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BOOK VALUE RISK MANAGEMENT OF BANKS: LIMITED HEDGING, HTM ACCOUNTING, AND RISING INTEREST RATES

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ABSTRACT

We document that as interest rates rose in 2022, banks limited the impact on the accounting value of their assets but left most long-duration assets exposed to interest rate risk. Call report and SEC data show that only about 6% of U.S. banking assets were hedged with derivatives, and even the heaviest users hedged only a small share of their portfolios. Rather than hedge market-value risk, banks relied on held-to-maturity (HTM) accounting to shield book capital, reclassifying roughly $1 trillion of securities as HTM once rates began to rise. More vulnerable banks, especially those overseen by less stringent state regulators, were more likely to shift into HTM. We develop a simple model of how capital regulation, accounting rules, and bank incentives interact in determining whether banks hedge interest rate risk or recapitalize. Capital regulation can reduce run risk, particularly when equity holders are unwilling to hedge or raise new capital. HTM accounting can help well-capitalized banks avoid the costs of excessively tight capital requirements, but it can also enable weaker, moderately-capitalized, banks to window-dress capital ratios, leaving them susceptible to runs. Incorporating deposit franchise value into regulatory capital without considering run risk may further weaken the effectiveness of capital regulation. These findings carry important implications for regulatory capital accounting and risk-management practices across the banking sector.

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1. Introduction

The Federal Reserve's sharp interest rate hikes in 2022, undertaken to combat high inflation, led to significant declines in the value of long-duration assets held by banks. These losses exposed solvency run risks at hundreds of institutions and contributed to the collapses of Silicon Valley Bank (SVB) and First Republic, the largest U.S. bank failures since the Great Recession (Jiang et al., 2024). These events raised urgent questions about how banks manage interest rate risk and whether regulatory and accounting frameworks inadvertently discouraged appropriate hedging.

This paper uses the 2022 tightening episode as a lens to examine how banks responded to rising rates and managed their interest rate exposure. We present new evidence that, from a market value perspective, banks largely did not hedge the interest rate risk on their assets. Instead, they reduced the interest rate sensitivity of their book assets by reclassifying securities as held-to-maturity (HTM)—a strategy that shielded regulatory capital from mark-to-market losses. We then develop a model to analyze how accounting rules shape banks' incentives to hedge or recapitalize, and conclude with implications for the regulatory framework. [2]

We utilize three complementary data sources to illuminate the scale and significance of banks' hedging activities. The first source is SEC Edgar's 10K and 10Q filings for all publicly traded bank holding companies, covering 258 banks in 2022, including SVB and First Republic. Since hedging information is not consistently reported across banks, we manually collect and standardize the data. The second source is bank call report data, which includes FDIC-insured banks with assets exceeding $5 billion. These banks report the notional value of non-trading interest rate swaps, offering broad coverage of nearly 94% of all bank assets, including private banks, but is limited to swaps. Last, we gather asset duration information from 62 publicly traded banks that disclosed this data in their 2021 and 2022 10Ks. This allows us to assess banks' total exposure to interest rate risk, combining asset risk and derivative usage.

In the first part of the paper, we document very limited use of interest rate hedging by banks. This result indicates that even with derivatives, banks' total asset value was significantly exposed to interest rate risk at the end of 2021, just before the monetary tightening. In our most comprehensive sample, over three-quarters of reporting banks disclosed no material use of interest rate swaps at the end of 2021. Interest rate swap usage is concentrated among larger banks, which hedge only a small portion of their assets. While swap users represent about three-quarters of total bank assets, they hedge, on average, only 4% of their assets and about one-quarter of their securities. Similar results emerge from the 258 publicly traded (larger) banks, which also report the use of derivative instruments other than interest rate swaps to hedge interest rate risk. Over 60% of banks report no hedges. The largest banks

[2] While there is some literature examining banks' exposure to interest rate and credit risk, most of it focuses on periods prior to the 2022 monetary tightening and does not directly analyze how banks manage interest rate risk through accounting choices. See, for example, Begenau et al. (2015), Kelly et al. (2016), Drechsler et al. (2017, 2021), Egan et al. (2017), Atkeson et al. (2018), Begenau and Stafford (2019), and Xiao (2020).

that do hedge cover only about 9% of their assets and less than one-third of their securities. Overall, the largest banks hedge the most, but the majority of their interest rate risk remains unhedged.

We confirm that banks' assets are significantly exposed to interest rate risk, even after accounting for hedging strategies, using data from 62 banks that disclose the duration of their total assets, including derivatives. They report an average duration of 4.6. Thus, a two-percentage point increase in the 10-year Treasury yield—similar to what was observed during our sample period—would imply a 9.2% loss in asset value. Applied across the entire banking sector, with total assets of $24 trillion, this equates to approximately $2 trillion in losses. These estimates align closely with those calculated by Jiang et al. (2024), indicating that hedging strategies and interest rate derivatives were largely insufficient to offset the majority of these losses.

One possibility is that hedging is limited because it is primarily employed by banks that are most vulnerable—those particularly exposed to asset declines or susceptible to bank runs. We find little evidence that the banks most vulnerable to asset declines or solvency runs were more likely to hedge interest rate risk before the 2022 monetary tightening. Although these riskier banks were somewhat more likely to use interest rate swaps, the amounts were minimal. In fact, using more comprehensive hedging data from 10-K filings, we find that riskier banks, if anything, hedged less than their peers before the tightening. Overall, banks at higher risk, such as SVB, hedged their interest rate risk to a similar extent as other banks prior to the rate increases.

Another potential reason for limited hedging is that banks hedge minimally on average but tend to increase their hedging activities as risks escalate. We find the opposite: riskier banks actually reduced their hedging activity during the period of monetary tightening. A case study of the failed Silicon Valley Bank (SVB) illustrates this pattern—at the end of 2021, SVB hedged roughly 12% of its securities portfolio; by the end of 2022, that figure had fallen to just 0.4%. We speculate that some vulnerable banks deviated from standard risk management practices in a "gamble for resurrection". As interest rates rose, selling profitable hedges allowed weaker banks to bet that interest rate would soon start declining—a risk that could benefit the bank if interest rates dropped but could ultimately translate into losses borne by the FDIC if interest rates continued to climb. This behavior is consistent with a "gambling for resurrection" strategy, which prioritized short-term gains at the expense of long-term financial stability.

Finally, banks may have chosen not to hedge in anticipation of being able to recapitalize ex post once interest rates rose sufficiently. However, we find little evidence of such recapitalizations during the period of rising rates.

In the second part of the paper, we demonstrate that banks used accounting treatments to shield the book value of their assets from interest rate fluctuations. In other words, while banks did little to hedge the market value of their assets, they significantly reduced the sensitivity of their book asset values to interest rate risk. Because certain explicit and implicit capital requirements are tied to banks' book values, the discretion to classify assets strategically can weaken incentives to hedge interest rate risk.

Banks can classify securities on their balance sheets as either Available-for-Sale (AFS) or Held-to-Maturity (HTM). The book value of AFS securities must reflect their market value, meaning any decline in market value due to rising interest rates is also reflected in their book value. By classifying securities as HTM, banks declare both the ability and intent to hold them until maturity. This classification allows banks to avoid reporting unrealized mark-to-market losses on their balance sheets and comprehensive income statements.

We document that banks made extensive use of HTM accounting before monetary tightening and increased its use as interest rates began to rise. By early 2022, approximately one-third of the $6 trillion in securities held by commercial banks were valued using HTM accounting. During 2021 and 2022, banks transferred nearly $1 trillion of their AFS securities to HTM. By the end of 2022, the share of securities valued using HTM rose to 45%, or $2.75 trillion. Our estimates suggest that U.S. banks avoided recognizing $175 billion in losses during subsequent quarters through these reclassifications. Rather than hedging against interest rate risk affecting the market value of their assets, banks focused on shielding the book value of their assets and their statements of comprehensive income from the impact of declining market prices.

These reclassifications enabled many banks to shield their regulatory capital from the impact of rising interest rates. For example, large banks subject to "advanced approaches" capital rules—and any bank seeking access to FHLB funding—faced requirements that did not exclude unrealized losses on AFS securities from capital calculations. More broadly, Gopalan and Granja (2023) show that supervisors treated unrealized losses on AFS and HTM securities differently when assessing the need for corrective action, suggesting that banks had incentives to reclassify assets to avoid supervisory scrutiny and intervention.

Consistent with these incentives, we find that the least healthy and most financially fragile banks were more likely to reclassify securities to HTM. Banks with lower capital ratios, a higher share of run-prone uninsured deposits, and longer-duration securities were particularly inclined to reclassify securities from AFS to HTM during 2021 and 2022. For example, only 1% of banks reclassified securities if uninsured deposits made up less than 20% of their total funding, whereas over 10% of banks with uninsured deposits exceeding half of their funding did so. This suggests that banks more exposed to asset value declines and with more fragile funding structures used HTM reclassification to obscure losses from rising interest rates.

One pertinent question is why fragile banks were allowed to use the HTM reclassification, which requires that banks be able to hold these securities until maturity. While a full analysis of this issue is beyond the scope of this paper, we provide suggestive evidence that regulatory scrutiny, rather than auditor oversight, plays a significant role. Banks audited by Big-4 firms were not significantly less likely to reclassify securities. However, banks regulated solely by national authorities were less likely to reclassify securities compared to those also overseen by state banking departments, even after controlling for size and other factors. This aligns with prior research (Agarwal et al., 2014; Granja and Leuz, 2023), which finds that state regulators tend to enforce rules less rigorously than their federal counterparts. These findings suggest that stricter regulatory oversight may lead to more consistent

enforcement of HTM accounting rules, potentially preventing banks from using this classification to obscure their true financial condition.[3]

Overall, our empirical findings indicate that banks did not hedge most of their interest rate exposure in terms of market value. Instead, they relied on HTM accounting and reclassification rules to protect the book value and regulatory capital of their assets as interest rates rose, thereby mitigating the impact of capital requirements.

To explore this further, we develop a simple stylized framework to interpret our findings. We extend the solvency-based bank run model of Jiang et al. (2024) by incorporating capital requirements and allowing shareholders to hedge interest rate risk. This extension allows us to explore how accounting rules impact the effectiveness of capital regulations when risk-free interest rates rise. Our analysis explores the conditions under which bank solvency runs may occur and evaluates the incentives for bank owners to hedge interest rate risk or raise additional capital. In doing so, we highlight how capital raising incentives—and capital regulation—interact with banks' hedging strategies and HTM accounting decisions.

Our model offers several insights. First, we show that limited liability and external financing frictions can discourage bank equity holders from eliminating run risk by hedging interest rate exposure ex-ante or recapitalizing ex-post—even when the bank's equity is positive in the good equilibrium (e.g., due to a valuable deposit franchise). In this sense, banks engage in a "gambling for resurrection" strategy —underinsuring their assets or avoiding raising substantial capital, hoping the run equilibrium does not occur. This behavior aligns with our empirical findings, which show that banks did not insure a significant portion of their interest rate risk exposure.

Second, the model highlights the trade-off in how unrealized losses are treated in regulatory capital across the cross-section of banks. When such losses are recognized—as under AFS accounting—capital requirements can become overly binding for otherwise "strong" banks, that is, those with high asset values in the absence of runs. These banks may hedge or recapitalize beyond what is necessary to prevent runs, thereby incurring deadweight costs. The HTM accounting treatment thus allows them to satisfy capital requirements at a lower cost when those requirements are excessively stringent, without weakening their hedging or recapitalization incentives to prevent bank runs. On the other spectrum, the weakest banks—those with sufficiently low equity values in the high–interest-rate state in the absence of run—do not hedge or recapitalize under either AFS or HTM accounting. For these banks, incurring hedging, recapitalization, or accounting reclassification costs is not optimal given a limited benefit of averting runs or regulatory closure.

The most significant changes occur among moderately capitalized banks. When these banks perceive the probability of a run to be relatively low, the availability of HTM can erode their hedging incentives

[3] Hedging HTM securities requires banks to recognize changes in the value of these assets (held at cost) and report the effects on the income statement, which may reduce the incentive to hedge. These accounting disincentives do not apply to AFS securities, where mark-to-market adjustments are already recognized. A back-of-the-envelope calculation suggests that hedge accounting standards for fixed-rate instruments were unlikely to materially constrain most banks' decisions to hedge interest rate risk.

by offering a cheaper alternative to satisfy regulatory thresholds. Such banks can engage in "window dressing" by designating assets as HTM to meet capital requirements while avoiding costly hedging, thereby remaining exposed to runs. Conversely, for moderately capitalized banks that perceive a high probability of runs and face low reclassification costs, HTM can strengthen hedging incentives by allowing them to meet regulatory capital standards at lower cost while simultaneously mitigating run risk.

Empirically, the combination of limited hedging, minimal recapitalization, and extensive HTM use among weaker institutions we document is consistent with HTM accounting being mainly used for "full window dressing" rather than a stabilizing mechanism. Interpreted through the lens of our model, this pattern suggests that many U.S. banks are moderately capitalized and perceive run risk as relatively low—conditions under which HTM accounting weakens hedging incentives by offering a less costly way to meet regulatory requirements.

Last, our framework also suggests that including the deposit franchise value (in the absence of a run) in regulatory capital calculations can weaken the effectiveness of capital regulation in incentivizing banks to prevent run risk and insolvency. Given that uninsured deposits are particularly vulnerable to runs, the regulatory capital condition could incorporate the solvency run threshold proposed by Jiang et al. (2024), ensuring that banks have sufficient capital to withstand runs by uninsured depositors.

Related Literature:

Our paper is related to a vast literature on bank risk and specifically their interest rate risk management practices that we cannot fully cover here. Within this literature, Begenau et al. (2015), Kelly et al. (2016), Drechsler et al. (2017, 2021), Egan et al. (2017), Atkeson et al. (2018), Begenau and Stafford (2019), and Xiao (2020) provide recent assessments of U.S. banks' exposure to credit and interest rate risk in periods preceding the 2022 monetary tightening episode we focus on. We differ from this literature in several ways.

First, this prior literature did not focus explicitly on the solvency run risk. For example, Drechsler et al. (2021) argue that despite maturity mismatches, banks do not face significant interest rate risk. They contend that the deposit franchise largely insulates banks by offsetting rate-induced declines in the market value of their assets. However, as Jiang et al. (2024) demonstrate, this reasoning overlooks the possibility of depositor runs triggered by rising interest rates. Such runs can rapidly erode the value of the deposit franchise and precipitate bank failures, as seen in the collapses of Silicon Valley Bank and First Republic. This perspective underscores that hedging can be valuable even in cases where the no-run equilibrium alone would suggest otherwise. In this sense, Drechsler et al. (2021) provide a partial view of interest rate risk, since their analysis focuses only on the favorable no-run equilibrium. Their conclusions, therefore, are likely to understate both the true extent of interest rate risk banks are exposed to and the benefits of formal hedging.

By contrast, we differ from this literature by providing a framework that analyzes the impact of capital requirement accounting—specifically the treatment of HTM versus AFS securities—within a bank run setting. From a modeling perspective, our paper is most closely related to Jiang et al. (2024). We extend

their self-fulfilling solvency bank run model by incorporating capital requirements and allowing shareholders to hedge interest rate risks. This enables us to explore the potential for solvency runs and assess owners' incentives to hedge interest rate risks or raise capital, while highlighting the interaction between capital regulation and HTM accounting decisions. In doing so, we contribute to the literature on deposit franchise market power in the deposit market.[4] We specifically examine how existing accounting standards for capital requirements shape the incentives to hedge when the deposit franchise itself is fragile.

In this sense, the paper is also related to a theoretical literature that studies the optimal design of prudential regulations and accounting standards (e.g., Bertomeu, Mahieux, and Sapra 2023; Kostić, Laux, and Muthsam 2024). Unlike these papers, we do not study optimal ex-ante regulation and standard setting. Instead, we focus on how the interaction of existing capital rules and accounting standards affects banks' hedging and recapitalization incentives during episodes of monetary tightening. Our model adds to this literature by suggesting that banks with greater exposure to interest rate risk and weaker deposit franchises are more likely to use the discretion in accounting valuation models to reclassify assets to HTM.

Second, a significant portion of prior research in this domain has concentrated on periods characterized by relatively low and stable interest rates. In contrast, we focus on a period marked by a substantial increase in interest rates and study the adjustment of banks' practices to these increases. In a recent work, McPhail et al. (2023) also uses confidential regulatory data and confirms our findings that interest rate swap positions are not economically significant in hedging the interest rate risk of bank assets. Importantly, we show that although economic hedging is minimal, the "hedging" of accounting interest rate risk is substantial. Fuster, Paligorova, and Vickery use confidential supervisory bank data and confirms our findings that the U.S. banks facing rising rates in 2022–23 largely avoided expanding hedging, and instead managed the interest-rate sensitivity of their regulatory capital by classifying the riskiest bonds as held-to-maturity.

Our paper also relates to a broader accounting literature that empirically examines how the valuation of securities under accounting rules interacts with capital regulation. This literature overwhelmingly finds that banks exploit the discretion in the accounting rules governing the valuation of securities to bolster their regulatory prudential ratios. Chircop and Nowotny-Farkas (2016) and Kim, Kim, and Ryan (2019) show that the Basel III requirement to include unrealized gains and losses on AFS securities in regulatory capital prompted banks to reclassify investment securities as HTM. Kim, Kim, and Ryan (2025) further show that certain banks reversed this classification in response to the tailoring rules that reinstated their eligibility to apply the prudential filter. Bischof, Brüggemann, and Daske (2023) find that banks with tighter capital ratios take advantage of a post-crisis change in international accounting standards that permitted reclassification from fair-value to amortized cost.[5] Finally,

[4] See, for example, Hannan and Berger (1991); Neumark and Sharpe (1992); Drechsler et al. (2017); Egan et al. (2017); Xiao (2020), Drechsler et al. (2021), and Egan et al. (2022).

[5] The paper also speaks to a literature that examines the implications of unrealized losses on AFS and HTM securities on the supply of bank credit (e.g., Greenwald et al. (2024); De Vito et al. (2025); Xie (2016).

Bischof, Laux, and Leuz (2021) find that prudential filters dampen banks' incentives to take timely corrective action following fair value losses. Our paper confirms the above findings and further shows that banks with more fragile funding structures and greater interest rate risk exposure are more likely to reclassify securities as HTM. As suggested by Bischof, Laux, and Leuz (2021), these findings may be problematic, as the banks that are less resilient and more prone to self-fulfilling solvency runs are the ones most likely to use the HTM classification.

Finally, our work is also related to emerging body of work that addresses the 2023 regional banking crisis. In addition to the study by Jiang et al. (2024), other papers in this literature include, among others, the contributions by Amador and Bianchi (2024), Acharya et al. (2024), Cookson et al. (2023), Drechsler et al. (2023), Haddad et al. (2023), Flannery and Sorescu (2023), Gopalan and Granja (2023), Koont et al. (2023), Kim, Kim, and Ryan (2025), and Jiang et al. (2025).

2. Institutional Background:

Here, we provide an overview of bank and regulatory accounting for securities and derivatives. We explain why the book values of bank assets may not reflect their market values when these are held to maturity. We then discuss how differences between the accounting for securities under financial reporting rules and regulatory rules affect the computation of capital ratios that determine capital requirements. Finally, we describe the accounting treatment of banks' derivative positions and we discuss how it interacts with the rules governing the valuation of the underlying securities.

2.1. Accounting for Marketable Securities and Capital Requirements

The rules governing the classification and valuation of debt securities allow management to classify them based on intent and ability to hold the security. Available for sale ("AFS") securities may be sold at the bank's discretion, and their book value is marked to market (fair value), with unrealized gains and losses reported in "other comprehensive income." Held to Maturity ("HTM") securities are designated to be held to maturity, with the bank declaring the intent and ability to collect their contractual cash flows. HTM securities are carried at amortized cost, with differences between cost and fair value disclosed in the footnotes.[6] Thus, for financial reporting purposes, unrealized losses on AFS and HTM securities have a different impact of banks' book value of equity.

The Basel III capital rules that were in place during our sample period allowed most U.S. banks to apply a filter that excluded the unrealized gains and losses on AFS securities that banks carried on their accumulated other comprehensive income (AOCI) from the computation of regulatory capital. As a result of using this filter, unrealized gains and losses on AFS and on HTM securities did not affect regulatory capital. Nearly all eligible banks elected to use this filter. The only institutions without this option were large, internationally active banks with total consolidated assets exceeding $700 billion or with more than $75 billion in foreign exposures. These banks were required to use the "advanced

[6] Debt securities can also be classified as trading securities. In this classification, unrealized gains and losses on these securities impact banks' net income. Laux and Leuz (2010) show that this classification is mostly relevant for large investment banks, such as Goldman Sachs, Morgan Stanley, or Credit Suisse.

approaches" framework under the U.S. implementation of the Basel III capital rules. In total, nine bank holding companies were subject to the advanced approaches framework: JP Morgan Chase, Bank of America, Citigroup, Wells Fargo, Goldman Sachs, Morgan Stanley, BNY Mellon, State Street, and Northern Trust.

These banks were not allowed to use the AOCI filter, so their Basel III capital requirements were not shielded from unrealized losses in AFS securities. This differential treatment of AFS and HTM securities potentially created incentives to reclassify assets from AFS to HTM. For a comprehensive assessment of these incentives, we refer to Kim, Kim, and Ryan (2019, 2025), who examine how the removal of the AOCI filter affected banks' securities portfolios, their hedging strategies, and their use of the HTM classification. Here, we simply note that during our sample period, six out of the nine advanced approaches banks (about 66%) reclassified securities to HTM, compared with approximately 5% of the remaining non-advanced approaches banks (226 out of 5,108 banks), which further supports the idea that advanced approaches banks had significant incentives to insulated their regulatory capital ratios from interest rate risk as interest rates increased during the monetary tightening period.

We note, however, that the advanced approaches banks under the U.S. implementation of the Basel III capital rules were not the only banks that were subject to capital requirements based on capital ratios that treated unrealized losses on AFS and HTM differently. In particular, the Federal Housing Finance Agency (FHFA) requires banks to maintain positive tangible equity capital to access Federal Home Loan Banks (FHLBs) advances. These FHLB advances are an important and relatively inexpensive source of liquidity, with interest rates tied to the FHLB's funding costs plus a small spread. Because the FHLBs benefit from an implicit government guarantee, their funding is relatively cheap, making advances a widely used tool for quick and short-term bank liquidity (e.g., Ashcraft, Bech, and Frame, 2010; Cecchetti, Schoenholtz, and White, 2023). As a result, between the beginning of 2021 and the second quarter of 2023, about 75% of banks in our sample obtained FHLB advances, borrowing on average 3.3% of their total assets. During the monetary tightening period, total FLHB advances ballooned from $391 billion in March 2021 to approximately $1,045 billion in the first quarter of 2023 (Cecchetti, Schoenholtz, and White, 2023), consistent with the characterization of the FHLB system as a lender-of-next-to-last-resort for commercial banks (Ashcraft, 2010).

Importantly, to access this form of short-term liquidity, banks must maintain positive tangible equity capital. As specified in 12 CFR 1266.4 (b)(1): "A Federal Home Loan Bank shall not make a new advance to a member without positive tangible capital unless the member's appropriate federal banking agency or insurer requests in writing that the Bank make such advance." Because the calculation of tangible owner's equity includes unrealized losses on AFS securities but not unrealized losses on HTM securities, FHLB-member banks nearing minimum capital thresholds have incentives to reclassify securities from AFS to HTM to limit further erosion of tangible equity and preserve access to FHLB funding. These incentives to maintain access to FHLB funding might help explain why 226 non-advanced approaches banks reclassified securities from AFS to HTM during our sample period despite having the AOCI filter. We empirically investigate these incentives in Section 5.

Moreover, if supervisors implicitly treated unrealized losses in AFS and HTM securities differently for the purpose of determining supervisory ratings and enforcement actions as discussed in Gopalan and Granja (2023), banks would also have incentives to reclassify securities from AFS to HTM.

