



GETTING MONETARY POLICY BACK ON TRACK

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and John B. Taylor

**FINANCIAL REGULATION:
SILICON VALLEY BANK AND BEYOND**

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Silicon Valley Bank and Beyond: Regulating for Liquidity

Darrell Duffie

Thanks for the opportunity to speak with you all today about what we have learned from recent banking failures. First, however, I want to add my congratulations to John Taylor on the thirtieth anniversary of the Taylor rule.

As Professor Anat Admati emphasized in her presentation, we have learned a lot of lessons in the last couple of months about weaknesses in the regulation and supervision of banks. The failures of post-financial-crisis regulation and supervision of banks pretty much cover the gamut. These are quite disappointing and implicate regulatory frameworks for failure resolution and capital sufficiency. In the area of capital requirements, we saw failures of stress testing, disclosure, and accounting—the entire capital regime. Let’s just stipulate, as Professor Admati has, that this was a solvency crisis.

However, I want to focus on what has been revealed by recent events about weaknesses in liquidity regulation. This is not to suggest that liquidity was the cause of the failure of these banks. The cause was insufficient capital. However, as shown in figure 5.1, which appeared in the Federal Reserve’s May 2023 *Financial Stability Report*, we’ve also learned that depositors at large banks are likely to flee from a bank much more quickly now than they have in prior bank runs. You can see on this chart, for each of the largest bank failures of recent decades, the largest one-day deposit outflows. In the cases of Signature Bank and Silicon Valley Bank [SVB], more

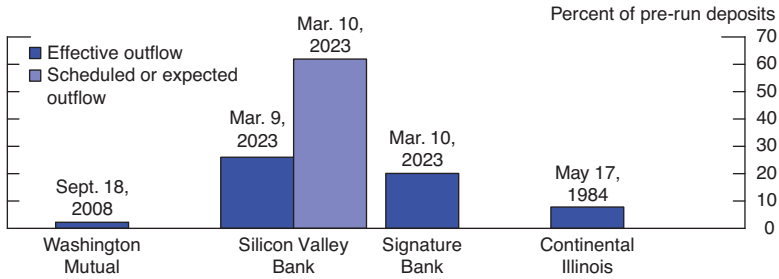


FIGURE 5.1. One-Day Deposit Outflows during Several Large Bank Failures. In the case of Silicon Valley Bank, more deposits left in a single day than the Fed’s liquidity coverage ratio (LCR) rule had anticipated would leave in an entire month.

Source: *Financial Stability Report*, Board of Governors of the Federal Reserve, May 2023.

deposits left in a single day than the Fed’s liquidity coverage ratio (LCR) rule had anticipated would leave in an entire month. What has changed the speed with which uninsured or large depositors might run, and what can the Federal Reserve do about this?

According to analysis released last week by Jason Goldberg, senior equity research analyst of Barclays, over the previous decade, there has been a huge increase in online banking and an even larger increase in mobile banking.¹ For just three large US banks, the number of mobile banking customers increased from about twenty million to roughly 120 million over the last twelve years. That’s remarkable. Aided by other technology, including social media such as Twitter [X], large wholesale depositors are now connected to one another and to the news, while digital banking technology gives them the ability to move their money nearly instantly. And this is exactly what we saw at SVB and Signature Bank. People are not lining up outside the banks as they were in past classic bank runs.

Consider the hypothetical bank whose assets and liabilities are depicted in figure 5.2. This is not intended to represent any particular bank. This bank has a large amount of wholesale deposits, essentially uninsured, as well as some insured deposits and other

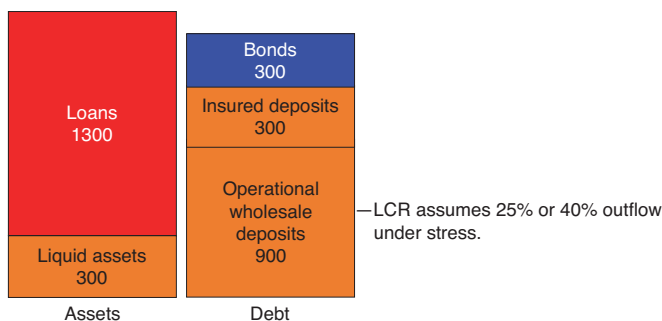


FIGURE 5.2. A Weakened Bank That Meets the Liquidity Coverage Ratio Rule. Balance sheet quantities for a hypothetical weakened bank that meets the LCR rule.

