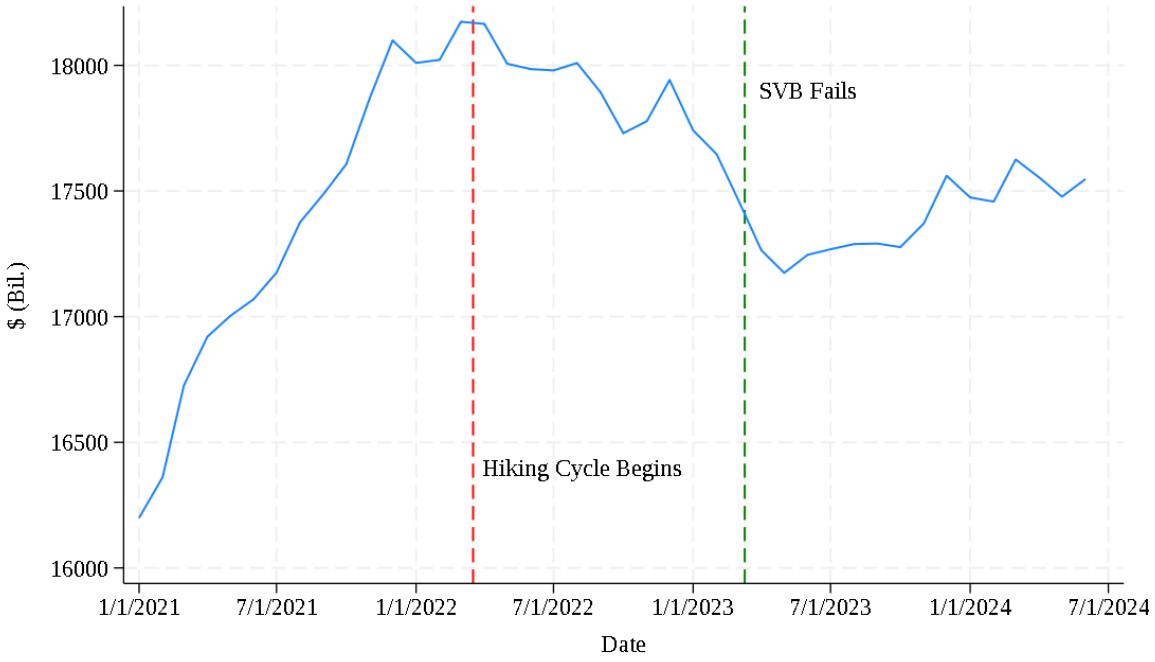


Figure 2: Brokered Deposit Users

This figure depicts a count of the number of banks using borrowing brokered deposits for the quarters indicated on the x-axis.

Source: Call Reports

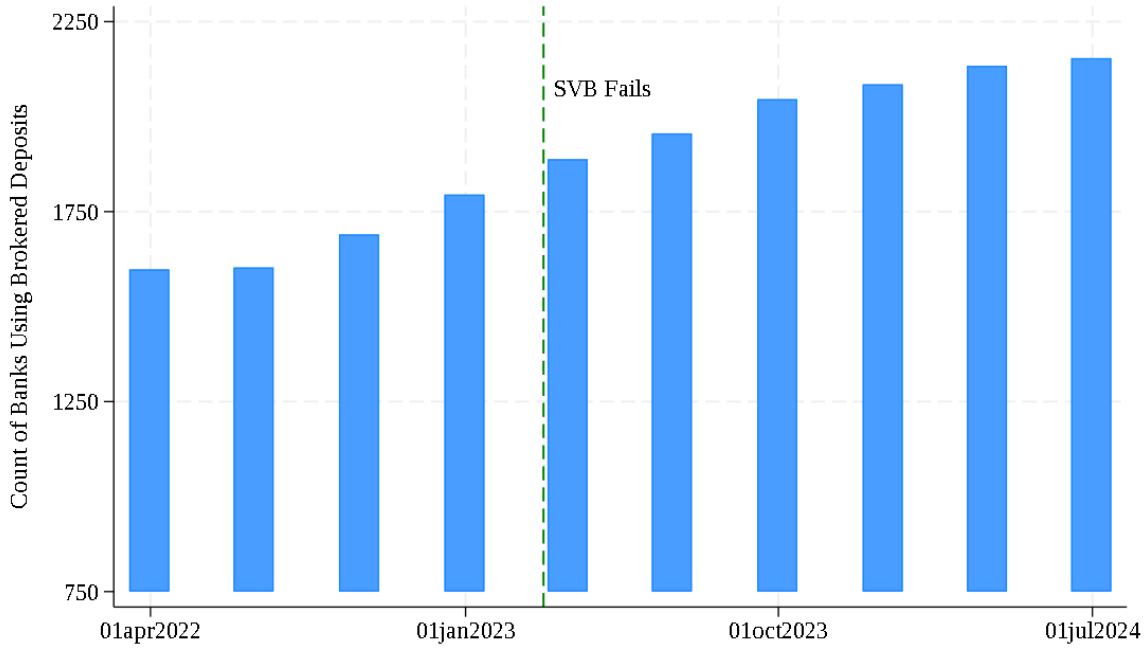


Figure 3: Reciprocal Deposit Users

This figure depicts a count of the number of banks using reciprocal deposits for the quarters indicated on the x-axis.

