Banks' Motivations for Designating Securities as Held to Maturity

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Abstract

We hypothesize and provide evidence that banks classify securities as held to maturity (HTM) rather than as available for sale (AFS) when HTM classification provides preferred financial accounting and regulatory capital treatments, not because they have a distinct economically motivated intent and ability to hold the securities to maturity. Specifically, we document distinct discretionary behavior in classifying securities during 2012-2022 by three categories of banks that differ regarding the regulatory AOCI filter, which removes accumulated other comprehensive income from Tier 1 capital: (1) advanced approaches banks for which the regulatory AOCI filter was phased out from 2014 to 2018 under the initial U.S. implementation of Basel III; (2) previously advanced approaches banks for which the AOCI filter was reinstated at the end of 2019 under the Federal Reserve's "tailoring rules"; and (3) non-advanced approaches banks. We further hypothesize and provide evidence that the three categories of banks differ in how they adjust the interest rate risk of AFS securities, hedge that risk, and finance their securities and other assets with uninsured deposits. Our findings provide support for recent calls to eliminate the HTM category and AOCI filter.

Keywords: banks; investment securities; held to maturity; regulatory capital; AOCI filter.

JEL Codes: G21; G28; M41; M48

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1. Introduction

As interest rates rose beginning in the second half of 2021, banks experienced large unrealized losses on fixed-rate debt investment securities (hereafter "securities") (Jiang et al. 2023b; McPhail, Schnabl, and Tuckman 2023). To avoid the recognition of future unrealized losses, during this period many banks transferred (i.e., reclassified) available-for-sale (AFS) securities, which under Accounting Standards Codification (ASC) 320 are recognized at fair value with unrealized gains and losses recorded in accumulated other comprehensive income (AOCI), a component of owners' equity, to held-to-maturity (HTM) securities, which are recognized at amortized cost (Granja 2023). These and other unrealized losses have motivated deposit runs at three regional banks: Silicon Valley, Signature, and First Republic (Jiang et al. 2023a; Drechsler et al. 2023). Reflecting these events, the allowed classification of securities as HTM has again come into question for both the non-recognition of unrealized losses and the unverifiability of firms' asserted intent and ability to hold securities to maturity (Peters 2023; Mahoney 2023).

Related concerns have been expressed about the regulatory AOCI filter, which removes AOCI, the largest and most variable component of which typically is cumulative unrealized gains and losses on AFS securities, from the calculation of banks' Tier 1 regulatory capital (Barr 2023).[1] The AOCI filter was applied to all U.S. banks from 1995 to 2013. Then under the initial U.S. adoption of Basel III, the AOCI filter was phased out over five years for "advanced approaches" banks with assets above $250 billion or foreign exposures above $10 billion over five years beginning on January 1, 2014 (Kim, Kim, and Ryan 2019). Under the Federal Reserve's 2019 tailoring rules implementing certain provisions of the Economic Growth, Regulatory Relief, and Consumer Protection Act of 2018 (EGRRCPA), as of December 31, 2019 the AOCI filter was reinstated for previously advanced approaches banks with assets between $250 billion and $700 billion and foreign exposures below $75 billion if the banks chose to opt out of the inclusion of AOCI in regulatory capital, which all five affected banks (American Express, Capital One, Charles Schwab, PNC

[1] Michael S. Barr, the Federal Reserve's Vice Chair for Supervision, in the cover letter to the Federal Reserve's April 2023 post-mortem review of Silicon Valley Bank, states that "we should require a broader set of firms to take into account unrealized gains or losses on available-for-sale securities, so that a firm's capital requirements are better aligned with its financial positions and risk" (Barr 2023, p. 3).

Financial, and U.S. Bancorp) did.[2] We thus refer to these five banks as the "opt-out" banks. Appendix A summarizes the regulatory categories of advanced approaches, opt-out, and non-advanced approaches banks.

The common feature of the classification of securities as HTM and the regulatory AOCI filter is a disregard for unrealized gains and losses on securities. Two reasons for this disregard are often invoked, both of which are largely spurious. First, unrealized gains and losses are said to be meaningless if the holder has the ability and intent to hold securities to maturity, because the holder will receive the promised return. For adequately marketable securities, which banks' securities generally are, this reason is makes little, if any, economic sense. A bank or other firm that holds fixed-rate securities that, due to post-purchase interest rate changes, pay a below (above) market return has lost (gained) regardless of whether the holder sells the securities immediately, receiving fair value, or holds them to maturity, receiving fair value.

Second, for banks, the interest rate risk of securities typically is economically hedged by deposits that have no contractual term but are usually sticky (or sleepy) due to depositor behavior. Under GAAP, deposits with no contractual term must be recognized at amortized cost.[3] Hence, the argument goes that the other side of this economic hedge, securities, should also be allowed to be recognized at amortized cost. While this argument holds water in sufficiently favorable circumstances, this hedge fails whenever and to the extent that deposits lose stickiness. This occurred with the recent deposit runs at three regional banks, which were motivated in substantial part by the banks' unrealized losses on securities. A hedge that fails when the hedged item experiences sufficiently large losses is a bad hedge, and thus it is a poor reason to allow suboptimal accounting for the hedged item, in this case to recognize HTM securities at amortized cost. It is a similarly bad rationale for the regulatory AOCI filter.

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[2] Four of the opt-out banks were advanced approaches banks subject to the AOCI filter phase out beginning on January 1, 2014: American Express due to its foreign exposure and Capital One, PNC, and U.S. Bancorp due to their size. Schwab became an advanced approaches bank subject to the AOCI filter phase out in the second quarter of 2018 when its assets first exceeded $250 billion.

[3] In particular, a bank cannot select the fair value option for deposits that are withdrawable upon demand (ASC 825-10-15-5). The bank also cannot obtain hedge accounting for derivatives-based hedges of the unrecognized intangible asset associated with the stickiness of these deposits (ASC 815-20-25-12a and 13a).

We hypothesize and provide evidence that banks' classification of securities as HTM rather than as AFS is fluid and primarily reflects their desire to obtain preferred financial and regulatory accounting treatments, rather than a distinct economically motivated intent and ability to hold the securities to maturity.[4] We examine securities classifications from 2012 to 2022 by three categories of publicly listed U.S. banks: (1) banks that are always advanced approaches during our sample period; (2) opt-out banks; and (3) non-advanced approaches banks. Our sample period includes four distinct subperiods: (1) the pre-Basel III period before the final rule specifying the phase-out of the AOCI filter (2012Q1–2013Q2); (2) the Basel III period during which the AOCI filter is phased-out for advanced approaches banks, including the opt-out banks (2013Q3–2019Q3); (3) the tailoring rules period in which the AOCI filter is reinstated for the opt-out banks (2019Q4–2021Q3); and (4) the interest rate rise period (2021Q4–2022Q4).

Most strikingly, we show that the opt-out banks exhibit particularly apparent discretionary securities classifications. Four of the five opt-out banks (all but American Express) transferred substantial amounts of securities from AFS to HTM during the Basel III subperiod to insulate their regulatory capital from unrealized losses on the securities, then transferred substantially all their HTM securities to AFS at the beginning of the tailoring rules subperiod when the AOCI filter protected their Tier 1 capital from these gains and losses, and finally transferred substantial securities back to HTM during the interest rate rise subperiod to insulate their owners' equity from unrealized losses on the securities.[5] Hence, the opt-out banks effectively first indicated they had the intent and ability to hold securities to maturity, then that they did not have this intent or ability, and finally that they had this intent and ability again.

[4] For example, one possible economic motivation for HTM classification is that the stickiness of banks' core deposits in most circumstances provides banks with the intent and ability to hold securities to maturity. None of our results suggest that this possibility drives banks' classification choices.

[5] Like many other banks, during the interest rate rise period the opt-out banks may have been concerned that their tangible common equity – a non-GAAP measure that excludes most intangible assets but includes AOCI – would become negative as interest rates increased, because a Federal Housing Finance Agency rule restricts the Federal Home Loan Banks from extending new advances or renewing existing advances to a bank with negative tangible equity unless the bank's primary regulator provides a waiver (Berry, 2022; American Bankers Association and Independent Community Bankers of America, 2022). This rule is codified 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. The Bank shall promptly provide the FHFA with a copy of any such request."

The four opt-out banks' transfers of securities out of HTM in 2019 and 2020 raises the question of how they were able to do so without tainting their HTM portfolios. They did so in two general ways. First, the FASB issued three accounting standards updates (ASUs) with effective dates close to the effective date of the tailoring rules that allowed firms to transfer securities out of HTM on or near the ASU's effective dates without tainting their HTM portfolios. Two of the four banks invoked one or more of these ASUs as the basis for transfers of $25 billion of securities out of HTM. Second, and much more importantly, three of the opt-out banks invoked the tailoring rules as the basis for transfers of $212 billion of securities out of HTM. By the second quarter of 2020, the four opt-out banks that held HTM securities immediately prior to the effective date of the tailoring rules had transferred substantially all of their HTM securities to AFS.[6]

The GAAP basis for the tailoring rules as a justification for banks' transferring securities out of HTM without tainting their HTM portfolios is tenuous at best. The relevant guidance is ASC 320-10-25-10, which allows firms to transfer securities out of HTM without taint upon the occurrence of an event that meets four conditions: the event is "isolated…nonrecurring…unusual for the reporting entity…[and] could not be reasonably anticipated." Changes in regulatory capital definitions do not affect banks' economic capital, occur with considerable frequency, and are subject to regularly changing political influences such as the EGRRCPA and thus do not appear to meet any of the four conditions, not to mention all four of them. None of these banks indicated that their HTM portfolios were tainted by the transfers, a conclusion that would have made it difficult for two of them to transfer securities back to HTM starting in late 2021.

Our findings extend recent research on security reclassifications by Kim et al. (2019) and Granja (2023). Kim et al. (2019) show that the phase-out of the AOCI filter under the initial U.S. implementation of Basel III led advanced approaches banks to increase the proportion of their securities classified as HTM. We extend Kim et al.'s analysis to the reinstatement of the AOCI filter for the opt-out banks under the tailoring rules, as described above, and we also demonstrate ongoing effects of the AOCI filter for advanced approaches banks. In particular, we show that advanced approaches banks continued to reclassify securities

[6] The HTM securities transferred to AFS securities by the opt-out banks around the tailoring rules constitute 24 percent of the total HTM securities held by the sample banks.

from AFS to HTM throughout our sample period, ending this period with 57 percent of their securities classified as HTM. In contrast, non-advanced approaches banks for which the AOCI filter was never removed changed HTM securities modestly until 2022, when they also reclassified securities to HTM as interest rates rose.

Granja (2023) shows that banks transferred substantial amounts of securities from AFS to HTM beginning in late 2021, and that banks with lower capital ratios, more uninsured deposits, and higher interest rate risk were more likely to make these transfers. Our findings extend those of Granja (2023) by showing that for the opt-out banks these transfers were preceded by transfers of securities from HTM to AFS around the tailoring rules. In addition, our results suggest that the transfers of securities from AFS to HTM by advanced approaches banks beginning in late 2021 are attributable at least in part to the removal of the AOCI filter, not just to the rise in interest rates. We thus further demonstrate the fluidity and accounting and regulatory capital motivations of banks' security classifications, as well as the tenuous basis for opt-out banks' transfers of securities out of HTM under the tailoring rules. In this regard, our results more directly undercut firms' asserted intent and ability to hold securities to maturity as a rationale for amortized cost accounting for HTM securities.

We also provide two sets of results regarding the interest rate risk of AFS securities and economic hedges of this risk for the three categories of banks. First, prior research examining earlier settings shows that the AOCI filter induces banks to hold riskier AFS securities. Specifically, Kim et al. (2019) examine the phase-out of the AOCI filter for advanced approaches banks under the initial U.S. implementation of Basel III and show that these banks hold less credit risky AFS securities after the phase-out. Bischof, Laux, and Leuz (2021) examine cross-country variation in the AOCI filter during the financial crisis and find that banks in countries with stronger AOCI filters take weaker corrective actions in response to losses on AFS securities. Extending this research to the tailoring rules and interest rate rise subperiods, we find that advanced approaches banks for which the AOCI filter remains removed continue to reduce the interest rate risk of their AFS securities through the end of 2022, while the opt-out banks increase the interest rate risk of their AFS securities after the reinstatement of the AOCI filter.

Second, recent research in finance examines the interest rate and liquidity risks arising from banks' largely unhedged fixed-rate assets and runnable non-FDIC guaranteed no-term deposits (Jiang et al. 2023a,b; MacPhail, Schnabl, and Tuckman 2023; Drechsler et al. 2023). Consistent with the findings of these papers, we provide evidence that the opt-out and non-advanced approaches banks do not appreciably use derivatives that qualify for fair value hedge accounting to hedge the increased interest rate risk of their AFS securities. We further find that, for all three categories of banks, asset-liability management of interest rate risk deteriorated during our sample period due to disproportionate increases in their runnable non-FDIC insured deposits. These two sets of results support recent calls to eliminate or restrict the applicability of the AOCI filter (Barr 2023).

2. Background, Related Literature, and Hypotheses

Increases in interest rates beginning in the second half of 2021

The Federal Reserve's Federal Open Market Committee raised the target federal funds rate by 5.25 percent from 0 to 0.25 percent on March 16, 2022 to 5.25 to 5.5 percent on July 26, 2023, where it remains at the time of this writing in September 2023. Market expectations about the target federal funds rate influence interest rates throughout the economy. The medium-to-long maturity interest rates that most affect the value of banks' assets began rising at various points in the second half of 2021.[7] As relevant market interest rates have risen, the values of fixed-rate financial assets have fallen substantially. To illustrate, for a fixed-rate asset with a duration of five years and no interest rate optionality, an instantaneous increase in the relevant market rate of 3.8 percent (which equals the increase in the five-year Treasury bond yield from 0.65 percent in August 2021 to 4.45 percent in October 2022, the period that experienced the bulk of the increase in the yield to date) decreases the value of the asset by almost 19 percent.