Source: Author's calculations.

liabilities. This bank is meeting the liquidity coverage ratio because, in current regulations, it's assumed that even over a thirty-day period, depending on details that we won't cover today, either 25% or 40% of these wholesale operational deposits are at risk of fleeing the bank. So, this bank seems not to require much liquidity coverage under current standards. But I showed you a moment ago (in figure 5.1) that perhaps 40% or 60% of wholesale deposits could leave in a single day. So something about liquidity regulations should be fixed.

Going forward, for the case of a solvent but weakened bank, how much liquidity, and what forms of liquidity, will be judged adequate to prevent a destructive bank run?

Banks currently meet a large part of their liquidity coverage requirements by stocking up on high-quality liquid assets (HQLA). But suppose we get much more realistic about how much coverage is required for wholesale large uninsured depositors. If we assume, as I would, that a large depositor would leave essentially instantly, then one needs roughly 100% coverage of the wholesale uninsured depositors. Some of you might find that shocking. Do we really need to zoom from about 25% liquidity coverage to 100%? There

are people here today from the private sector. If one of you learned today that a bank at which you are keeping your firm's uninsured deposits is at risk, what fraction of your deposits would you choose to leave in the bank? And how many of you might be left out of the news of that event? Well, I think the answer is pretty clear. If it were me, I would almost instantly move all of my deposits. Realistic liquidity coverage for these depositors would be close to 100%. Some of you knowledgeable pragmatists in the audience might say, "That's ridiculous, because it would trap in the banking system an enormous quantity of high-quality liquid assets, which, for most of the time, are completely idle and unuseful."

An example of the negative impact of trapped HQLA occurred in September 2019 when large banks were unwilling to let go of their Federal Reserve deposits to quell a serious liquidity problem in wholesale funding markets. Overnight interest rates in Treasury repo markets went up by nearly 1,000 basis points intraday. On the JPMorgan Chase earnings call that immediately followed this crisis, CEO Jamie Dimon was asked by an analyst why he didn't invest JPMorgan Chase's enormous Federal Reserve balances into repos (repurchase agreements) to earn those high interest rates. That form of arbitrage would probably have brought the repurchase agreement market from crisis back to normalcy. In his response, Dimon referred specifically to liquidity regulations requiring large banks to cover all their intraday liquidity needs—not merely over thirty days—with their own resources.² The most popular liquidity source for meeting these requirements is Federal Reserve deposits. In effect, an enormous quantity of Federal Reserve deposits is now trapped by regulation. Figure 5.3 illustrates that, for adequate liquidity coverage, trillions of dollars of uninsured deposits in the US banking system would need to be covered by high-quality liquid assets, including Federal Reserve deposits. That's just not realistic—unless the Fed increases the size of its balance sheet even further.

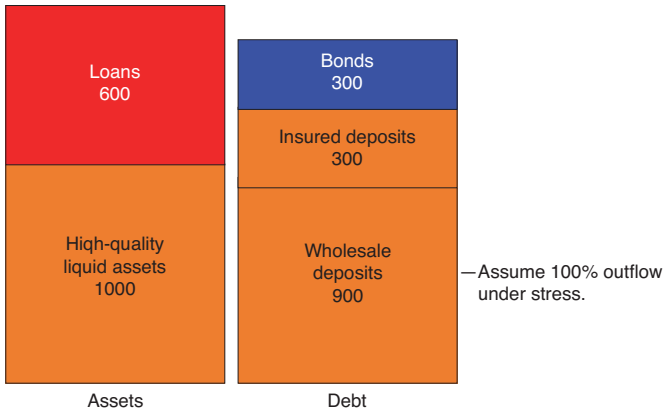


FIGURE 5.3. A Bank That Covers Realistic Deposit Outflows with HQLA. A large quantity of HQLA is trapped on a hypothetical bank's balance sheet. Source: Author's calculations.

What regulatory change would satisfy my suggested need to radically increase liquidity coverage while allowing for a much more realistic and useful approach for satisfying the liquidity resources needed by banks? Going back to the formation of the Federal Reserve System, a primary purpose of the Fed has been to provide crisis liquidity to banks as a lender of last resort (LOLR). In the sort of crisis that we have seen over the past two months, banks should have posted lots of their assets at the Fed's discount window to receive the liquidity they needed to cover fleeing depositors. But that was not the case. Under current regulations, lender-of-last-resort liquidity from the Fed does not count toward meeting a bank's regulatory liquidity needs. Currently, banks must be self-reliant in meeting these requirements.