Finally, we note that under U.S. GAAP, banks disclose the fair value of HTM securities in the notes to the financial statements (10-Q/10-K). Thus, unrealized losses on HTM portfolios were publicly observable even though they did not flow through income, AOCI (for non-advanced-approaches banks applying the AOCI filter), or risk-based capital ratios. Our analysis does not depend on opacity about losses. Instead, it emphasizes that the HTM/AFS distinction reallocates the same economic losses across ***reporting locations*** that do—or do not—affect binding constraints (regulatory capital ratios, internal risk limits, and access screens such as FHLB tangible equity). This difference in ***where*** the loss is recognized changes hedge/reclassify/recapitalize incentives even when users can infer the fair-value shortfall from the footnotes.

2.2. Accounting for Hedges

When derivative instruments are recorded in banks' balance sheets without a designated hedging relationship, they are measure at fair value, with unrealized gains and losses on these positions recognized in income. But if a derivative is effective in hedging a risk exposure, management can elect to use "hedge accounting". The purpose of hedge accounting is to reduce earnings volatility by allowing companies to offset the effects of the derivative and the exposure it is intended to hedge. The main types of risks that qualify for hedge accounting are fair value risks, such as exposures to changes in the fair value of existing assets or liabilities, and cash flow risks such as exposure to variability in the cash flows of an asset or liability. Broadly, interest rate swaps are classified as fair value hedges, which means that offsetting gains and losses (on both the derivative and hedged item) are recognized in earnings.

A difficult issue for hedge accounting arises in the treatment of debt securities classified as HTM. The main purpose of hedge accounting is to curb earnings volatility. However, while HTM securities are economically exposed to interest rate risk, their reported book values are not. As a result, an interest rate swap hedging an HTM security cannot offset the earnings impact of the hedged item, since the latter does not affect earnings. Consistent with this logic, the U.S. GAAP prohibits hedges of interest rate risk for HTM securities from qualifying for hedge accounting (ASC 815-20-25-43(c)(2)). This accounting treatment weakens banks' incentives to hedge HTM securities when holding an interest rate swap without a designated hedge would materially increase earnings volatility. In later sections, we empirically evaluate if banks' use of HTM during the monetary tightening period affected their hedging strategies.

3. Data, Sample, and Measurement

3.1. Hedging Activities

We use multiple data sources to study the scale and importance of banks' hedging activity. First, we use bank Call Report data to analyze interest rate swap activity. Banks with total assets over $5 billion are required to report, in Schedule RC-L, the notional amounts of interest rate swaps held for *non-*

trading purposes, including a breakdown of positions where the bank pays a fixed rate.[7] This reporting structure allows us to directly observe the direction of swap contracts—specifically, positions in which banks pay fixed and receive floating rates, a common hedging arrangement. Additionally, some banks below the $5 billion threshold either report these positions voluntarily or are required to do so by their primary federal regulator. In total, there are 1,271 banks reporting interest rate swaps. Table 1 shows that the group of banks reporting the notional value of their interest rate swaps comprise about 95% of the total assets in the banking system.

We collect additional information from 10-K and 10-Q filings submitted to the Securities and Exchange Commission (SEC) by publicly traded bank holding companies for fiscal years ending in 2021 and 2022, and link these filings to call report data using the CRSP–FRB link table provided by the Federal Reserve Bank of New York. An important contribution of this effort is a novel panel on the effective average duration of banks' investment securities portfolios—information not available in call reports and therefore unique to the SEC filings. We hand-collect year-end 2021 and 2022 values, which are typically disclosed in the "Management's Discussion and Analysis" section of the 10-K. Because reporting practices vary across institutions, we also search the full text of each filing to identify duration disclosures and ensure consistency across banks. The resulting measures provide a direct gauge of banks' interest rate risk exposure and play a central role in our analysis of hedging effectiveness and balance sheet sensitivity.

We also extract the notional value of derivatives designated as hedging instruments—including interest rate swaps, futures, forwards, and options—from the notes to consolidated financial statements. This exercise extends the call-report-based measures and allows us to benchmark results across multiple sources. However, disclosures of hedging instruments in SEC filings are highly heterogeneous and often incomplete, making this sample inherently noisy. For this reason, we construct hedging ratios from 10-K/10-Q data as supplementary evidence and present them as robustness checks in the Appendix, rather than as the main specification.

As shown in Figure A1, both the call report and SEC-based data cover the largest banks across the size distribution. All banks with assets above $5 billion are subject to the disclosure requirements underlying the call report, while the largest U.S. bank holding companies are publicly traded, meaning the SEC filings capture a substantial share of total banking system assets.

3.2. **Reclassification of AFS Securities to HTM**

We obtain information about the total amortized cost and fair value of securities classified as HTM or AFS as well as other variables used in the empirical analysis from the call reports filed by all U.S. banks at the end of each quarter. To measure the reclassification of securities from AFS to HTM, we begin by hand-collecting information about these reclassifications from the 10-K and 10-Q filings

[7] In Schedule RC-L, there is a category called, "total gross notional amount of derivative contracts held for purposes other than trading." The specific item under this category we are using is "RCON/RCFD A589," called "interest rate swaps where the bank has agreed to pay a fixed rate."

submitted to the Securities and Exchange Commission (SEC) and to the FDIC by large publicly traded bank holding companies and commercial banks that are registered with the SEC. For the large majority of private banks that are not registered with the SEC, call reports do not directly provide information concerning these reclassifications or the amounts involved. Nevertheless, the call reports provide a set of variables that, taken together, allow us to infer when such reclassifications occurred and to determine reasonable estimates of their magnitude.

Specifically, we identify reclassifications of AFS securities into the HTM portfolio for non-SEC registered banks using two supplemental sets of criteria. First, we define a reclassification quarter if all of the following conditions are met: (i) an increase in the amortized cost of HTM securities that exceeds 15% of the sum of the total amortized cost of AFS and HTM securities in the previous quarter, (ii) an increase in the sum of the amortized costs of HTM securities and AFS securities of no more than 7.5% of the sum of the total amortized cost of AFS and HTM securities in the previous quarter, and (iii) a non-zero change in the absolute value of the net unrealized gains or losses on HTM securities reported in AOCI. The first two conditions ((i) and (ii)) indicate a transfer of securities, since they imply a substantial increase in HTM balances that is at least partly offset by a decline in AFS balances. The third condition is critical because it we want to exclude cases in which AFS securities mature and new HTM are purchased. The third condition (iii) reflects changes in the unamortized unrealized gains and losses that existed at the date of transfer of a debt security from HTM into AFS, which together with offsetting changes in the carrying value of AFS and HTM securities is a very strong indicator of reclassification.

A limitation of the previous set of criteria is that they may exclude some reclassifications that are sizable but fall short of 15% of the total amortized cost of AFS and HTM securities in the previous quarter. Therefore, we introduce a supplemental set of criteria, defining a reclassification quarter if the following conditions are met: (i) an increase in the amortized cost of HTM securities that exceeds 5% of the sum of the total amortized cost of AFS and HTM securities in the previous quarter, (ii) an increase in the sum of the amortized costs of HTM securities and AFS securities of no more than 2.5% of the sum of the total amortized cost of AFS and HTM securities in the previous quarter, and (iii) an absolute change in the absolute value of the net unrealized gains or losses on HTM securities reported in AOCI that exceeds 0.25% the sum of the total amortized cost of AFS and HTM securities in the previous quarter. In this supplemental set of criteria, we allow smaller reallocations between AFS and HTM, provided they are accompanied by a more substantial change in the unamortized unrealized gains and losses on HTM securities that are included in AOCI. Applying these criteria identifies sixteen reclassification quarters that are not captured by the first set of criteria.

Finally, we manually inspected the AFS and HTM portfolios of all banks in the United States to identify possible reclassifications missed by the above procedures. In rare cases where we observed a significant increase in HTM balances and a corresponding decline in AFS balances that was not flagged by our procedure, we searched for the banks' annual reports in the company websites. This search revealed 10 additional cases of private banks or Pink Sheet-listed banks that disclosed reclassifications during 2021 and 2022. We also identified nine quarters in which conditions (i) and (ii) were met, but the change in the net unrealized losses of HTM securities occurred only in the following quarter or at

year-end. We interpret these cases as likely instances of inadvertent misreporting by smaller banks that corrected their filings later in the year possibly when their financial statements were audited.

We measure the aggregate dollar amount of securities reclassified from AFS to HTM for all identified reclassification quarters. For the hand-collected sample, we use the amounts disclosed in the statement of cash flow or the notes to the consolidated financial statements in SEC filings. For the other cases, we impute the reclassification amount as the increase in the amortized cost of HTM securities during the quarter. This imputed measure may contain some noise, since we do not observe redemptions or new purchases of existing HTM debt securities and, thus cannot perfectly isolate the reclassification amounts. In the Internet Appendix, we report an evaluation of our imputed measure's accuracy by comparing the reclassification amount under our imputation procedure against the actual reclassification amount in the hand-collected sample. The analysis shows that any measurement error is relatively small and not systematically biased.

In the same Internet Appendix section, we also conduct additional empirical exercises that assess robustness to alternative sets of reclassification criteria. Specifically, we replicate our main empirical tests using (i) only the hand-collected data set, (ii) the hand-collected data set plus reclassifications identified under the first set of criteria, and (iii) the hand-collected data set plus the reclassifications identified under our second set of criteria. Our main results are robust across all these alternative procedures. Finally, in the Internet Appendix, we also describe the procedure that we use to estimate the amount of accounting losses that banks avoided recognizing in their balance sheets and statements of comprehensive income through reclassification to HTM.

4. Banks' Use of Interest Rate Hedging prior to Monetary Tightening

4.1 Descriptive Evidence

We begin our empirical analysis by providing basic descriptive statistics about banks' use of interest rate hedges. In Table 1 and Figure 1, we show that few banks hedged their interest rate exposure prior to the monetary tightening. Only 290 of 1,271 banks report using interest rate swaps for non-trading purposes. Therefore, over three quarters of all reporting banks report no use of interest rate swaps. The predominant users of swaps are large banks, which also represent the majority of assets held at U.S. banks. Banks representing $17 trillion or 77% of all assets in the U.S. banking system report some use of interest rate swaps. But the notional amount of the interest rate swaps held by these banks represent, on average, only about four percent of their assets. Overall, about 94% of aggregate assets in the U.S. banking system are not hedged by interest rate swaps (Figure 1A). By contrast, Jiang et al. (2024) show that more than 70% of bank assets were exposed to interest rate risk over this time period. Even if we ignore loans and restrict our attention to securities, we find that the interest rate swaps of these banks cover, on average, only between one fifth to one fourth of the decline in the value of their securities. In sum, the extent of hedging seems insufficient to significantly protect banks' balance sheets against the rise of interest rates.

Banks use derivative instruments other than interest rate swaps to hedge interest rate risk. In Table 1 and Figure 1B, we use information obtained from voluntary disclosures in 10-Ks and 10-Qs to provide

further descriptive statistics about banks' hedging activities. These statistics consider all derivative instruments that banks use to hedge their interest rate risks. In this group of banks, over 60% do not report on hedging activities and only 62 banks report their duration. Among banks that choose to report hedging, banks below $250 billion in assets hedge about 5% of their total assets whereas banks whose assets exceed $250 billion hedge almost 9% of their total assets, or about 30% of their security holdings. In other words, even banks that choose to report their hedging activity do not hedge the interest rate exposure of most of their securities, let alone loans and other assets.

The idea that banks' assets are exposed to substantial interest rate risk after hedging is corroborated on the sample of 62 banks that report the duration of their security portfolios, including the impact of fair value swaps. With an average duration of 4.6 (and ignoring convexity) the implied losses for a two percentage points increase in the 10-year Treasury yield that occurred during the recent monetary tightening would add up to more than 9% of asset value. Jiang et al. (2024) find that marked-to-market bank assets declined by an average 10% across all banks during that period, about $2 trillion in the aggregate, not accounting for risk hedges. This evidence further supports the notion that the size of banks' hedging activity was not large enough to offset most of the $2 trillion loss in the value of U.S. banks' assets.

By failing to adequately hedge their assets, including loans, against rising interest rates before the 2022 monetary tightening, how did banks shield their reported balance sheets from mounting losses in securities, which are easier to value than loans? The answer likely lies in the current accounting standards governing the valuation of securities. Banks can avoid recording unrealized mark-to-market losses in their balance sheets and statements of comprehensive income if they classify their securities as HTM. In Figure 2A, we show that in the beginning of 2022, only about one-third or about $2 trillion out of the $6 trillion of securities held by U.S. banks were valued using HTM accounting. This breakdown between AFS securities and HTM securities in the aggregate balance sheet of the banking system changed drastically during the monetary tightening period. By the end of 2022, U.S. banks still held approximately $6 trillion in securities but 45% of those securities, or $2.75 trillion were now valued using HTM accounting.

This large shift in the breakdown between AFS and HTM securities during 2022 indicates that banks actively sought to insulate their balance sheets and statements of comprehensive income from recognizing declining security prices during 2022. We show in Figure 2B that banks reclassified almost $1 trillion of their existing AFS securities to HTM during 2021 and 2022. These reclassifications fully account for the reallocation between AFS and HTM securities that occurred between 2021 and 2022 and allowed banks to avoid recording accounting losses on these assets simply by slapping a new label upon their existing securities. During 2021, U.S. banks reclassified about $220 billion in securities with JPMorgan Chase alone accounting for $104.5 billion of the total amount. The reclassification activity accelerated considerably as the Federal Reserve began raising interest rates during the first and second quarters of 2022 with banks reclassifying more than half a trillion of securities during these two quarters.

Figure 3 shows that banks' deliberate reclassification of large portions of their securities portfolios as HTM enabled them to avoid recognizing substantial accounting losses in the quarters that followed. We estimate the amount of losses that banks avoided by reclassifying securities to HTM following the methodology in Jiang et al. (2024). We obtain asset maturity and repricing data from the call reports and we use exchange-traded mortgage-backed securities and treasury indices to estimate the value of the securities that were transferred to the HTM category. Figure 3A shows that the estimated losses on reclassified securities increase steadily during 2022 and amounted to approximately $175 billion in the fourth quarter of 2022.

To put this amount in perspective, we show that the CET1 capital (prior to adjustments) of the group of banks that reclassified securities was about $1.05 trillion at the end of 2022. The estimated losses on securities reclassified from AFS to HTM would wipe out more 15% of these banks' capital if these accounting losses were to impact regulatory capital. In Figure 3B, we show significant heterogeneity in the severity of these estimated losses as a percentage of each bank's CET1 capital at the end of 2022. The estimated "hidden" losses account, on average, for 20% of the CET1 capital of reclassifying banks. But for more than ten percent of reclassifying banks, we estimate that they avoided recognizing losses representing more than half of their equity capital.[8]

4.2 Cross-sectional Evidence

We find that U.S. banks hedge only a small fraction of their asset exposure to interest rate risk. It is nonetheless possible that the most fragile banks could have had incentives to make their balance sheets more resilient by hedging a greater portion of their assets prior to the monetary tightening.

We find little evidence that banks whose assets were most exposed to interest rate risk or whose liabilities were most fragile hedged a much larger fraction of their assets at the end of 2021. In Figure 4, we split our call report sample into twenty equal-sized bins based on different measures of interest rate risk exposure. We explore how hedging varies across measures of capitalization (Figure 4A), reliance on uninsured deposits as a measure of deposit fragility (Figure 4B), and the share of long-term securities as a measure of exposure to interest rate risks (Figure 4C). The plots indicate that banks with lower capitalization, that rely more on uninsured deposits, and whose assets were more vulnerable to rising interest rates did not hedge a significantly larger proportion of their assets than other banks. The interest rate swaps of the group of banks with the most uninsured leverage cover, on average, less than 2.5% of their assets whereas swaps account for about 1.5 percent of assets for the group of banks with median uninsured leverage.

[8] We make two conservative assumptions in estimating the book losses that banks avoided by reclassifying securities as HTM: (i) securities are assumed to be transferred to HTM at the end of the quarter, and (ii) the composition of securities reclassified—including the share of Treasuries versus MBS, as well as the maturity and repricing structure—mirrors that of the bank's overall securities portfolio. These assumptions likely understate the unrealized losses avoided through reclassification. The first assumption limits our estimates to market value declines occurring after the quarter of reclassification. The second is conservative because banks may have stronger incentives to reclassify longer-duration, higher-risk securities—such as those highlighted in Fuster, Paligorova, and Vickery (2025).

The difference between the hedging intensity of the group of banks with the most fragile deposit structure and that of other banks is, therefore, economically small and driven almost entirely by differences in the extensive margin. We find similar results when we turn our attention to the hedging data voluntarily disclosed by public bank holding companies in their SEC filings in Figure A2. Although the relationship between these measures and the extent of hedging is slightly negative in this sample, the economic magnitude of these differences is again small. Overall, we conclude that more fragile banks did not hedge a significantly larger proportion of their assets.

In Figure A3, we explore how the extensive margin of hedging varies across the three measures of interest rate risk exposures. Panel A indicates that banks with lower levels of capitalization, specifically those with lower Equity to Asset ratios, were slightly more inclined to hedge at least some of their assets. Panels B and C suggest that banks relying more heavily on uninsured deposits and holding a greater share of long-term securities were more likely to hedge at least some of their assets. But when we focus on the relation between these measures of bank fragility and the intensive margin of hedging in Figure A4, we find that, conditional on hedging at least some assets, banks hedge a very small percentage of their assets and that this hedging intensity, though related to their risk exposure, is not economically meaningful.

Figure A5 shows that, if anything, there is a negative relation between exposure to interest rate risk and use of HTM accounting prior to the monetary tightening. Panel A shows that weakly capitalized banks classified a smaller fraction of their assets as HTM. The results of Panels B and C are more ambiguous and point to weak relation between asset exposure to interest rate risks and the share of securities classified as HTM prior to the monetary tightening.

Overall, our cross-sectional evidence on banks' use of hedging is noisy and does not reveal a clear or economically significant relationship between interest rate exposure and hedging activity prior to the monetary tightening cycle. Our findings are related to those of Kim, Kim, and Ryan (2025), who suggest that large advanced-approaches banks increased their hedging activities of their AFS securities during monetary tightening, whereas non-advanced-approach banks did not. A plausible explanation for our findings is that most banks in our sample fall into the non-advanced-approaches category, and include many moderately capitalized banks that as we show in Section 6 may have limited hedging or recapitalization incentives despite facing significant interest rate exposure exposure.

5. Bank Hedging during the Monetary Tightening of 2022

5.1 Changes in Hedging Behavior

Next, we document how banks adjusted their hedging activities during the period of monetary tightening. A case study of the recently failed Silicon Valley Bank (SVB) is illustrative. SVB hedged about 12% of all its securities at the end of 2021. By the end of 2022, it had reduced these hedges to 0.4%. In other words, as interest rates rose, SVB reduced its hedging of interest rate risk. Unwinding those hedges increased the duration of its assets from 3.7 to 5.6 years, leaving the bank significantly more exposed to further interest rate increases, which ultimately materialized. Given that the bank would have retained the profits if interest rates had declined, while its creditors including the FDIC

would absorb most of the losses in the event of failure, SVB's actions are reminiscent of classic "gambling for resurrection."

We show that the case of SVB was not an exception. As Figure 5 shows, among banks that reported positive non-trading use of interest rate swaps—specifically positions in which the bank pays a fixed rate and receives a floating rate, the most common hedging arrangement—at any point between 2021:Q4 and 2022:Q4, more than one-quarter experienced declines in their hedging ratios. We restrict the analysis to banks that reported positive non-trading use of interest rate swaps at least once during this period and classify them into quartiles based on changes in their swap-to-asset hedging ratios between 2021:Q4 and 2022:Q4. The bottom quartile consists of banks with the largest declines in hedging ratios, while the top quartile consists of those with the largest increases. We then trace the evolution of average hedging ratios for each group over the course of 2022.

For banks in the bottom quartile, the share of total assets covered by interest rate swaps declined by about 6 percentage points between 2021:Q4 and 2022:Q4, an economically meaningful reduction. At the same time, roughly one-quarter of banks increased their hedging ratios over this period. The main difference between the two groups is size: banks that increased their hedging are, on average, $6.4 billion larger (Table A4). Along other dimensions—such as state charter status, primary federal regulator (Fed, OCC, or FDIC), long-term securities as a share of assets, uninsured leverage ratio, and equity-to-asset ratio—the two groups are broadly similar.

Similar patterns arise among publicly traded banks that report hedging derivatives (Figure A6). Panel A shows that more than one-quarter of these banks experienced declines in their hedging ratios. When scaling hedging derivatives by total securities or by AFS securities, bottom-quartile banks saw declines of about 30 and 40 percentage points, respectively (Panels B and C).

We next dig deeper into the heterogeneity across banks who reported positive non-trading use of interest rate swaps at least once during this period. Banks with fragile funding structures sold (or closed) more hedges during 2022. On the liabilities side, banks with a higher uninsured leverage, i.e., more fragile funding, sold (or closed) more hedges (Figure 6A). Banks with lower capitalization also reduced their hedging intensity to a greater extent than other banks (Figure 6B). On the asset side, we show that banks with greater ex-ante exposures to interest rate risk through their holdings of long-term securities decreased their use of interest rate swaps to a greater extent than other banks (Figure 6C).

Table 2 examines how bank characteristics relate to changes in hedging practices. We run cross-sectional regressions on banks that reported non-zero use of hedging swaps in at least one quarter between 2021:Q4 and 2022:Q4. The dependent variable is the cumulative change in swap-to-asset ratios from 2021:Q4 to 2022:Q4; the key explanatory variables capture capitalization, funding stability, and interest rate risk, with log assets included as a size control. The results show that more fragile banks reduce their hedging to a greater extent. Column (1) indicates that a one-standard deviation decrease in the capital ratio is associated with a 1 p.p. reduction in swap ratios. Column (2) shows that a one-standard deviation increase in the uninsured leverage ratio leads to a 0.7 p.p. larger reduction. Column (3) finds that banks more exposed to interest rate risk—through higher shares of long-duration securities—also reduced hedging more. Column (4) demonstrates that these effects remain when

included jointly in a multivariate specification. Results are qualitatively similar in Panel B where we use the full sample of banks.

Finally, we find a similar pattern of reduced hedges when examining the overall duration of bank assets for the limited set of banks that reported this information (including SVB). During 2022, these banks increased the duration of their assets from 4.6 to 5.1 (Figure 7A). The duration increases were largest for banks with the highest uninsured leverage such as SVB, although the SVB case was extreme even among banks with very fragile funding (Figure 7B). In other words, one might imagine that banks, which were more exposed to solvency runs would have mitigated those runs by increasing their hedging. Instead, they sold or reduced their hedges, exposing themselves to more interest rate risk. Changes in hedging among these banks suggests that SVB was likely not the only bank potentially engaged in gambling for resurrection.

5.2 Reclassification of Securities to the HTM category

5.2.1 Bank Fragility and Reclassification of Securities

The evidence presented thus far begs the question of how these fragile banks escaped outside scrutiny that would expose their deteriorating capital positions. We argue that the accounting rules governing the valuation of securities and, in particular, the use of the HTM accounting to value securities at least partly explains why banks were able to avoid significant pushback from investors, regulators, and other stakeholders. Again, the case of SVB is illustrative of the forces at play. At the end of 2021, SVB held $125 billion in securities out of which 78% or $98 billion were valued using HTM accounting. By the end of the second quarter of 2022, SVB had unrealized losses of $10 billion on these HTM securities and at the end of the third quarter these losses had escalated to $16 billion. These unrealized losses remained unrecognized in the financial statements of SVB and, at the end of the third quarter of 2023, amounted to the entire common equity tier 1 capital of SVB. Because of HTM accounting, SVB did not have to adjust the value of these securities in their balance sheet and financial statements at any point during 2022 and it was not until the first quarter of 2023 that swirling concerns about SVB's financial condition precipitated a massive run (e.g., Cookson et al., 2023) that led to its inevitable demise.

Most banks did not use the HTM classification to the same extent as SVB. But as we have shown previously, U.S. banks collectively reclassified almost $1 trillion dollars in securities to the HTM category effectively insulating U.S. banks from recording estimated losses of $175 billion in their balance sheets. In this section, we ask whether these reclassifications were operated mostly by strong banks that had both the intent and ability to hold these securities until their maturity or if, on the contrary, reclassifications of AFS securities into HTM were predominantly made by fragile banks that purposefully wanted to "hide" the impact that potential losses would have on their already-frail balance sheets.