[7] Interest rates for U.S. Treasuries of longer maturities typically began to increase further before the first increase in the target federal funds rate in March 2022. For example, 3-month U.S. Treasuries started to rise in early January 2022, while 5-year U.S. Treasuries started to rise no later than August 2021.

Accounting for Securities

The accounting guidance for securities stems primarily from FAS 115, a 1993 standard written in the wake of the thrift crisis. The political environment that led to FAS 115 is instructive for the accounting issues arising from the current turmoil in the banking industry. The thrift crisis was primarily attributable to thrifts' holdings of long-duration fixed-rate assets financed by zero contractual duration (but sticky) demand and savings deposits. These assets experienced large economic losses as interest rates rose sharply during the 1970s, peaked in 1981, and remained high through the remainder of the 1980s. Due to the use of amortized cost accounting, these large losses were initially unrealized and thus unrecognized for accouning (and regulatory) purposes. Over the long lives of the assets, the losses were gradually realized and thus recognized. As this occurred, many banks invested in risky assets in gambles for resurrection, worsening the crisis (White 1991).

Motivated by this history, in 1990, the SEC's Chair (Richard Breeden) and top accounting personnel (Edmund Coulson and Robert Bayless) publicly argued that market value accounting should be required for marketable securities (Breeden 1990), while the banking and insurance industries and their regulators pushed back against the SEC's position (Johnson and Swieringa 1996, p. 159). FAS 115, which as of 2009 is codified in ASC 320, is the product of a political compromise that reflects aspects of the divergent preferences of these parties (Johnson and Swieringa 1996, pp. 166-172).

Specifically, ASC 320 allows distinct accounting treatments for securities based primarily on the asserted intent of the holder. Consistent with the expressed preferences of the banking and insurance industries and their regulators, securities for which the holder asserts it has the intent and ability to hold to maturity are classified as HTM and recognized at amortized cost. Partly consistent with the expressed preferences of the SEC, securities for which the holder asserts no intent are classified as AFS and recognized at fair value on the balance sheet, but with unrealized gains and losses recorded in AOCI.

Because credit losses typically are recognized to a significant extent (currently under ASC 320's impairment rules for AFS securities and ASC 326's current expected credit loss model for HTM securities),[8] unrealized gains and losses on securities primarily reflect the effects of interest rate movements on the value of fixed-rate securities.

The AOCI filter and the tailoring rules

FAS 115's main accounting innovation was to require AFS securities to be recognized at fair value, with cumulative gains and losses recorded in AOCI. Prior to the imposition of the AOCI filter in January 1995, AOCI was included in banks' Tier 1 regulatory capital. Hence, to avoid volatility in regulatory capital, upon their adoption of FAS 115, many banks classified sizeable portions of their securities as HTM, thereby maintaining the prior amortized cost accounting.[9]

This classification choice quickly turned out poorly for the banks, because from early 1994 to early 1995, interest rates rose sharply, yielding large unrealized losses on banks' fixed-rate HTM securities subject to restrictions on sale and reclassification. To mitigate this problem, bank regulators implemented the AOCI filter in January 1995. In November 1995, the FASB provided a moratorium enabling firms to sell and reclassify their HTM securities without tainting their HTM portfolios. Many banks used this moratorium to substantially reduce their classification of securities as HTM.[10]

The AOCI filter applied to all banks until December 31, 2013. Then, under the initial U.S. implementation of Basel III, for advanced approaches banks with greater than $250 billion assets or $10 billion foreign exposure, the AOCI filter was phased out over five years beginning on January 1, 2014. Finally, under the Federal Reserve's tailoring rules implementing provisions of EGRRCPA, the AOCI filter was reinstated effective as of December 31, 2019, for previously advanced approaches banks with assets

[8] Prior to a bank's adoption of ASC 326—which occurred from January 2020 to January 2023 depending on the bank's size, listing status, and adoption choice—its HTM securities were also subject to ASC 320's impairment rules.

[9] Hodder, Kohlbeck, and McAnally (2002) report that the median bank holding company in their sample classified 51 percent of its securities as AFS upon the adoption of FAS 115. As the median bank holding company does not hold any trading securities, that bank classified 49 percent of its securities as HTM.

[10] Hodder et al. (2002) report that the median bank in their sample raised the proportion of securities classified as AFS from 51 percent prior to the moratorium to 85 percent afterwards.

between $250 billion and $700 billion and foreign exposures below $75 billion, as long as the banks opted out of the inclusion of AOCI in regulatory capital. All five affected banks did opt out.

Transfers of securities from HTM to AFS in general and in response to the tailoring rules

Except in allowed circumstances, firms cannot sell HTM securities or transfer the securities to other categories without tainting their HTM portfolios. When a firm's HTM portfolio is tainted, ASC 320-10-35-9 requires the firm to transfer the entire HTM portfolio to AFS. The firm generally cannot classify any securities as HTM for two years.[11]

Two sets of guidance in ASC 320 specify when firms may sell HTM securities or transfer them to another category without tainting their HTM portfolios. First, ASC 320-10-25-6 allows firms to transfer securities out of HTM in six specified circumstances.[12] These circumstances clearly do not apply to three opt-out banks' transfers of securities from HTM to AFS for which they invoke the tailoring rules. Moreover, ASC 320-10-25-7 states that it is not appropriate for firms to analogize to these six circumstances.

Second, ASC 320-10-25-10 allows firms to transfer securities out of HTM without taint upon the occurrence of an event that meets four conditions: the event is "isolated…nonrecurring…unusual for the reporting entity…[and] could not be reasonably anticipated." ASC 320-10-25-11 states that "Other than extremely remote disaster scenarios (such as a run on a bank or an insurance entity), very few events would meet all four of these conditions."

The three opt-out banks that invoked the tailoring rules to transfer $212 billion of securities out of HTM at the end of 2019 or early 2020 must have done so based on ASC 320-10-25-10. Changes in

[11] The two-year tainting period reflects SEC guidance from the previously described period of increasing interest rates in 1994 and 1995 when banks found themselves holding too many HTM securities, specifically, a January 10, 1995 speech by Tracey C. Barber of the SEC staff at the 22nd Annual National Conference on Current SEC Developments (EY 2022, p. 58). The idea behind the tainting period is the firm needs to develop policies and procedures that reestablish the credibility of its assertions regarding the intent and ability to hold securities.

[12] These circumstances are (1) a significant deterioration in the creditworthiness of the issuer of the security; (2) a change in tax law that eliminates or reduces the tax-exempt status of the security; (3) a major business combination or disposition that requires the firm to rebalance its securities portfolio to maintain the desired interest rate or credit risk exposure; (4) a significant regulatory change regarding the type or magnitude of permissible investments; (5) a significant increase in capital requirements that requires the firm to downsize; and (6) a significant change in regulatory risk weights for securities.

regulatory capital definitions—which do not directly affect banks' economic capital, occur with considerable frequency, and are subject to regularly changing political influences[13]—do not appear to meet any of the four conditions, not to mention all four conditions. The change made by the tailoring rules, which opt-out banks surely viewed as a favorable development, does not constitute anything approaching an "extremely remote disaster scenario". None of the three opt-out banks indicated that their HTM portfolios were tainted by these transfers, a conclusion that would have have made it difficult for the bank to transfer securities back to HTM once interest rates started rising in the second half of 2021. Regardless of whether ASC 320-10-25-10 applies to these transfers, the banks' transfer of securities first into HTM, then out of HTM, then back into HTM illustrates that their intent to hold securities to maturity is both fluid and primarily motivated by their preferred financial accounting and regulatory capital treatments rather than by a distinct economically motivated intent and ability to hold the securities to maturity.

In addition, the FASB periodically writes standards that affect the accounting for HTM securities. When this occurs, the FASB often provides firms with "one-time" options to transfer securities out of HTM without tainting their HTM portfolios. The FASB issued three ASUs with effective dates close to the effective date of the tailoring rules that provided such options. ASUs 2017-12 and 2019-04, which allow hedge accounting for last-of-layer hedges of portfolios of prepayable assets, allowed any firm to transfer securities that are eligible to be the hedged item in a last-of-layer hedge out of HTM without taint upon the adoption of the ASUs, even if the firm had no intention to engage in such a hedge.[14] ASU 2020-04, which provides accounting expedients and exceptions regarding the replacement of LIBOR with other reference rates, provided banks with a one-time option to transfer securities that referenced rates affected by reference rate reform and were classified as HTM before January 1, 2020, out of HTM at any time from the first quarter of 2020 to the end of 2022.

[13] For example, the Trump-era EGRRCPA unwound provisions of the prior Obama-era Dodd-Frank Act and regulations implementing that act.

[14] For regular adopters with December 31 fiscal year ends, the effective date of ASU 2017-12 is January 1, 2019, and the effective date of ASU 2019-04 is January 1, 2020. A firm could transfer securities out of HTM upon the adoption of ASU 2019-04 only if it had not previously made such a transfer upon the adoption of ASU 2017-04.

Hypotheses

Our hypotheses follow from the first two hypotheses in Kim et al. (2019), which pertain to advanced approaches banks' behavior around the phase-out of the AOCI filter beginning in 2014 under the initial U.S. implementation of Basel III. We expect the opt-out banks to behave like advanced approaches banks during the Basel III period, but to reverse this behavior around the tailoring rules.

Specifically, our first hypothesis follows from Kim et al.'s (2019) H1, which states that advanced approaches banks increase the classification of securities as HTM around the AOCI filter phase-out. We hypothesize that the opt-out banks behave similarly to advanced approaches banks during the Basel III period, but then the opt-out banks reclassify securities from HTM to AFS during the tailoring rules period.

We also conduct empirical analysis for advanced approaches and non-advanced approaches banks during the tailoring rules subperiod, which do not directly affect these banks, and for all three categories of banks during the interest rate rise subperiod. Consistent with Granja (2023), we expect all banks to transfer securities from AFS to HTM once they understand that interest rates are rising.

Our second hypothesis follows from Kim et al.'s (2019) H2, which states that advanced approaches banks reduce the risk of both AFS and HTM securities around the phase-out of the AOCI filter. We limit this hypothesis to the risk of AFS securities for reasons discussed below. We hypothesize that advanced approaches and opt-out banks reduce the interest rate risk of AFS securities during the Basel III subperiod, but that opt-out banks then increase the interest rate risk of AFS securities during the tailoring rules period.

Unlike Kim et al. (2019), we propose no hypothesis about the interest rate risk of HTM securities for two reasons. First, only one of the opt-out banks holds any HTM securities during the tailoring rule period after the second quarter of 2020, and this bank holds only a small amount of these securities, so the level and change in the risk of opt-out banks' HTM securities during the tailoring rule period cannot be reliably interpreted. Second, the primary difference between advanced approaches and opt-out banks during the tailoring rule period pertains to reinstatement of the AOCI filter and AFS securities.

While we do not propose any hypothesis in this regard, we also conduct empirical analysis of the extent to which banks economically hedge the interest rate risk of their fixed-rate securities. The values of

fixed-rate securities vary inversely with the relevant market interest rates. Banks can economically hedge these value fluctuations in two primary ways. First, they can use interest rate derivatives that may be designated and qualify as fair value hedges of the interest rate risk of their fixed-rate AFS securities.[15] In contrast, hedges of the interest rate risk of fixed-rate HTM securities cannot qualify for hedge accounting under ASC 815-20-25-12d and 15f. Second, banks can engage in asset-liability management by holding liabilities with similar duration as their securities. Typically, banks' asset-liability management substantially involves deposits that have no contractual maturity but have non-contractual stickiness, that is, that pay interest rates that usually exhibit low sensitivity to market interest rate movements. This sort of asset-liability management works only as long as the deposits maintain low interest-rate sensitivity and, in particular, do not run. Non-FDIC insured deposits are considerably more likely to run. Deposit runs in March 2023 at Silicon Valley, Signature, and First Republic banks, all of which had high proportions of uninsured deposits, illustrate the limitations of this sort of asset-liability management.

3. Sample and Data

Our sample consists of 297 publicly listed U.S. bank and thrift holding companies and stand-alone banks and thrifts (hereafter collectively "banks") from the first quarter of 2012 to the fourth quarter of 2022.[16] We hand collect securities transferred between AFS and HTM from banks' Form 10-K filings. For securities transferred from HTM to AFS, we also collect whether the transfers tainted the banks' HTM portfolios and, if not, the stated reasons why the transfers did not taint the portfolios.

We obtain most financial variables, including risk-weighted AFS securities and non-FDIC insured deposits (which we measure as total deposits less deposits with balances below $250,000), from the FR Y-9C filings for bank holding companies and Call Reports for stand-alone banks. However, we calculate the

[15] An accounting hedge of the interest rate risk of a fixed-rate asset or liability is a fair-value hedge, whereas an accounting hedge of a floating-rate asset or liability is a cash-flow hedge.