Source: Call Reports

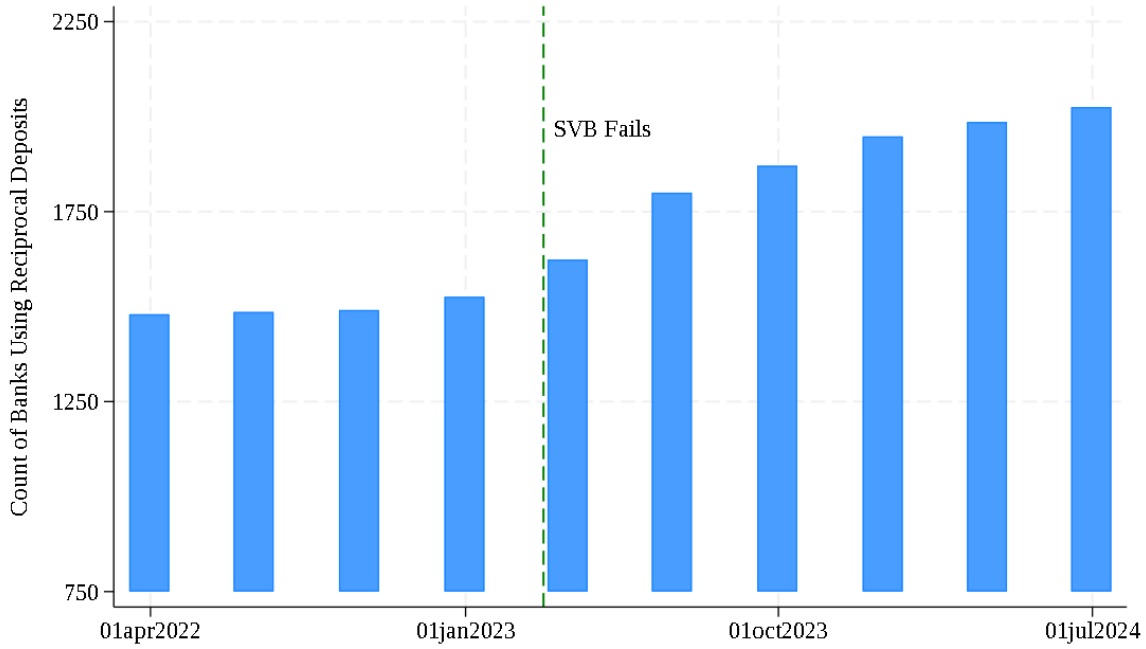


Figure 4: Total BTFP Activity

This figure depicts the volume of borrowing from and collateral pledged to the BTFP facility between its inception and Jun. 30, 2024.

Source: BTFP Data Repository

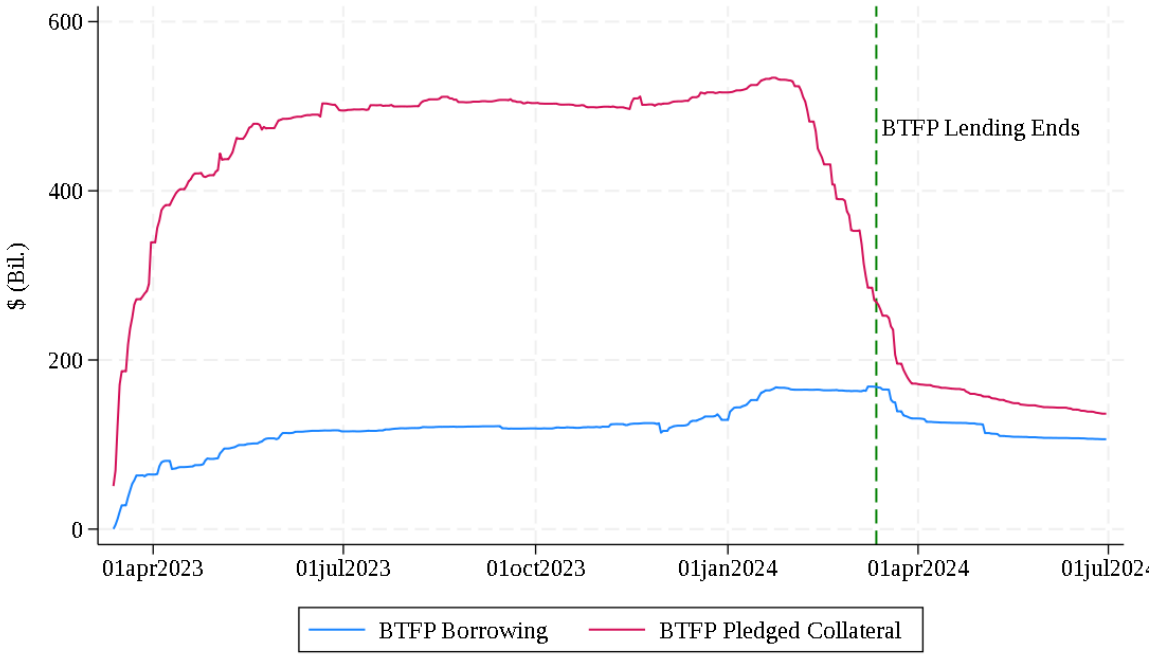


Figure 5: Discount Window Eligible and Pledging Banks

This figure depicts the count of banks that have either filed the requisite paperwork to be eligible for discount window credit (blue line) or have pledged any amount of collateral to their discount window pledge account (red line).