We explore the relationship between measures of exposure to interest rate risk and banks' proclivity to reclassify securities from AFS to HTM in Figure 8. Figure 8A shows a strong negative relation between levels of regulatory capital and the propensity to reclassify assets from AFS to HTM.

Similarly, Figure 8B indicates a strong positive relation between the banks' exposure to interest rate risks through their holdings of long-duration assets and the propensity to transfer assets from AFS to HTM. Figure 8C repeats the analysis using the share of uninsured deposits at the bank as a measure of fragile deposit funding. The plot shows that banks with greater reliance on run-prone uninsured depositors were also more likely to reclassify securities to HTM during 2021 and 2022.

Finally in Figure 8D, we repeat the analysis in Figure 8C after splitting the sample between below- and above-median share of long-term securities. The idea is to assess whether banks that are more exposed to interest rate risk and are also financed primarily by run-prone uninsured depositors are incrementally more likely to transfer assets from AFS to HTM. We find a significantly stronger association between the significance of uninsured deposits in bank funding and asset reclassification when banks have significant asset exposures to interest rate risks. Overall, the results of Figure 8 strongly indicate that more fragile banks were more likely to reclassify securities from AFS to HTM during this period.

We further probe the relation between these bank characteristics and their decisions to transfer securities from AFS to HTM in Table 3. We estimate cross-sectional regressions in which the dependent variable is a dummy variable that takes the value of one if the bank reclassified securities from AFS to HTM during 2021 and 2022 and the main variables of interest are the measures of capitalization, less stable funding, and exposure to interest rate risk. We also include asset percentile dummies to control non-parametrically for the impact of bank size. We cluster standard errors at the level of the bank's state headquarters.

The results in Table 3 further support the idea that more fragile banks were also more likely to reclassify securities from AFS to HTM. Column (1) indicates that a one-standard deviation increase in the capital ratio is associated with a 1 p.p. lower likelihood of reclassification. The results of Column (2) suggest that a bank that is 100% financed by uninsured deposits would be 8.6 p.p. more likely to reclassify securities into HTM than a bank with no uninsured deposits. In Column (3), the results show that banks with higher exposure to interest rate risks through their holdings of high-duration longer term securities are also significantly more likely to reclassify assets.

Column (4) shows that the interaction between the exposure to run-prone depositors and the exposure to interest rate risk matters. Banks with a high share of exposure to uninsured deposits are incrementally more likely to reclassify if they also have greater exposures to longer-term securities. In Column (5), we show that that the explanatory power of each of these variables is not subsumed when we include them together in a multivariate specification and when we add additional controls for the ratio of securities to total assets in each bank and for the percentage of securities that is classified as AFS at the beginning of 2021. In Panel B, we use as dependent variable a measure of the percentage of securities that each bank reclassified to HTM between 2021 and 2022. We find similar results when using this measure, which accounts for the intensive margin of asset reclassification.

5.2.2 Capital Requirements and Reclassification of Securities to HTM

In this section, we further examine banks' motivations for avoiding recognition of accounting losses through reclassification of securities to HTM. In particular, we assess whether the differential treatment

of unrealized gains and losses in AFS versus HTM, in the context of regulatory and supervisory requirements, prompted banks to use HTM accounting to shield book values and regulatory capital as interest rates rose.

As we discussed in Section 2.1, U.S. banks face capital requirements that exclude unrealized losses on HTM—but not AFS—securities from regulatory capital. Under Basel III, nine large "advanced approaches" banks had to include unrealized AFS losses, creating incentives to reclassify assets as HTM. Kim, Kim, and Ryan (2019, 2025) show that this differential treatment shaped their portfolio and hedging behavior. During our sample period, six of nine advanced approaches banks (≈66%) reclassified securities to HTM, compared with only about 5% of non-advanced approaches banks (226 of 5,108). This contrast underscores how advanced approaches banks had stronger incentives to shield capital ratios as interest rates rose.

As noted in Section 2.1, the FHFA's requirement that banks maintain positive tangible equity to access FHLB advances also differentiates between unrealized losses on AFS and HTM securities. Since FHLB advances serve as an important source of next-to-last-resort funding, member banks reliant on this funding have incentives to preserve positive tangible equity by reclassifying securities as HTM. Here, we provide empirical evidence that reliance on FHLB advances is associated with greater use of reclassification to HTM, particularly among more fragile banks and banks that are more exposed to interest rate risks.

In Figure 9, we explore how reliance on FHLB funding shapes the relationship between banks' fragility and their use reclassification to HTM. We partition banks into two groups based on whether they are FHLB members that obtained FHLB advances at any point between the beginning of 2021 and the second quarter of 2023. We then repeat the analysis of Figure 8 for both FHLB and non-FHLB banks. Figure 9 Panel A shows that banks relying on FHLB funds are more likely to reclassify securities into HTM, especially when they have lower capitalization. Panel B indicates that FHLB banks are also more likely than non-FHLB banks to reclassify when they depend more heavily on unstable sources of funding, consistent with incentives to preserve access to FHLB funding. Finally, in Panel C, we show that FHLB banks with greater exposure to interest rate risk through their securities portfolio are more likely than similar non-FHLB banks to reclassify securities to HTM. Overall, the figure strongly suggests that the differential regulatory treatment of unrealized losses and gains in AFS and HTM securities motivates more fragile banks to reclassify into HTM.

In Table 4, we estimate cross-sectional regressions similar to those in Table 3, in which the main variables of interest are the interaction between an indicator variable for whether a bank obtained FHLB advances and measures of capitalization, uninsured deposit funding, and exposure to interest rate risk. The results in Table 4 suggest that FHLB banks are incrementally more likely to reclassify securities to HTM as they become more fragile. Column (1) shows that a one-standard deviation increase in the capital ratio is associated with a 0.4 p.p. lower likelihood of reclassification for bank without FHLB advances, but with a stronger 1.6 p.p. reduction for FHLB bank that obtained advances between 2021 and 2023. Columns (2) and (3) also indicate that banks relying more heavily on uninsured deposits and with greater exposure to interest rate risks through holdings of longer-term

securities are also incrementally more likely to reclassify to HTM if they obtain loans from the FHLB. In the Internet Appendix, we show that these findings are robust to implementing a matching procedure based on Iacus et al. (2012), which ensures covariate balance between FHLB and non-FHLB banks in key dimensions such as bank size and the share of securities held.

Overall, these empirical findings suggest that prudential requirements based on capital ratios that treat unrealized gains and losses on AFS and HTM securities differently, such as the tangible common equity requirement for FHLB funding, create incentives for banks to exploit the discretion allowed under the rules governing the classification of securities to reclassify securities to HTM and ease their regulatory constraints.

5.3 Recapitalization as an Alternative to Hedging

Our empirical findings suggest that banks made very limited use of hedging. But the main insight on this section begs the question of whether banks might have found it relatively cheaper to forgo an ex-ante hedging program and instead plan to recapitalize ex-post. While this is plausible, our empirical evidence does not support the possibility that banks injected substantial capital before, during, or after the monetary tightening.

First, our large sample analysis of call report data for all bank holding companies shows no indication of capital injections that substantially buffered the capital shortfall resulting from rising interest rates (Figure A7).

Second, for a limited sample of 407 large bank holding companies (BHCs) with consolidated assets exceeding $3 billion, we further analyzed efforts to raise external capital between 2021 and 2023. In particular, we focus on BHCs reporting sales of common stock (BHCK3579) greater than one percent of their initial capital stock. For these entities, we searched and reviewed annual reports and Form D filings to verify that equity securities were issued to raise capital. We find that only 17 out of these 407 entities (or 3.5% of all large BHCs) raised an aggregate amount of approximately $7 billion in equity securities during this period. Most offerings occurred in 2021, when seven entities raised $5.2 billion, while in 2022, twelve entities raised $1.2 billion, and in the first two quarters of 2023, three entities raised $0.5 billion.[9]

By comparison, at the beginning of the sample period these 407 BHCs held roughly $25 trillion in assets and $2.44 trillion in book equity. [10]As of the end of the second quarter of 2023, their mark-to-market losses on AFS and HTM securities totaled about $518 billion, rising to more than $1 trillion

[9] In table A6, we show that these 17 entities raised, on average, capital equivalent to 2.5% of their total assets and 25% of their book equity at the beginning of the period. On average, the amount of capital raised by these 17 entities exceeded their losses in securities but this is mostly explained by a few smaller bank holding companies. By contrast, Silicon Valley Bank raised considerably less than what was necessary to cover its substantial losses in HTM securities.

[10] Note that the $25 trillion figure is based on FR Y-9C consolidated regulatory balance sheets, which capture not only commercial bank subsidiaries but also large nonbank affiliates, such as broker-dealers, investment advisers, and foreign subsidiaries. Because these nonbank entities fall outside the Call Report perimeter, the aggregate consolidated assets of Y-9C filers can exceed the total assets reported for U.S. commercial banks.

once other assets are included (see also Jiang et al. 2024). This indicates that the amount of capital raised during the 2022 monetary tightening episode by these entities was negligible relative to both their assets and the losses they experienced.

Overall, these findings confirm that ex-post recapitalizations were rare, not economically meaningful, and confined to a small set of banks. Thus, our empirical evidence supports the interpretation that both hedging, and recapitalization were very limited in practice

6. Regulatory Framework and Use of HTM Accounting

The evidence above suggests that the least healthy and stable banks used HTM accounting to conceal their asset losses, raising important questions about the effectiveness of the current regulatory and supervisory framework in curbing or enabling such behavior. While a full analysis of these issues is beyond the scope of this paper, we present several relevant facts in this section.

The collapse of SVB brought increased scrutiny to the accounting rules governing the valuation of government bonds and mortgage-backed securities. HTM accounting allows banks to avoid marking securities to market if they intend and are able to hold them until maturity. If they lack this intent or ability, they must use AFS accounting, which requires marking securities to market and recognizing unrealized losses in their comprehensive income statements. The key challenge in enforcing HTM rules lies in assessing whether banks truly meet the criteria to hold long-term securities until maturity (e.g., Bischoff, Laux, and Leuz, 2021). When enforcement is weak or absent, financially unstable banks may exploit the HTM classification to conceal potential losses, avoiding external scrutiny and buying time to "gamble for resurrection."

HTM accounting rules appear to have been weakly enforced during the 2022 monetary tightening. Our empirical evidence shows that the banks least able to hold securities until maturity were the most likely to reclassify large portions of their portfolios to HTM, contrary to both the letter and spirit of the rules. This suggests that many gatekeepers, including auditors and supervisors, likely failed to properly assess the reasonableness of banks' claims about their ability to hold reclassified securities until maturity. This raises an important question: is this pattern a flaw in the system, or an inherent feature of the HTM classification option? Can stricter enforcement by auditors and supervisors salvage the HTM option, or should it be eliminated altogether, as some policymakers have proposed (e.g., Group of Thirty, 2023), due to the inherent difficulty in verifying intent and ability to hold to maturity?

To contribute to this debate, we draw on extensive literature that highlights significant heterogeneity in how different gatekeepers enforce the same rules (e.g., Agarwal et al., 2014). We investigate whether more fragile banks were less likely to reclassify securities into HTM when subject to stricter oversight. Specifically, we examine whether banks audited by the Big-4 firms (Deloitte & Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers) were less likely to reclassify securities compared to those audited by other firms. Additionally, we assess whether the likelihood of reclassifying securities to HTM varied based on the identity of the primary bank regulator. Following prior work by Agarwal et al. (2014) and Granja and Leuz (2023), we ask whether banks were less likely to reclassify securities

when solely supervised by federal agencies, as opposed to being jointly supervised by less stringent state banking departments and the FDIC or FED.

In column (1) of Table 5, we estimate cross-sectional regressions, similar to Table 3, to investigate whether weak banks audited by Big-4 firms are less likely to reclassify securities. The results indicate that Big-4 audited banks were not statistically less likely to reclassify securities in 2021 and 2022. This finding suggests that auditors may take a back seat to bank supervisors in enforcing accounting rules in the banking industry (e.g., Nicoletti, 2018).

In column (2), we examine how OCC supervision relates to the likelihood of reclassification. Consistent with the idea that OCC-supervised banks are more strictly regulated than those jointly supervised by state banking agencies, we find that while regular banks have a similar likelihood of reclassification, fragile OCC banks are significantly less likely to reclassify securities. This finding suggests that stricter enforcement of accounting standards could potentially curb the use of the HTM classification by weaker banks.[11]

Another important question regarding the recent crisis is whether existing regulations weakened banks' incentives to protect their balance sheets against interest rate risks. Accounting standards have been criticized for contributing to this issue. Under current rules, a derivative qualifies for hedge accounting only if the underlying securities are marked to market on the bank's balance sheet and income statement (ASC 815-20-25-12(d), 15(f), -42(c)(2), and -43(d)(2)). If a security is classified as HTM, its hedge does not qualify for hedge accounting, as changes in the value of the derivative would not offset any mark-to-market fluctuations in the security's valuation. In other words, hedging interest rate risk on HTM securities is fundamentally inconsistent with the HTM classification.

We explore whether the use (and potential abuse) of the HTM classification hindered banks' hedging activities and could partially explain why banks hedged such a small fraction of their assets. A quick "back-of-the-envelope" calculation suggests that accounting standards for hedging fixed-rate instruments were unlikely to be a binding constraint on most banks' hedging decisions. As shown in Table 1, the notional amount of hedging instruments accounts, on average, for less than 50% of the value of AFS securities held by large publicly listed banks. Nevertheless, we formally investigate whether HTM accounting weakened banks' incentives to hedge interest rate risks. Specifically, we (i) use cross-sectional variation to assess whether banks that classify a larger share of their securities as HTM hedge a smaller fraction of their assets, (ii) use within-bank variation to examine whether increases in HTM classifications are associated with declines in the share of assets protected by hedges,

[11] These empirical results should be interpreted with caution, as the selection of a private auditor or primary regulator is likely endogenous. For instance, banks can choose their regulators at inception and often switch their primary federal regulators over time (Rosen, 2003; Granja and Leuz, 2024). Unobserved factors—such as a bank's underlying compliance culture—may influence both its choice of auditor or regulator and its adherence to accounting standards. To address this concern, we implement a matching procedure based on Iacus et al. (2012) in the appendix, which ensures covariate balance in key dimensions such as bank size and the share of securities held, both across banks with and without a Big Four auditor and across those overseen by different primary regulators.

and (iii) explore whether reclassifications from AFS to HTM lead banks to remove or sell hedges on those securities.

We present the results of this analysis in Table 6, which consistently show that the share of securities classified as HTM is statistically unrelated to the ratio of interest rate swaps to assets used by banks. This null result holds whether we examine cross-sectional variation in the share of HTM securities, within-bank changes in the share of assets classified as HTM, or changes driven by the reclassification of securities from AFS to HTM. These findings suggest that hedge accounting is, at best, a convenient scapegoat for banks' low use of derivatives to hedge interest rate risk.

Overall, our empirical findings indicate that the vast majority of banks neither hedged most of their asset interest rate exposure nor raised a meaningful amount of capital as rates were rising and run risk arguably increased. Instead, it appears that banks—particularly weaker ones—relied on HTM accounting and reclassification rules to preserve the book value and regulatory capital of their assets as interest rates rose. Stronger banks—those with higher capitalization and more stable funding—were more likely to engage in hedging activities**.**

7. A Stylized Banking Framework with Interest Rate Risk, Capital Regulation, HTM Accounting, and Recapitalization Option

In this section, we develop a simple stylized framework to interpret our empirical findings. The objective of our framework is to clarify the economic trade-offs that arise from the interaction between accounting rules, capital regulation, and bank incentives—particularly in the context of solvency-related bank-run risk induced by rising interest rates. Specifically, the framework illustrates why banks may rationally choose not to hedge or raise capital ex post.

Our framework highlights that HTM accounting can be either stabilizing or destabilizing depending on a bank's condition. For stronger banks, HTM classification can prevent unnecessary overcapitalization when regulatory requirements are overly stringent and, in some cases, encourage additional hedging by weaker banks. On the other hand, HTM classification can be destabilizing by enabling weaker banks to sidestep regulatory pressure and forgo hedging their interest rate risk, thereby exposing them to run risk.

While our framework allows HTM accounting to play either a stabilizing or destabilizing our empirical evidence from the 2022 monetary tightening suggests that the "window dressing" channel dominated, as weaker banks used HTM reclassifications without hedging or raising capital. This practice likely enabled them to mitigate the impact of both explicit and implicit capital requirements.

7.1 Setup

We build on the model of self-fulfilling solvency runs on franchise value from Jiang et al. (2024), extending it to incorporate bank capital requirements and the ability of shareholders to inject additional capital. Specifically, capital requirements are enforced after interest rates are set but before sunspots occur, giving the bank an opportunity to recapitalize and avoid a run. This extension enables us to examine how accounting rules influence the effectiveness of capital regulation in the face of rising

risk-free interest rates, as well as the incentives for bank owners to proactively hedge interest rate risk or raise additional capital.

We consider a monopoly bank with long-dated assets and liabilities (deposits) already in place before a risk-free rate shock occurs. All else being equal, rising rates increase the range over which the bank becomes vulnerable to a self-fulfilling run on its franchise value. Our analysis focuses on the incentives of bank owners to hedge asset risk in order to eliminate the possibility of a run equilibrium. Simultaneously, owners can opt to classify assets as HTM. The core premise of our model's timing is that as rates increase, owners have the opportunity to recapitalize the bank; however, once a run is underway, it is too late to intervene. Formally, timing is as follows:

- Initial Stage:
    - Bank starts with a given asset and liability structure and summarized by (d, r) facing an uncertain interest rate realization r_f equal to r_f^l with probability (1 - p) and r_f^h with probability p, where $r_f^h \geq r_f^l$, which is an absorbing state.
    - Before the interest rate is realized, bank equity holders choose what fraction of the bank's assets to classify as HTM and whether to hedge against interest rate risk.
    - Capital requirements are enforced by the central bank.

- Run Stage (after realization of interest rate risk):
    - Regulators enforce capital requirements.
    - Sunspot realizes and depositors decide whether to withdraw their deposits.

7.1.1 Bank Assets and Liabilities

Assets: Bank assets are normalized to a historical cost value of 1. They are invested in risk-free liquid perpetuities (e.g., T-bonds with infinite maturity) with an average coupon of r. The assets are completely liquid: the bank can always sell them at their present value of coupons discounted at the risk-free rate. At the realized risk-free rate r_f, the market value of bank assets is given by $\frac{r}{r_f}$.

Liabilities: The bank's existing liabilities comprise runnable deposits[12] with face value d. The bank therefore has (book) capital $e_b = 1 - d$. Existing depositors can keep their deposits with the bank or withdraw them to invest in outside goods such as a money market fund or deposits at other banks, which earn $\mu(r_f) < r_f$. The external rate increases in the risk-free rate $1 > \mu'(r_f) > 0$. On the other hand, if the bank fails, depositors realize a positive cost of failure. In other words, prevailing rates do not compensate depositors if they think the bank will fail for sure. This payoff structure captures the idea that depositors are willing to pay to obtain deposit services and want to use these services if the bank is sound, but depositors prefer to withdraw their funds to keeping them in the bank, if the bank

[12] Extending the model to include insured deposits is straightforward. In such extension banks with larger share of uninsured deposits are more prone to runs (see Jiang et al. 2024)

will fail. In this setting, banks have market power in the deposit market, which may give rise to franchise value.[13]

There is a deadweight cost of raising equity capital, τ per dollar of external equity.

7.1.2 Capital Regulation and Accounting Rules

Banks are subject to capital regulation. The bank's regulatory capital, e_r, must meet or exceed the minimum capital requirement, $\bar{e} \geq 0$, that is $e_r \geq \bar{e}$. If regulatory capital falls below this threshold, regulators close the bank, resulting in zero value for shareholders. Notably, capital requirements exclude the franchise value of deposits, so the face value of deposits serves as the relevant measure for deposit liabilities in capital calculations.

We consider capital requirements that are based on a regulatory capital ratio, e_r, that is tied to the market value of assets and face value of deposits, except for assets classified as hold-to-maturity (HTM) that are valued at their book value. Large "advanced approaches" banks, as well as banks seeking liquidity from the FHLB, are subject to capital regulations of this form. More broadly, as Gopalan and Granja (2023) show, supervisors tend to place greater weight on unrealized losses in AFS securities when evaluating whether to initiate corrective actions. This practice effectively creates a regulatory distinction between AFS and HTM securities, even when the accounting treatment is not explicitly different under capital rules. If the bank classifies a share of its assets as the HTM assets, then, for a given realization of interest rate, its regulatory capital equals to:

$$e_r = \underbrace{\boldsymbol{a}}_{HTM} + \underbrace{(1-\boldsymbol{a})\left(\frac{r}{r_f}\right)}_{Market\ value\ of\ AFS} - \underbrace{d}_{Face\ value\ of\ deposits} \tag{1}$$

The assets classified as HTM are recorded at their book value of 1, and the AFS assets at their market value of $\frac{r}{r_f}$. To classify one unit of assets to HTM accounting has a cost θ. This cost could represent the elimination of option value following the commitment to carry an asset classified as HTM until its maturity (Kim, Kim, and Ryan 2019; Kim, Kim, and Ryan, 2025) or other costs associated with the decision to disclose gains and losses in the footnotes rather than recognizing them in the balance sheet.

We further assume that $\frac{r}{r_f^l} - d \geq \bar{e}$, implying that under a low-interest-rate realization, the bank remains adequately capitalized to meet regulatory requirements even if all of its assets are classified as AFS.

7.1.3 Sunspot Distribution

As in Jiang et al (2024) and related models, there is a possibility of multiple equilibria, which arise from depositors' strategic complementarity where a "sunspot" serves as a coordination device that is uncorrelated with fundamentals of the economy. To evaluate incentives to hedge the "bad equilibria"

[13] See, among others, Hannan and Berger (1991), Neumark and Sharpe (1992), Drechsler et al. (2017), and Egan et al. (2017) for evidence of bank market power in the deposit market.

ex ante, we explicitly define the probability distribution over sunspots. A "good" sunspot arises with probability $1-\epsilon$, and a "bad" sunspot arises with probability ϵ.

7.2 Equilibrium

We characterize the equilibrium by first analyzing depositors' run decisions, following the framework of Jiang et al. (2024), and then examining bank equity holders' choices regarding hedging and the classification of assets as HTM.

7.2.1 Depositor run choice

We begin by examining the depositors' decision on whether to run if the bank assets are not hedged. As we later show, the only motivation for insuring assets (or recapitalizing ex post) is to prevent the emergence of a run equilibrium. Because by assumption $\frac{r}{r_f^l} - d \geq \bar{e} \geq 0$ the run equilibrium can only occur in the high-interest rate realization state. As shown in Jiang et al. (2024), we have the following equilibrium structure of the run subgame for a high realization of r_f. Define the value of the bank in the absence of a run in the high-interest rate state as $e_m^{No\ Run} = \frac{r}{r_f^h} - d\left[\frac{\mu(r_f^h)}{r_f^h}\right]$

(i) If $\frac{r}{r_f^h} - d \geq 0$, the bank is fundamentally sound: there is a unique no-run equilibrium.

(ii) If $\frac{r}{r_f^h} - d < 0 \leq e_m^{No\ Run}$ two possible equilibria exist: a no run equilibrium and the market value of equity is $e_m^{No\ Run}$; a run equilibrium when the market value of equity is zero.

(iii) If $e_m^{No\ Run} < 0$, the bank is fundamentally insolvent: there is a unique run equilibrium

In our analysis that follows, our attention will focus on r_f^h such that the two conditions outlined in (ii) are fulfilled. Specifically, this implies that in the high-interest-rate state, in the absence of a run, the market value of bank equity remains positive; however, an equilibrium with a solvency-induced bank run is still plausible.

Asset Hedging Decision

We next analyze the incentives of bank equity holders to hedge assets ex-ante. We begin by examining the bank's hedging decision in the absence of capital requirements.