[16] Most listed banking entities are structured as bank holding companies (Kim and Kim 2023). Schwab is a thrift holding company. We include stand-alone banks and thrifts in the sample primarily because two recently failed regional banks, Signature and First Republic, and (at least) one regional bank downgraded in 2023, Zions, are stand-alone banks. The sample includes 259 bank holding companies, 22 thrift holding companies, 14 stand-alone banks, and 2 stand-alone thrifts.

weighted-average maturity of AFS securities using data from banks' Form 10-Q and 10-K filings because this data is less aggregated than that in regulatory filings. ASC 320 requires quarterly disclosure of the amounts of AFS securities maturing in four bins: 1 year or less, 1–5 years, 5–10 years, and over 10 years. We use XBRL to collect the amounts of AFS securities in these bins, filling in about 30% of missing data with hand collection from the filings. We also collect the amounts of (fixed-rate) AFS securities that are fair value hedged, which we compare to total AFS securities to determine the amount of hedging, from the financial statement notes in banks' 10-Q and 10-K filings, because this information is only available from these filings. ASU 2017-12 first mandates that firms disclose the carrying amount of hedged assets for hedges that receive hedge accounting. Hence, we observe the amounts of AFS in fair value hedges from March 2018 onwards for most banks.

Lastly, we obtain three-month U.S. Treasury rates from the Federal Reserve Bank of St. Louis. Appendix B provides the definitions of all model variables.

Table 1, Panel A reports descriptive statistics for the model variables for the full sample pooled across years. Panel B, C, and D report the statistics separately for the advanced approaches, opt-out, and non-advanced approaches, respectively, banks. In the full sample, AFS (HTM) securities on average constitute 15.5 (3.4) percent of assets. The opt-out banks hold the highest percentages of both classifications of securities at 17.7 percent for AFS and 8.5 percent for HTM. The statistics for the other variables generally are similar to those in prior banking papers.

4. Empirical Results

Visual Evidence of Securities Transfers

To provide descriptive evidence regarding our first hypothesis, we first discuss figures that depict trends in securities reclassifications by advanced approaches, opt-out, and non-advanced approaches banks in each year of our sample period from 2012 to 2022. Figure 1 depicts the dollar amounts of security reclassifications from AFS to HTM in each year in Panel A and from HTM to AFS in Panel B. Throughout the sample period, advanced approaches banks primarily transferred AFS securities to HTM. The only

appreciable exception to this occurred in 2018, when these banks transferred a sizeable amount of securities from HTM to AFS; these transfers are due to four of the banks' early adoption of ASU 2017-12.

Similar to advanced approaches banks, the opt-out banks solely transferred securities from AFS to HTM prior to the tailoring rules. At the end of 2019 and early in 2020, around the effective date of the tailoring rules, the opt-out banks transferred substantially all their HTM securities to AFS. As interest rates rose late in 2021 and throughout 2022, opt-out banks transferred large amounts of securities from AFS to HTM.

The non-advanced approaches banks have transfers in both directions in the years prior to the interest rate increase period. The largest security transfers are from HTM to AFS in 2018 and 2019; 74 percent (46 of 62) of these transfers invoke ASU 2017-12 or ASU 2019-04, of which 76 percent (35 of 46) of the banks involved do not have fair value hedges of AFS securities through the end of 2022. Similar to both advanced approaches and opt-out banks, non-advanced approaches banks transfer securities from AFS to HTM in 2021 and 2022 as interest rates rise.

Figure 2 depicts the cumulative effects of these transfers and also the initial classifications of securities for the three categories of banks in each sample year. Panel A depicts the mean ratio of AFS securities to total assets, Panel B depicts the mean ratio of HTM securities to total assets, and Panel C depicts the mean ratio of HTM securities to the sum of AFS and HTM securities. Because the last ratio abstracts from growth in the sum of AFS and HTM securities, the trends are easiest to interpret in Panel C, so we discuss only this panel.

For advanced approaches banks, the proportion of HTM securities rises steadily from approximately 3 percent in 2012 to approximately 57 percent in 2022, consistent with the AOCI filter incentivizing HTM classification. For the opt-out banks, this proportion also rises strongly until the tailoring rules, at which point the proportion falls to near zero until interest rates begin rising in late 2021. By the fourth quarter of 2022, the proportion increases to approximately 36 percent. For non-advanced banks, there is a gradual rise in the proportion of HTM securities from approximately 11 percent in 2012 to approximately 17 percent in the third quarter of 2015, followed by a gradual decline in the proportion back

to approximately 11 percent at the end of 2020, followed by a strong increase in the proportion to about 23 percent at the end of 2022. In summary, as the AOCI filter is initially phased-out for the opt-out banks, these banks reclassify securities similarly to advanced approaches banks; when the AOCI filter is reinstated for the opt-out banks under the tailoring rules, the banks reclassify securities in the opposite direction of advanced approaches banks and more like non-advanced approaches banks; and when interest rates rise, all three categories of banks transfer securities to HTM, with the opt-out banks again behaving more like advanced approaches banks.

Figure 3 breaks out the two types of security transfers by opt-out banks depicted in Figure 1, distinguishing the four opt-out banks that engaged in such transfers. Two of these banks made the predicted transfers around each of the phase-out of the AOCI filter, tailoring rules, and increase in interest rates. US Bancorp transferred securities from AFS to HTM in 2012 in advance of the phase-out of the AOCI filter, then transferred all of its HTM securities to AFS in 2019 around the tailoring rules, and finally transferred securities from AFS to HTM in 2021 and 2022 as interest rates rose. Schwab transferred securities from AFS to HTM in 2017 in advance of becoming an advanced approaches bank, then classified all of its HTM securities as AFS in 2019 and 2020 around the tailoring rules, and finally transferred securities from AFS to HTM in 2022 as interest rates rose. The other two opt-out banks made the predicted transfers only at two of these times. Capital One transferred securities from AFS to HTM in 2013 in advance of the phase-out of the AOCI filter and then classified all of its HTM securities to AFS in 2019 around the tailoring rules, but it did not transfer securities from AFS to HTM in 2021 and 2022 as interest rates rose. PNC transferred almost all of its HTM to AFS in 2019 around the tailoring rules, and it transferred securities from AFS to HTM in 2021 and 2022 as interest rates rose.

Figure 4 breaks out the transfers of securities from HTM to AFS by opt-out banks in 2019 and 2020, depicted in Figure 1, Panel B distinguishing the rationales for these transfers provided by each of the four opt-out banks that engaged in such transfers. The tailoring rules are the predominant rationale in both years. In addition, Schwab invoked ASU 2017-12 in 2019 (despite having no fair value hedges of AFS securities until 2023Q1), and PNC invoked both ASU 2019-04 and ASU 2020-04 in 2020.

Table 1, Panel E summarizes the number, dollar amount, and associated percentages of transfers of securities from HTM to AFS by all our sample banks during our sample period by the stated reasons why the transfers do not taint the banks' HTM portfolios or if the transfers taint the portfolios. We classify a transfer as tainting the HTM portfolio if the bank states that the transfer taints the portfolio or if the bank has no HTM securities after the transfer and provides no reason why the transfer does not taint the portfolio. Of the 118 total transfers from HTM to AFS, 39 (33.1 percent by frequency but only 3.1 percent by dollar amount) taint the banks' HTM portfolios. The most common non-taint reasons in terms of frequency are ASU 2017-12 (41 transfers, 34.8 percent) and ASU 2019-04 (14 transfers, 11.9 percent), but the dominant reason in terms of dollar amount is the tailoring rules ($231.8 billion, 72.3 percent). Interestingly, two banks other than opt-out banks, Truist Financial and Ally Financial, invoke the tailoring rules as the reason for transfers. Truist Financial never was an advanced approaches bank and thus we do not classify it as an opt-out bank. It was formed in the December 2019 merger of BB&T and SunTrust, is larger than three of the opt-out banks and would have become an advanced approaches bank if not for the tailoring rules. Ally Financial states that under the tailoring rules it is no longer subject to liquidity coverage ratio requirements. Being freed from these requirements, which do not distinguish AFS and HTM securities, Ally presumably wishes to have the ability to sell the transferred securities.

Regression Analyses of Securities Transfers

To formally test our first hypothesis and the supportive patterns depicted in Figures 1−4, Table 2 reports estimations of spline regression models that show how advanced approaches banks, opt-out banks, and non-advanced approaches banks change the classifications of their securities as as the AOCI filter is first phased-out for the advanced approaches and opt-out banks and then reinstated for the opt-out banks and finally as interest rates rise toward the end of the 2012−2022 sample period. The dependent variables in these models are one of the following four measures of securities classifications: AFS securities divided by total assets, $AFS/Asset_{i,t}$, in column (1); HTM securities divided by total assets, $HTM/Asset_{i,t}$, in column (2); AFS and HTM securities divided by total assets, $Sec/Asset_{i,t}$, in column (3); and HTM securities divided by total AFS and HTM securities, $HTM/Sec_{i,t}$, in column (4).

The explanatory variables of interest are the interactions between indicators for the three bank categories—advanced approaches (*AA*), opt-out (*opt-out*), and non-advanced approaches (*non-AA*)—and variables that capture the count of quarters during each of the four subperiods of the 2012−2022 sample period: (i) the six quarters before the October 2013 issuance of the final rule for the initial U.S. implementation of Basel III (2012Q1–2013Q2) (pre-Basel III);[17] (ii) the 25 quarters from the issuance of the final rule to the quarter prior to the December 31, 2019 effective date of the tailoring rules (2013Q3–2019Q3) (Basel III); (iii) the eight quarters from the effective date of the tailoring rules to the third quarter of 2021 (2019Q4–2021Q3) (the tailoring rules); and (iv) the five quarters with increasing interest rates (2021Q4–2022Q4) (interest rate increase).[18] The quarter-count variable for each subperiod takes a value of zero for the quarters before that period, n for the nth quarter of the period, with n taking values from 1 to N_s (i.e., 6, 25, 8, and 5 for the pre-Basel III, Basel III, tailoring rules, and interest rate increase subperiods, respectively), and N_s for all subsequent quarters. We denote these quarter-count variables by the period name followed by *QC*. For example, *Tailoring Rules QC* takes a value of zero for quarters up to 2019:Q3 and one for 2019:Q4, increases by one for each subsequent quarter during the period up to eight for 2021Q3, and equals eight for all subsequent quarters. This specification implies that the coefficient on an explanatory variable of interest in equation (1) below captures the slope coefficient on the the count of quarters during the subperiod for the category of banks of interest. As our hypotheses most directly pertain to changes in the security classification incentives for the various categories of banks from one subperiod to the next, we

[17] Advanced approaches banks (including two of the four opt-out banks that initially were advanced approaches banks) often cite the final rule as the reason for reclassifications of securities from AFS to HTM in 2013Q3 and Q4.

[18] We chose 2021Q4 as the first quarter of the increasing interest rate period because this is the quarter in which market expectations that interest rates would increase over the near term first jumped strongly. For example, the Federal Reserve Board members and Federal Reserve Bank presidents' predictions of the federal funds target rate in 2022 increased by 0.6 percent from September to December 2021, three times the 0.2 percent increase from June to September 2021. Federal Reserve Board, Summary of Economic Projections for December 14-15 FOMC meeting, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20211215.pdf and https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20210922.pdf.

also report the changes in these slope coefficients from the prior subperiod to the current subperiod for these bank categories.[19]

Reflecting the above discussion, the spline regression model, which also includes five bank-quarter control variables commonly used in bank research and bank fixed effects, is

$$\text{Dependent variable}_{i,t} = \Sigma_s \Sigma_c \beta_{c,s} (\text{Bank category c} \times \text{Subperiod s QC}) + \gamma \text{ Controls}_{i,t} + \text{Bank fixed effects.} \quad (1)$$

The coefficient $\beta_{c,s}$ equals the estimated average quarterly increase in the dependent variable during subperiod s ∈ {pre-Basel III, Basel III, tailoring rules, interest rate rise} for banks of category c ∈{ AA, opt-out, non-AA}. The coefficient difference $\beta_{c,s} - \beta_{c,s-1}$ equals the change in this quarter-count sensitivity from subperiod s−1 to s for banks of category c. Robust standard errors corrected for heteroscedasticity and clustered by bank category are reported in parentheses in Table 2 and subsequent tables.

Columns (1)-(4) of Table 2 report the estimations of equation (1) with $HTM/Assets_{i,t}$, $HTM/Assets_{i,t}$, $Sec_{i,t}/Assets_{i,t}$, and $HTM/Sec_{i,t}$, respectively, as the dependent variable. Columns (5)-(8) of the table report the corresponding changes in the coefficients of interest from the prior subperiod to the current subperiod. In discussing the table, we again abstract from changes in securities as a percentage of assets by focusing on the estimation of the model with the dependent variable $HTM/Sec_{i,t}$ reported in columns (4) and (8). For this dependent variable, the findings of Kim et al. (2019) and our first hypothesis imply that the coefficients $\beta_{AA,Basel\ III}$ and $\beta_{opt\text{-}out,Basel\ III}$ are positive, and relatedly that the coefficient differences $\beta_{AA,Basel\ III} - \beta_{AA,pre\text{-}Basel\ III}$ and $\beta_{opt\text{-}out,Basel\ III} - \beta_{opt\text{-}out,pre\text{-}Basel\ III}$ are positive, because the phase-out of the AOCI filter during the Basel III period provided these banks with the incentive to increase HTM securities. This hypothesis futher posits that the the coefficient $\beta_{opt\text{-}out,tailoring\ rules}$ and the coefficient difference $\beta_{opt\text{-}out,tailoring\ rules} - \beta_{opt\text{-}out,Basel\ III}$ are

[19] The significance levels on the changes in coefficients can be estimated either by imposing linear restrictions on the coefficients in equation (1) or by estimating spline models that include subperiod count variables that are specified differently than described above but are informationally equivalent to equation (1). Stata appears to do the latter.

negative, because the tailoring rules reinstated the AOCI filter for the opt-out banks, reversing this incentive.