Source: Discount Window Data Repository

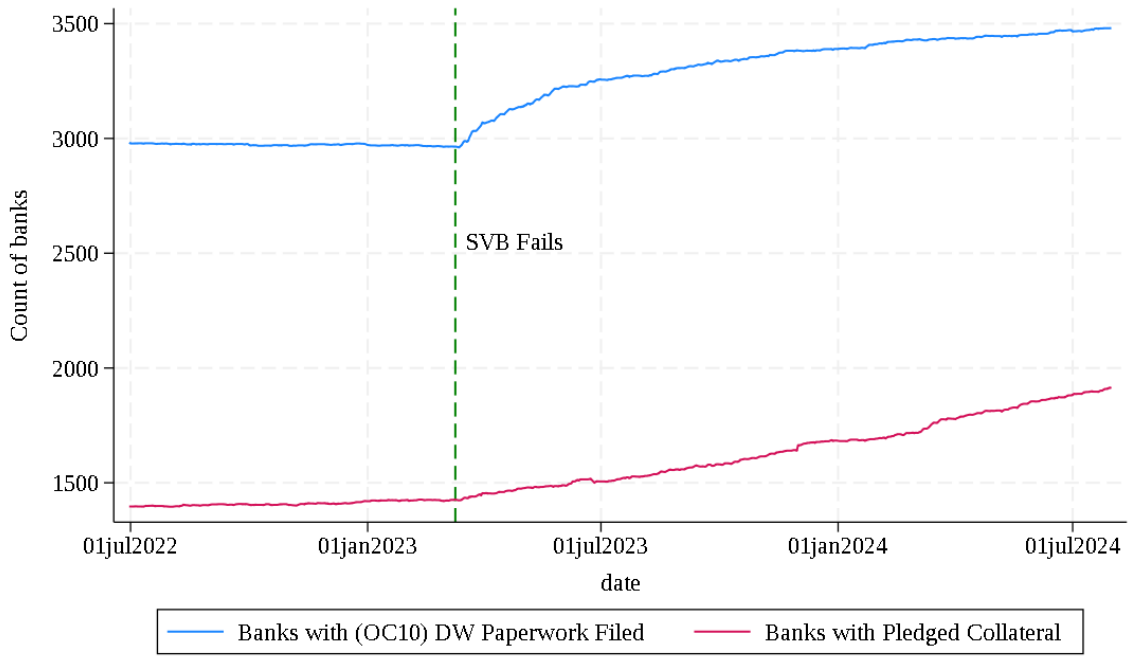


Figure 6: BTFP Collateral Pledged Versus BTFP Borrowing

This figure depicts a scatterplot of banks' maximum BTFP collateral pledge through Q3 2023 as a share of their year-end 2022 liabilities, against banks' maximum BTFP borrowing amount through Q3 2023 as a share of their year-end 2022 liabilities. A 45-degree line is included for reference. One outlier with a collateral-to-liability share over 70% is excluded from the graph for legibility.

Source: BTFP Data Repository

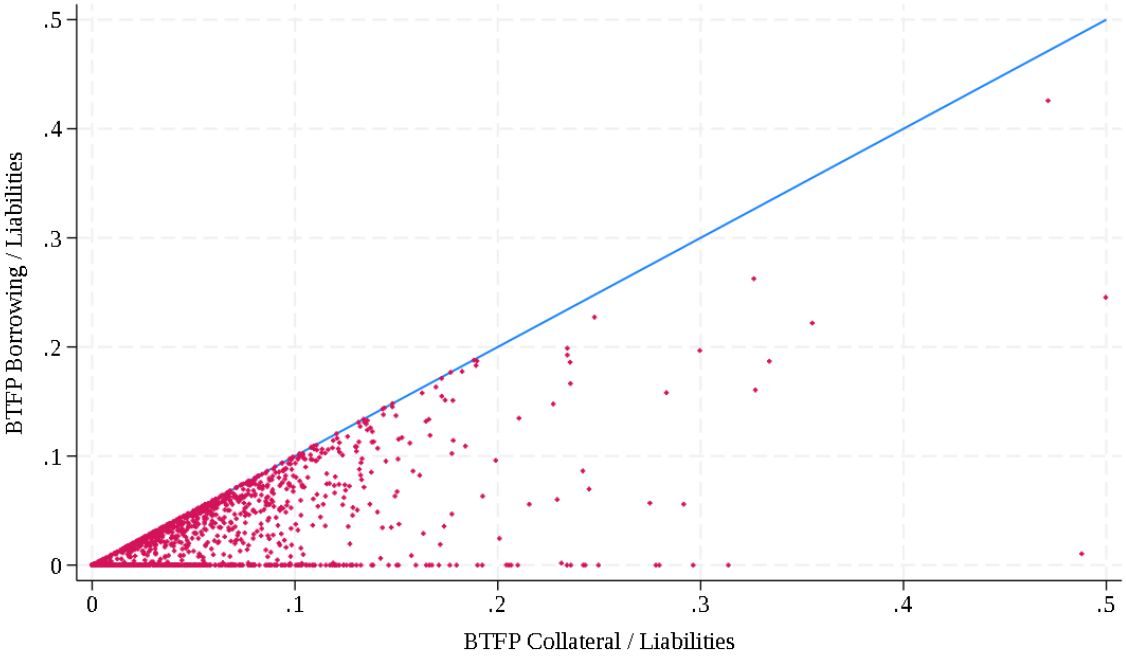
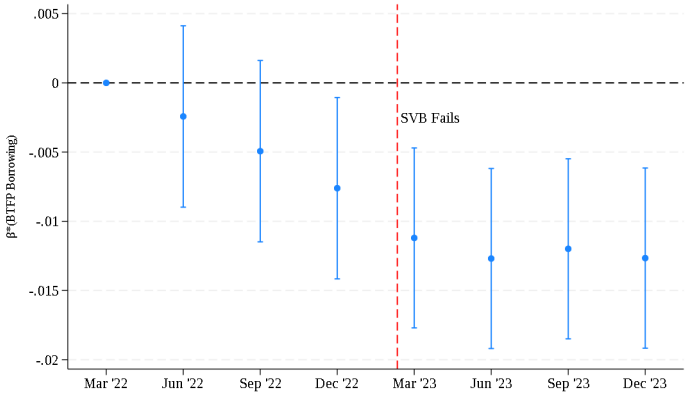
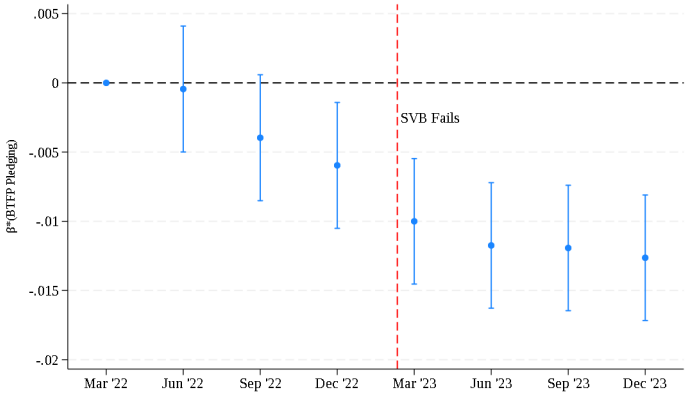