7.2.2 Benchmark: Insurance Choice without Capital Requirements

We begin with a benchmark that examines equity holders' incentives to hedge bank assets in the absence of capital requirements. The motivation for asset insurance is to prevent bank runs, which as we discussed above occur only in the high-interest rate state. To eliminate the run risk in that state, the bank needs a capital injection of $\left(d - \frac{r}{r_f^h}\right)$. We therefore consider the bank equity holders incentives to buy an insurance contract, that pays the bank exactly $\left(d - \frac{r}{r_f^h}\right)$ in the high-interest rate state. To finance this contract, the bank equity holders need to raise $p(1+\tau)\left(d - \frac{r}{r_f^h}\right)$ capital ex-ante where τ>0 is the

cost of insurance above its actuarially fair value. This markup captures administrative expenses, unmodeled risk aversion, or solvency constraints faced by insurers.

Shareholders must decide whether to purchase insurance that eliminates run risk or to forgo hedging altogether.[14] Since hedging has no impact on the bank's ex-post equity value in the low-interest-rate state, equity holders will opt to insure only if the expected equity value in the high-interest-rate state—net of the ex-ante hedging cost—exceeds the equity value without hedging in that state:

$$\underbrace{p\left[e_m^{No\ Run} + \left(d - \frac{r}{r_f^h}\right)\right]}_{\substack{Equity\ value\ with\ hedging \\ when\ rates\ are\ high}} - \underbrace{p(1+\tau)\left(d - \frac{r}{r_f^h}\right)}_{Hedging\ cost} \geq p \quad \underbrace{(1-\epsilon)e_m^{No\ Run} + \epsilon \times 0}_{\substack{Equity\ value \\ absent\ hedging\ when\ rates\ are\ high}} \tag{2}$$

In other words, the bank will choose to hedge if the expected benefit of preserving the franchise value in the high-interest-rate state exceeds the net cost to shareholders:

$$e_m^{No\ Run} \geq \frac{\tau}{\epsilon}\left(d - \frac{r}{r_f^h}\right) \tag{3}$$

The probability of a run triggered by a bad sunspot plays a central role in determining the threshold at which private insurance becomes worthwhile. If the likelihood of a run is sufficiently low in the absence of hedging, shareholders may prefer to leave the bank exposed rather than incur the cost of insurance.

7.2.3 AFS and Excessive Capital Requirements

Suppose, instead, banks are subject to an AFS capital requirement, i.e. all assets are valued at market value and the capital requirement is enforced after interest rates change, which is equivalent to enforcing $a = 0$ in the condition (1). The AFS equilibrium is very stark. First, all runs are eliminated: banks either hedge ex-ante to prevent a run or are closed by regulators. This section highlights the central trade-off associated with raising AFS-based capital requirements. On one hand, such requirements create incentives for banks to hedge interest rate risk or, as we show later, to recapitalize ex post. On the other hand, overly stringent requirements can lead to excessive hedging or recapitalization and may force the closure of banks that would have chosen to hedge or recapitalize under more moderate capital requirements.

To see why AFS capital requirements eliminate runs, note that weakly positive capital requirement, $\bar{e} \geq 0$, implies that $e_r = \frac{r}{r_f^h} - d \geq 0$. As we show above, this is equivalent to a bank being fundamentally sound and thus not subject to runs. This stark result arises because, once the interest

[14] Excess capital increases the deadweight cost of hedging without providing the benefit of reducing the likelihood of a run. Any positive capital issuance that fails to eliminate the run does not affect its probability, as the likelihood of a sunspot is independent of fundamentals. Thus, such issuance offers no benefits to equity holders, only additional costs.

rate is realized, the model features no fundamental uncertainty—so a fundamentally sound bank with $e_r = 0$ AFS capital always survives.

Moreover, AFS strictly positive capital requirements, $\bar{e} > 0$ can also eliminate runs, but at an additional deadweight "hedging" cost of $\tau p \bar{e}$. In that sense, AFS capital requirements are excessive.

The benefit of AFS capital requirements is that they strengthen banks' incentives to hedge asset risk. Equity holders weigh the cost of insurance against the expected equity value of the bank in the high-interest-rate state and will choose to insure if:

$$\underbrace{p\, e_m^{No\ Run} + p\left(d - \frac{r}{r_f^h} + \bar{e}\right)}_{\substack{Equity\ value\ with\ hedging \\ when\ rates\ are\ high}} - \underbrace{p\,(1+\tau)\left(d - \frac{r}{r_f^h} + \bar{e}\right)}_{Hedging\ cost} \geq 0$$

$$e_m^{No\ Run} \geq \tau\left(d - \frac{r}{r_f^h} + \bar{e}\right) \tag{4}$$

If bank failures occur, they do so when the regulator closes banks for being undercapitalized. As long as the capital requirement is not too stringent, specifically, if $\bar{e} < \frac{(1-\epsilon)}{\epsilon}\left(d - \frac{r}{r_f^h}\right)$, then more banks choose to hedge their assets than would in the absence of a capital requirement. However, when capital requirements are positive, some banks—those for whom $\tau\left(d - \frac{r}{r_f^h} + \bar{e}\right) > e_m^{No\ Run} \geq \frac{\tau}{\epsilon}\left(d - \frac{r}{r_f^h}\right)$, opt not to hedge and instead remain exposed to run risk. They would have hedged at a lower capital requirement and would have had sufficient capital to avoid runs.

7.2.4 HTM Accounting

As noted above, when capital requirements are enforced after adverse interest rate shocks, AFS accounting can impose two main costs. First, banks may "over-insure," ending up with more capital than is necessary to prevent runs and incurring excessive deadweight hedging costs. Second, some banks that would have opted to eliminate run risk under a lower capital requirement may instead choose to exit. Next, we introduce the possibility of HTM accounting and show that banks can broadly use it for two distinct purposes. "Strong" banks use it to meet overly stringent capital requirements while avoiding unnecessary capital infusions beyond what is needed to prevent runs. In this way, HTM classification can prevent overcapitalization and, in some cases, even encourage additional hedging among more constrained institutions. On the other hand, weaker, moderately capitalized banks can also use HTM accounting primarily to "window dress" their capital positions—appearing compliant with requirements without hedging underlying interest rate risk. In such cases, HTM classification can be destabilizing by allowing these institutions to sidestep regulatory pressure and remain exposed to run risk.

In what follows we assume that the cost of HTM accounting is no bigger than $\theta < (1-\epsilon)\tau p\left(1 - \frac{r}{r_f^h}\right)$. This condition implies that, absent run-risk considerations, it is cheaper to satisfy bank capital

requirements by reclassifying assets rather than by raising capital, and that if the bank prefers regulatory closure in high–interest-rate states to reclassifying its assets ex-ante, it will also choose not to hedge those assets.[15]

With HTM accounting, the bank faces three strategic options: (i) *Fold*, taking no action—neither hedging nor using HTM; (ii) *Window Dress*, foregoing hedging and fully relying on HTM classification to satisfy capital requirements; and (iii) *Hedge and Partially Reclassify*, hedging interest rate risk while partially using HTM accounting to meet regulatory capital constraints.

Let's first consider the net value of window dressing over folding:

$$(1-\epsilon)pe_m^{No\ Run} - \theta$$

Intuitively, by window dressing, the bank avoids regulatory closure but remains exposed to runs. Relative to certain closure, this strategy yields an additional expected equity value of $(1-\epsilon)pe_m^{No\ Run}$ while incurring the reclassification cost θ. Hence if

$$e_m^{No\ Run} < \frac{\theta}{(1-\epsilon)p} \tag{5}$$

The bank would prefer to fold.[16]

If $e_m^{No\ Run} \geq \frac{\theta}{(1-\epsilon)p}$ the bank will either fully window dress or the bank can hedge and receive $\left(d - \frac{r}{r_f^h}\right)$ of capital in the high-rate state and classify a share of its assets where $a^* = \frac{1-d}{\left(1-\frac{r}{r_f^h}\right)}$ to HTM accounting to satisfy its capital constraint. The hedging will eliminate the risk of runs and relax the regulatory capital constraint. This strategy yields the following value to shareholders:

$$pe_m^{No\ Run} - \underbrace{p\tau\left(d - \frac{r}{r_f^h}\right)}_{Net\ cost\ of\ hedging} \underbrace{-\theta \times a^*}_{Cost\ of\ partial\ HTM\ reclassifcation}. \tag{6}$$

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[15] Reclassifying one unit of assets as HTM entails an ex-ante cost of θ but raises regulatory capital in the high–interest-rate state by $1 - \frac{r}{r_f^h}$. Alternatively, hedging this value decline costs $\tau p \times \left(1 - \frac{r}{r_f^h}\right)$. Thus, when $\theta < \tau p\left(1 - \frac{r}{r_f^h}\right)$, the bank prefers HTM reclassification to meet capital requirements, ignoring run risk. We further assume $\theta < (1-\epsilon)\tau p\left(1 - \frac{r}{r_f^h}\right)$, which nests the above condition and implies that if closure in the high–interest-rate state is cheaper than ex-ante reclassification, the bank would also choose not to raise capital.

[16] Note that since $\theta < (1-\epsilon)\tau p\left(1 - \frac{r}{r_f^h}\right)$ the bank would also prefer not to raise capital and partially reclassify. The net value of this strategy relative to folding is $pe_m^{No\ Run} - \tau p \times \left(1 - \frac{r}{r_f^h}\right) - \theta a^*$ where $a^* = \frac{1-d}{\left(1-\frac{r}{r_f^h}\right)}$. Note that $e_m^{No\ Run} - \tau p \times \left(1 - \frac{r}{r_f^h}\right) - \theta a^* < e_m^{No\ Run} - \tau p \times \left(1 - \frac{r}{r_f^h}\right) < \frac{\theta}{(1-\epsilon)p} - \tau p \times \left(1 - \frac{r}{r_f^h}\right) < 0$ since $e_m^{No\ Run} < \frac{\theta}{(1-\epsilon)p}$ and $\theta < (1-\epsilon)\tau p\left(1 - \frac{r}{r_f^h}\right)$ meaning that that bank would also prefer to fold then hedge and partially reclassify.

The strategy of hedging and partially reclassifying will be better than fully window dressing if

$$p\epsilon e_m^{No\ Run} \geq p\tau\left(d - \frac{r}{r_f^h}\right) - (1-a^*)\theta \rightarrow e_m^{No\ Run} \geq \frac{\tau}{\epsilon}\left(d - \frac{r}{r_f^h} - \frac{(1-a^*)\theta}{\tau p}\right), \quad (7)$$

Intuitively, relative to fully window dressing, hedging and partly reclassifying yields an additional expected equity value of $p\epsilon e_m^{No\ Run}$ by preventing runs in the high-interest rate state. On the costs side it results in additional hedging cost equal to $p\tau\left(d - \frac{r}{r_f^h}\right)$ but also generates the reclassification cost savings of $(1-a^*)\theta$, since the bank now reclassifies less assets.

Proposition 1 summarizes this discussion.

Proposition 1: Consider banks, which can satisfy the regulatory capital constraint if they follow HTM accounting for all their assets ($1 - d = \bar{e}$). Then equilibrium strategies are the following:

(i) Fold: If $e_m^{No\ Run} < \frac{\theta}{(1-\epsilon)p}$ the bank will not hedge its assets nor engage in HTM accounting classification and will be closed by regulators in the high-rate state.

If $e_m^{No\ Run} \geq \frac{\theta}{(1-\epsilon)p}$ there are two possibilities:

(ii) "Window dress:" If $\frac{\theta}{(1-\epsilon)p} \leq e_m^{No\ Run} < \frac{\tau}{\epsilon}\left(d - \frac{r}{r_f^h} - \frac{(1-a^*)\theta}{\tau p}\right)$, where $a^* = \frac{1-d}{\left(1-\frac{r}{r_f^h}\right)}$, the bank will not hedge and will classify all its assets to HTM accounting.

(iii) "Hedge and partially reclassify" If $e_m^{No\ Run} \geq \frac{\theta}{(1-\epsilon)p}$ and $e_m^{No\ Run} \geq \frac{\tau}{\epsilon}\left(d - \frac{r}{r_f^h} - \frac{(1-a^*)\theta}{\tau p}\right)$ the bank will hedge receiving $\left(d - \frac{r}{r_f^h}\right)$ of capital in the high interest rate state and will classify $a^* = \left(\frac{1-d}{1-\frac{r}{r_f^h}}\right)$ of its assets to HTM accounting

Proof: Directly follows from our discussion above.

As Proposition 1 shows, the distinction between HTM and AFS accounting creates materially different incentives for banks' hedging behavior. Under AFS accounting—where unrealized gains and losses affect regulatory capital—banks face direct exposure of their capital ratios to market fluctuations. In this regime, hedging interest rate risk becomes an essential tool for stabilizing reported equity and avoiding regulatory intervention. Consequently, when HTM classification is unavailable, banks either fully hedge their portfolios to meet capital requirements when $e_m^{No\ Run} \geq \tau\left(d - \frac{r}{r_f^h} + \bar{e}\right)$ or otherwise do not hedge and face potential shutdown in adverse rate environments.

When HTM is available, the bank faces three strategic options: Fold, Window Dress, or Hedge and Partially Reclassify. The impact of HTM accounting on hedging differs depending on the bank's strength as measured by its equity position.

Weakest Banks: Proposition 1 shows that the weakest banks, those whose bank equity in the high-interest rate state in the absence of run and regulatory closure is sufficiently low $e_m^{No\ Run} < \frac{\theta}{(1-\epsilon)p}$, will not hedge and fold. Notably, these banks would also refrain from hedging in the absence of HTM accounting.[17] Hence, for the weakest banks, the introduction of HTM does not alter their hedging behavior.

Moderately Capitalized Banks: If $e_m^{No\ Run} \geq \frac{\theta}{(1-\epsilon)p}$ the banks hedge if also

i) $e_m^{No\ Run} \geq \tau\left(d - \frac{r}{r_f^h} + \bar{e}\right)$ in the absence of HTM

ii) $e_m^{No\ Run} \geq \frac{\tau}{\epsilon}\left(d - \frac{r}{r_f^h} - \frac{(1-a^*)\theta}{\tau p}\right)$ $a^* = \frac{1-d}{\left(1-\frac{r}{r_f^h}\right)}$ with HTM.

These equations show that the introduction of HTM accounting can cause some banks that would otherwise hedge not to do so, while at the same time encouraging other banks to hedge that would not have done so otherwise. If

$$\frac{\tau}{\epsilon}\left(d - \frac{r}{r_f^h} - \frac{(1-a^*)\theta}{\tau p}\right) > \tau\left(d - \frac{r}{r_f^h} + \bar{e}\right)$$

introduction of HTM lowers the range of equity value $e_m^{No\ Run}$, for which banks choose to hedge, making hedging less likely overall. This condition is more likely to hold when the cost of HTM accounting θ and the probability of a bank run, ϵ, are sufficiently small and the capital requirements, $\bar{e}$, are sufficiently high. Intuitively, if the probability of a bank run is not too high, then without HTM, regulatory capital constraints may compel some banks to hedge even when they would otherwise prefer not to. Once HTM becomes available, these banks may opt not to hedge—especially if the costs of HTM are low enough.

On the other hand, if the probability of a bank run, ϵ, is sufficiently high, and the costs of HTM accounting are low, HTM accounting can induce some banks to hedge that would otherwise choose not to. These are banks that are concerned about runs but whose equity values—absent a run and under high interest rates—are not high enough to justify hedging without HTM, particularly when capital requirements are sufficiently above zero. In such cases, hedging can help banks eliminate the risk of runs, while HTM accounting enables them to meet the remaining capital requirements.

Strong banks: The strong banks—those whose equity remains sufficiently high in the high-interest-rate state in the absence of a run or regulatory closure—hedge under both regimes, if they would

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[17] This is because $e_m^{No\ Run} < \frac{\theta}{(1-\epsilon)p} < \tau\left(d - \frac{r}{r_f^h} + \bar{e}\right) = \tau\left(1 - \frac{r}{r_f^h}\right)$ given that we assume that the costs of reclassification are sufficiently small so that $\theta < (1-\epsilon)\tau p\left(1 - \frac{r}{r_f^h}\right)$ holds, which violates the hedging condition (4).

otherwise face run risk. However, such banks are weakly better off under the HTM (strictly if $\bar{e} > 0$). This is because the capital requirements can be overly stringent for "strong banks,"—those with high bank franchise values. These banks hedge beyond what is necessary for avoiding runs. Under HTM-based capital requirements, these banks still hedge sufficiently to prevent runs but classify a portion of their assets as HTM to meet capital thresholds more efficiently. Notably, these banks can feasibly hold the reclassified securities to maturity under all sunspot realizations. This result resembles that in Kostić, Laux, and Muthsam (2024) who also find that loosening accounting rules can, under certain conditions, result in more cost-effective bank capital management policies.

In sum, the weakest banks do not hedge under either regime, as neither hedging nor reclassification is optimal when their equity in the high–interest-rate state is sufficiently low absent run and regulatory closure. The strong banks hedge under both regimes as long as they would otherwise face run risk, although HTM accounting allows them to satisfy capital requirements at lower cost when those requirements are excessively stringent. The most significant changes occur among moderately capitalized banks. When these banks perceive the probability of a run to be relatively low, the availability of HTM can erode their hedging incentives by offering a cheaper alternative to satisfy regulatory thresholds. Such banks often engage in "window dressing" by designating assets as HTM to meet capital requirements while avoiding costly hedging, thereby remaining exposed to runs. Conversely, for moderately capitalized banks that perceive a high probability of runs and face low reclassification costs, HTM can strengthen hedging incentives by allowing them to meet regulatory capital standards at lower cost while simultaneously mitigating run risk.

Finally, we note that the strongest banks, which do not face run risk in the high–interest-rate state ($\frac{r}{r_f^h} - d \geq 0$), do not need to hedge their assets under either regime. For such banks, the HTM reclassification can simply help them reduce the costs associated with capital regulation when it is excessive.

7.3 Recapitalization vs Hedging

Our stylized model shows that limited liability, combined with positive hedging costs, can weaken bank equity holders' incentives to mitigate run risk. In our framework, our emphasis was on ex-ante hedging decisions. It is straightforward to reinterpret our analysis as also offering insights into ex-post recapitalization. Within our framework, ex-post capital injections can be seen as equivalent to basic ex-ante insurance, provided that the expected net costs of recapitalization are comparable to the net costs associated with hedging.

To illustrate this equivalence in a simple example, suppose that after the high interest rate state is realize the banks can raise $\left(d - \frac{r}{r_f^h}\right)$ additional capital to prevent the bank run at the net "external financing" cost of $\tau\left(d - \frac{r}{r_f^h}\right)$. Note that the ex-ante cost of this strategy is $p\tau\left(d - \frac{r}{r_f^h}\right)$. Alternatively, as in our main framework the bank equity holders can buy the insurance contract, paying the bank $\left(d - \frac{r}{r_f^h}\right)$ in the high-interest rate states to eliminate the risk of runs, which also has a net cost of $p\tau\left(d - \frac{r}{r_f^h}\right)$. Given that the expected recapitalization costs are the same, the next expected benefits of

ex-ante hedging or ex-post recapitalization to equity holders are also identical. In other words, for any insurance cost, there is an equivalent recapitalization cost τ that delivers the same benefit. Hence, the conditions we derived above for whether bank would want to hedge ex-ante, would be identical to the ones governing the ex-post capitalization decision. Overall, our model illustrates how equity holders, protected by limited liability, may rationally engage in "gambling for resurrection"—underinsuring their assets and/or avoiding meaningful recapitalization in the hope that a run equilibrium does not materialize.

Our main empirical findings suggest that banks made very limited use of hedging. But the main insight on this section begs the question of whether banks might have found it relatively cheaper to forgo an ex-ante hedging program and instead plan to recapitalize ex-post. While this is plausible, our empirical evidence discussed in Section 5.3 does not support the possibility that banks injected substantial capital before, during, or after the monetary tightening.

7.5 Implications

The stylized framework outlined above carries several implications that we discuss below and confront with our empirical findings.

7.5.1 HTM Accounting Dilutes the Impact of Capital Regulation

Our model demonstrates that bank capital requirements can effectively mitigate run risk by enhancing banks' incentives to hedge their assets or bolster their capital. However, the efficacy of such regulations is contingent upon the definition of regulatory capital. For strong banks, HTM accounting allows them to satisfy capital requirements at lower cost when those requirements are excessively stringent, without endangering their stability. Among moderately capitalized banks, however, the option of HTM accounting can be exploited to attenuate the effects of capital regulation—whether explicit or implicit—thereby undermining its stabilizing role and increasing the likelihood of run risk. On the other hand, for some moderately capitalized banks that perceive a high probability of runs and face low reclassification costs, HTM can strengthen hedging incentives by allowing them to meet regulatory capital standards at lower cost while simultaneously eliminating run risk.

Empirically, the combination of limited hedging, minimal recapitalization, and extensive HTM use among weaker institutions we document is consistent with HTM accounting being mainly used for "full window dressing" rather than a stabilizing mechanism. As shown in Table 2 and Figure 9, weaker banks—those with lower capital ratios, higher uninsured deposit shares, and longer-duration assets—were significantly more likely to reclassify securities from AFS to HTM.[18] By doing so, these institutions avoided recognizing roughly $175 billion in unrealized losses without reducing underlying

[18] Our framework can be readily extended to examine how incentives to hedge or raise capital vary with asset duration and funding structure. Following Jiang et al. (2024), this can be done by distinguishing between shorter- and longer-duration assets and by incorporating the share of uninsured deposits on the liability side. All else equal, banks with lower capitalization, longer-duration assets, and higher shares of uninsured deposits face—absent hedging or recapitalization—greater interest rate exposure and are therefore more vulnerable to runs and to declines in their regulatory capital when rates rise.

risk exposure. Moreover, these same banks generally refrained from hedging—and in some cases reduced their hedging activity—as interest rates rose, consistent with the opportunistic use of HTM to mask losses rather than to manage capital prudently.

Interpreted through the lens of our model, this pattern suggests that many U.S. banks are moderately capitalized and perceive the probability of runs as relatively low, conditions under which HTM accounting erodes hedging incentives by providing a cheaper means of meeting regulatory thresholds. This perception of low run risk may also reflect expectations of regulatory intervention, which, if incorporated in our framework, would further weaken incentives to hedge. Overall, while our framework accommodates both stabilizing and opportunistic roles of HTM accounting, the empirical evidence indicates that the "window dressing" mechanism dominated during the recent monetary tightening episode.

7.5.2 Implications for Bank Capital Regulation

Our model does not directly delve into the welfare implications of bank capital regulation, as such analysis goes beyond the scope of our simple stylized framework. Nonetheless, our framework offers several insights that could be pertinent in this context.

First, our model clarifies how accounting rules and capital regulation jointly shape banks' incentives to hedge, recapitalize, or reclassify assets in the presence of higher-interest-rate-induced run risk. These insights could be useful input in regulatory analysis and also apply to other shocks that can induce solvency risk (such as credit shocks).

Second, our framework offers a rationale for HTM accounting that departs from the traditional justification of offsetting asset value fluctuations with deposit franchise value. In our framework, HTM accounting serves as a tool for easing capital requirements when hedging and recapitalization are costly. However, strong and moderately capitalized banks use this flexibility differently: strong banks employ it to avoid unnecessary hedging or capital raising, while weaker banks may exploit it to circumvent regulatory constraints.

Third, it may be desirable for regulators to incentivize bank equity holders to hedge or raise more capital than they would choose on their own, particularly given the externalities associated with bank failures or underpriced deposit insurance (e.g., see Calomiris et al. 2019). Capital requirements can help achieve this goal. However, as discussed above, the effectiveness of such regulation critically depends on how regulatory capital is defined.