As hypothesized, the estimation reported in column (4) of Table 2 and changes in the coefficients from the prior subperiod reported in column (8) indicate that advanced approaches banks significantly increase the proportion of their securities classified as HTM ("the HTM proportion") during the Basel III subperiod both in isolation and relative to the pre-Basel III period. Specifically, the coefficient 0.010 ($p<0.01$) on *AA*Basel III* in column (4) [change in coefficient 0.001 ($p<0.01$) on *AA*Basel III* in column (8)] indicates that advanced approaches banks increase the HTM proportion by 1.0 percent per quarter during the Basel III period [by 0.1 percent per quarter during that period relative to the pre-Basel III period]. Extending these findings, we find that advanced approaches banks highly significantly increase this proportion by 0.6 percent per quarter during the tailoring rule subperiod, which is 0.4 percent less than during the Basel III period. We further find that advanced approaches banks highly significantly increase this proportion by 3.8 percent per quarter during the interest rate risk subperiod, which is 3.1 percent more than during the tailoring rules period.

Also as hypothesized, the coefficient 0.010 ($p<0.01$) on *opt-out*Basel III* in column (4) implies that the opt-out banks increase HTM securities as a proportion of assets by 0.1 percent per quarter during the Basel III period. Unexpectedly, the change in coefficient -0.024 ($p<0.01$) on *opt-out*Basel III* in column (8) implies that the HTM proportion increases by 2.4 percent less per quarter during this period than during the pre-Basel III period. It is not clear why the opt-out banks increased this proportion so strongly during the pre-Basel III period, though anticipation of the implementation of Basel III is a possibility. As hypothesized, and unlike our findings for advanced approaches banks, we find that the opt-out banks reduce the HTM proportion by a highly significant 5.2 percent per quarter during the tailoring rules period, which is 5.3 percent relative to the Basel III period. We further find that the opt-out banks highly significantly increase the HTM proportion by 9.8 percent per quarter during the increasing interest rate period, which is 15.1 percent more than during the tailoring rules period.

We find that the non-advanced approaches banks highly significantly decrease the HTM proportion by 0.1 percent per quarter during the Basel III subperiod and by 0.6 percent per quarter during tailoring rules period, and that they highly significantly increase this proportion by 2.7 percent per quarter during the interest rate period.

Visual Evidence of Changes in AFS Securities Interest Rate Risk

To provide descriptive evidence regarding our second hypothesis, Figure 5 depicts the weighted-average maturity of AFS securities, a measure of the securities' interest rate risk, for the three categories of banks in each sample year. For advanced approaches banks, the weighted average maturity exhibits a slight peak at the end of the pre-Basel III period but is overall quite flat from the first quarter of 2012 to the second quarter of 2016, bouncing around in a range from approximately 7.5 to 8.3 years. The weighted-average maturity then increases noticeably to approximately 8.6 years in the third quarter of 2016; this increase is entirely attributable to Bank of America redefining maturity from expected maturity to contractual maturity.[20] This distortion in the time-series can be eliminated either by consistently defining the maturity of residential mortgage backed-securities as 15 years for Bank of America, an approach that is presented in Figure 5, or by dropping the bank from the sample. After the third quarter of 2016, the weighted-average maturity declines fairly consistently over the remaining sample period to approximately 6 years in the fourth quarter of 2022. The pattern of weighted-average maturity up to the third quarter of 2016 is initially at most modestly explained by the phase-out of the AOCI filter, and is consistent with the finding of Chircop and Novatny-Farkas (2016) that advanced approaches banks insignificantly reduced the weighted-average maturity of their AFS securities from before the beginning of the phase-out of the AOCI filter through the third quarter of 2014. In contrast, the decline in subsequent quarters is consistent with the ongoing phase-out of the filter eventually increasing advanced approaches banks' incentives sufficiently for them to reduce the interest rate risk of AFS securities. This incentive strengthens in the rising interest rates period.

[20] Bank of America's Form 10-Q filing for the third quarter of 2016, p. 118, indicates that its maturity disclosures reflect the contractual maturity of securities, whereas its Form 10-Q filing for the second quarter of 2016, p. 138, indicates its maturity disclosures reflect the expected maturity. This change is primarily important for residential mortgage-backed securities, for which the underlying mortgages are prepayable without penalty.

For the opt-out banks, the weighted-average maturity of AFS securities is quite flat at approximately 10.3 years until the second quarter of 2014, at which point it drops steadily to approximately 7.4 years in the fourth quarter of 2018, consistent with the phase-out of the AOCI filter increasing the banks' incentive to reduce the interest rate risk of AFS securities. The weighted-average maturity then rises steadily to approximately 9 years in the second quarter of 2022, consistent with the reinstatement of the AOCI filter under the tailoring rules reversing the banks' incentive to reduce the risk of AFS securities. The weighted-average maturity then drops in the final two quarters of the sample period to approximately 8 years, as the opt-out banks reduce the maturity of AFS securities as interest rates rise.

For non-advanced approaches banks, the weighted-average maturity of AFS securities is quite flat at approximately 10 years through the end of 2018, at which point it rises to approximately 10.6 years in the fourth quarter of 2021, perhaps reflecting a search for yield when interest rates fell during the COVID-19 pandemic. The weighted-average maturity then falls to approximately 9.8 years in the fourth quarter of 2022, as the banks reduce the maturity of AFS securities as interest rates rise.

Regression Analyses of Changes in AFS Securities Interest Rate Risk

To formally test our second hypothesis and the supportive patterns depicted in Figure 5, Table 3 reports estimations of spline (i.e., piecewise linear) regression models that examine how advanced approaches, opt-out, and non-advanced approaches banks change AFS securities interest rate risk during the four subperiods of our 2012−2022 sample period. The spline models have the same structure and explanatory variables as equation (1), as well as analogous interpretations of coefficients and changes in coefficients from the prior subperiod as for the estimations reported in Table 2. The dependent variables are one of the following three measures of AFS securities interest rate risk: the weighted-average maturity of AFS securities, $AFS\ Maturity_{i,t}$, in column (1); the weighted-average maturity of AFS securities calculated consistently using 15 years as the maturity of residential mortgage-backed securities for Bank of America, $AFS\ Maturity\ Adj_{i,t}$, in column (2); and the weighted-average maturity of AFS securities setting the value of the variable as missing for Bank of America, $AFS\ Maturity\ ex\ BoA_{i,t}$, in column (3). The last two dependent variables reflect alternative approaches to sterilizing Bank of America's redefinition of maturity

from expected maturity to contractual maturity in the third quarter of 2016, which leads to the dramatic increase in $AFS\ Maturity_{i,t}$ for the advanced approaches banks in that quarter depicted in Figure 5. The third dependent variable can equally well be viewed as a sample restriction.

Columns (1)-(3) of Table 3 report the estimations of equation (1) with $AFS\ Maturity_{i,t}$, $AFS\ Maturity\ Adj_{i,t}$, and $AFS\ Maturity\ ex\ BoA_{i,t}$, respectively, as the dependent variable. Columns (4)-(6) of the table report the corresponding changes in the coefficients of interest from the prior subperiod to the current subperiod. For each dependent variable, our second hypothesis posits that the coefficients $\beta_{AA,Basel\ III}$ and $\beta_{opt\text{-}out,Basel\ III}$ and the coefficient differences $\beta_{AA,Basel\ III} - \beta_{AA,pre\text{-}Basel\ III}$ and $\beta_{opt\text{-}out,Basel\ III} - \beta_{opt\text{-}out,pre\text{-}Basel\ III}$ are negative, because the phase-out of the AOCI filter during the Basel III period provided the advanced approaches and opt-out banks with the incentive to decrease AFS securities risk. This hypothesis further posits that the coefficient $\beta_{opt\text{-}out,tailoring\ rules}$ and the coefficient difference $\beta_{opt\text{-}out,tailoring\ rules} - \beta_{opt\text{-}out,Basel\ III}$ are positive, because the tailoring rules reinstated the AOCI filter for the opt-out banks.

To sidestep the need to discuss the effects of the sizeable distortion in weighted-average AFS maturity arising from Bank of America redefining the maturity of residential mortgage-backed securities in the third quarter of 2016, we discuss only the estimation with dependent variable $AFS\ Maturity\ Adj_{i,t}$ reported in column (2) of Table 3 along with the corresponding coefficient changes from the prior subperiods reported in column (5). These results yield different inferences from those for $AFS\ Maturity_{i,t}$ only for the advanced approaches banks in the Basel III subperiod when the distortion occurs, including the two coefficient changes involving those banks in that period. These results yield very similar inferences as those for $AFS\ Maturity\ Ex\ BoA_{i,t}$ for all bank categories in all subperiods.

Consistent with our second hypothesis, these results indicate that advanced approaches banks significantly reduce the weighted-average maturity of AFS securities during the Basel III subperiod both in isolation and relative to the pre-Basel III period. Specifically, the coefficient -0.016 ($p<0.01$) on *AA*Basel III* in column (2) and the corresponding coefficient change -0.032 ($p<0.01$) in column (5) imply that advanced approaches banks decrease the weighted-average AFS maturity by 0.016 years per quarter during the Basel III period, and by 0.032 years per quarter relative to the pre-Basel III period. These results also

indicate that advanced approaches banks continue to significantly reduce the weighted-average maturity of AFS securities during the tailoring rule subperiod both in isolation and relative to the Basel III period. Specifically, the coefficient on *AA*Tailoring Rule* and corresponding coefficient change in columns (2) and (5) imply that advanced approaches banks decrease the weighted-average AFS maturity by 0.152 years per quarter during the tailoring rules period, and by 0.136 years per quarter relative to the Basel III period. Lastly, the results indicate that advanced approaches banks again continue to significantly reduce the weighted-average maturity of AFS securities during the interest rate rise subperiod in isolation, though at an insignificantly different level relative to the tailoring rule period. Specifically, the coefficient on *AA*Interest Rate Rise* and corresponding coefficient change in columns (2) and (5) imply that advanced approaches banks decrease the weighted-average AFS maturity by 0.171 years per quarter during the interest rate rise subperiod.

Also consistent with our second hypothesis, the results in Table 3 indicate that the opt-out banks highly significantly reduce the weighted-average maturity of AFS securities during the Basel III subperiod both in isolation and relative to the pre-Basel III period. Specifically, the opt-out banks decrease the weighted-average AFS maturity by 0.131 years per quarter during the Basel III period, and by 0.229 years per quarter relative to the pre-Basel III period. Most importantly, and in striking contrast to the findings for advanced approaches banks discussed above, these results indicate that the opt-out banks highly significantly increase the weighted-average maturity of AFS securities during the tailoring rule subperiod both in isolation and relative to the Basel III period. Specifically, the opt-out banks increase the weighted-average AFS maturity by 0.117 years per quarter during the tailoring rules subperiod, and by 0.248 years per quarter relative to the Basel III subperiod. Lastly, and in contrast to the opt-out banks' behavior during the tailoring rules period, the results indicate that the opt-out banks significantly reduce the weighted-average maturity of AFS securities during the interest rate rise subperiod and relative to the tailoring rule period. Specifically, the opt-out banks decrease the weighted-average AFS maturity by 0.013 years per quarter during the interest rate rise subperiod, and by 0.130 year per quarter relative to the tailoring rules period.

While we make no hypothesis regarding non-advanced approaches banks, the results in Table 3 indicate that these banks significantly reduce the weighted-average maturity of AFS securities during the Basel III subperiod in isolation, but increase this maturity relative to the pre-Basel III period. Specifically, non-advanced approaches banks decrease the weighted-average AFS maturity by 0.012 years per quarter during the Basel III period, and increase this maturity by 0.063 years per quarter relative to the pre-Basel III period. These results also indicate that non-advanced approaches banks highly significantly increase the weighted-average maturity of AFS securities during the tailoring rule subperiod both in isolation and relative to the Basel III period. Specifically, the coefficient on *non-AA*Tailoring Rule* and corresponding coefficient change in columns (2) and (5) imply that the non-advanced approaches banks increase the weighted-average AFS maturity by 0.135 years per quarter during the tailoring rules subperiod, and by 0.146 years per quarter relative to the Basel III subperiod. Lastly, and as for the other two categories of banks, the results indicate that the non-advanced approaches banks significantly decrease the weighted-average maturity of AFS securities during the interest rate rise subperiod in isolation and relative to the tailoring rule period. Specifically, non-advanced approaches banks decrease the weighted-average AFS maturity by 0.261 years per quarter during the interest rate rise subperiod, and by 0.396 years per quarter relative to the tailoring rules period. Notice that, while the effects on the weighted-average maturity of AFS securities are significant for the non-advanced approaches banks in each subperiod, the opposing direction of the effects in the tailoring rules subperiod relative to those in the other subperiods causes the effects to largely offset over the entire sample period, as depicted in Figure 5.

In summary, the visual evidence depicted in Figure 5 and the results reported in Table 3 are consistent with our second hypothesis that the phase-out of the AOCI filter for advanced approaches banks including the opt-out banks leads these banks to reduce the interest rate risk of their AFS securities during the Basel III period, and that the reinstatement of the AOCI filter for the opt-out banks leads these banks to increase the interest rate risk of their AFS securities. These results thus support recent calls to eliminate or restrict the applicability of the AOCI filter (Barr 2023).

Admittedly, the results of the tests of this hypothesis are not as sharp around the regulatory changes as the prior results of the tests of the first hypothesis regarding the three categories of banks' classification of securities. This lesser sharpness likely reflects the greater amount of time necessary to change the interest rate risk of securities than to change their accounting classifications. It may also reflect limitations of the calculation of the weighted-average maturity using the wide maturity intervals commonly exhibited by financial report disclosures.