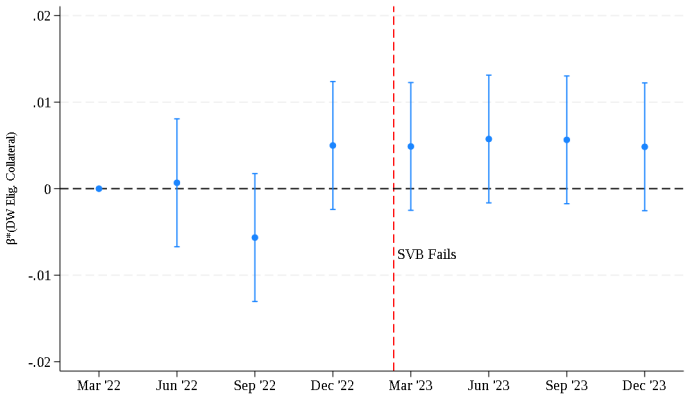
Figure 7: Uninsured Deposit Growth Differences Across Banks
This figure shows event study diff-in-diff plots using the continuous "treatment" variable indicated. Source: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository



(a) Estimated coefficient representing the sensitivity of quarterly change in ln(Uninsured Deposits) to normalized BTFP borrowing



(b) Estimated coefficient representing the sensitivity of quarterly change in ln(Uninsured Deposits) to normalized BTFP collateral value



(c) Estimated coefficient representing the sensitivity of quarterly change in ln(Uninsured Deposits) to normalized BTFP-eligible collateral pledged to the discount window

Figure 8: BTFP-Eligible Collateral Pledged to the Discount Window

This figure depicts an ordered scatterplot of banks' share of BTFP-eligible collateral pledged to the discount window as of 2022, based on par value.

Source: Discount Window Data Repository

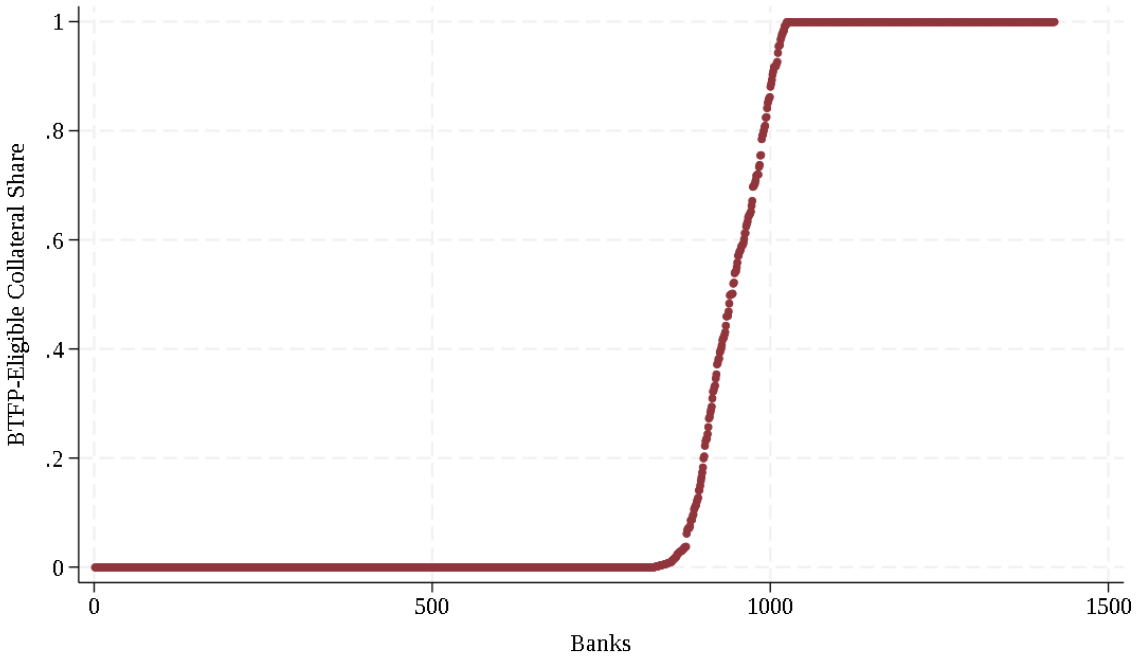


Table 1: BTFP Borrowing and Pledging Banks

This table reports the number of borrowers and collateral pledgers in panel A as of the indicated dates. In panel B, the table shows the mean, median, and interquartile range of bank pledging and borrowing amounts, measured as the maximum value between BTFP inception and September 30, 2023, normalized by year-end 2022 total liabilities. Sources: Call Report, BTFP Data Repository