That mistake has been picked up by a number of others, including my copanelist today, Randal Quarles, and Bill Nelson and in a speech he gave some years ago.³ This approach of including LOLR support toward meeting regulatory liquidity requirements, depicted in figure 5.4, has been tried in some countries but not in the United States. This regulatory approach should be pushed forward in the

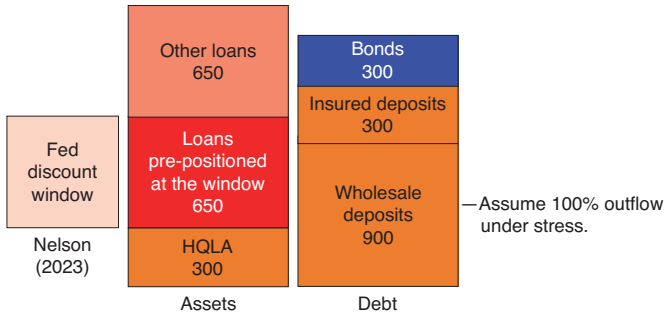


FIGURE 5.4. Proposed Higher Liquidity Coverage.

The illustrated bank ties down fewer high-quality liquid assets to meet a realistic assumption on deposit outflows by also relying on the Fed for liquidity support, pre-positioning some of its less-liquid assets at the Fed’s discount window. However, access to the discount window does not count toward liquidity coverage requirements in the current regulatory framework.

Source: Author’s calculations.

United States so that banks can cover the liquidity needs imposed by their depositors and, at the same time, not tie down so many high-quality liquid assets that those liquid assets are not available in sufficient quantity when needed elsewhere.

The Financial Stability Board released two reports in the last eighteen months that favorably evaluate post-financial-crisis banking regulation. However, in a quiet part of one of those reports, there is a discussion of problems associated with the “usability” of high-quality liquid assets. This brings to mind Charles Goodhart’s telling of the parable of the “last taxi at the taxi stand.”⁴ As I’m sure almost everybody in the audience knows, this is the story of a weary traveler who has arrived at the train station and is now looking for a taxi to go home. By analogy, taxis represent high-quality liquid assets. The traveler thanks his good luck that there is indeed a taxi at the stand—but only one—and he requests a lift home. However, the taxi driver says, “No, I’m sorry, but we’re required by regulation to ensure that there is always at least one taxi left at the stand in case someone arrives needing a ride.” The passenger says, “Well, I’m

here and ready to go home.” But the taxi driver says, “No. Rules are rules; I can’t take you, because there would then be no taxis left at the stand.” Using this analogy, you can see that trapping a large quantity of high-quality liquid assets serves no useful purpose and involves significant costs.

The discount window is not the Fed’s only source of last-resort lending. The Federal Reserve recently put a standing repo facility (SRF) in place, which could also be a useful source of liquidity for banks under stress. So far, however, many banks have not signed up for access to the SRF, and the SRF has rarely been used except in testing. My guess is that many banks haven’t signed up for the SRF because that involves some costs, whereas they are not allowed to count access to the SRF toward their liquidity coverage requirements.

Thank you very much for the chance to speak with you today.

Notes

1. Jason M. Goldberg, “US Large-Cap Banks: Jason Goldberg’s Bank Brief | Volume 20,” Barclays Equity Research, May 2023. Totals are for Bank of America, JPMorgan Chase, and Wells Fargo.
2. Emily Barrett and Alex Harris, “Dimon Says Regulation Limited JPMorgan from Calming Repo Market,” Bloomberg.com, October 15, 2019.
3. William Nelson, “Recognizing the Value of the Central Bank as a Liquidity Backstop,” Staff Working Paper 2017-1, The Clearing House, January 2017.
4. Charles Goodhart, “Liquidity Risk Management,” Banque de France, *Financial Stability Review*—Special Issue on Liquidity, no. 11 (February 2008): 3.

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Silicon Valley Bank: What Happened? What Should We Do about It?