Evidence of the Extents of Hedging of Fixed-Rate AFS Securities and Uninsured Deposits

In this section, we provide descriptive evidence regarding the extent to which the three categories of banks hedge fixed-rate AFS securities using interest rate derivatives that qualify for hedge accounting and are subject to breakdowns in asset-liability management by issuing non-FDIC guaranteed deposits. Reflecting the increase in uninsured deposits since the FDIC insurance cap was raised to $250,000 per depositor in 2008, average uninsured deposits as a percentage of assets is 36.5 percent in the full sample and 55.1 (35.1) [35.8] percent for the advanced approaches (opt-out) [non-advanced approaches] banks.

Figure 6 depicts the amortized cost of AFS securities that are designated as the hedged items in qualifying fair value hedges divided by the amortized cost of all AFS securities (the "hedging ratio"). The figure depicts the hedging ratio beginning in 2018Q1, the first quarter for which the necessary data are reliably provided under ASU 2017-12. The figure shows that advanced approaches banks dramatically increased their average hedging ratio from approximately 10% in 2018Q1 to over 35% in 2022Q4. In contrast, opt-out banks, which engaged in almost as much hedging as advanced approaches banks in 2018Q1, reduced their hedging by about half by 2022Q2, with the decline predominantly occurring around the effective date of the tailoring rules. Non-advanced approaches banks hedged relatively little throughout the period. While we do not discuss the results of estimating spline regression models analogous to those in prior tables to conserve space, for completeness, columns (1) and (3) of Table 4 report the estimation of such models with the hedging ratio as the dependent variable.

Figure 7 depicts banks' non-FDIC insured deposits divided by total assets beginning in 2012Q1. This ratio is higher for the advanced approaches banks than for the opt-out and non-advanced approaches

banks. The ratio generally rises for all three categories of banks until interest rates start increasing in early 2022, when it begins falling as some uninsured depositors start withdrawing funds. The decrease in the ratio in 2022 is largest for the opt-out banks and smallest for the advanced approaches banks, which depositors likely view as too big to fail. While we do not discuss the results of estimating spline regression models analogous to those in prior tables to conserve space, for completeness, columns (2) and (4) of Table 4 report the estimation of such models analogous with the ratio of uninsured deposits to assets as the dependent variable.

In summary, the evidence depicted in Figures 6 and 7 and reported in Table 4 indicates that in the wake of the tailoring rules the opt-out banks both have hedged the interest rate risk of their fixed-rate AFS securities to a low and decreasing extent and are increasingly exposed to runs of uninsured deposits that would cause their asset-liability management to fail. In contrast, advanced approaches banks have hedged the interest rate risk of their fixed-rate AFS securities to a considerably greater extent as interest rates rose, though these banks also have even higher levels of uninsured deposits. Whether advanced approaches banks are sufficiently well hedged or otherwise protected (e.g., by too big to fail policies) so that runs of uninsured deposits are unlikely to occur remains to be determined. Non-advanced approaches banks have not hedged the interest rate risk of their fixed-rate AFS securities appreciably and are increasingly exposed to runs of uninsured deposits

5. Conclusion

The regulatory AOCI filter removes accumulated other comprehensive income, which primarily includes unrealized gains and losses on available-for-sale (AFS) securities, from banks' Tier 1 regulatory capital. In this study, we distinguish the classifications of securities as AFS versus as held to maturity (HTM) and the risk management of AFS securities during the 2012-2022 period by three categories of banks differentially subject to the AOCI filter during this period: (1) advanced approaches banks for which the regulatory AOCI filter was phased out over five years beginning in 2014 under the U.S. implementation of Basel III; (2) opt-out banks which had previously been advanced approaches banks but for which the

AOCI filter was reinstated in the fourth quarter of 2019 under the Federal Reserve's tailoring rules; and (3) non-advanced approaches banks for which the AOCI filter applies throughout our sample period. The phase-out of the AOCI filter incentivized advanced approaches and opt-out banks to classify securities as HTM and to reduce the risk of AFS securities, while the reinstatement of the AOCI filter reversed these incentives for the opt-out banks. In addition to these regulatory changes regarding the AOCI filter, our sample period includes the sharp increase in interest rates beginning in the fourth quarter of 2021, which provided all banks with the incentive to classify securities as HTM and to reduce the risk of AFS securities. Hence, the four subperiods of our sample period are pre-Basel III (2012Q1–2013Q2), Basel III (2013Q3–2019Q3), tailoring rules (2019Q4–2021Q3), and interest rate rise (2021Q4–2022Q4).

We first hypothesize and provide visual and spline regression evidence that banks classify securities as HTM rather than as AFS when HTM classification provides them with preferred financial accounting and regulatory capital treatments, not because they have a distinct economically motivated intent and ability to hold the securities to maturity. Specifically, we hypothesize and find that advanced approaches banks increasing classify securities as HTM as the AOCI filter is phased-out over the Basel III subperiod, and we further find that these banks continue to do so in subsequent subperiods. We hypothesize and find that the opt-out banks behave similarly to advanced approaches banks during the Basel III period but then reverse this behavior during the tailoring rules period, reclassifying securities as AFS and increasing the risk of AFS securities. We find that all three categories of banks increase their classification of securities as HTM during the interest rate rise subperiod. While all three categories of banks exercise discretion over securities classification, this behavior is most apparent for the opt-out banks; these banks essentially first indicated they had the intent and ability to hold securities to maturity, then that they did not have this intent or ability, and finally that they had this intent and ability again.

We then hypothesize and provide visual and spline regression evidence that advanced approaches and opt-out banks for which the AOCI filter is removed reduce the interest rate risk of their AFS securities during the Basel III period. We hypothesize and find that the opt-out banks behave similarly to advanced

approaches banks during the Basel III period but then reverse this behavior during the tailoring rules period, increasing the risk of AFS securities.

Lastly, we provide visual and spline regression evidence regarding whether banks economically hedged the interest rate risk of fixed-rate AFS securities using interest rate derivatives that qualify for fair value hedging accounting, and whether banks are subject to run risk on uninsured deposits. We find that while advanced approaches banks hedge the interest rate risk of fixed-rate AFS securities to an appreciable and increasing extent during our sample period, the opt-out banks do so to a lesser and decreasing extent, and the non-advanced approaches banks do so hardly at all. We find that all three categories of banks exhibit strongly increasing percentages of uninsured deposits until the beginning the interest rate rise period, when these deposits started to move to higher yielding investments.

Collectively, our findings provide support for recent calls to eliminate the HTM category, the associated amortized cost accounting for securities, and the regulatory AOCI filter.

Appendix A
Bank Categories

Bank Category	Treatment	Banks
Advanced Approaches (AA)		
Under the initial U.S. adoption of Basel III, banks with ≥$250 billion assets or ≥$10 billion foreign exposure	AOCI filter phased out over five years beginning on January 1, 2014	<u>Category I</u>: JP Morgan Chase Bank of America Citigroup
Under the tailoring rules, global systemically important banks (Category I) and non-GSIBs with ≥$700 billion assets or ≥$75 billion foreign exposure (Category II) - All of these banks had previously been advanced approaches under the initial U.S. adoption of Basel III	AOCI filter remains removed under the tailoring rules	Wells Fargo Goldman Sachs Morgan Stanley BNY Mellon State Street <u>Category II</u>: Northern Trust
Opt-out		
Under the initial U.S. adoption of Basel III, opt-out banks were advanced approaches banks as of 2014Q1 for four banks and as of 2018Q2 for Charles Schwab	AOCI filter phased out as of January 1, 2014 for four banks and 2018Q2 for Charles Schwab	American Express Capital One Financial Charles Schwab PNC Financial US Bancorp
Under the tailoring rules, previously advanced approaches banks with <$700 billion assets and <$75 billion in nonbank assets	AOCI filter reinstated on December 31, 2019 for banks that opt out of the inclusion of AOCI in regulatory capital (all five banks did)	
Non-Advanced Approaches (non-AA)		
Under the initial U.S. adoption of Basel III, non-advanced approaches banks	AOCI filter always applies	All banks not listed above
Under the tailoring rules, previously non-advanced approaches banks with <$700 billion assets and <$75 billion in nonbank assets		

Appendix B
Variable Definitions

Variable Name	Definition
AFS/Asset	Fair value of AFS securities (1773) divided by total assets (2170), from bank regulatory filings
HTM/Asset	Amortized cost of HTM securities (1754) divided by total assets (2170), from bank regulatory filings
Sec/Asset	Sum of the fair value of AFS securities (1773) and amortized cost of HTM securities (1754) divided by total assets (2170), from bank regulatory filings
HTM/Sec	Amortized cost of HTM securities (1754) divided by the sum of the fair value of AFS securities (1773) and amortized cost of HTM securities (1754), from bank regulatory filings
AFS Maturity	Maturity-weighted AFS securities where the maturity weights are 0.5 for maturities one year or less; 3 for maturities over one year through five years; 7.5 for maturities over five years through ten years; 15 for maturities over 10 years and securities with no single maturity, following English et al. (2018)
AFS Maturity Adj.	Same as AFS Maturity except that, for Bank of America, all mortgage-backed securities other than commercial mortgage-backed securities are classified as having maturities over 10 years during the quarters prior to 2016Q4
Hedged AFS/AFS	Amortized cost basis of hedged AFS securities (from 10-Q and 10-K filings) divided by the amortized cost of AFS securities (1772) from bank regulatory filings
Uninsured Deposits/Asset	Total deposits (2200) minus deposits of $250,000 or less (F045+F049), aggregated from Call Reports, divided by total assets (2170), from bank regulatory filings
AA	Equals one for nine banks designated advanced approaches under the tailoring rules
opt-out	Equals one for five banks that opted out of the AOCI filter under the tailoring rules
non-AA	Equals one for banks that were never subject to AOCI filter removal
Pre-Basel III QC	Takes a value of one for 2012Q1, increases by one for each subsequent quarter during the period up to six for 2013Q2, and equals six for all subsequent quarters
Basel III QC	Takes a value of zero for quarters up to 2013Q2 and one for 2013Q3, increases by one for each subsequent quarter during the period up to 25 for 2019Q3, and equals 25 for all subsequent quarters.
Tailoring Rule QC	Takes a value of zero for quarters up to 2019Q3 and one for 2019Q4, increases by one for each subsequent quarter during the period up to eight for 2021Q3, and equals eight for all subsequent quarters.
Interest Rate Rise QC	Takes a value of zero for quarters up to 2021Q3 and one for 2021Q4, and increases by one for each subsequent quarter during the period up to 5 for 2022Q4.
Size	Natural logarithm of total assets measured in thousands (2170), from bank regulatory filings
EBLLP	Earnings (4301) before loan loss provisions (4230) divided by one-quarter-lagged total loans (B528), from bank regulatory filings
Deposit	Total deposits (6631+6633) divided by total assets (2170), from bank regulatory filings

CapRatio Lag	One-quarter-lagged total equity (G105) divided by total assets (2170), from bank regulatory filings
Net Income	Net income (4340) divided by one-quarter-lagged total assets (2170), from bank regulatory filings

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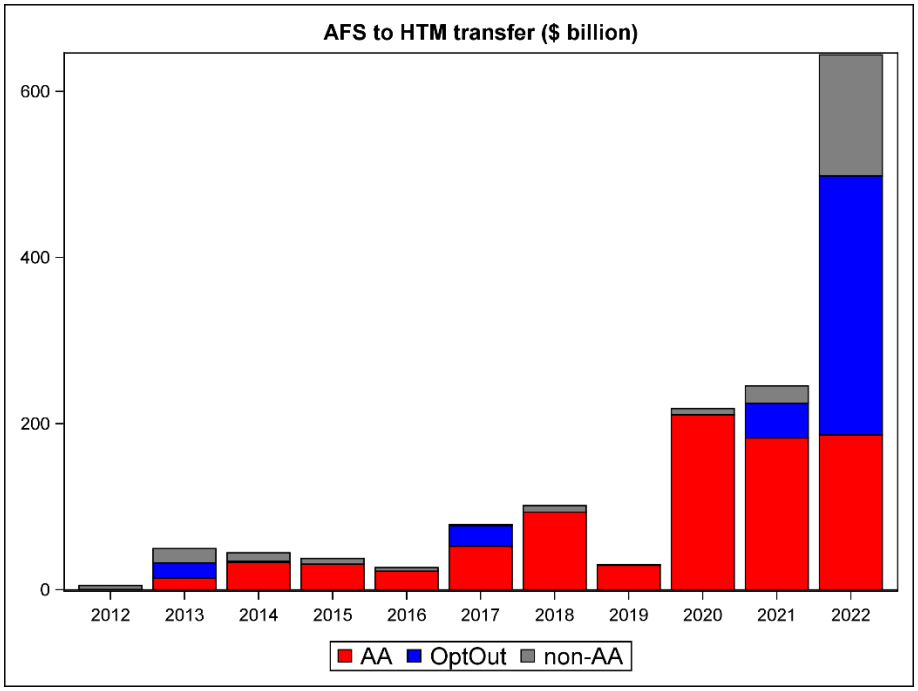
Figure 1
Transfers of Investment Securities between AFS and HTM Classifications
Each Year from 2012 to 2022 by Bank Category