Panel A: Number of Banks Pledging to and Borrowing from the BTFP

	BTFP Pledgers	BTFP Borrowers	Total Pledgers (Cumulative)	Total Borrowers (Cumulative)
Mar 31, 2023	497	258	498	294
Apr 30, 2023	705	405	726	481
May 31, 2023	930	583	955	693
Jun 30, 2023	1,049	655	1,106	813
Jul 31, 2023	1,119	699	1,183	883
Aug 31, 2023	1,167	720	1,245	949
Sep 30, 2023	1,213	729	1,297	998

Panel B: BTFP Pledging and Borrowing Amounts (% of Liabilities)

	Mean	25th Percentile	50th Percentile	75th Percentile
$\frac{Q3Max\{BTFPCollateral\}}{Liabilities_{2022}}$	6.2	2.3	4.8	8.5
$\frac{Q3Max\{BTFPBorrowing\}}{Liabilities_{2022}}$	3.2	0.0	2.0	5.0
$\frac{Q3Max\{BTFPBorrowing_{\|Borr>0\}}\}}{Liabilities_{2022}}$	4.2	1.1	3.2	6.0

Table 2: Changes in Funding Concentration and Number of Funding Sources
Panel A reports OLS results for a regression of the 2023 change in funding HHI on banks' maximum collateral pledge to the BTFP by Sep. 30, 2023. The HHI for alternative and contingency funding is measured as the sum of squared shares of federal funds purchased, repurchase agreements, subordinated debentures, trading liabilities, FHLB advances, other borrowed money (excluding FHLB advances and Fed borrowing), interbank deposits, and public deposits. Higher values indicate greater concentration. Panel B reports results from a linear probability model regressing a dummy indicating loss of at least one funding source during 2023 on banks' maximum collateral pledge to the BTFP by Sep. 30, 2023. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: HHI Changes (Dec '22 – Dec '23)

	DW Pledgers	DW Eligible	BTFP Pledgers
	Δ HHI	Δ HHI	Δ HHI
Pledged BTFP Collateral	0.53***	0.59***	0.35**
	(0.18)	(0.14)	(0.15)
N	1,378	2,848	1,280
Adj. R^2	0.01	0.01	0.00

Panel B: Fewer Private Funding Sources (Dec '22 – Dec '23)

	DW Pledgers	DW Eligible	BTFP Pledgers
	Δ Funding Sources < 0	Δ Funding Sources < 0	Δ Funding Sources < 0
Pledged BTFP Collateral	0.00*	0.01***	0.01***
	(0.00)	(0.00)	(0.00)
N	1,396	2,892	1,290
Adj. R^2	0.00	0.00	0.01

Table 3: Descriptive Statistics

This table reports bank-level descriptive statistics for measures of bank size, funding sources, liquid assets, and discount window activity. All data except the final two discount window test variables are reported as of 2022. The final two variables report summary statistics for a binary indicator of a discount window test in 2023 after the inception of the BTFP (unconditionally, and conditional on no tests between Q2 2022 and the start of the BTFP, respectively). A test loan is defined as a loan with a total value of no more than $2,500. Descriptive statistics are reported for three different samples of banks, as indicated: "DW Pledgers," defined as banks that had collateral pledged to the discount window as of Feb. 28, 2023; "DW Eligible" banks that had filed the Operating Circular #10 documentation by Feb. 28, 2023; and "BTFP Pledgers," defined as banks that had pledged any collateral to the BTFP by Sep. 30, 2023. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository..

	DW Pledgers (*N=1,422*)				DW Eligible (*N=2,971*)				BTFP Pledgers (*N=1,299*)			
	Mean	25th %ile	50th %ile	75th %ile	Mean	25th %ile	50th %ile	75th %ile	Mean	25th %ile	50th %ile	75th %ile
Assets ($ mil)	12591.2	358.1	822.7	2406.7	6425.9	201.3	442.4	1174.3	13391.8	266.2	591.7	1670.1
Liabilities ($ mil)	11359.2	324.8	743.3	2190.0	5799.1	181.8	402.2	1049.3	12037.6	242.2	538.9	1534.3
Uninsured Deposits (% of Assets)	28.3	18.1	28.0	37.7	27.4	17.2	27.2	37.2	29.3	19.6	29.0	38.5
Core Deposits (% of Assets)	77.7	72.8	80.1	86.0	79.1	74.6	81.6	86.7	80.2	75.4	81.9	87.1
Time Deposits (% of Assets)	16.2	7.9	13.2	21.1	17.1	9.2	14.5	22.3	15.5	8.4	13.6	20.0
Wholesale Funding (% of Assets)	7.8	0.7	5.0	11.2	6.4	0.0	3.5	9.4	6.7	0.6	4.4	10.2
Brokered Deposits (% of Assets)	3.4	0.0	0.0	3.9	2.6	0.0	0.0	2.6	2.4	0.0	0.0	2.6
Reciprocal Deposits (% of Assets)	2.2	0.0	0.0	2.5	1.9	0.0	0.0	1.5	2.1	0.0	0.0	2.1
Cash (% of Assets)	6.9	2.2	4.1	8.5	7.9	2.5	4.9	10.1	5.5	2.1	3.7	6.7
Securities (Amort. Cost, % of Assets)	25.1	12.9	22.3	35.6	25.8	12.8	23.5	36.4	30.4	17.8	28.0	40.5
DW Collateral (% of Liabs.)	8.7	0.8	3.0	10.6	4.2	0.0	0.0	2.8	5.7	0.0	0.6	5.2
DW Test post-BTFP (1/0)	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
DW Test post-BTFP | No Prior Test (1/0)	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0