Randal Quarles

On March 10, 2023, the California Department of Financial Protection and Innovation seized Silicon Valley Bank (SVB), a state-chartered commercial bank headquartered in Santa Clara, California, with over \$209 billion in assets, and appointed the Federal Deposit Insurance Corporation as receiver. On March 9, depositors of the bank had withdrawn over \$40 billion of the bank's \$175 billion in deposits during the course of a few hours, and on the morning of March 10, the bank and its regulators had information that the bank would lose another \$100 billion in deposits before the end of the day, requiring an emergency closure. It was the second-largest bank failure in American history.

In the months since, the search for explanations has been wide ranging. There have been multiple congressional hearings, think tank white papers from across the ideological spectrum, learned commentary from a score of academics and former policymakers, and a 102-page memo from the banking system's chief regulator, Michael Barr, vice chairman for supervision of the Board of Governors of the Federal Reserve System (the "Barr Memo").¹ The analyses have been comprehensive and often quite technical, covering capital regulation, liquidity rules, and supervisory practice, and the resulting policy recommendations have been extremely varied and often highly political, from increasing the limit on deposit insurance to as much as \$50 million per account to increasing capital requirements across the system by as much

as 25%—recommendations that have often been quite similar to positions held by their proponents long before the failure of Silicon Valley Bank.

Lost in this surfeit of denunciation and policy entrepreneurship is a very simple story that ought to be familiar to us: well-meant but ill-calibrated and highly stimulative fiscal policy engenders serious and stubborn inflation, which causes a category of financial institutions that have particularly interest-rate-sensitive assets and highly mobile liabilities to come under great liquidity pressure as the value of their assets falls, and the cost of their liabilities rises, pressure that is exacerbated when the Fed takes sensible steps to bring that inflation under control. That was the fundamental story of the savings and loan associations in the United States: President Lyndon Johnson’s “guns and butter” policy drove substantial deficits, leading to high inflation, which monetary policy was slow to contain. During the Great Inflation of the 1970s, inflation rose from about 1% in 1964 to more than 14% in 1980, driving down the value of the thirty-year mortgage assets of the country’s savings and loan associations (S&Ls) and increasing their cost of funding. Many S&Ls, in turn, tried to salvage their position by taking additional risk, which ended up worsening their situation when the Federal Reserve finally began an aggressive response, driving the economy into a recession that led to large credit losses on that additional risk.

Although the assets in question are different, and the process is playing out over a couple of years rather than a couple of decades, this is almost exactly the story of SVB and the other banks that failed in the spring of 2023. Three waves of COVID-19 stimulus in 2020 and 2021, followed by the Infrastructure Investment and Jobs Act and Inflation Reduction Act in 2021 and 2022, put almost \$7.5 trillion of stimulus into the economy in a little more than two years, triggering generationally high inflation, which the Fed at first accommodated and is now responding to with a generationally

robust interest rate policy. As we think about lessons learned from this latest episode, we should keep this fundamental fact firmly in mind: the most important teaching of SVB is “Don’t do that again.” Massive fiscal irresponsibility has severe and inescapable consequences, not least for the financial system.

Almost none of the analyses of the SVB failure, however, emphasize or even mention this fundamental cause of the failure. Instead, they focus on the regulation and supervision of the entities that failed, although these are clearly secondary issues given the overwhelming importance of the sudden and self-inflicted inflationary surge. The most prominent of these analyses is the Barr Memo, which lays out a road map for a regulatory response based on four key conclusions:

1. SVB’s executive team failed to manage its risk.
2. The Fed’s supervisory team failed to appreciate the extent of the vulnerabilities.
3. When they did recognize the vulnerabilities, they didn’t do enough about them.
4. The Fed’s lassitude was attributable to the regulatory tailoring project mandated by the Economic Growth, Regulatory Relief, and Consumer Protection Act of 2018 and a contemporaneous change in supervisory culture at the Fed, which reduced standards and promoted a less assertive approach.

Given that the first three conclusions are both fairly obvious and fairly nonprescriptive, most of the Barr Memo’s recommendations stem from the final conclusion: the regulatory changes and supervisory approach of the prior administration reduced standards that would otherwise have prevented the bank’s failure, calling for a rapid reversal of these changes.