Panel A. Transfers from AFS to HTM



Panel B. Transfers from HTM to AFS

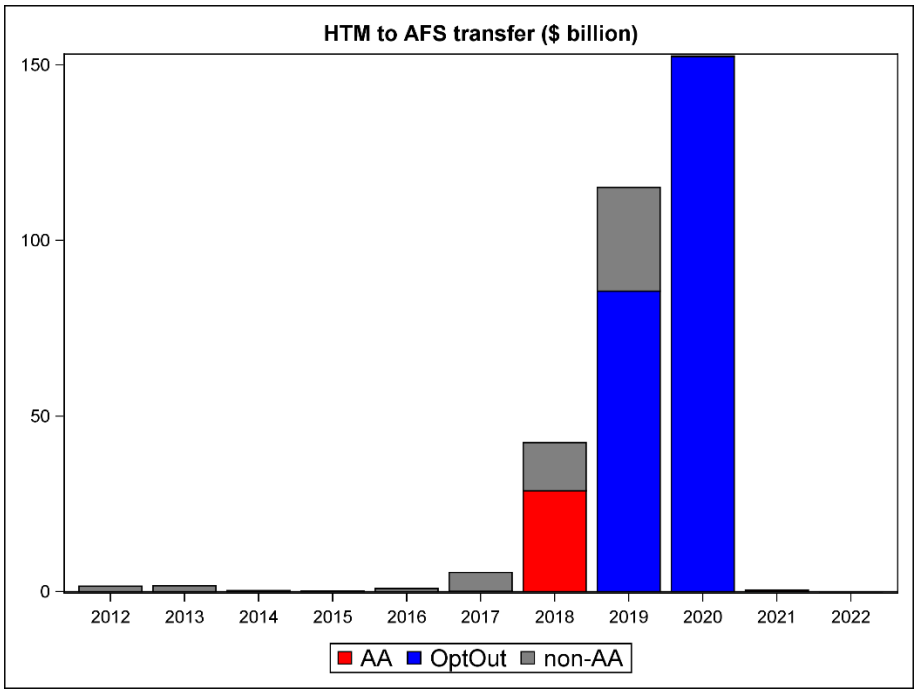
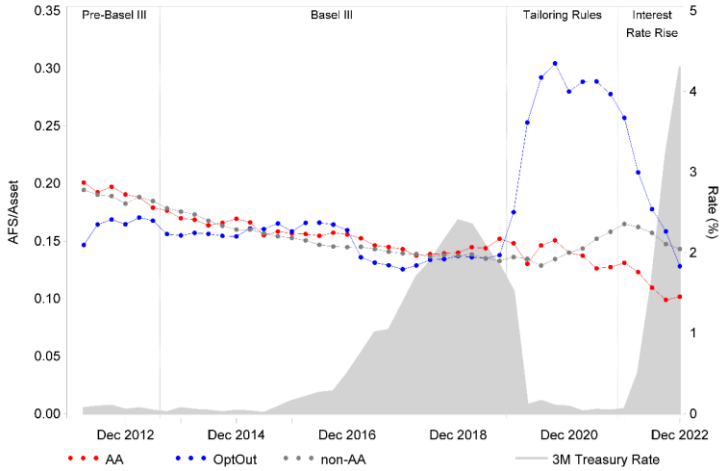
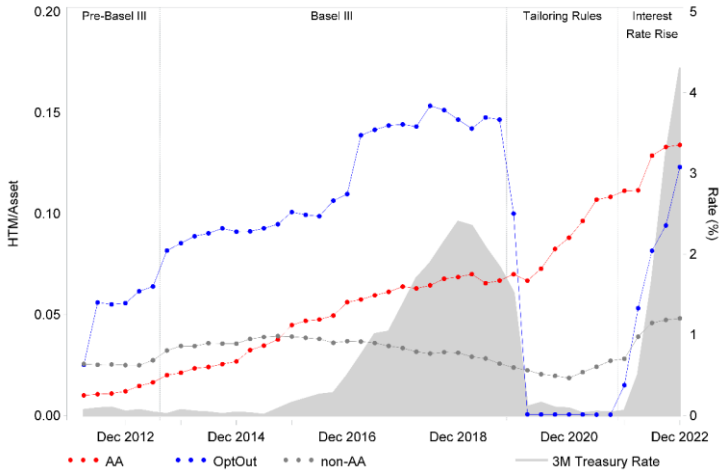


Figure 2
AFS and HTM Investment Securities as Proportions of Assets
Each Year from 2012 to 2022 by Bank Category

Panel A. AFS Securities/Assets



Panel B. HTM Securities/Assets



Panel C. HTM Securities/(AFS + HTM Securities)

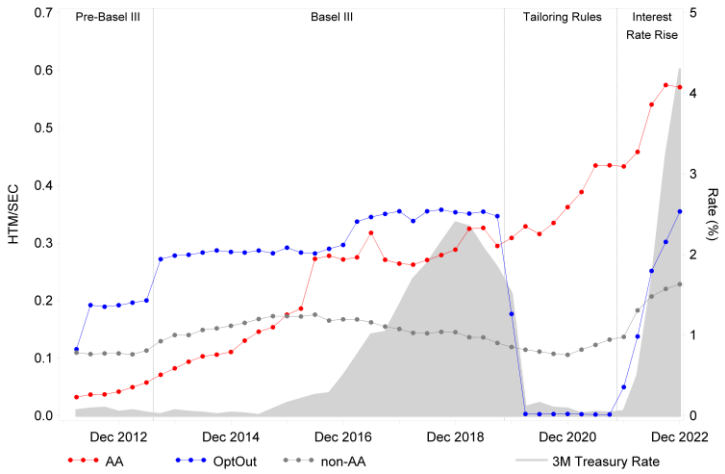
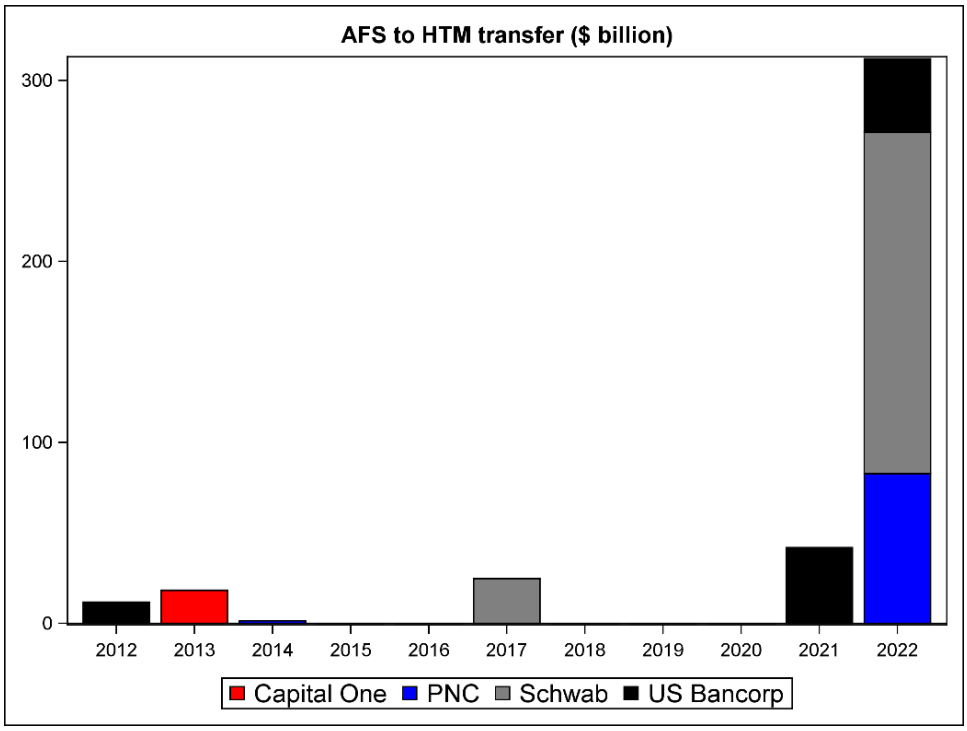


Figure 3
Transfers of Investment Securities between AFS and HTM Classifications
Each Year from 2012 to 2022 by Individual Opt-out Banks

Panel A. Transfers from AFS to HTM



Panel B. Transfers from HTM to AFS

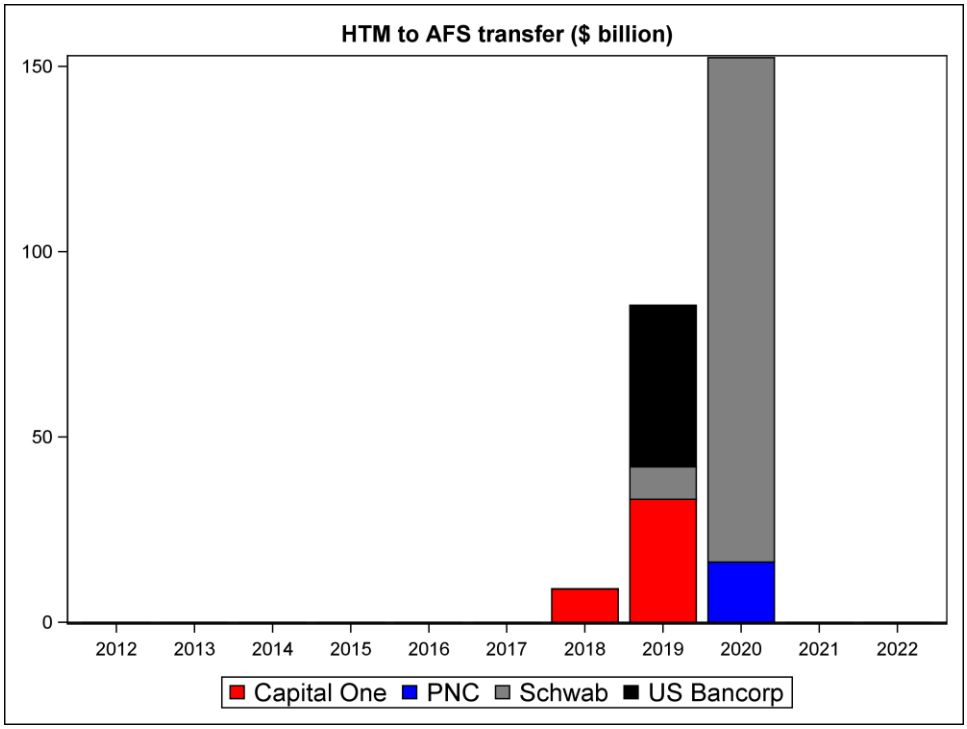
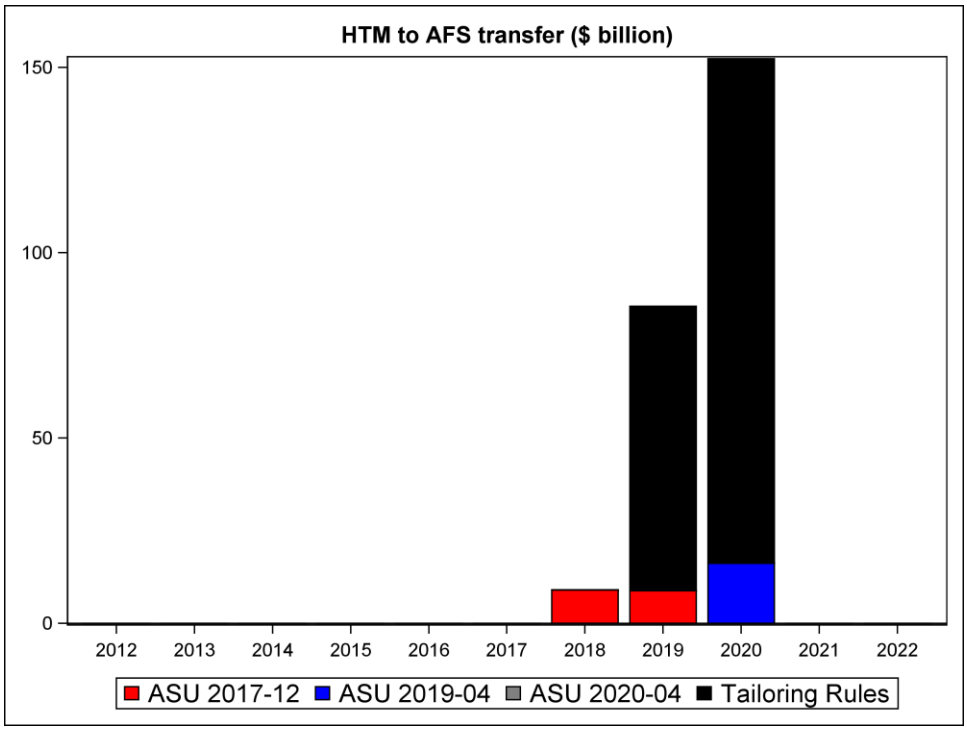


Figure 4
Transfers of Investment Securities from HTM to AFS Classifications
Each Year from 2012 to 2022 by Opt-out Banks Distinguishing Bases for Transfers[21]



[21] The opt-out banks transferred securities from HTM to AFS only in 2018, 2019 and 2020. While not visible in the figure due to the small amount involved, in 2020, PNC Financial transferred $49 million of securities from HTM to AFS without tainting its HTM portfolio as allowed by ASU 2020-04 (Reference Rate Reform).