Table 4: Uninsured and Core Deposit Changes

This table reports ordinary least squares and instrumental variables estimates of the effect of banks' BTFP access—measured using the value of collateral placed at the facility—on the change in uninsured deposits and core deposits, as indicated. Uninsured deposits are only reported by banks with total assets of at least $1 billion. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-eligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities. Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	Δ Uninsured Deps		Δ Core Deps	
	(OLS)	(IV)	(OLS)	(IV)
Pledged BTFP Collateral	-0.17***	0.03	-0.14***	-0.18
	(0.07)	(0.17)	(0.05)	(0.21)
N	620	620	1,396	1,396
Adj. R^2	0.01	–	0.00	–
First Stage F-stat	–	122.24	–	88.63

Panel B: Discount Window Eligible Sample

	Δ Uninsured Deps		Δ Core Deps	
	(OLS)	(IV)	(OLS)	(IV)
Pledged BTFP Collateral	-0.21***	-0.07	-0.18***	-0.15
	(0.07)	(0.18)	(0.04)	(0.20)
N	803	803	2,892	2,892
Adj. R^2	0.01	–	0.01	–
First Stage F-stat	–	142.74	–	140.06

Panel C: BTFP Pledgers Sample

	Δ Uninsured Deps		Δ Core Deps	
	(OLS)	(IV)	(OLS)	(IV)
Pledged BTFP Collateral	-0.15**	-0.04	-0.18***	0.13
	(0.07)	(0.18)	(0.04)	(0.15)
N	447	447	1,290	1,290
Adj. R^2	0.01	–	0.02	–
First Stage F-stat	–	92.96	–	93.47

Table 5: Instrument Determinants Regression Across Samples (Dec. 2022)
This table reports ordinary least squares regressions of our instrument—the BTFP-eligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities—on bank-level variables measured as of year-end 2022. This "determinants regression" is shown for three samples of banks as indicated in the column headers. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

	Instrument: $\frac{\text{BTFP-eligible DW Collateral}}{\text{Liabilities}}$		
	DW Pledging Banks	DW Eligible Banks	BTFP Pledging Banks
Leverage Ratio	-0.02	-0.01	-0.02
	(0.04)	(0.02)	(0.02)
FHLB Member	-1.12	-0.43	-0.52
	(0.94)	(0.34)	(0.67)
$\frac{\text{FHLB Advances}}{\text{Liabilities}}$	-0.07	-0.04	-0.00
	(0.07)	(0.03)	(0.08)
$\frac{\text{Time Deposits}}{\text{Liabilities}}$	0.02	0.01	-0.00
	(0.02)	(0.01)	(0.02)
$\frac{\text{Interbank Deposits}}{\text{Liabilities}}$	-0.10	-0.05	0.01
	(0.11)	(0.05)	(0.13)
$\frac{\text{Brokered Deposits}}{\text{Liabilities}}$	0.12	0.07	0.14
	(0.09)	(0.05)	(0.13)
$\frac{\text{Indiv. + Corp. Deposits}}{\text{Liabilities}}$	-0.08	-0.04	0.02
	(0.09)	(0.04)	(0.10)
$\frac{\text{Public Deposits}}{\text{Liabilities}}$	-0.10	-0.05	0.00
	(0.09)	(0.04)	(0.10)
$\frac{\text{Other Borr. (ex-FHLB)}}{\text{Liabilities}}$	-0.05	-0.04*	-0.06
	(0.04)	(0.02)	(0.07)
$\frac{\text{Wholesale Funding (ex-OBM)}}{\text{Liabilities}}$	-0.06	-0.03	-0.01
	(0.06)	(0.03)	(0.08)
$\frac{\text{Core Deposits}}{\text{Liabilities}}$	0.02	0.01	-0.01
	(0.05)	(0.02)	(0.04)
$\frac{\text{Unrealized Losses}}{\text{Assets}}$	0.01	0.02	0.03
	(0.03)	(0.02)	(0.03)
$\frac{\text{Treas. + MBS}}{\text{Securities}}$	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)
ln(Assets)	0.03	0.10**	0.13
	(0.09)	(0.05)	(0.09)
N	1,394	2,908	1,293
Adj. R^2	0.02	0.02	0.10

Table 6: First Stage Regression Results Across Samples
This table reports the first stage results from a regression of BTFP access—measured using the value of collateral placed at the facility—on our instrument—the BTFP-eligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities (see equation 3). The first stage results are shown for three samples of banks as indicated in the column headers. Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

	2^{nd} Stage Endog. Regressor: $\frac{Q3Max\{BTFPCollateral\}}{Liabilities_{2022}}$		
	DW Pledging Banks	DW Eligible Banks	BTFP Pledging Banks
$\frac{\text{BTFP-eligible DW Collateral}}{\text{Liabilities}}$	0.42***	0.44***	0.61***
	0.04	0.04	0.06
N	1,396	2,892	1,290
F-stat	88.63	140.06	93.47
R^2	0.06	0.05	0.07

Table 7: Changes in Funding Sources Following the BTFP

This table reports 2SLS estimates of the effect of BTFP access—measured using the value of collateral placed at the facility—on the change in several alternative and contingency funding sources from Dec. 31, 2022 to Dec. 31, 2023. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-eligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities. Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	-0.54***	-0.48***	-0.48***	-0.21**
	(0.14)	(0.14)	(0.11)	(0.09)
N	1,396	1,396	1,396	1,396
First Stage F-stat	88.63	88.63	88.63	88.63