We briefly discuss another alternative of computing capital requirements, which accounts for the franchise value of the bank. Using the market value of equity in the case of no run, $e_m^{No\ Run}$, can dilute the effects of bank capital requirements on incentives to raise capital. To understand it in the simple example, consider the case when the deposit franchise value perfectly hedges the asset value changes due to higher interest rates (similar to Dreschler et al. 2021). Then, the regulatory bank capital will be invariant to interest rates, despite increased run risk. What is critical therefore is an assessment that compares marked-to-market value of all bank assets with the book value of its non-equity liabilities,

$\frac{r}{r_f} - d$, which represents the bank run threshold. In the refined version of our model, where a portion of deposits is not runnable (such as insured deposits and some uninsured ones), the run condition would involve comparing the market value of bank assets and the remaining deposit franchise value with the face value of runnable (uninsured) deposits, as outlined by Jiang et al. (2024). However, implementing such assessments in practice can be challenging, as it is difficult to accurately determine the remaining deposit franchise value during a partial run.

Fourth, our analysis shows that HTM accounting can also dilute the effects of such capital regulation when banks are afforded discretion in determining the valuation of their assets (e.g., book vs market value). It suggests that strengthening regulations governing the utilization of HTM accounting practices could therefore enhance the effectiveness of bank capital requirements in mitigating the risk of bank runs.

Finally, our framework can be extended in several directions to speak more directly to welfare. First, one can introduce a social loss function that captures the expected costs of runs (including externalities) alongside the private benefits and costs of hedging and recapitalization. In this extension, a strictly positive capital requirement $\bar{e} > 0$ can endogenously improve welfare when private choices under-internalize run externalities. However, some banks may face "excessive" requirements if the regulator observes equity imprecisely—for example, through a noisy signal of $e_m^{No\ Run}$. This would result in stringent rules binding for banks that would have hedged in the absence of regulation. In such cases, HTM flexibility serves as a relief valve that reduces deadweight compliance costs. On the other hand, HTM rules may also erode hedging incentives for weaker, moderately capitalized banks.

A welfare-oriented regulator would aim to limit the deadweight costs of runs while considering the costs of hedging and recognizing that capital regulation is an imperfect tool for achieving this balance. Allowing some HTM flexibility can therefore improve outcomes by mitigating these inefficiencies. On the other hand, HTM rules may also weaken hedging incentives for weaker banks, increasing vulnerability to shocks. The model thus would feature the following trade-off: while HTM flexibility can reduce inefficiencies from imperfect regulation, it may also dampen market discipline and exacerbate risk-taking incentives.

8 Conclusion

We examine how banks managed interest rate risk during the 2022 monetary tightening, which triggered a sharp rise in rates and a corresponding decline in the value of long-duration assets. Using data from call reports and SEC filings, we find that banks primarily relied on HTM accounting and asset reclassification to shield book capital from the impact of rising rates, rather than hedging against the fall in market asset values. We show that the trade-off associated with HTM accounting depends on asset strength: stronger banks use it to avoid overly stringent capital requirements, while weaker banks may use it to "window dress" their capital positions—leaving them exposed to run risk.

More broadly, our model underscores that capital requirements can prevent bank runs if they are rigorously and dynamically enforced—particularly in the wake of interest rate increases. However, the definition of regulatory capital is equally critical. Our analysis raises several considerations that extend

beyond the formal scope of the model. While accounting standards permit HTM classification only when banks intend and are able to hold assets to maturity, our framework highlights how weaker, moderately capitalized banks may exploit HTM accounting to "window dress" capital positions—especially when regulators are unable or unwilling to enforce this criterion. In a run scenario, such banks would be unable to hold HTM assets to maturity, exposing the fragility behind the accounting treatment.

If regulators could identify banks vulnerable to runs and restrict their ability to classify assets as HTM, it would curb the perverse incentives to under-hedge or under-capitalize. Implementing this would require credible screening criteria—such as those proposed by Jiang et al. (2024) or similar measures. [19] At the more radical end of the policy spectrum, one might consider eliminating HTM accounting entirely. However, our model also shows that AFS-based capital requirements come with their own costs, particularly for stronger banks that may be forced to overcapitalize or over-hedge.

[19] Such capital and risk-management regulations should also take into account ability of banks to finance their loans off balance sheets through loan sales and non-bank institutions (shadow banks) that provide several services like banks and have gained market share that reflects in part the regulatory actions on banks as well as (see Buchak et al. 2018, 2024). These institutions are predominantly financed with short-term uninsured debt, but they are also significantly better capitalized than banks on average (Jiang et al. 2020). See Corbae and D'Erasmo (2021), Begenau and Landgvoit (2022), and Buchak et al. (2024), for recent quantitative studies of impact of regulatory policies on banks.

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Table 1: Summary Statistics

The top panel of the table shows aggregate statistics based on banks' hedging activity in 2021:Q4. The samples are based on call reports and 10Ks/10Qs. The bottom two panels of the table present the statistics using average values of all the banks in each category as of 2021:Q4. The numbers in parentheses are standard deviations. The second panel uses call reports. The first three rows in this panel are based on a sample of banks that are required to report rate swaps. The last three rows in this panel are based on a sample of banks that report non-zero interest rate swaps. The third panel uses 10K/10Q filings. It is based on a sample of publicly traded banks that report hedges in their 10K/10Q filings. We remove outliers by winsorizing the full sample at 5th and 95th percentiles. Column 1 shows these statistics for all the banks, column 2 for banks with assets below 10 billion, column 3 for banks with assets above 10 billion but below 250 billion, and column 4 for banks with assets above 250 billion. Data Sources: Bank Call Reports, 10Qs, and 10Ks.

	(1) All Banks	(2) Asset <10B	(3) Asset [10B,250B]	(4) Asset >250B
Assets of FDIC-insured banks	23.5T	3.4T	6.9T	13.2T
Assets of banks required to report rate swap	22.0T	1.8T	6.9T	13.2T
# Banks required to report rate swap	1,271	1,117	141	13
Assets of banks w/ non-zero rate swap	16.9T	0.7T	3.8T	12.4T
# Banks w/ non-zero rate swap	290	203	76	11
Assets of publicly traded banks w/ hedge	7.4T	0.3T	2.8T	4.4T
# Publicly traded banks w/ hedge	98	48	44	6
Assets of publicly traded banks reported duration	5.0T	0.1T	1.5T	3.4T
# Publicly traded banks reported duration	62	27	31	4
Rate Swap/Asset	0.9	0.7	2.1	3.0
	(2.1)	(1.9)	(2.8)	(2.9)
Rate Swap/Security	5.7	4.6	13.1	16.8
	(14.4)	(13.1)	(19.9)	(20.1)
Rate Swap/AFS Security	7.7	6.1	17.8	24.9
	(19.9)	(18.0)	(27.3)	(28.2)
Rate Swap/Asset | Non-Zero Rate Swap	3.8	3.8	3.8	3.6
	(2.7)	(2.7)	(2.7)	(2.8)
Rate Swap/Security | Non-Zero Rate Swap	24.3	24.6	24.2	19.9
	(20.7)	(20.5)	(21.5)	(20.4)
Rate Swap/AFS Security | Non-Zero Rate Swap	31.8	31.6	32.8	29.4
	(29.4)	(29.5)	(29.7)	(28.4)
Hedge/Asset	5.4	5.3	5.0	8.7
	(4.8)	(4.8)	(4.7)	(3.7)
Hedge/Security	36.1	43.9	28.4	30.6
	(40.5)	(47.6)	(32.7)	(15.8)
Hedge/AFS Security	44.9	52.2	36.6	46.9
	(46.4)	(52.6)	(39.8)	(31.3)
Duration	4.6	4.6	4.5	5.9
	(1.4)	(1.2)	(1.0)	(3.6)

Table 2: Bank Fragility and Hedging Changes

This table reports the coefficients of OLS regressions examining the relation between measures of bank fragility and banks' decisions to sell (or close) their hedging positions during 2022. The dependent variable is the cumulative change of non-trading interest rate swaps to asset ratios from 2021:Q4 to 2022:Q4. Panel A uses the sample that restricts to banks that had positive hedging swaps at least once during this period. Panel B uses the full sample of banks. Equity ratio is equity divided by total assets. Uninsured leverage ratio is uninsured deposits divided by assets. % Long Term securities is the ratio between total securities with maturity or repricing exceeding 15 years and the total securities. In all specifications, we include log asset values as a control. We winsorize equity ratio at the 99 percentile to adjust a few extreme outliers with very large capitalization ratios. All explanatory variables are scaled by sample standard deviation. Standard errors are presented in parentheses and are clustered at the state level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: Non-Zero Hedging Swaps Sample

	Change of Interest Rate Swaps/Assets During 2022			
	(1)	(2)	(3)	(4)
Equity Ratio	1.906***			1.896***
	(0.363)			(0.354)
Uninsured Leverage Ratio		-0.665*		-0.614*
		(0.386)		(0.363)
% Long Term securities			-1.287***	-1.272***
			(0.372)	(0.355)
Observations	300	300	300	300
Adjusted R^2	0.087	0.012	0.040	0.128

Panel B: Full Sample

	Change of Interest Rate Swaps/Assets During 2022			
	(1)	(2)	(3)	(4)
Equity Ratio	0.161*			0.198
	(0.097)			(0.142)
Uninsured Leverage Ratio		-0.246**		-0.209*
		(0.109)		(0.115)
% Long Term securities			-0.385***	-0.369***
			(0.100)	(0.100)
Observations	1211	1211	1174	1174
Adjusted R^2	0.001	0.003	0.012	0.016

Table 3: Bank Fragility and Reclassification into HTM

This table reports the coefficients of OLS regressions examining the relation between measures of bank fragility and banks' decision to transfer assets from AFS to HTM. The dependent variable in Panel A is a dummy variable that takes the value of one if the bank reclassified assets from AFS to HTM between 2021 and 2022. The dependent variable in Panel B is the ratio between the total amount of transferred securities and total securities in the AFS and HTM portfolios. Tier 1 Capital Ratio is Tier 1 capital divided by total assets. We winsorize the Tier 1 Capital Ratio variable at the 99 percentile to adjust a few extreme outliers with very large capitalization ratios. % Uninsured Deposits is the ratio between uninsured deposits and total deposits. % Long Term securities is the ratio between total securities with maturity or repricing exceeding 15 years and the total securities. Baseline controls include a set of indicator variables for asset percentile and controls for the share of AFS securities in banks' securities portfolios and for the percentage of securities in total assets. Standard errors are presented in parentheses and are clustered at the state level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: Dummy Variable for Reclassification to HTM

	(1)	(2)	(3)	(4)	(5)
	I(Reclassification to HTM)=1				
Tier 1 Capital Ratio	-0.007***				-0.020***
	(0.001)				(0.003)
% Uninsured Deposit		0.086***		0.019	0.100***
		(0.024)		(0.024)	(0.029)
% Long Term Securities			0.109***	-0.024	0.097***
			(0.019)	(0.038)	(0.018)
% Long Term Securities × % Uninsured Deposits				0.332***	
				(0.098)	
Share of AFS Securities					0.008
					(0.007)
Securities (% Assets)					0.110***
					(0.020)
Observations	5027	4978	4850	4818	4818
Adjusted R^2	0.097	0.099	0.109	0.116	0.120
Asset Percentile	Yes	Yes	Yes	Yes	Yes

Panel B: % Assets Reclassified to HTM

	(1)	(2)	(3)	(4)	(5)
	% Assets Reclassified to HTM				
Tier 1 Capital Ratio	-0.006***				-0.011***
	(0.002)				(0.002)
% Uninsured Deposit		0.058**		0.020	0.061**
		(0.028)		(0.027)	(0.028)
% Long Term Securities			0.064***	-0.002	0.059***
			(0.015)	(0.027)	(0.015)
% Long Term Securities × % Uninsured Deposits				0.163**	
				(0.061)	
Share of AFS Securities					0.008
					(0.007)
Securities (% Assets)					0.033**
					(0.016)
Observations	4853	4821	4850	4818	4818
Adjusted R^2	0.014	0.016	0.020	0.023	0.024
Asset Percentile	Yes	Yes	Yes	Yes	Yes

Table 4: FHLB and Reclassification into HTM

This table reports the coefficients of OLS regressions examining how use of FHLB funding mediates the relation between measures of bank fragility and banks' decision to transfer assets from AFS to HTM. The dependent variable in Panel A is a dummy variable that takes the value of one if the bank reclassified assets from AFS to HTM between 2021 and 2022. The dependent variable in Panel B is the ratio between the total amount of transferred securities and total securities in the AFS and HTM portfolios. The main variables of interest are interactions between a dummy variable that take the value of one if the bank obtains funding from the FHLB between 2021Q1 and 2023Q2 and our measures of Tier 1 Capital Ratio, % Uninsured Deposits, and % Long Term Securities. Baseline controls include a set of indicator variables for asset percentile. We winsorize the Tier 1 Capital Ratio variable at the 99 percentile to adjust a few extreme outliers with very large capitalization ratios. Standard errors are presented in parentheses and are clustered at the state level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	I(Reclassification to HTM)=1			% Assets Reclassified to HTM		
Tier 1 Capital Ratio	-0.002*			-0.002		
	(0.001)			(0.001)		
FHLB Bk.	0.010*	-0.039***	-0.009**	0.006	-0.036**	-0.008
	(0.005)	(0.011)	(0.004)	(0.006)	(0.015)	(0.007)
Tier 1 Capital Ratio × FHLB Bk.	-0.023***			-0.015**		
	(0.007)			(0.006)		
% Uninsured Deposits		0.001			-0.018	
		(0.020)			(0.024)	
% Uninsured Deposits × FHLB Bk.		0.145***			0.124***	
		(0.031)			(0.038)	
% Long Term Securities			0.034			0.007
			(0.023)			(0.019)
% Long Term Securities × FHLB Bk.			0.093***			0.071***
Observations	4,999	4,956	4,832	4,835	4,805	4,832
Adjusted R^2	0.098	0.102	0.109	0.014	0.018	0.021

Table 5: External Scrutiny and Reclassification into HTM

This table reports the coefficients of OLS regressions examining how auditors and supervisory agencies mediate the relation between measures of bank fragility and banks' decision to transfer assets from AFS to HTM. The dependent variable in Panel A is a dummy variable that takes the value of one if the bank reclassified assets from AFS to HTM between 2021 and 2022. The dependent variable in Panel B is the ratio between the total amount of transferred securities and total securities in the AFS and HTM portfolios. The main variables of interested are dummy variables that take the value of one if the banks is audited by a big-4 auditing firm or if the bank is primarily regulated by the OCC, FDIC, and Federal Reserve. Fragile Bk is a dummy that takes the value of one if the bank is in the top decile of the distribution of the share of uninsured deposits and of the distribution of the share of long-term securities, Baseline controls include a set of indicator variables for asset percentile and controls for the share of AFS securities in banks' securities portfolios and for the percentage of securities in total assets. Standard errors are presented in parentheses and are clustered at the state level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels.

Panel A: Dummy Variable for Reclassification to HTM

	(1)	(2)	(3)	(4)
Big4Auditor	-0.012			
	(0.041)			
Big4Auditor × Fragile Bk.	0.145			
	(0.179)			
OCC		-0.008		
		(0.006)		
OCC × Fragile Bk.		-0.190**		
		(0.078)		
FDIC			0.009*	
			(0.005)	
FDIC × Fragile Bk.			0.100	
			(0.082)	
Federal Reserve				0.012
				(0.008)
Federal Reserve × Fragile Bk.				0.117
				(0.137)
Observations	1964	4818	4818	4818
Adjusted R^2	0.134	0.122	0.121	0.121

Panel B: % Assets Reclassified to HTM

	(1)	(2)	(3)	(4)
Big4Auditor	-0.042***			
	(0.015)			
Big4Auditor × Fragile Bk.	0.001			
	(0.081)			
OCC		-0.005		
		(0.005)		
OCC × Fragile Bk.		-0.073**		
		(0.034)		
FDIC			-0.001	
			(0.005)	
FDIC × Fragile Bk.			0.031	
			(0.057)	
Federal Reserve				0.013
				(0.008)
Federal Reserve × Fragile Bk.				0.061
				(0.117)
Observations	1964	4818	4818	4818
Adjusted R^2	0.040	0.024	0.023	0.024

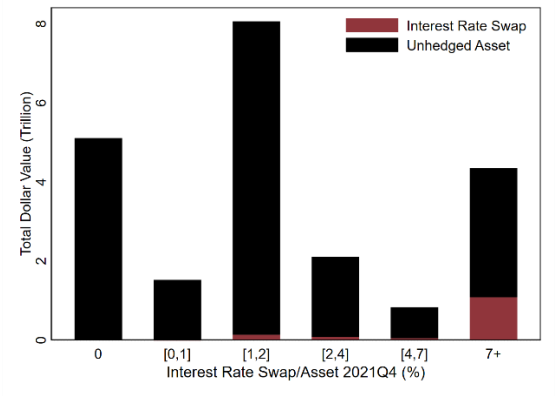
Table 6: Hedging and HTM Security

This table reports the coefficients of OLS regressions examining the relation between hedging and banks' holding of HTM securities. The dependent variable is interest rate swap to asset ratios. Share of HTM Securities measures the share of securities classified as HTM out of total securities. Reclassification to HTM takes the value of one if the bank reclassified assets from AFS to HTM between 2021 and 2022. % Assets Reclassified to HTM is the ratio between the total amount of reclassified securities and total securities in the AFS and HTM portfolios. Tier 1 Capital Ratio is Tier 1 capital divided by total assets. % Uninsured Deposits is the ratio between uninsured deposits and total deposits. % Uninsured Deposits is the ratio between uninsured deposits and total deposits. % Long Term securities is the ratio between total securities with maturity or repricing exceeding 15 years and the total securities. Securities (% Assets) is the security to asset ratio. Baseline controls include a set of indicator variables for asset percentile. We winsorize the Tier 1 Capital Ratio variable at the 99 percentile to adjust a few extreme outliers with very large capitalization ratios. Standard errors are presented in parentheses and are clustered at the state level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

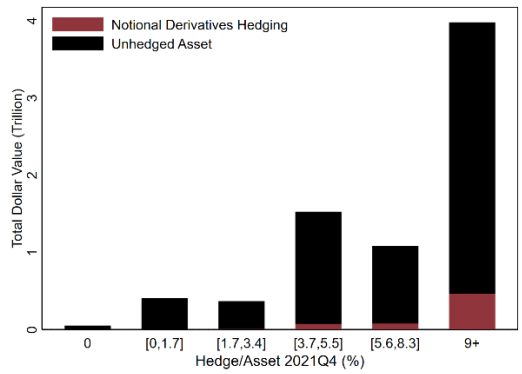
	(1)	(2)	(3)	(4)
	Interest Rate Swap / Asset			
Share of HTM Securities	0.006	0.009		
	(0.019)	(0.009)		
Reclassification to HTM			0.003	
			(0.005)	
% Assets Reclassified to HTM				-0.000
				(0.003)
Securities (% Assets)	-0.039	0.072*	0.073**	0.073**
	(0.025)	(0.036)	(0.036)	(0.036)
Tier 1 Capital Ratio	-0.018*	-0.033*	-0.032	-0.032
	(0.009)	(0.019)	(0.019)	(0.020)
% Uninsured Deposits	-0.034**	-0.065	-0.066	-0.068
	(0.013)	(0.046)	(0.045)	(0.045)
% Long Term Securities	0.026	-0.027	-0.025	-0.026
	(0.021)	(0.031)	(0.030)	(0.030)
Observations	2392	2386	2386	2386
Adjusted R^2	0.019	0.799	0.799	0.799
Asset Ptile Dummies	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Bank FE	No	Yes	Yes	Yes

Figure 1: Aggregate Hedged and Unhedged Asset Value – 2021

This figure plots the aggregate hedged and unhedged asset values based on 2021:Q4 call reports (Panel a) and 2021:Q4 10Ks and 10Qs (Panel b). In Panel (a), the red bars indicate the total notional value of interest rate swaps of all banks in each hedging ratio bucket. The black bars indicate the total unhedged assets of all banks in each hedging ratio bucket, where unhedged assets are calculated as total assets minus the notional value of interest rate swaps. In Panel (b), the red bars indicate the notional value of hedges of all banks in each hedging ratio bucket. The black bars indicate the total unhedged asset value of all banks in each hedging ratio bucket, where unhedged asset value is calculated as total assets minus the notional value of hedge. In both panels, the first bucket includes banks with zero notional value of hedge, and the remaining hedging ratio buckets are constructed by dividing banks with non-zero hedging into 5 equal-sized groups based on their hedging ratios in 2021:Q4. *Data Sources*: Bank Call reports and 10Ks and 10Qs.



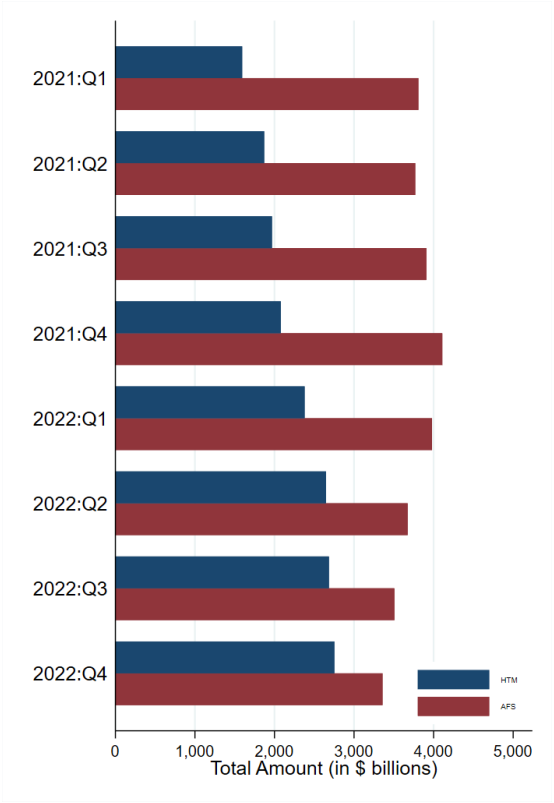
(a) Interest Rate Swap/Asset (call reports)



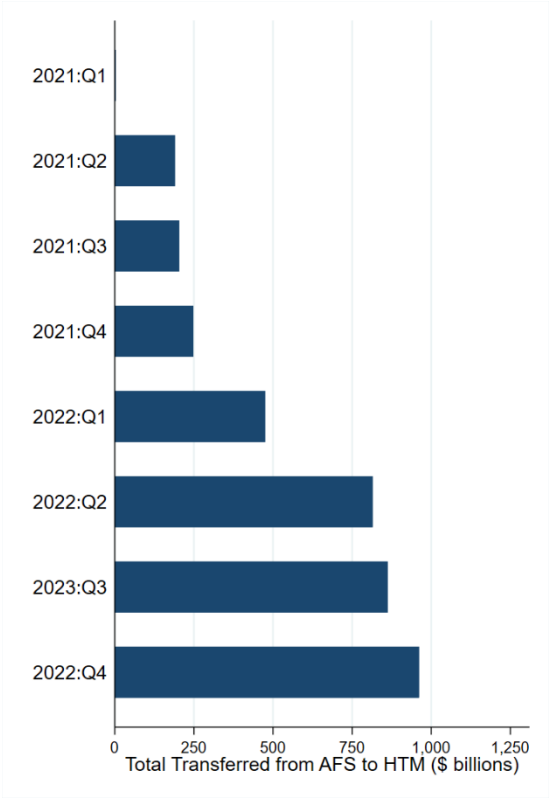
(b)) Hedge/Asset (10K)

Figure 2: Aggregate Securities Classified as Held-to-Maturity (HTM) and Available-for-Sale (AFS)

This figure plots the breakdown of Total Securities between HTM and AFS (Panel A) and the total amounts of securities being reclassified from AFS to HTM by U.S Banks (Panel B). *Data Sources:* Bank Call reports, bank holding company 10Qs, and 10Ks.