Figure 5
Weighted-Average Maturity or Time to First Repricing of AFS Securities from 2012 to 2022 by Bank Category

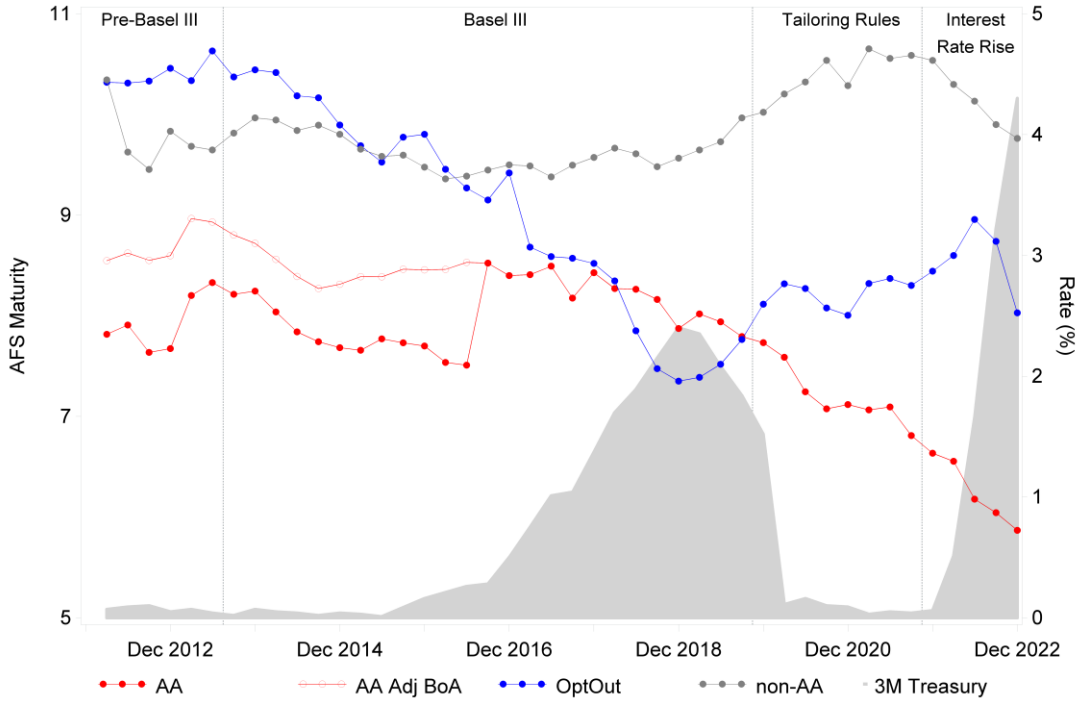


Figure 6
Extent of Fair Value Hedges of Fixed-Rate AFS Securities by Bank Category

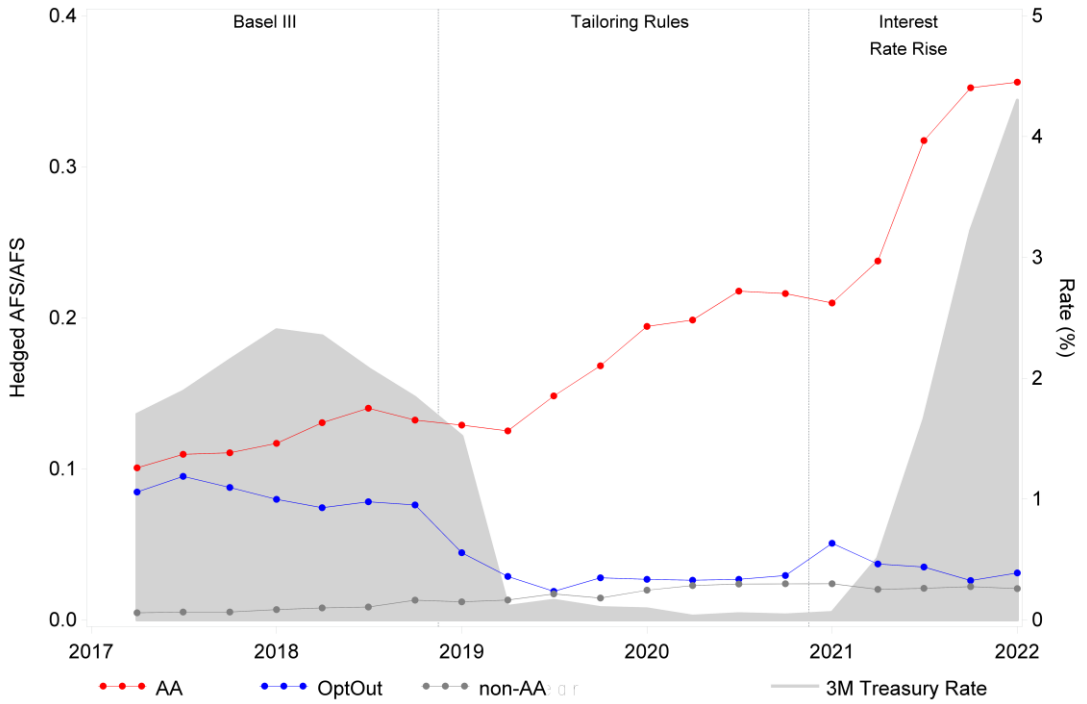


Figure 7
Ratio of Non-FDIC Insured Deposits to Total Assets
by Bank Category

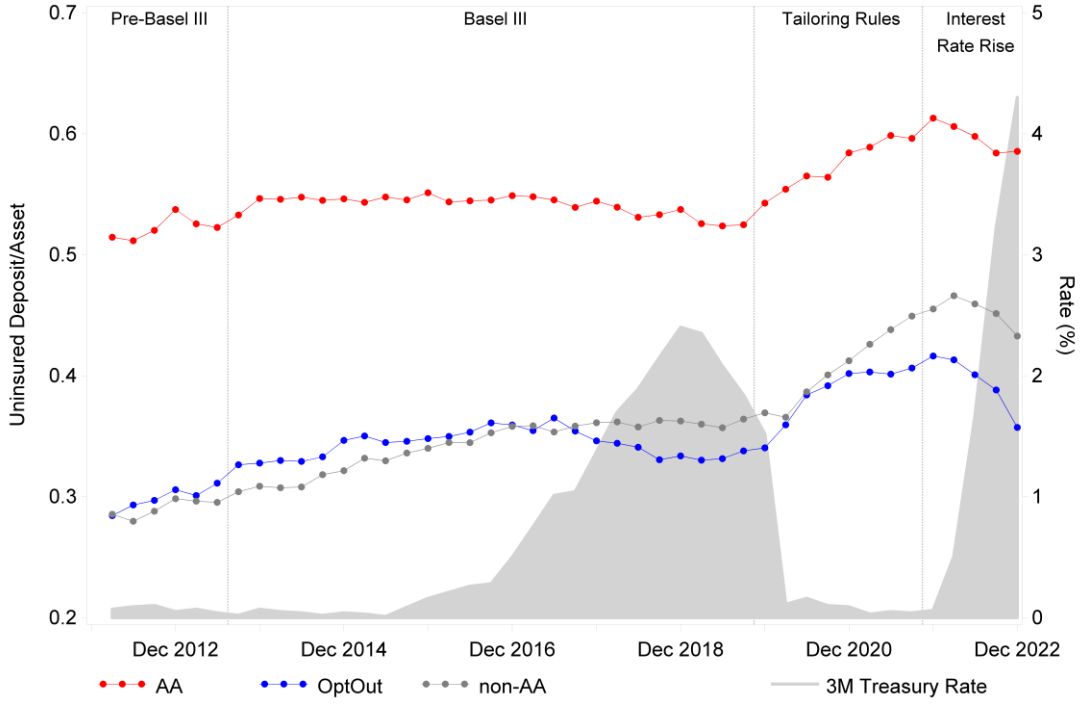


Table 1
Summary Statistics

This table presents descriptive statistics for the model variables. Panel A reports the mean, standard deviation, and first through third quartiles of the variables for the pooled sample of banks. Panels B – D report the same statistics for the advanced approaches (AA), opt-out, and non-advanced approaches (non-AA) banks, respectively. Panel E summarizes the number, amounts, and percentages of transfers of securities from HTM to AFS by our sample banks during our sample period by the stated reasons why the transfers do not taint the banks' HTM portfolios or if they taint the portfolios. We classify a transfer as tainting the HTM portfolio if the bank states that it taints the portfolio or if the bank has no securities classified as HTM after the transfer and provides no reason why the transfer does not taint the portfolio. All variables are defined in Appendix B.

Panel A: All Banks

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	N	Mean	S.D.	P25	P50	P75
AFS/Asset	11,136	0.155	0.096	0.093	0.136	0.200
HTM/Asset	11,136	0.034	0.063	0.000	0.005	0.045
Sec/Asset	11,136	0.189	0.113	0.113	0.167	0.239
HTM/Sec	11,136	0.151	0.215	0.000	0.033	0.253
AFS Maturity	10,011	9.746	3.716	6.828	10.562	12.889
AFS Maturity Adj.	10,011	9.756	3.716	6.865	10.579	12.894
UnDep/Asset	11,009	0.365	0.153	0.262	0.350	0.449
Hedged AFS/AFS	6,232	0.017	0.080	0.000	0.000	0.000
Size	11,136	15.907	1.681	14.809	15.642	16.709
EBLLP	11,136	0.038	0.705	0.005	0.006	0.007
Deposit	11,136	0.773	0.112	0.745	0.798	0.839
CapRatio Lag	11,136	0.113	0.038	0.093	0.108	0.126
Net Income	11,136	0.003	0.018	0.002	0.003	0.003

Panel B: Advanced Approaches (AA) Banks

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	N	Mean	S.D.	P25	P50	P75
AFS/Asset	396	0.152	0.097	0.084	0.140	0.215
HTM/Asset	396	0.059	0.054	0.013	0.044	0.097
Sec/Asset	396	0.211	0.123	0.137	0.185	0.316
HTM/Sec	396	0.252	0.187	0.104	0.223	0.370
AFS Maturity	375	7.644	2.864	5.290	7.573	10.033
AFS Maturity Adj.	375	7.915	3.026	5.302	7.778	10.380
UnDep/Asset	396	0.551	0.195	0.413	0.495	0.770
Hedged AFS/AFS	252	0.138	0.166	0.000	0.077	0.235
Size	396	20.578	1.036	19.701	20.723	21.468
EBLLP	396	0.017	0.012	0.010	0.013	0.023
Deposit	396	0.551	0.226	0.497	0.602	0.717
CapRatio Lag	396	0.095	0.014	0.085	0.095	0.105
Net Income	396	0.002	0.001	0.002	0.002	0.003

Panel C: Opt-out Banks

VARIABLES	(1) N	(2) Mean	(3) S.D.	(4) P25	(5) P50	(6) P75
AFS/Asset	219	0.177	0.128	0.114	0.149	0.211
HTM/Asset	219	0.085	0.122	0.000	0.046	0.099
Sec/Asset	219	0.261	0.196	0.186	0.212	0.250
HTM/Sec	219	0.233	0.220	0.000	0.217	0.401
AFS Maturity	140	0.035	0.072	0.000	0.000	0.042
UnDep/Asset	219	0.351	0.081	0.297	0.350	0.419
Hedged AFS/AFS	219	9.006	3.754	5.574	10.555	12.403
Size	219	19.546	0.446	19.100	19.677	19.868
EBLLP	219	0.015	0.007	0.008	0.013	0.020
Deposit	219	0.643	0.144	0.652	0.693	0.725
CapRatio Lag	219	0.114	0.023	0.099	0.117	0.133
Net Income	219	0.004	0.003	0.003	0.003	0.004

Panel D: Non-Advanced Approaches (Non-AA) Banks

VARIABLES	(1) N	(2) Mean	(3) S.D.	(4) P25	(5) P50	(6) P75
AFS/Asset	10,521	0.155	0.095	0.093	0.135	0.199
HTM/Asset	10,521	0.032	0.060	0.000	0.003	0.041
Sec/Asset	10,521	0.187	0.109	0.113	0.165	0.237
HTM/Sec	10,521	0.145	0.215	0.000	0.026	0.237
AFS Maturity	9,417	9.847	3.719	6.955	10.711	12.978
UnDep/Asset	10,394	0.358	0.148	0.259	0.345	0.443
Hedged AFS/AFS	5,840	0.012	0.070	0.000	0.000	0.000
Size	10,521	15.655	1.336	14.746	15.546	16.478
EBLLP	10,521	0.040	0.726	0.005	0.006	0.007
Deposit	10,521	0.784	0.093	0.754	0.802	0.841
CapRatio Lag	10,521	0.114	0.038	0.093	0.109	0.127
Net Income	10,521	0.003	0.018	0.002	0.003	0.003

Panel E: Transfers of Securities from HTM to AFS by Stated Reason Why No Taint or if Taint

Reason for Transfer	Freq.	Percent	$ billion	Percent
ASU 2017-12	41	34.8	55.0	17.2
taint HTM portfolio	39	33.1	10.1	3.1
ASU 2019-04	14	11.9	21.7	6.8
tailoring rules	5	4.2	231.8	72.3
Volcker rule	4	3.4	0.6	0.2
credit deterioration	3	2.5	0.1	0.0
merger	3	2.5	0.5	0.2
other - not taint HTM portfolio	2	1.7	0.0	0.0
ASU 2020-04	2	1.7	0.5	0.2
Basel III	2	1.7	0.1	0.0
COVID-19	1	0.9	0.1	0.0
Office of Management and Budget rule reducing interest subsidies for certain municipal (Build America) bonds	1	0.9	0.0	0.0
close to maturity	1	0.9	0.0	0.0
Total	118	100	320.5	100