Panel B: Discount Window Eligible Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	-0.50***	-0.41***	-0.40***	-0.11
	(0.13)	(0.12)	(0.09)	(0.08)
N	2,892	2,892	2,892	2,892
First Stage F-stat	140.06	140.06	140.06	140.06

Panel C: BTFP Pledgers Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	-0.84***	-0.59***	-0.63***	-0.05
	(0.12)	(0.11)	(0.09)	(0.06)
N	1,290	1,290	1,290	1,290
First Stage F-stat	93.47	93.47	93.47	93.47

Table 8: Changes in Liquid Assets Following the BTFP

This table reports 2SLS estimates of the effect of BTFP access—measured using the value of collateral placed at the facility—on the change in cash and securities (measured at amortized cost). The final column uses the sum of the absolute value of realized gains and losses during 2023, which is meant to proxy for the extent of securities sales. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-eligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities. Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	-0.33*	0.09	-0.42***	4.46
	(0.18)	(0.11)	(0.12)	(2.80)
N	1,396	1,396	1,396	1,368
First Stage F-stat	88.63	88.63	88.63	89.75

Panel B: Discount Window Eligible Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	-0.22	0.13	-0.35***	4.22**
	(0.15)	(0.10)	(0.10)	(1.79)
N	2,892	2,892	2,892	2,830
First Stage F-stat	140.06	140.06	140.06	140.23

Panel C: BTFP Pledgers Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	-0.20*	0.05	-0.25***	5.14**
	(0.11)	(0.08)	(0.08)	(2.53)
N	1,290	1,290	1,290	1,284
First Stage F-stat	93.47	93.47	93.47	94.29

Table 9: Changes in Discount Window Borrowing Preparation

This table reports 2SLS estimates and reduced-form estimates of the effect of BTFP access—measured using the value of collateral placed at the facility—on the incidence of discount window testing (columns 1 and 2) and the change in discount window collateral after accounting for collateral placed at the BTFP. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-eligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities ("BTFP-Eligible DW Collateral"). Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	P(DW Test post-BTFP) (%)		P(DW Test post-BTFP | no prior) (%)		Δ DW Collateral		Δ Inelig. DW Collateral	
	(IV)	(RF)	(IV)	(RF)	(IV)	(RF)	(IV)	(RF)
Pledged BTFP Collateral	-2.86***	–	-1.50**	–	-6.61***	–	-0.60	–
	(0.93)		(0.73)		(2.00)		(1.30)	
BTFP-Eligible DW Collateral	–	-1.19***	–	-0.62***	–	-2.75***	–	-0.40
		(0.26)		(0.15)		(0.43)		(1.09)
N	1,396	1,396	1,396	1,396	1,391	1,391	1,047	1,047
First Stage F-stat	88.63	–	88.63	–	89.00	–	153.83	–

Panel B: Discount Window Eligible Sample

	P(DW Test post-BTFP) (%)		P(DW Test post-BTFP | no prior) (%)		Δ DW Collateral		Δ Inelig. DW Collateral	
	(IV)	(RF)	(IV)	(RF)	(IV)	(RF)	(IV)	(RF)
Pledged BTFP Collateral	-1.24*	–	-0.80	–	-15.16***	–	-2.94**	–
	(0.70)		(0.58)		(3.09)		(1.53)	
BTFP-Eligible DW Collateral	–	-0.55***	–	-0.35***	–	-5.76***	–	-1.93*
		(0.13)		(0.09)		(1.04)		(1.05)
N	2,892	2,892	2,892	2,892	1,961	1,961	1,184	1,184
First Stage F-stat	140.06	–	140.06	–	76.16	–	165.57	–

Panel C: BTFP Pledgers Sample

	P(DW Test post-BTFP) (%)		P(DW Test post-BTFP | no prior) (%)		Δ DW Collateral		Δ Inelig. DW Collateral	
	(IV)	(RF)	(IV)	(RF)	(IV)	(RF)	(IV)	(RF)
Pledged BTFP Collateral	-1.24*	–	-0.80	–	-12.27***	–	-4.02***	–
	(0.66)		(0.54)		(1.96)		(1.61)	
BTFP-Eligible DW Collateral	–	-0.60***	–	-0.34***	–	-7.62***	–	-2.78***
		(0.19)		(0.13)		(1.92)		(1.01)
N	1,150	1,150	1,150	1,150	997	997	504	504
First Stage F-stat	94.77	–	94.77	–	97.10	–	100.93	–

Table 10: Changes in Funding Sources Following the BTFP Using a Placebo Instrument

This table reports 2SLS estimates of the effect of BTFP access—measured using the value of collateral placed at the facility—on the change in several alternative and contingency funding sources from Dec. 31, 2022 to Dec. 31, 2023. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-ineligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities. Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	0.96	-1.97	-1.62	-0.95
	(1.24)	(1.53)	(1.27)	(0.92)
N	1,396	1,396	1,396	1,396
First Stage F-stat	1.89	1.89	1.89	1.89

Panel B: Discount Window Eligible Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	-1.39	2.70	2.45	2.17
	(1.41)	(2.39)	(2.04)	(1.75)
N	2,892	2,892	2,892	2,892
First Stage F-stat	1.78	1.78	1.78	1.78

Panel C: BTFP Pledgers Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	8.53	-7.15	-3.67	-7.31
	(23.05)	(18.40)	(9.52)	(19.17)
N	1,290	1,290	1,290	1,290
First Stage F-stat	0.15	0.15	0.15	0.15