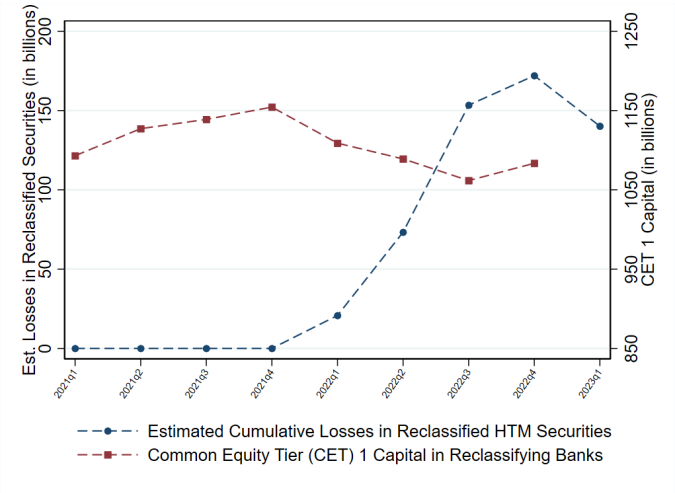
(a) Total AFS and HTM securities



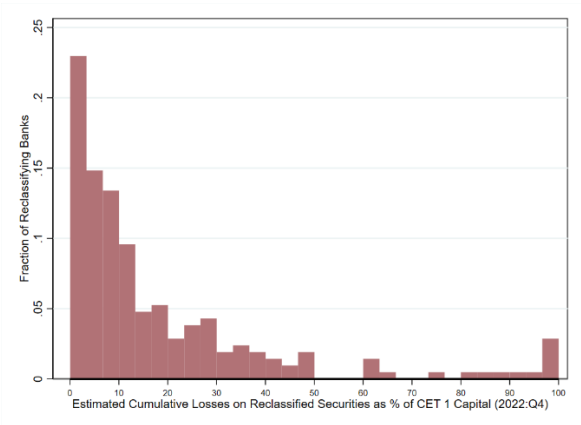
(b) Total amounts reclassified

Figure 3: Estimated Losses on Reclassified Securities

This figure presents the estimated losses on reclassified securities. Panel A shows the time series of the estimated cumulative losses on reclassified HTM securities and the common equity tier (CET) 1 capital of banks that reclassified their securities. Panel B shows the histogram of the estimated losses on reclassified securities for each bank as a fraction of their respective CET1 capital at the end of 2022. *Data Sources:* Bank call reports.



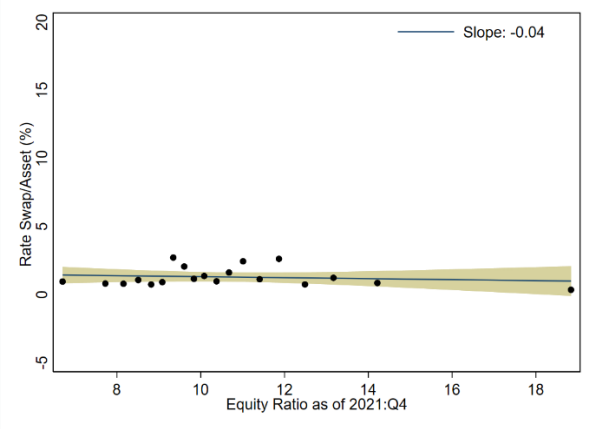
(a) Time Series



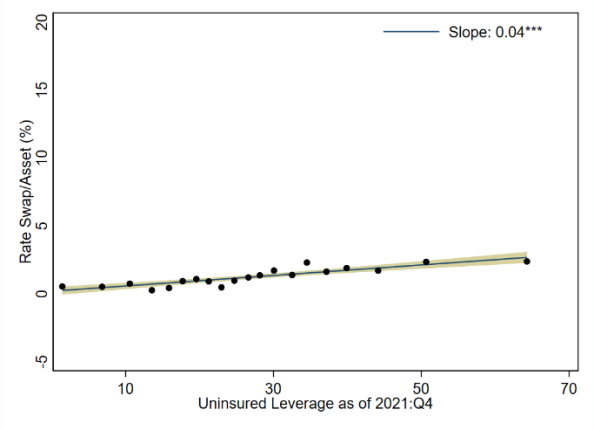
(b) Histogram

Figure 4: Bank Use of Interest Rate Swaps --- Net Margin

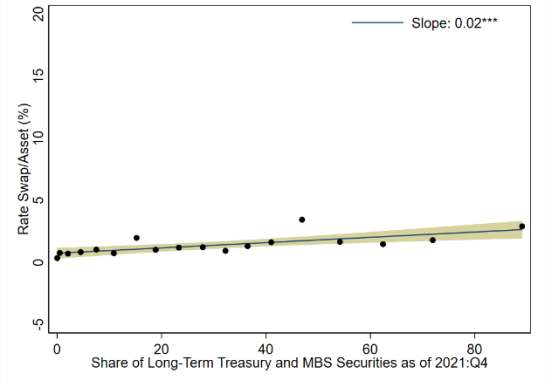
This figure presents binned scatterplot of 2021Q4 hedging against equity ratio (Panel A), uninsured leverage ratio (Panel B), and long-term security ratio (Panel C) as of 2021:Q4. Uninsured leverage is calculated as uninsured deposit divided by total asset as in Jiang et al. (2020). Long-term security ratio is the ratio between total securities with maturity or repricing exceeding 15 years and the total securities. The underlying sample includes all banks that are required to report their use of interest rate swaps in 2021Q4. We divide sample into 20 equal-sized bins and plot the average interest rate swaps to asset ratio in each bin against the average equity ratio, uninsured leverage ratio, and long-term security ratio in that bin, respectively. The shaded area shows the 95% confidence interval. The slope and statistical significance are reported in each panel (with ***, ** and * implying significance at 1%, 5% and 10% levels respectively). *Data Sources*: Bank call reports in 2021:Q4.



(a) Equity/Asset



(b) Uninsured Leverage



(c) Long-Term Security/Asset

Figure 5: Time Series Change in Hedges

This figure plots quarterly hedging growth relative to 2021:Q4 using hedging information from 10K and 10Q. It plots the growth from 2022:Q1 till 2022:Q4. Hedging growth is calculated as change in interest rate swap to asset ratios obtained from bank call reports. We divide banks into four equal-sized bins based on their hedge/asset growth from 2022:Q1 to 2022:Q4 and plot the average value of banks in each bin every quarter. We do the same exercise for SVB and plot the evolution of its hedging ratios over the same time period. *Data Sources:* Bank call reports.

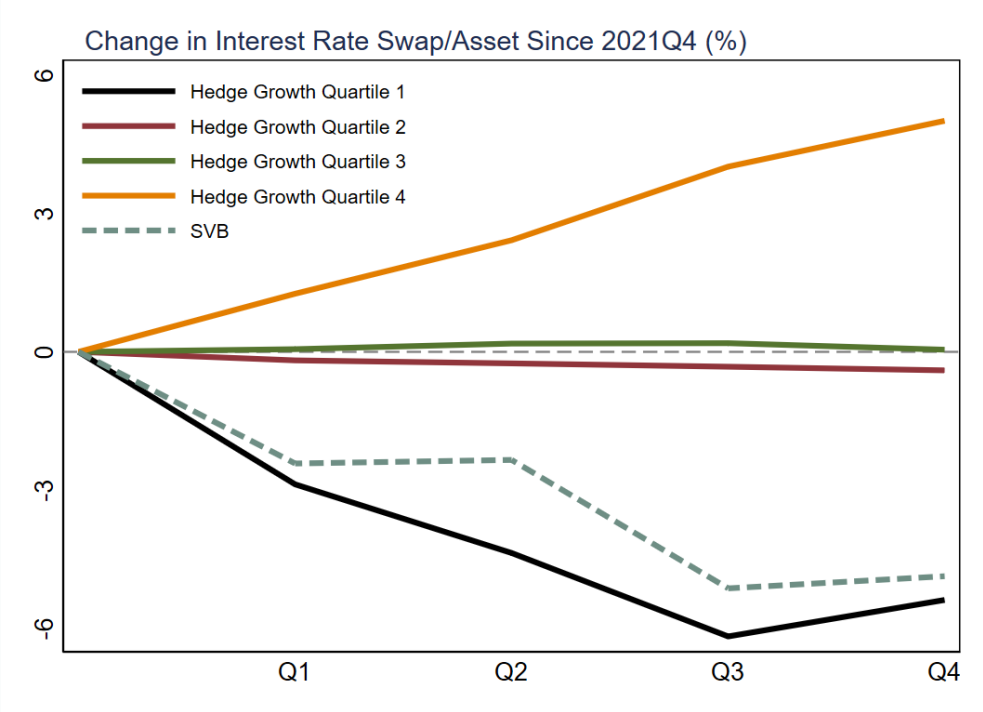
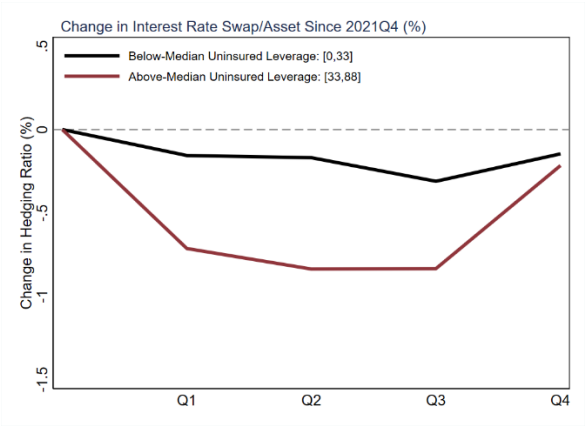
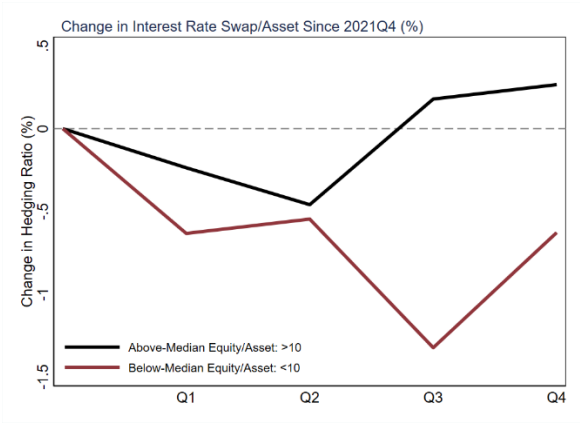


Figure 6: Change in Hedging by Bank Balance Sheet Characteristics

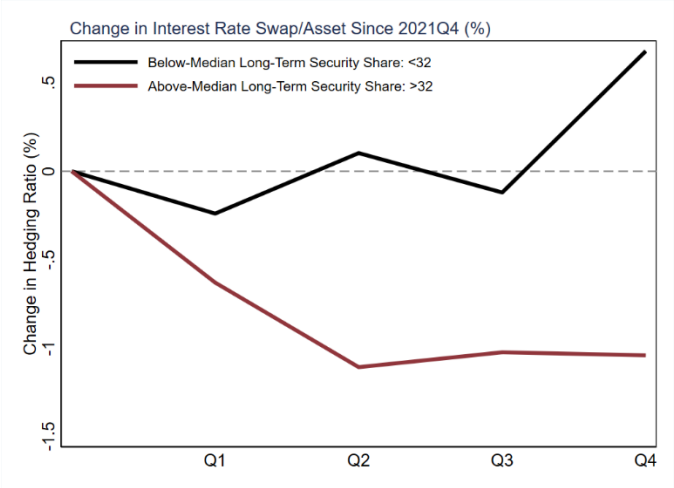
This figure plots quarterly hedging growth relative to 2021:Q4 using interest rate swap to asset ratio. It plots the growth from 2022:Q1 till 2022:Q4. In Panel (a), we divide banks into two equal-sized bins based on their uninsured leverage ratios in 2021:Q4. In Panel (b), we divide banks into two equal-sized bins based on their equity to asset ratio in 2021:Q4. In Panel (c), we divide banks into two equal-sized bins based on their long-term security to asset ratio in 2021:Q4. In all panels, we plot the mean value of banks in each bin. *Data Sources:* Bank call reports.



(a) Uninsured Leverage



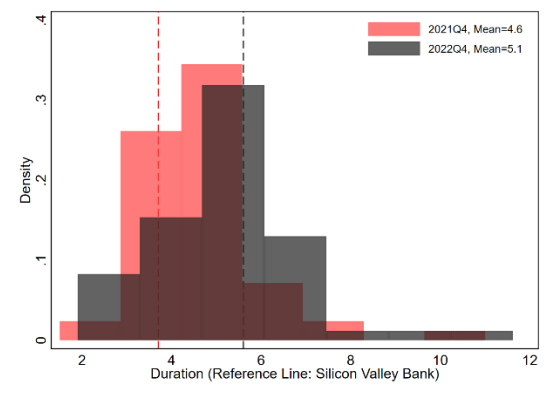
(b) Equity/Asset 2021Q4



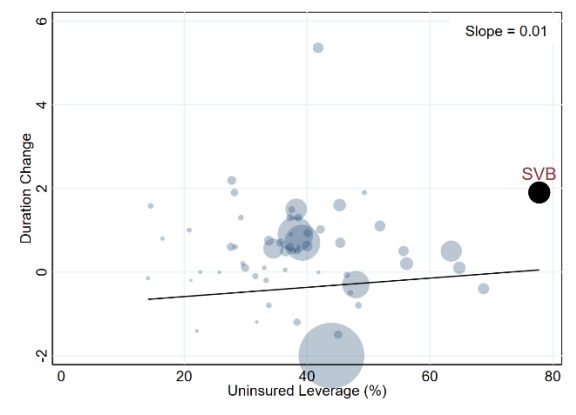
(c) Long-Term Security/Asset

Figure 7: Duration

This figure plots duration of assets of publicly traded banks as reported in their 10K and 10Q. Panel (a) plots the histograms (density) of asset duration in 2021:Q4 and 2022:Q4. The reference lines in Panel (a) indicate Silicon Valley Bank's (SBV) values. SVB's duration in 2021:Q4 is 3.7 and in 2022:Q4 is 5.6. Panel (b) plots the change in asset duration from 2021:Q4 to 2022:Q4 against uninsured leverage ratio in 2021:Q4. In Panel (b), the bubble size indicates bank asset size in 2021:Q4. SVB is labeled in the plot. The line in panel(b) is the best fit lines based on weighted least squares. The slope and statistical significance are reported in each panel (with ***, ** and * implying significance at 1%, 5% and 10% levels respectively). *Data Sources:* Bank call reports and 10Ks and 10Qs



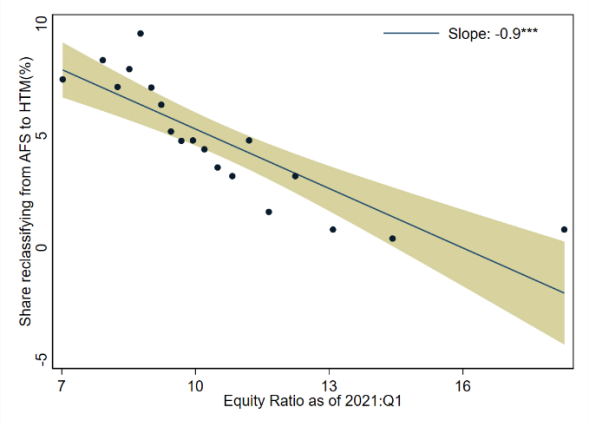
(a) Duration Distribution



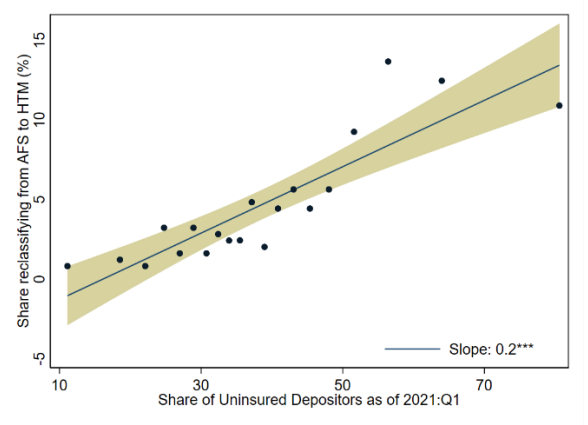
(b) Change in Duration

Figure 8: Bank Fragility and Reclassification of Securities to HTM

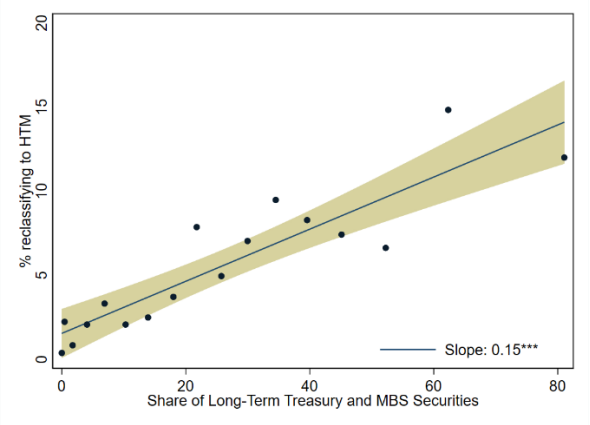
This figure presents binned scatterplot of the propensity to reclassify assets from AFS to HTM against equity ratio (Panel A), uninsured leverage ratio (Panel B), and long-term security ratio (Panel C) in 2021Q1. We divide sample into 20 equal-sized bins and plot the share of reclassifying banks in each bin against the average equity ratio, uninsured leverage ratio, and long-term security ratio in that bin, respectively. The shaded area shows the 95% confidence interval. The slope and statistical significance are reported in each panel (with ***, ** and * implying significance at 1%, 5% and 10% levels respectively). *Data Sources*: Bank call reports in 2021:Q4.



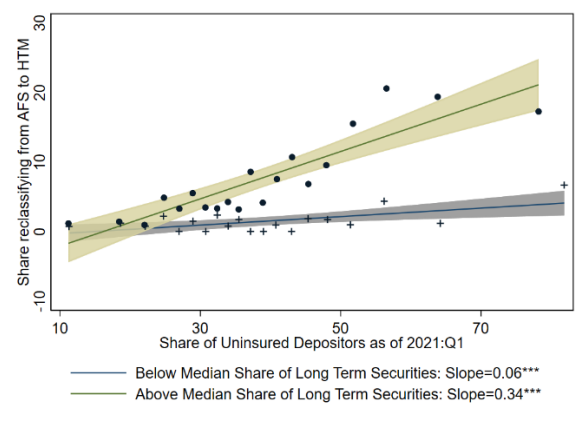
(a) Equity/Asset



(b) Uninsured Leverage



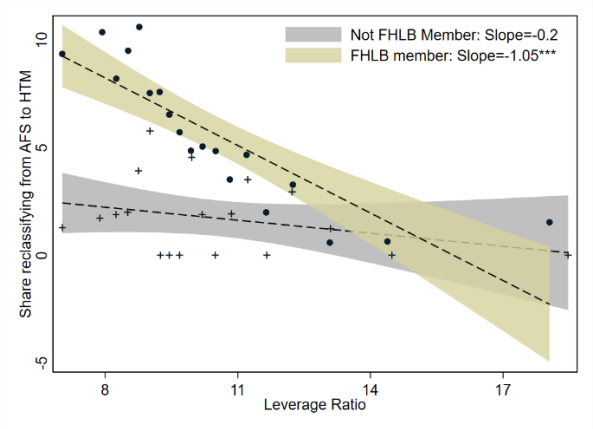
(c) Long-Term Security/Asset



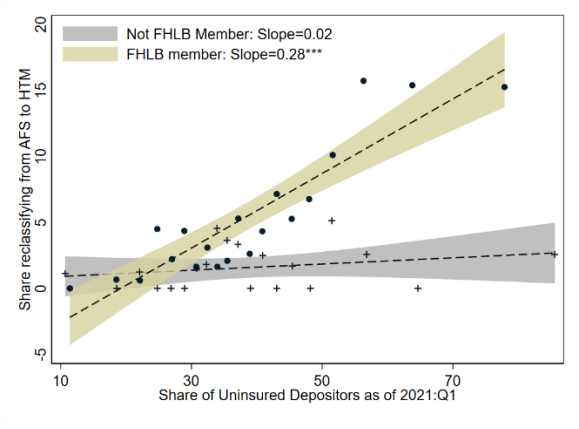
(d) Long-Term Security/Asset x Uninsured

Figure 9: FHLB Capital Requirements, Bank Fragility, and Reclassification of Securities to HTM

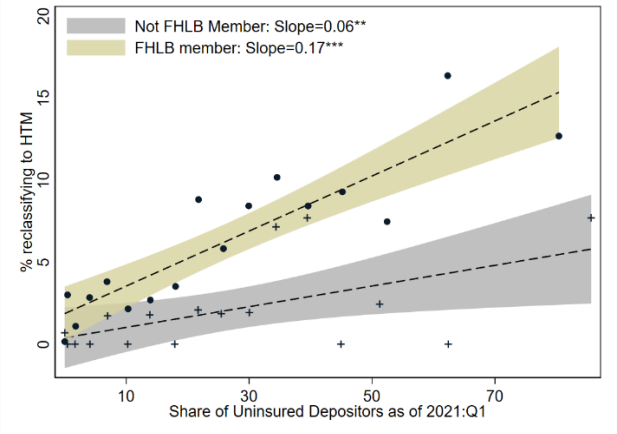
This figure plots reclassification rates and measures of bank fragility separately for banks that obtained FHLB advances at any point between 2021Q1 and 2023Q2 and for those that did not. Each panel presents binned scatterplot of the propensity to reclassify assets from AFS to HTM against equity ratio (Panel A), uninsured leverage ratio (Panel B), and long-term security ratio (Panel C) in 2021Q1. We divide sample into 20 equal-sized bins and plot the share of reclassifying banks in each bin against the average equity ratio, uninsured leverage ratio, and long-term security ratio in that bin, respectively. The shaded area shows the 95% confidence interval. The slope and statistical significance are reported in each panel (with ***, ** and * implying significance at 1%, 5% and 10% levels respectively). *Data Sources*: Bank call reports in 2021:Q4.



(a) Equity/Asset



(b) Uninsured Leverage



(c) Long-Term Security/Asset

Internet Appendix

Table of Contents

APPENDIX A: TABLES AND FIGURES

TABLE A1: SUMMARY STATISTICS – 2022

The top panel of the table shows aggregate statistics based on banks' hedging activity in 2022:Q4. The samples are based on call reports and 10Ks/10Qs. The bottom two panels of the table present the statistics using average values of all the banks in each category as of 2022:Q4. The numbers in parentheses are standard deviations. The second panel uses call reports. The first three rows in this panel are based on a sample of banks that are required to report rate swaps. The last three rows in this panel are based on a sample of banks that report non-zero interest rate swaps. The third panel uses 10K/10Q filings. It is based on a sample of publicly traded banks that report hedges in these filings. We remove outliers by winsorizing the full sample at 5th and 95th percentiles. Column 1 shows these statistics for all the banks, column 2 for banks with assets below 10 billion, column 3 for banks with assets above 10 billion but below 250 billion, and column 4 for banks with assets above 250 billion. *Data Sources*: Bank Call Reports, 10Qs, and 10Ks.