Table 2
Changes in Security Holdings

This table reports the estimation of spline (i.e., piecewise linear) regression models that capture how the AFS and HTM securities held by advanced approaches (AA), opt-out, and non-advanced approaches (non-AA) banks changed over the 2012−2022 sample period. The knots in the models are located at the interior boundaries of the four subperiods of our sample period: (i) pre-Basel III (2012Q1–2013Q2), (ii) Basel III (2013Q3–2019Q3), (iii) tailoring rules (2019Q4–2021Q3), and (iv) interest rate rise (2021Q4–2022Q4). The dependent variables are AFS securities divided by total assets, $AFS/Asset_{i,t}$; HTM securities divided by total assets, $HTM/Asset_{i,t}$; AFS plus HTM securities divided by total assets, $Sec/Asset_{i,t}$; and HTM securities divided by AFS plus HTM securities, $HTM/Sec_{i,t}$. The explanatory variables of interest are the interactions between the indicators for AA, opt-out, and non-AA banks and the quarterly count variables for the four subperiods. In columns (1) – (4), the coefficients on the interaction terms are the time sensitivities of the dependent variables fo non-advanced approaches (non-AA) banks changed over the 2012−2022 sample period. Columns (5) – (8) present the changes in the coefficients for the three bank types from the prior subperiod. The coefficients for the interaction terms with the pre-Basel III period are omitted as they are identical to the ones in columns (1) – (4). All variables are defined in Appendix B. Standard errors corrected for heteroscedasticity and clustered by bank type are reported in parentheses. ∗∗∗, ∗∗, and ∗ denote significance at the one percent, five percent, and ten percent levels, respectively, in two-tailed tests.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Coefficient for each period				*Change in coefficient from prior period*			
VARIABLES	*AFS/Asset*	*HTM/Asset*	*Sec/Asset*	*HTM/Sec*	*AFS/Asset*	*HTM/Asset*	*Sec/Asset*	*HTM/Sec*
AA*Pre-Basel III QC	-0.006***	0.002***	-0.004***	0.009***				
	(0.000)	(0.000)	(0.000)	(0.000)				
AA*Basel III QC	-0.001***	0.002***	0.001***	0.010***	0.004***	0.000	0.004***	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AA*Tailoring Rule QC	-0.000**	0.003***	0.002***	0.006***	0.001***	0.001**	0.002***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AA*Interest Rate Rise QC	-0.008***	0.007***	-0.001**	0.038***	-0.007***	0.004***	-0.003***	0.031***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
opt-out*Pre-Basel III QC	-0.004***	0.006***	0.001***	0.025***				
	(0.000)	(0.000)	(0.000)	(0.000)				
opt-out*Basel III QC	-0.000*	0.002***	0.002***	0.001***	0.004***	-0.004***	0.001***	-0.024***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
opt-out*Tailoring Rule QC	0.022***	-0.023***	-0.001**	-0.052***	0.022***	-0.025***	-0.003***	-0.053***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
opt-out*Interest Rate Rise QC	-0.044***	0.035***	-0.009***	0.098***	-0.066***	0.058***	-0.008***	0.151***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

non-AA*Pre-Basel III QC	-0.004***	0.003***	-0.001***	0.012***				
	(0.000)	(0.000)	(0.000)	(0.000)				
non-AA*Basel III QC	-0.002***	-0.001***	-0.002***	-0.001***	0.002***	-0.004***	-0.002***	-0.013***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
non-AA*Tailoring Rule QC	0.004***	-0.002***	0.003***	-0.006***	0.006***	-0.001**	0.005***	-0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
non-AA*Interest Rate Rise QC	-0.003***	0.006***	0.003***	0.027***	-0.007***	0.008***	0.000	0.033***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.006	0.015**	0.009**	0.041***	-0.006	0.015**	0.009**	0.041***
	(0.003)	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)
EBLLP	0.002***	-0.000	0.002***	-0.000*	0.002***	-0.000	0.002***	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Deposit	-0.039*	0.014	-0.025	0.051	-0.039*	0.014	-0.025	0.051
	(0.013)	(0.024)	(0.020)	(0.036)	(0.013)	(0.024)	(0.020)	(0.036)
CapRatio Lag	-0.189***	-0.163***	-0.352***	-0.270***	-0.189***	-0.163***	-0.352***	-0.270***
	(0.016)	(0.011)	(0.012)	(0.016)	(0.016)	(0.011)	(0.012)	(0.016)
Net Income	-0.039***	0.005	-0.035***	0.020*	-0.039***	0.005	-0.035***	0.020*
	(0.002)	(0.004)	(0.002)	(0.006)	(0.002)	(0.004)	(0.002)	(0.006)
Observations	11,136	11,136	11,136	11,136	11,136	11,136	11,136	11,136
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Adj. R-squared	0.741	0.744	0.818	0.667	0.741	0.744	0.818	0.667

Table 3
Changes in AFS Security Weighted-Average Maturity

This table reports the estimation of spline (i.e., piecewise linear) regression models that capture how the weighted-average maturity of the AFS securities held by advanced approaches (AA), opt-out, and non-advanced approaches (non-AA) banks changed over the 2012−2022 sample period. The knots in the models are located at the interior boundaries of the four subperiods of our sample period: (i) pre-Basel III (2012Q1–2013Q2), (ii) Basel III (2013Q3–2019Q3), (iii) tailoring rules (2019Q4–2021Q3), and (iv) interest rate rise (2021Q4–2022Q4). The dependent variables are the weighted average of the maturity of AFS securities, *AFS Maturity*$_{i,t}$, this maturity calculated consistently using 15 years as the life of residential mortgage-backed securities for Bank of America, *AFS Maturity Adj.*$_{i,t}$, and this maturity treating the observations for Bank of America as missing, *AFS Maturity exBoA*$_{i,t}$. The explanatory variables of interest are the interactions between the indicators for AA, opt-out, and non-AA banks and the quarterly count variables for the four subperiods. In columns (1) – (3), the coefficients on these interaction terms are the time sensitivities of the dependent variables for the three bank categories during the four subperiods. Columns (4) – (6) present the changes in these coefficients for a bank type from the prior subperiod. The changes in the coefficients on the interaction terms for the pre-Basel III period are omitted as they are identical to the coefficients reported in columns (1) – (3). All variables are defined in Appendix B. Standard errors corrected for heteroscedasticity and clustered by bank type are reported in parentheses. ∗∗∗, ∗∗, and ∗ denote significance at the one, five, and ten percent levels, respectively, in two-tailed tests.

	(1)	(2)	(3)	(4)	(5)	(6)
	Coefficient for each period			*Change in coefficient from prior period*		
VARIABLES	*AFS Maturity*	*AFS Maturity Adj.*	*AFS Maturity exBoA*	*AFS Maturity*	*AFS Maturity Adj.*	*AFS Maturity exBoA*
AA*Pre-Basel III QC	0.021	0.016	0.065**			
	(0.008)	(0.009)	(0.008)			
AA*Basel III QC	0.018***	-0.016***	-0.004***	-0.003	-0.032*	-0.069**
	(0.000)	(0.000)	(0.000)	(0.008)	(0.009)	(0.008)
AA*Tailoring Rule QC	-0.168***	-0.152***	-0.125***	-0.186***	-0.136***	-0.121***
	(0.008)	(0.010)	(0.009)	(0.007)	(0.009)	(0.009)
AA*Interest Rate Rise QC	-0.163***	-0.171***	-0.167***	0.005	-0.018	-0.042*
	(0.003)	(0.003)	(0.003)	(0.010)	(0.013)	(0.011)
opt-out*Pre-Basel III QC	0.098***	0.098***	0.098***			
	(0.002)	(0.002)	(0.002)			
opt-out*Basel III QC	-0.131***	-0.131***	-0.131***	-0.229***	-0.229***	-0.229***
	(0.002)	(0.002)	(0.002)	(0.000)	(0.001)	(0.000)
opt-out*Tailoring Rule QC	0.116***	0.117***	0.116***	0.247***	0.248***	0.247***
	(0.004)	(0.005)	(0.004)	(0.002)	(0.003)	(0.002)
opt-out*Interest Rate Rise QC	-0.013**	-0.013**	-0.013**	-0.129***	-0.130***	-0.130***

	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.006)
non-AA*Pre-Basel III QC	-0.075***	-0.075***	-0.075***			
	(0.001)	(0.001)	(0.001)			
non-AA*Basel III QC	-0.012**	-0.012**	-0.012**	0.064***	0.063***	0.064***
	(0.002)	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)
non-AA*Tailoring Rule QC	0.133***	0.135***	0.134***	0.145***	0.146***	0.146***
	(0.006)	(0.007)	(0.006)	(0.007)	(0.009)	(0.008)
non-AA*Interest Rate Rise QC	-0.261***	-0.261***	-0.261***	-0.394***	-0.396***	-0.395***
	(0.004)	(0.004)	(0.004)	(0.010)	(0.011)	(0.010)
Size	0.561**	0.554***	0.558**	0.561**	0.554***	0.558**
	(0.061)	(0.055)	(0.059)	(0.061)	(0.055)	(0.059)
EBLLP	-0.037***	-0.037***	-0.037***	-0.037***	-0.037***	-0.037***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Deposit	-1.019	-1.210	-1.104	-1.019	-1.210	-1.104
	(1.163)	(1.329)	(1.232)	(1.163)	(1.329)	(1.232)
CapRatio Lag	2.824**	2.824**	2.760***	2.824**	2.824**	2.760***
	(0.293)	(0.294)	(0.231)	(0.293)	(0.294)	(0.231)
Net Income	0.469**	0.443*	0.456**	0.469**	0.443*	0.456**
	(0.096)	(0.118)	(0.106)	(0.096)	(0.118)	(0.106)
Observations	10,008	10,008	9,964	10,008	10,008	9,964
Firm FE	YES	YES	YES	YES	YES	YES
Adj. R-squared	0.656	0.656	0.656	0.656	0.656	0.656

Table 4
Hedging of Fixed-Rate AFS Securities and of Uninsured Deposits

This table reports the estimation of spline (i.e., piecewise linear) regression models that capture how the extent of economic hedging of the interest rate risk of fixed-rate AFS securities using interest-rate derivatives that qualify for fair value hedge accounting or uninsured deposits by the various bank categories changed over the sample period. The knots in the models are located at the interior boundaries of the four subperiods of our sample period: (i) pre-Basel III (2012Q1–2013Q2), (ii) Basel III (2013Q3–2019Q3), (iii) tailoring rules (2019Q4–2021Q3), and (iv) increasing interest rates (2021Q4–2022Q4). Because data on fair value hedges of AFS securities first become reliably available in 2018Q1, the analysis of this form of economic hedging starts then. The dependent variables are hedged AFS securities divided by total AFS securities, *Hedged AFS/AFS*$_{i,t}$, and uninsured deposits divided by total deposits, *Uninsured Deposits/Asset*$_{i,t}$. The explanatory variables of interest are the interactions between the indicators for the three bank categories and the quarterly count variables for the four subperiods. In columns (1) and (2), the coefficients on these interaction terms indicate the time-sensitivity of the dependent variable for the various bank types during the various subperiods. Columns (3) and (4) report the changes in these coefficients. In column (3), the coefficients for the interaction terms with the pre-Basel III and the Basel III periods are omitted as they are identical to the ones in column (1). In column (4), the coefficients for the interaction terms with the pre-Basel III period are omitted as they are identical to the ones in column (2). All variables are defined in Appendix B. Standard errors corrected for heteroscedasticity and clustered by bank type are reported in parentheses. ∗∗∗, ∗∗, and ∗ denote significance at the one percent, five percent, and ten percent levels, respectively, in two-tailed tests.

	(1)	(2)	(3)	(4)
	Coefficient for each period		*Change in coefficient from prior period*	
VARIABLES	*Hedged AFS /AFS*	*Uninsured Deposit/Asset*	*Hedged AFS /AFS*	*Uninsured Deposit/Asset*
AA*Pre-Basel III QC		0.004***		
		(0.000)		
AA*Basel III QC	0.004***	-0.001***		-0.005***
	(0.000)	(0.000)		(0.000)
AA*Tailoring Rule QC	0.007***	0.005***	0.004***	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)
AA*Interest Rate Rise QC	0.032***	-0.003***	0.024***	-0.007***
	(0.000)	(0.000)	(0.000)	(0.000)
opt-out*Pre-Basel III QC		0.011***		
		(0.000)		
opt-out*Basel III QC	-0.008***	-0.001***		-0.012***
	(0.000)	(0.000)		(0.000)
opt-out*Tailoring Rule QC	-0.006***	0.006***	0.002***	0.007***
	(0.000)	(0.000)	(0.000)	(0.000)
opt-out*Interest Rate Rise QC	0.002***	-0.010***	0.008***	-0.016***
	(0.000)	(0.000)	(0.000)	(0.000)
non-AA*Pre-Basel III QC		0.006***		
		(0.000)		
non-AA*Basel III QC	0.000	0.001***		-0.005***
	(0.000)	(0.000)		(0.000)
non-AA*Tailoring Rule QC	-0.000	0.006***	-0.000	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)

non-AA*Interest Rate Rise QC	-0.001***	0.000***	-0.001***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.042***	0.028***	0.042***	0.028***
	(0.002)	(0.002)	(0.002)	(0.002)
EBLLP	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Deposit	0.121***	0.425***	0.121***	0.425***
	(0.010)	(0.010)	(0.010)	(0.010)
CapRatio Lag	0.031	-0.004	0.031	-0.004
	(0.050)	(0.003)	(0.050)	(0.003)
Net Income	0.024	0.045***	0.024	0.045***
	(0.046)	(0.000)	(0.046)	(0.000)
Observations	4,753	11,009	4,753	11,009
Firm FE	YES	YES	YES	YES
Adj. R-squared	0.600	0.915	0.600	0.915