Table 11: Changes in Liquid Assets Following the BTFP Using a Placebo Instrument

This table reports 2SLS estimates of the effect of BTFP access—measured using the value of collateral placed at the facility—on the change in cash and securities (measured at amortized cost). The final column uses the sum of the absolute value of realized gains and losses during 2023, which is meant to proxy for the extent of securities sales. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-ineligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities. Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	-1.41	0.01	-1.43	-18.46
	(1.56)	(0.71)	(1.22)	(20.61)
N	1,396	1,396	1,396	1,368
First Stage F-stat	1.89	1.89	1.89	2.31

Panel B: Discount Window Eligible Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	2.85	0.63	2.23	33.07
	(2.44)	(0.96)	(1.90)	(34.13)
N	2,892	2,892	2,892	2,830
First Stage F-stat	1.78	1.78	1.78	1.29

Panel C: BTFP Pledgers Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	-9.84	-5.27	-4.58	-169.32
	(26.05)	(14.18)	(12.01)	(540.40)
N	1,290	1,290	1,290	1,284
First Stage F-stat	0.15	0.15	0.15	0.10

Table 12: Changes in Discount Window Borrowing Preparation Using a Placebo Instrument

This table reports 2SLS estimates and reduced-form estimates of the effect of BTFP access—measured using the value of collateral placed at the facility—on the incidence of discount window testing (columns 1 and 2) and the change in discount window collateral after accounting for collateral placed at the BTFP. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-ineligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities ("BTFP-Eligible DW Collateral"). Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	P(DW Test post-BTFP) (%)	P(DW Test post-BTFP | no prior) (%)	Δ DW Collateral	Δ Inelig. DW Collateral
Pledged BTFP Collateral	10.37	1.95	103.18	65.40
	(9.92)	(5.08)	(72.74)	(57.64)
N	1,396	1,396	1,391	1,047
First Stage F-stat	1.89	1.89	1.85	1.35

Panel B: Discount Window Eligible Sample

	P(DW Test post-BTFP) (%)	P(DW Test post-BTFP | no prior) (%)	Δ DW Collateral	Δ Inelig. DW Collateral
Pledged BTFP Collateral	17.10	9.65	109.38***	225.60
	(14.20)	(8.86)	(39.28)	(326.35)
N	2,892	2,892	1,961	1,184
First Stage F-stat	1.78	1.78	7.25	0.48

Panel C: BTFP Pledgers Sample

	P(DW Test post-BTFP) (%)	P(DW Test post-BTFP | no prior) (%)	Δ DW Collateral	Δ Inelig. DW Collateral
Pledged BTFP Collateral	-18.62	-9.02	727.84	329.28
	(42.80)	(22.54)	(2379.99)	(1382.66)
N	1,150	1,150	997	504
First Stage F-stat	0.20	0.20	0.09	0.06

Table 13: Changes in Funding Sources Following the BTFP (Dec. '22 – Dec. '24)

This table reports 2SLS estimates of the effect of BTFP access—measured using the value of collateral placed at the facility—on the change in several alternative and contingency funding sources from Dec. 31, 2022 to Dec. 31, 2024. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-eligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities. Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	-0.71***	-0.45***	-0.53***	-0.26*
	(0.20)	(0.17)	(0.14)	(0.14)
N	1,362	1,362	1,362	1,362
First Stage F-stat	90.42	90.42	90.42	90.42

Panel B: Discount Window Eligible Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	-0.73***	-0.37**	-0.44***	-0.14
	(0.20)	(0.15)	(0.13)	(0.12)
N	2,826	2,826	2,826	2,826
First Stage F-stat	144.68	144.68	144.68	144.68

Panel C: BTFP Pledgers Sample

	Δ Time Deposits	Δ Wholesale Funding	Δ Brokered Deposits	Δ Reciprocal Deposits
Pledged BTFP Collateral	-0.88***	-0.41***	-0.46***	-0.10
	(0.17)	(0.14)	(0.12)	(0.09)
N	1,264	1,264	1,264	1,264
First Stage F-stat	95.29	95.29	95.29	95.29

Table 14: Changes in Liquid Assets Following the BTFP (Dec. '22 – Dec. '24)
This table reports 2SLS estimates of the effect of BTFP access—measured using the value of collateral placed at the facility—on the change in cash and securities (measured at amortized cost). The final column uses the sum of the absolute value of realized gains and losses during 2023, which is meant to proxy for the extent of securities sales. The variable "Pledged BTFP Collateral" is measured as the maximum collateral pledge to the BTFP by Sep. 30, 2023, divided by 2022 year-end bank liabilities. We instrument for "Pledged BTFP Collateral" with the BTFP-eligible collateral posted to the discount window as of year-end 2022, normalized by total liabilities. Standard errors are reported in parentheses. Statistical significance: *** $p \leq 0.01$,** $p \leq 0.05$,* $p \leq 0.10$. Sources: FFIEC Call Reports, BTFP Data Repository, Discount Window Data Repository.

Panel A: Discount Window Pledgers Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	-0.64**	-0.08	-0.56**	4.24
	(0.31)	(0.15)	(0.23)	(2.90)
N	1,362	1,362	1,362	1,334
First Stage F-stat	90.42	90.42	90.42	91.57

Panel B: Discount Window Eligible Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	-0.47*	-0.01	-0.46***	4.11**
	(0.24)	(0.14)	(0.17)	(1.86)
N	2,826	2,826	2,826	2,765
First Stage F-stat	144.68	144.68	144.68	144.94

Panel C: BTFP Pledgers Sample

	Δ Cash & Securities	Δ Cash	Δ Securities	Σ|Realized Gain/Loss|
Pledged BTFP Collateral	-0.45***	-0.26***	-0.20*	4.98*
	(0.15)	(0.10)	(0.11)	(2.63)
N	1,264	1,264	1,264	1,258
First Stage F-stat	95.29	95.29	95.29	96.15