	(1) All Banks	(2) Asset <10B	(3) Asset [10B,250B]	(4) Asset >250B
Assets of FDIC-insured banks	23.6T	3.4T	7.1T	13.1T
Assets of banks required to report rate swap	22.0T	1.8T	7.1T	13.1T
# Banks required to report rate swap	1,218	1,060	145	13
Assets of banks w/ non-zero rate swap	16.3T	0.7T	4.0T	11.7T
# Banks w/ non-zero rate swap	270	180	80	10
Assets of publicly traded banks w/ hedge	7.6T	0.2T	3.0T	4.4T
# Publicly traded banks w/ hedge	97	44	47	6
Assets of publicly traded banks reported duration	5.1T	0.1T	1.7T	3.3T
# Publicly traded banks reported duration	65	27	34	4
Rate Swap/Asset	0.9	0.6	2.4	3.9
	(2.2)	(1.9)	(3.3)	(3.5)
Rate Swap/Security	5.4	3.9	14.4	19.9
	(13.9)	(11.9)	(20.5)	(20.1)
Rate Swap/AFS Security	7.6	5.4	19.7	41.6
	(19.3)	(16.3)	(27.7)	(34.2)
Rate Swap/Asset | Non-Zero Rate Swap	4.0	3.7	4.4	5.1
	(3.2)	(3.1)	(3.4)	(3.1)
Rate Swap/Security | Non-Zero Rate Swap	23.6	22.4	25.9	25.8
	(20.4)	(20.1)	(21.4)	(19.2)
Rate Swap/AFS Security | Non-Zero Rate Swap	32.4	29.7	35.6	54.1
	(28.2)	(27.5)	(28.7)	(28.4)
Hedge/Asset (10K)	6.5	6.1	6.4	11.0
	(6.3)	(6.3)	(6.4)	(4.2)
Hedge/Security (10K)	39.9	44.0	36.0	41.0
	(39.1)	(43.4)	(37.3)	(16.5)
Hedge/AFS Security (10K)	59.9	61.4	53.4	101.0
	(56.4)	(60.6)	(50.9)	(58.5)
Duration	5.1	4.9	5.1	5.7
	(1.6)	(1.4)	(1.6)	(2.8)

TABLE A2: DESCRIPTIVE STATISTICS ON AFS AND HTM ASSETS

The top panel of the table shows aggregate statistics about available-for-sale (AFS) and held-to-maturity (HTM) securities and loans in 2022:Q4. The bottom panel of the table presents the statistics using average values of all the banks in each category as of 2022:Q4. The numbers in parentheses are standard deviations. The samples are based on call reports. Column 1 shows these statistics for all the banks, column 2 for banks with assets below 10 billion, column 3 for banks with assets above 10 billion but below 250 billion, and column 4 for banks with assets above 250 billion. *Data Sources:* Bank Call Reports.

	(1) All Banks	(2) Asset <10B	(3) Asset [10B,250B]	(4) Asset >250B
Assets of FDIC-insured banks	23.6T	3.4T	7.1T	13.1T
Aggregate AFS Security	2.9T	612B	1.0T	1.2T
Aggregate HTM Security	2.8T	128B	538B	2.1T
Aggregate AFS Loan	0.1T	20B	31B	62B
Aggregate HTM Loan	11.9T	2.2T	4.4T	5.3T
AFS Security/Asset	20.5	20.7	15.3	14.6
	(15.9)	(15.9)	(12.9)	(12.9)
HTM Security/Asset	3.8	3.7	6.8	15.1
	(9.4)	(9.4)	(9.5)	(11.6)
AFS Loan/Asset	0.3	0.3	0.5	0.4
	(2.5)	(2.5)	(2.3)	(0.6)
HTM Loan/Asset	60.0	60.0	63.3	39.1
	(18.6)	(18.6)	(16.9)	(19.4)
Number of Banks	4723	4565	145	13

TABLE A3: EXTERNAL SCRUTINY AND RECLASSIFICATION INTO HTM – MATCHED SAMPLE

This table reports the coefficients of OLS regressions examining how auditors and supervisory agencies mediate the relation between measures of bank fragility and banks' decision to transfer assets from AFS to HTM. The empirical specifications and variables are defined similarly to Table 3 except that we coarsen-exact match (Iacus et al., 2012) the sample to achieve covariate balance between the size and securities portfolio composition across banks with and without big-4 auditing and different types of regulators. Standard errors are presented in parentheses and are clustered at the state level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: Dummy Variable for Reclassification to HTM

	(1)	(2)	(3)	(4)
Big4Auditor	0.004			
	(0.058)			
Big4Auditor × Fragile Bk.	0.180			
	(0.223)			
OCC		-0.032**		
		(0.015)		
OCC × Fragile Bk.		-0.249**		
		(0.097)		
FDIC			0.019**	
			(0.009)	
FDIC × Fragile Bk.			-0.077	
			(0.207)	
Federal Reserve				0.008
				(0.016)
Federal Reserve × Fragile Bk.				0.173
				(0.252)
Observations	1702	1892	1921	1882
Adjusted R^2	0.176	0.185	0.120	0.159

Panel B: % Assets Reclassified to HTM

	(1)	(2)	(3)	(4)
Big4Auditor	-0.038*			
	(0.020)			
Big4Auditor × Fragile Bk.	0.076			
	(0.065)			
OCC		-0.015		
		(0.009)		
OCC × Fragile Bk.		-0.096*		
		(0.054)		
FDIC			0.002	
			(0.009)	
FDIC × Fragile Bk.			-0.106	
			(0.172)	
Federal Reserve				0.004
				(0.009)
Federal Reserve × Fragile Bk.				0.122
				(0.185)
Observations	1702	1892	1921	1882
Adjusted R^2	0.052	0.059	0.036	0.040

TABLE A4: FHLB AND RECLASSIFICATION INTO HTM– MATCHED SAMPLE

This table reports the coefficients of OLS regressions examining how use of FHLB funding mediates the relation between measures of bank fragility and banks' decision to transfer assets from AFS to HTM. The dependent variable in Panel A is a dummy variable that takes the value of one if the bank reclassified assets from AFS to HTM between 2021 and 2022. The dependent variable in Panel B is the ratio between the total amount of transferred securities and total securities in the AFS and HTM portfolios. The main variables of interest are interactions between a dummy variable that take the value of one if the bank obtains funding from the FHLB between 2021Q1 and 2023Q2 and our measures of Tier 1 Capital Ratio, % Uninsured Deposits, and % Long Term Securities. Baseline controls include a set of indicator variables for asset percentile. Standard errors are presented in parentheses and are clustered at the state level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	I(Reclassification to HTM)=1			% Assets Reclassified to HTM		
Tier 1 Capital Ratio	-0.008			-0.004		
	(0.006)			(0.003)		
FHLB Bk.	0.011	-0.033**	0.002	0.009	-0.042**	-0.004
	(0.007)	(0.015)	(0.008)	(0.006)	(0.017)	(0.009)
Tier 1 Capital Ratio × FHLB Bk.	-0.012*			-0.012**		
	(0.007)			(0.006)		
% Uninsured Deposits		0.000			-0.025	
		(0.039)			(0.029)	
% Uninsured Deposits × FHLB Bk.		0.121***			0.136***	
		(0.044)			(0.038)	
% Long Term Securities			0.101			0.022
			(0.061)			(0.028)
% Long Term Securities × FHLB Bk.			0.026			0.059**
			(0.055)			(0.026)
Observations	4,801	4,768	4,641	4,644	4,620	4,641
Adjusted R^2	0.094	0.096	0.107	0.013	0.016	0.019

TABLE A5: WHICH BANKS INCREASED HEDGING

This table compares the characteristics of banks that increased their hedging ratios (interest rate swap to asset ratios) and those that decreased their hedging ratios during 2021:Q4 to 2022:Q4. The first column lists the characteristics: log asset, whether the bank is a state-chartered bank, whether the bank is supervised by FED, OCC, FDIC, respectively, long-term security share of total asset, uninsured leverage ratio, and equity to asset ratio. The second and the third columns show the mean values for the group of banks with negative hedging growth during this period and the group of banks with positive hedging growth, respectively. The fourth column shows the difference between the two groups, and the last column shows the t-statistics. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

Variable	Negative Hedging Growth	Positive Hedging growth	Difference	t-Statistics
Log Asset	22.203	23.143	-0.940***	-4.68
State-Chartered Bank	0.702	0.706	-0.004	-0.07
FED	0.242	0.206	0.037	0.71
OCC	0.293	0.294	-0.001	-0.02
FDIC	0.465	0.500	-0.035	-0.58
Long-Term Security Share	0.363	0.354	0.009	0.27
Uninsured Leverage Ratio	33.580	34.902	-1.322	-0.77
Equity to Asset	10.633	10.993	-0.360	-0.88

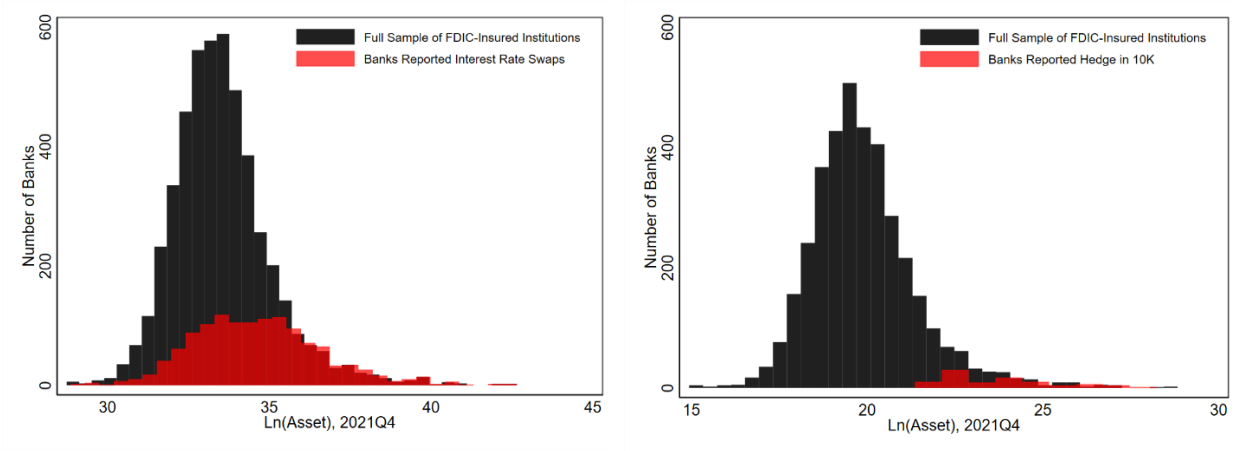
TABLE A6: SUMMARY STATISTICS ON BANKS' RECAPITALIZATIONS

This table presents descriptive statistics of concerning the amount of capital raised by banks that issued capital between 2021 and 2023:Q2

Variable	N	Mean	Std. Dev	P25	P50	P75
Capital Raised (% Assets)	17	.024	.020	.008	.0167	.033
Capital Raised (% Book Equity)	17	.277	.213	.0998	.225	.476
Capital Raised (% of Unrealized Losses in AFS and HTM Securities	17	1.213	1.506	.328	.864	1.556

FIGURE A1: DATA AND SAMPLE

This figure compares our sample coverage to the full sample of FDIC-insured financial institutions in 2021:Q4 call report data. Panel (a) plots the histogram (frequency) of the logarithm of asset values for banks in the full sample as well as banks that are required to report their use of interest rate swaps. Panel (b) plots the histogram (frequency) of the logarithm of asset values for banks in the full sample as well as the publicly traded banks that report notional value of hedge in 2021. In panel (a) the assets of sample analyzed is close to 95% of the assets of all the FDIC insured institutions. In panel (b) the assets of sample analyzed is 68% of the assets of all the FDIC insured institutions. *Data sources*: bank call reports and 10Ks and 10Qs.

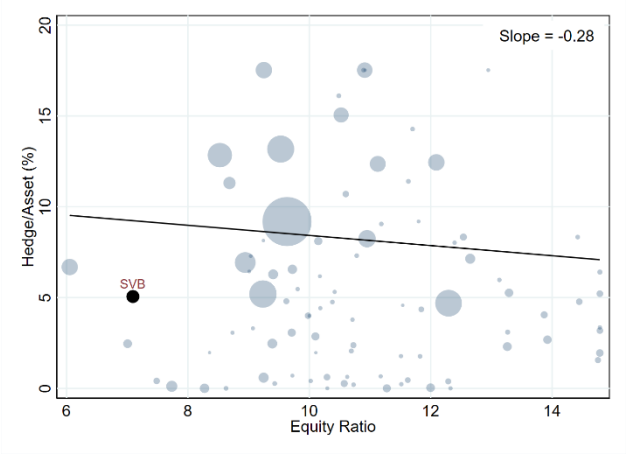


(a) Call Report

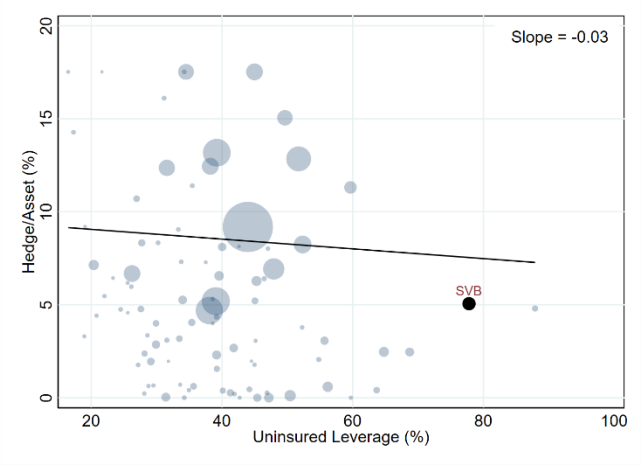
(b) 10K

FIGURE A2: HEDGING RATIOS AND BANK EXPOSURE TO INTEREST RATE RISK- 2021

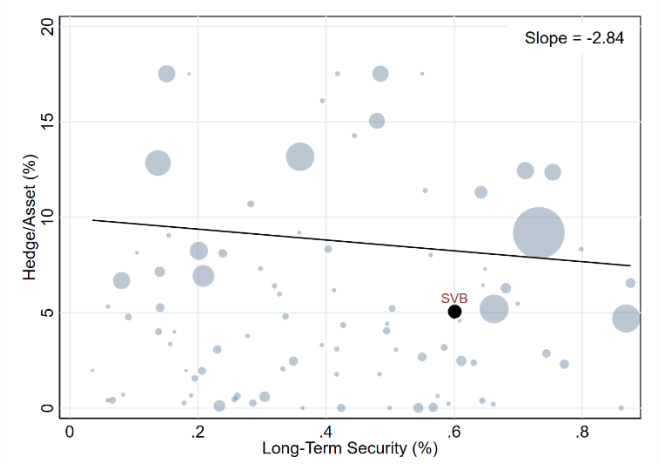
This figure plots hedging ratio for publicly traded banks calculated using information in 10K and 10Q against two measures of bank exposure to interest rate risk. Panel (a) plots hedge to asset ratio against equity ratio as of 2021:Q4. Panel (b) plots hedge to asset ratio as of 2021:Q4 against uninsured leverage ratio as of 2021:Q4. Panel (c) plots hedge to asset ratio as of 2021:Q4 against long-term security to asset ratio as of 2021:Q4. Uninsured leverage is calculated as uninsured deposit divided by total asset. Long-term security ratio is the ratio between total securities with maturity or repricing exceeding 15 years and the total securities. In all panels, the bubble size indicates the asset size. The lines in each panel are the best fit lines based on weighted least squares. The slope and statistical significance are reported in each panel (with ***, ** and * implying significance at 1%, 5% and 10% levels respectively). *Data Sources*:10Ks and 10Qs and bank call reports.



(a) Equity/Asset



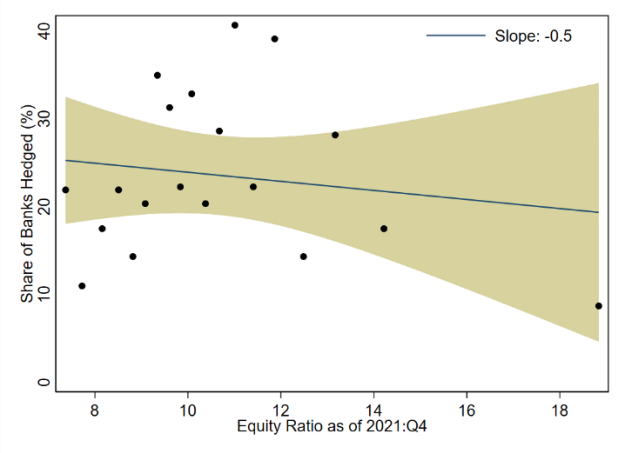
(b) Uninsured Leverage



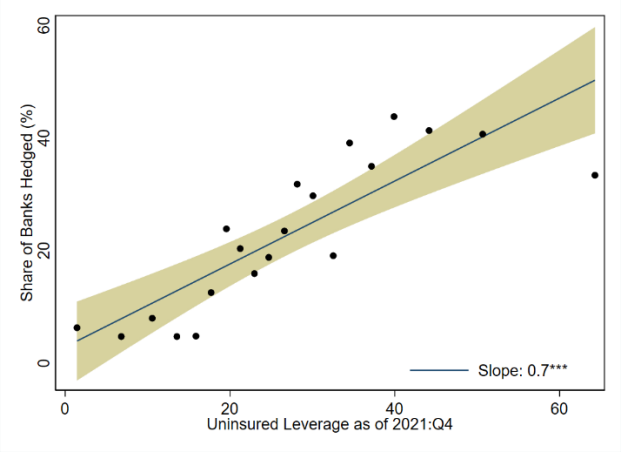
(c) Long-Term Security/Asset

FIGURE A3: BANK USE OF INTEREST RATE SWAPS --- EXTENSIVE MARGIN

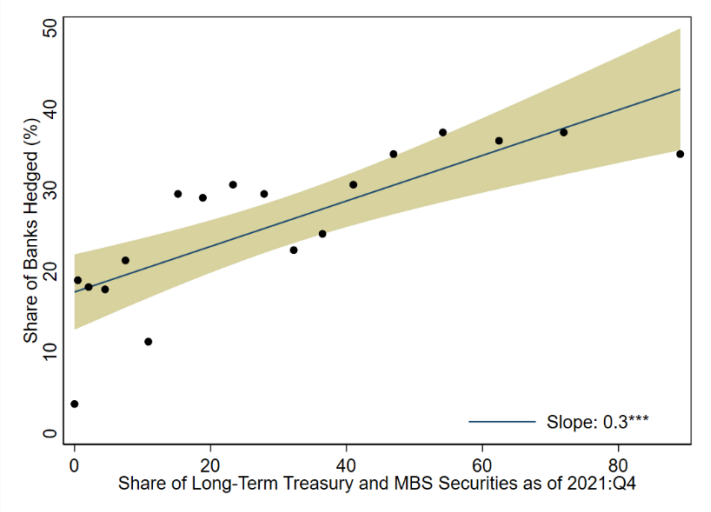
This figure presents binned scatterplot of 2021:Q4 hedging against equity ratio (Panel A), uninsured leverage ratio (Panel B), and long-term security ratio (Panel C) as of 2021:Q4. Uninsured leverage is calculated as uninsured deposit divided by total asset. Long-term security ratio is the ratio between total securities with maturity or repricing exceeding 15 years and the total securities. The underlying sample includes all banks that are required to report their use of interest rate swaps in 2021:Q4. We divide sample into 20 equal-sized bins and plot the share of banks with positive interest rate swaps in each bin against the average equity ratio, uninsured leverage ratio, and long-term security ratio in that bin, respectively. The shaded area shows the 95% confidence interval. The slope and statistical significance are reported in each panel (with ***, ** and * implying significance at 1%, 5% and 10% levels respectively). *Data Sources:* Bank call reports in 2021:Q4.



(a) Equity/Asset



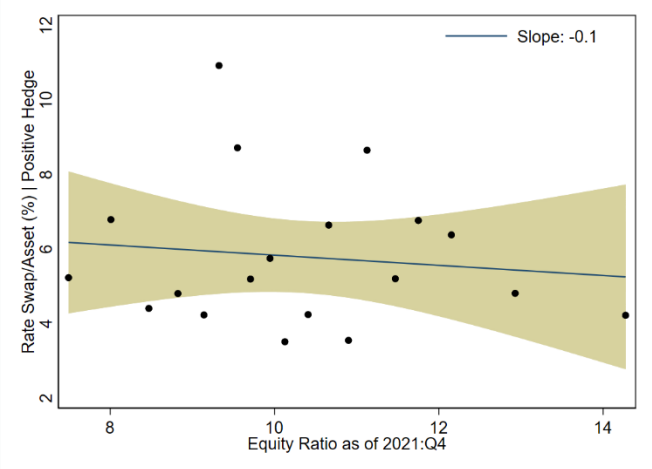
(b) Uninsured Leverage



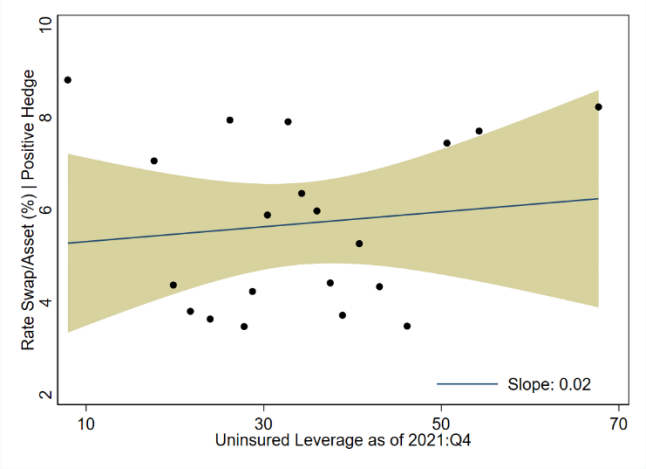
(c) Long-Term Security/Asset

FIGURE A4: BANK USE OF INTEREST RATE SWAPS --- INTENSIVE MARGIN

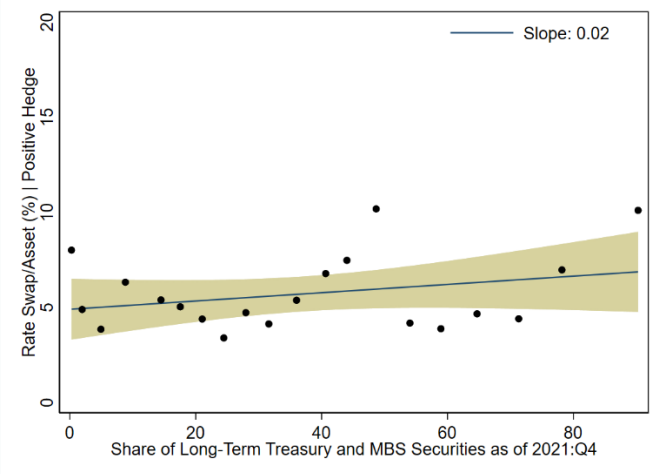
This figure presents binned scatterplot of 2021Q4 hedging against equity ratio (Panel A), uninsured leverage ratio (Panel B), and long-term security ratio (Panel C) as of 2021:Q4. Uninsured leverage is calculated as uninsured deposit divided by total asset. Long-term security ratio is the ratio between total securities with maturity or repricing exceeding 15 years and the total securities. The underlying sample includes all banks that reported positive interest rate swaps in 2021Q4. We divide sample into 20 equal-sized bins and plot the average interest rate swaps to asset ratio in each bin against the average equity ratio, uninsured leverage ratio, and long-term security ratio in that bin, respectively. The shaded area shows the 95% confidence interval. The slope and statistical significance are reported in each panel (with ***, ** and * implying significance at 1%, 5% and 10% levels respectively). *Data Sources:* Bank call reports in 2021:Q4.



(a) Equity/Asset



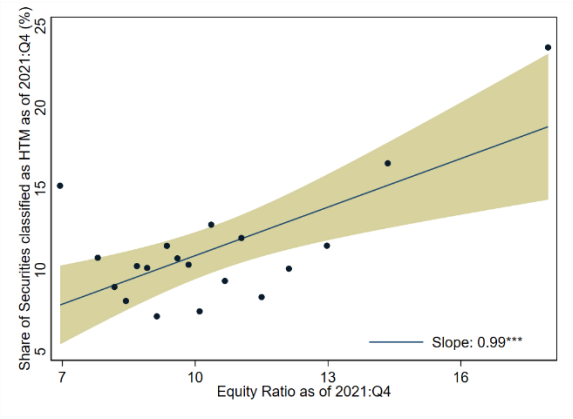
(b) Uninsured Leverage



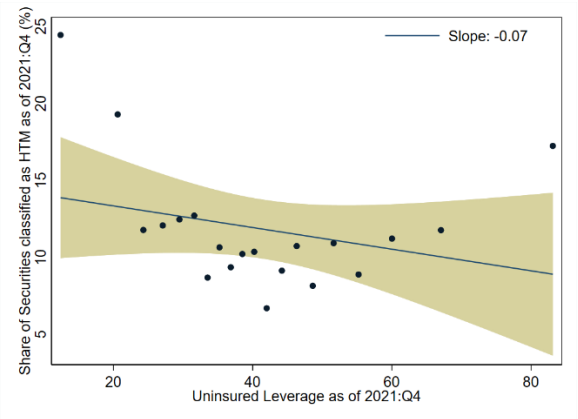
(c) Long-Term Security/Asset

FIGURE A5: SHARE OF SECURITIES CLASSIFIED AS HTM

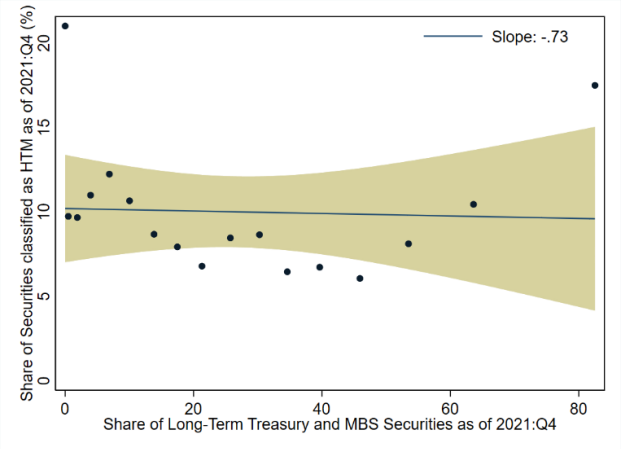
This figure presents binned scatterplot of 2021Q4 share of securities classified as HTM against equity ratio (Panel A), uninsured leverage ratio (Panel B), and long-term security ratio (Panel C). The underlying sample includes all banks that filed call reports in 2021Q4. We divide sample into 20 equal-sized bins and plot the average share of securities classified as HTM in each bin against the average equity ratio, uninsured leverage ratio, and long-term security ratio in that bin, respectively. The shaded area shows the 95% confidence interval. The slope and statistical significance are reported in each panel (with ***, ** and * implying significance at 1%, 5% and 10% levels respectively). Data Sources: Bank call reports in 2021:Q4.



(a) Equity/Asset



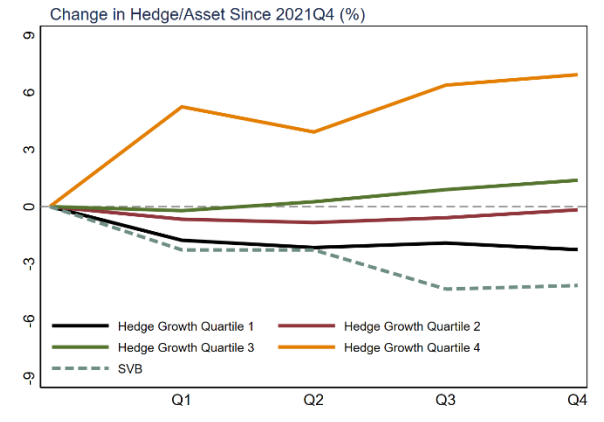
(b) Uninsured Leverage



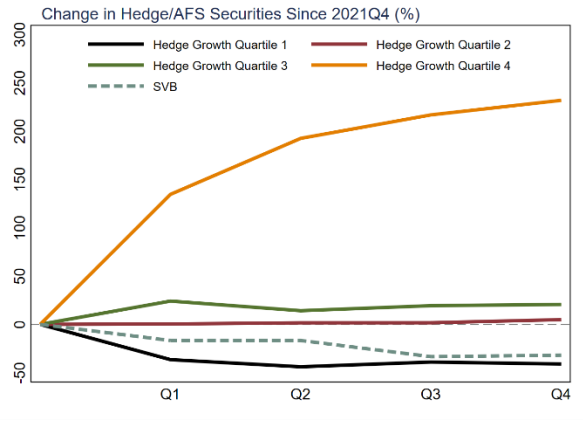
(c) Long-Term Security/Asset

FIGURE A6: TIME SERIES CHANGE IN HEDGES – 10K AND 10Q

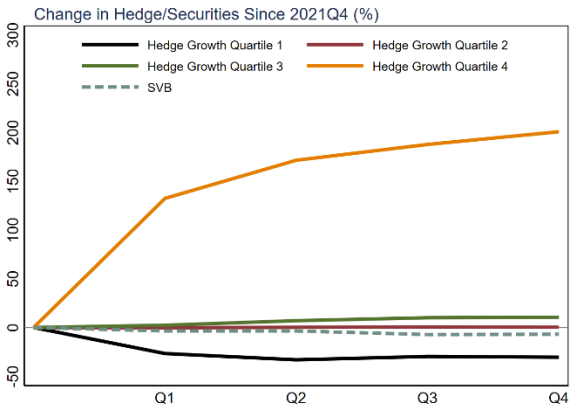
This figure plots quarterly hedging growth relative to 2021:Q4 using hedging information from 10K and 10Q. It plots the growth from 2022:Q1 till 2022:Q4. Hedging growth is calculated as change in notional value of hedging ratios obtained from publicly traded banks' 10Ks and 10Qs. In Panel (a), we divide banks into four equal-sized bins based on their hedge/asset growth from 2022:Q1 to 2022:Q4 and plot the average value of banks in each bin every quarter. In Panel (b), we divide banks into four equal-sized bins based on their hedge/AFS security growth from 2022:Q1 to 2022:Q4 and plot the average value of banks in each bin every quarter. In Panel (c), we divide banks into four equal-sized bins based on their hedge/security growth from 2022:Q1 to 2022:Q4 and plot the average value of banks in each bin every quarter. We do the same exercise for SVB and plot the evolution of its hedging ratios over the same time period. *Data Sources:* 10Ks and 10Qs.



(a) Hedge/Asset



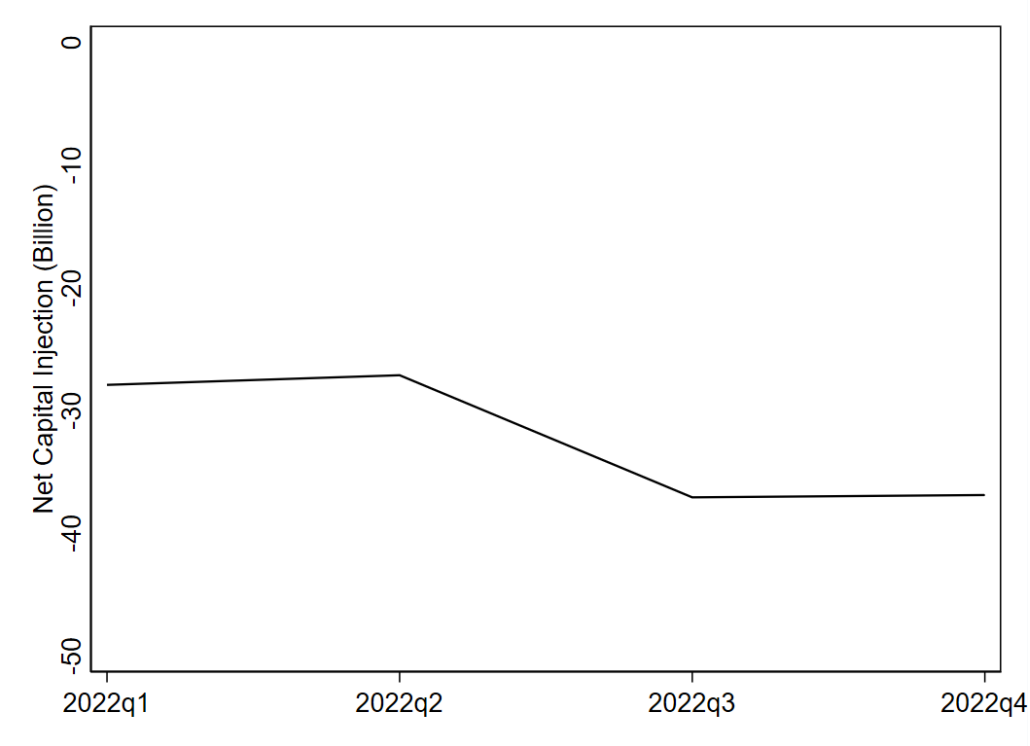
(b) Hedge/AFS Security



(c) Hedge/Security

FIGURE A7: AGGREGATE CAPITAL INJECTION (NET OF DIVIDEND) IN 2022

This figure plots the quarterly aggregate bank capital injection net of dividends in 2022. We add up sale, conversion, acquisition, or retirement of capital stock, cash dividends declared on preferred stocks, and cash dividends declared on common stocks. The negative values indicate net reduction in equity. *Data sources: Bank call reports.*



APPENDIX B: HEDGING DATA COLLECTION

We describe our manual data collection process in this appendix. We obtain the list of publicly traded banks from Compustat Bank Fundamentals Annual and download their 10-K and 10-Q filings from SEC EDGAR. 255 banks filed 10-K and 10-Q reports in 2022, where we are able to merge 240 of them with bank call report data using the link table provided by the Federal Reserve Bank of New York. Most information about hedging is recorded under "Item 8: Financial Statements and Supplementary Data." We manually collect the following pieces of information from these banks' 10-K and 10-Q reports.

B.1 DURATION

The effective average duration of banks' securities portfolios is a key input for our analysis, as it provides a direct measure of interest rate risk exposure. We therefore collect this information manually from 10-K filings for year-end 2021 and 2022 whenever it is disclosed.

Unlike securities values and derivatives notional amounts, which are typically reported in standardized tables, duration data are often embedded in the narrative sections of filings. In most cases, banks report the average duration under "Item 7: Management's Discussion and Analysis of Financial Condition and Results of Operations." To ensure completeness, we also search the full text of each 10-K using keywords such as "duration" or "life," since reporting practices vary across institutions.

As an illustration, SVB Financial Group's 2022 10-K (p. 66, "Consolidated Financial Condition, Investment Securities") reports that *"the weighted-average duration of our total fixed income securities portfolio including the impact of fair value swaps"* was 5.6 years in 2022, compared with 3.7 years in 2021. We record these values in our dataset, where they serve as direct measures of interest rate risk exposure and are used in the paper's analysis of hedging effectiveness and balance sheet sensitivity.

In many cases, however, banks only disclose the duration for 2022, without reporting the prior year's value. To construct a consistent panel, we supplement these missing data by consulting the 2021 10-K reports. For example, BankUnited Inc.'s 2022 10-K states that the effective duration of its investment securities portfolio was 2.0 years at year-end 2022, but does not provide the 2021 figure. We therefore refer back to the firm's 2021 10-K, where we find that the effective duration was 1.5 years at year-end 2021.

These examples highlight the manual effort required to construct the duration dataset: extracting data from narrative disclosures, searching across filings, and reconciling year-to-year omissions. The resulting panel provides the first systematic evidence on the evolution of securities portfolio duration across publicly traded U.S. banks, and forms the basis for our empirical analysis of interest rate risk management.

B.2 NOTIONAL VALUE OF HEDGING DERIVATIVES

We collect data on the notional amounts of derivatives designated as hedging instruments from banks' 10-K and 10-Q reports whenever such information is disclosed. These data are essential for measuring the scale of banks' interest rate hedging activity. We use these values to construct hedging ratios that serve as robustness for our call report measures. In most cases, the information appears in the "Note – Derivative Instruments" section of the financial statements. We compile quarterly observations for 2022 (Q1–Q3), which we combine with year-end data from 2021 and 2022 reported in the 10-K. For banks with fiscal years

ending in June or September, we adjust the collection accordingly, drawing on the relevant 10-Q filings to maintain consistent coverage across four quarters.

As an illustration, Figure B1 shows SVB Financial Group's derivative disclosures. The first three panels come from SVB's 2022 Q1–Q3 10-Q filings (Item 1, Note 8 – Derivative Financial Instruments), while the final panel is drawn from its 2022 10-K (Note 16). By summing the notional values reported in these tables, we record SVB's total hedging derivatives at $1,944 million at year-end 2021, $5,900 million in both Q1 and Q2 2022, $1,546 million in Q3 2022, and $10,700 million at year-end 2022.

Reporting practices vary across banks, however. Some institutions disclose only the total notional value of derivatives, without distinguishing between those designated as hedging instruments and those held for trading or other purposes. In such cases, we exclude these banks from analyses that require hedging-specific measures. For example, HSBC USA Inc.'s 2022 10-K reports total derivative notional values of $1,327,929 million in 2022 and $1,395,345 million in 2021 without separating hedging and non-hedging positions. We treat these figures as total derivatives only, not as evidence of hedging activity.

	March 31, 2022			December 31, 2021		
	Notional or Contractual Amount	Fair Value		Notional or Contractual Amount	Fair Value	
(Dollars in millions)		Derivative Assets (1)	Derivative Liabilities (1)		Derivative Assets (1)	Derivative Liabilities (1)
Derivatives designated as hedging instruments:						
Interest rate risks:						
Interest rate swaps (2)	$ 5,900	$ —	$ —	$ 10,700	$ 18	$ —
Interest rate swaps	—	—	—	—	—	—

	June 30, 2022			December 31, 2021		
	Notional or Contractual Amount	Fair Value		Notional or Contractual Amount	Fair Value	
(Dollars in millions)		Derivative Assets (1)	Derivative Liabilities (1)		Derivative Assets (1)	Derivative Liabilities (1)
Derivatives designated as hedging instruments:						
Interest rate risks:						
Interest rate swaps (2)	$ 5,900	$ —	$ —	$ 10,700	$ 18	$ —

	September 30, 2022			December 31, 2021		
	Notional or Contractual Amount	Fair Value		Notional or Contractual Amount	Fair Value	
(Dollars in millions)		Derivative Assets (1)	Derivative Liabilities (1)		Derivative Assets (1)	Derivative Liabilities (1)
Derivatives designated as hedging instruments:						
Interest rate risks:						
Interest rate swaps (2)	$ —	$ —	$ —	$ 10,700	$ 18	$ —
Currency exchange risks:						
Foreign exchange contracts	1,546	94	—	—	—	—
Total derivatives designated as hedging instruments		94	—		18	—

The total notional or contractual amounts and fair value of our derivative financial instruments at December 31, 2022, and December 31, 2021, were as follows:

	December 31, 2022			December 31, 2021		
	Notional or Contractual Amount	Fair Value		Notional or Contractual Amount	Fair Value	
(Dollars in millions)		Derivative Assets (1)	Derivative Liabilities (1)		Derivative Assets (1)	Derivative Liabilities (1)
Derivatives designated as hedging instruments:						
Interest rate risks:						
Interest rate swaps (2)	$ 550	$ —	$ —	$ 10,700	$ 18	$ —
Currency exchange risks:						
Foreign exchange contracts	778	17	—	—	—	—
Foreign exchange contracts	616	—	56	—	—	—
Total derivatives designated as hedging instruments		17	56		18	—

FIGURE B1: TOTAL DERIVATIVES DESIGNATED AS HEDGING INSTRUMENTS IN NOTIONAL AMOUNT. SVB FINANCIAL GROUP, 10-K REPORT FOR 2022 AND, 10-Q REPORTS FOR Q1-Q3 2022.

APPENDIX C: RECLASSIFICATION OF AVAILABLE FOR SALE SECURITIES AS HTM

Here, we provide further details about our manual data collection process and we discuss additional robustness exercises that we carried out to assess the sensitivity of our reclassification analysis to alternative measurement procedures. For publicly-listed banks, we hand-collected the total amounts of securities transferred from the AFS to HTM from the annual reports of all publicly listed U.S. banks and bank holding companies and we merged this data to the banks' call reports using the New York Fed's CRSP-FRB link. These amounts are not reported in a standard footnote, so we collected them on a best-effort basis by searching for the terms "transfer", "reclassification" and "HTM"' and reading the passages of the footnotes to the consolidated financial statements of the 2022 and 2021 that indicated the amounts that were transferred from AFS to HTM. Most reclassifying banks do not indicate in which quarter they transferred the securities from AFS to HTM. For each public bank that reclassified securities from AFS to HTM, we allocate the amounts transferred during the year to the quarter in which we observe a greater increase in HTM securities and a decline in AFS securities.

Private banks that are not registered with the SEC are not required to file annual reports and do not have to report the amounts of securities transferred from AFS to HTM in their regulatory call reports. In the main draft, we describe the procedure that we use to infer whether a private bank reclassified securities from AFS to HTM. Here, we conduct robustness analyses that evaluate the sensitivity of our findings to alternative procedures to define a reclassification. Specifically, Table C.1. uses alternative definitions of reclassification to examine the relation between bank fragility and reclassification of securities from AFS to HTM in column (5) of Table 3, Panel B. In column (2), the hand-collected reclassification data obtained from annual reports of banks that publicly disclose their filings is augmented with reclassifications identified under the first, but not the second, set of criteria used in the paper to identify reclassifications in the group of private banks that do not publicly disclose their annual reports. Column (3) instead augments the hand-collected data with cases identified under the second, but not the first, set of criteria. Finally, in column (4), we rely solely on the hand-collected reclassification data without any imputation.

The results in Table C.1. indicate that the relation between bank fragility and the use of reclassification to HTM is robust to using alternative procedures for identifying cases of reclassification among private banks. In column (1), we report the results of the main specification in the paper. Columns (2) and (3) yield very similar coefficients and statistical significance levels when applying only one of the two criteria used to define reclassifications. Finally, column (4) demonstrates that the relation remains robust even when no imputation is used for banks without publicly available filings, though the economic magnitude of those coefficients are somewhat smaller than those in the main specification.

Another concern with our imputation procedure is that, for private banks that do not publicly disclosure annual reports, we cannot directly observe the amount of securities reclassified from AFS to HTM when we identify a reclassification. For these banks, we impute the reclassification amount as the quarterly increase in the amortized cost of HTM securities during the quarter. This imputed measure may contain some noise, since we do not observe redemptions or new purchases of existing HTM debt securities and thus cannot perfectly isolate the reclassification amounts.

Here, we examine whether the imputed reclassification amounts are likely to be large or systematically biased. To do so, we compare the reclassification amounts under our imputation procedure with the actual reclassification amounts in the hand-collected sample, where these amounts can be directly observed. Figure C1 presents a histogram of the differences between imputed and actual amounts of reclassified securities, as a fraction of the bank's total securities. The histogram reveals two main findings. First, the measurement error is not skewed in any particular direction, indicating that we are neither systematically overestimating nor underestimating the actual reclassification amounts for private banks. Second, we note that in more than 80% of the cases, the imputed reclassification differs from the actual amount by less than 1% of total securities. Taken together, these results suggest that the imputation procedures introduces relatively small measurement errors for the large majority of cases.

Finally, we describe the procedure we use to estimate the accounting losses that banks avoided recognizing by reclassifying securities as HTM. To do so, we follow the methodology of Jiang et al. (2024) to estimate the effect of interest rate increases on banks' asset values. We proceed in three steps to forecast the evolution of market values for banks' securities. First, we obtain security maturity and repricing data from banks' call reports, which require reporting amounts of residential and non-residential mortgage-backed securities (MBS) as well as government securities by maturity and repricing categories. Second, we use traded indexes in MBSs and treasuries to impute changes in market value of these securities, adjusting these market values by maturity and type. Because the call reports provide limited detail on RMBS maturities, we use one RMBS exchange-traded fund to capture differences in the evolution of prices between MBS and Treasuries, and then adjust valuations across maturities using Treasury prices. Finally, to adjust for maturity, we use iShares U.S. Treasury Bond ETFs and S&P Treasury Bond Indices across maturities that match the breakdowns in the call reports.

We assume that securities are transferred to HTM at the end of the quarter and that the composition of the securities transferred to HTM mirrors the composition of the overall securities portfolio of the bank. Both assumptions are very conservative and likely underestimate the actual amount of loss recognition avoided through reclassification of securities. The first assumption implies that declines in the value of securities affect the values of reclassified securities only in the quarter following the transfer. The second assumptions is also conservative, as banks likely have greater incentives to reclassify securities with greater interest rate risk. The cumulative avoided losses on the reclassified portfolio are then simply the amounts reclassified multiplied by an index that appropriately weights the evolution of market prices according to the composition of securities of each bank.

Figure C1: Distribution of Imputation Errors in Reclassification Amounts

This figure plots the distribution of differences between imputed and actual reclassification amounts, expressed as a fraction of total securities at the bank. The sample consists of banks for which we hand-collected annual reports that disclose the annual amounts of securities reclassified. The errors in each observation are computed as the difference between the imputed quarterly increase in the amortized cost of HTM securities (imputed reclassification amount) and the actual reclassification amount obtained from hand-collected data. Data sources: Bank call reports and hand-collected data.

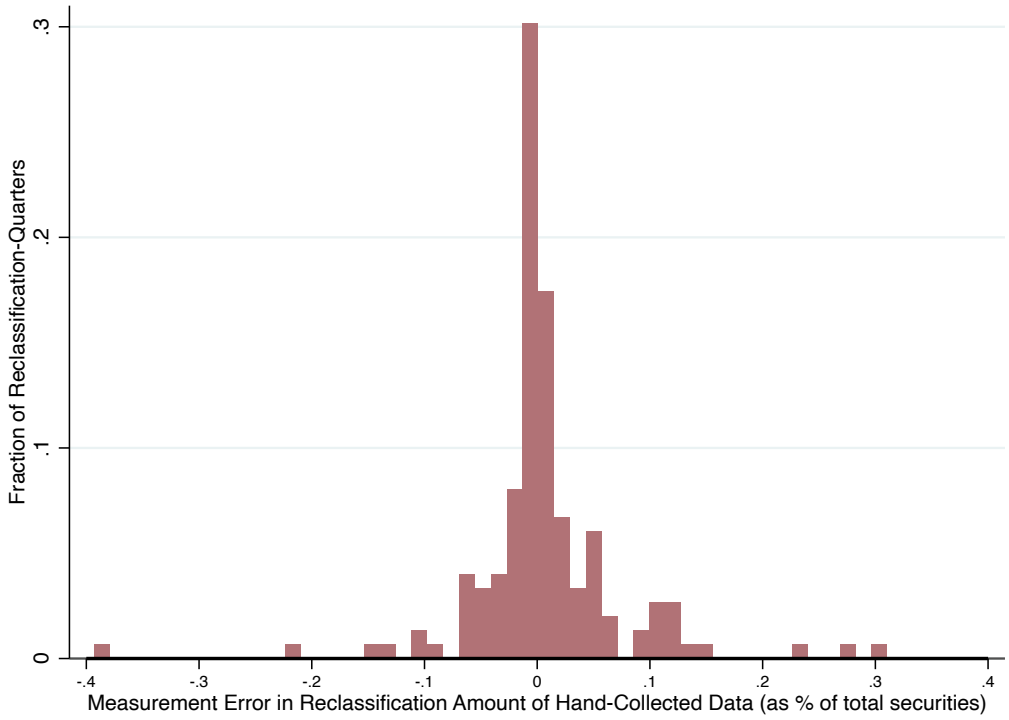


Table C.1: Bank Fragility and Reclassification into HTM – Robustness to Alternative Procedures to Measure Reclassification to HTM

This table reports the coefficients of OLS regressions examining the sensitivity of the results in column (5) of Table 3, Panel A to alternative procedures to define a reclassification quarter. In column (1), the dependent variable matches that in the main specification. In column (2), the hand-collected data is augmented with reclassifications identified under the first, but not the second, set of criteria used in the paper. In column (3), the hand-collected data is augmented with reclassifications identified under the second, but not the first, set of criteria used in the paper. Column (4) relies solely on hand-collected data from annual reports of banks that publicly disclose their filings. All other variables are defined as in the main specification. Standard errors are presented in parentheses and are clustered at the state level. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

Dep. Var:	(1) Original	(2) 1st Set only	(3) 2nd set only	(4) Hand-collected only
Tier 1 Capital Ratio	-0.002***	-0.002***	-0.002***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
% Uninsured Deposit	0.100***	0.097***	0.074***	0.073***
	(0.029)	(0.028)	(0.026)	(0.018)
% Long Term Securities	0.097***	0.093***	0.088***	0.040***
	(0.018)	(0.017)	(0.019)	(0.013)
Share of AFS Securities	0.008	0.005	0.009	0.000
	(0.007)	(0.007)	(0.008)	(0.005)
Securities (% Assets)	0.110***	0.103***	0.096***	0.012
	(0.020)	(0.019)	(0.017)	(0.016)
Observations	4,818	4,818	4,818	4,818
Adjusted R2	0.120	0.119	0.128	0.150
Asset Percentile	Yes	Yes	Yes	Yes