The fundamental conclusions of the Barr Memo have now been quite widely discredited. Other governors of the Federal Reserve Board have said that they had no input to the memo and did not

agree with it—that it is simply the preexisting policy agenda of one governor.² Pat Parkinson, the civil servant who headed the supervisory staff at the Fed during the regulatory response to the Great Financial Crisis, has said that the memo’s conclusions are not supported by the facts.³ An independent working group chaired by former FDIC chair Sheila Bair—no fan of the 2018 regulatory changes—has said that those changes were nonetheless not relevant to SVB’s failure, which was driven by other factors.⁴ Barney Frank, the former congressman and sponsor of the Dodd-Frank Act and longtime regulatory hawk, has said that the regulatory changes of 2018 “had no impact” and that “they did not stop supervising banks.”⁵ And the Fed chairman himself has stated in congressional testimony that, contrary to the Barr Memo, he did not think there had been a cultural shift in supervision at the Fed.⁶ It is, however, worth reviewing the Barr Memo’s conclusions in some detail, because an understanding of *why* the memo’s recommendations miss the mark can help sharpen the focus on what recommendations might, in fact, be helpful in the future.

First, consider the regulatory changes cited by the Barr Memo as “impeding effective supervision.” In 2018, Congress enacted the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA), which raised the general threshold for the application of the strictest capital and liquidity standards from \$50 billion in assets to \$250 billion in assets. The Federal Reserve implemented this law in November of 2019 through the issuance of the so-called “tailoring rule,” which established four categories of firms based on various indicators of risk and applied a sliding scale of regulatory stringency to those four categories, with the strictest standards reserved for the riskiest firms.⁷ The effect of the EGRRCPA, as implemented by the tailoring rule, was to change certain of the capital and liquidity rules that would otherwise have applied to Silicon Valley Bank as it grew rapidly after 2019, passing the pre-2018 \$50 billion threshold (the “Tailoring Changes”).

Barr claims that the Tailoring Changes contributed to the failure of SVB, but a close examination of the relevant changes shows that this cannot be true. Consider first the changes in capital regulation. The relevant rule here is the so-called “AOCI opt-out” (where AOCI stands for Accumulated Other Comprehensive Income), to which Barr attaches great significance. The AOCI opt-out is quite technical but not conceptually difficult. Banks hold debt securities in two main categories: “available for sale” (or “AFS”) and “held to maturity” (or “HTM”). HTM securities are those that the bank has acquired with the firm intention and ability to hold until they mature. As a consequence, changes in the market value of HTM securities are not recorded in the financial statements, as they could be misleading: an increase in market value is irrelevant for a security that will never be sold in the market (or so the thinking behind the accounting treatment goes), and showing that increase as an improvement in the firm’s balance sheet would be deceptive; the same holds true, although in the reverse direction, for decreases in value. AFS securities, on the other hand, are held precisely so that they *can* be sold in the market (whether to make a trading profit or to cover a liquidity need) and therefore are marked to market periodically, and the changes in value are collected in an account entitled “Accumulated Other Comprehensive Income,” or “AOCI.”

Since 2013, the largest banks have been required to hold capital against changes in the AOCI account, but no bank holds capital against changes in the value of HTM securities, because there are no changes in the accounting value of HTM securities—they are held at par until maturity and never marked to market. Given the potential for abuse in moving securities back and forth between AFS and HTM status, the accounting guild—especially since some actual abuses in the late 1990s and early 2000s—is very rigid about preventing any securities characterized as HTM from ever being sold. The consequence for a firm selling even one HTM security is generally that all that firm’s HTM securities must now

be marked to market, which is widely viewed as so draconian an outcome as to effectively prohibit any such sale.

The above accounting treatment of AFS and HTM securities is not unique to banks and was not altered by the Tailoring Changes. It should be immediately apparent that it creates a strong incentive for a firm to move securities from the AFS category to the HTM category, where that can colorably be done because marking the AFS securities to market can result in a volatile balance sheet. This incentive is especially strong for banks because of the regulatory capital consequences of changes in the value of the AOCI account—a bank can greatly reduce its capital volatility, and even in some cases its overall capital requirement, by putting as many of its liquid assets as possible into the HTM category. But at the same time, as banks have an especially strong incentive to make this move, that move is especially dangerous for banks, because it increases the liquidity fragility of the institution: some of the bank's most liquid assets (Treasuries and agency securities) get placed into a category that precludes their sale in the event of a liquidity need.

As a consequence, when the Fed first implemented the Basel III capital standards in the US in 2013 (in a regulation crafted by Governor Daniel Tarullo at a time when every member of the Board of Governors but one had been appointed by a Democratic president), the Fed ameliorated this incentive by allowing banks with less than \$250 billion in assets and \$10 billion in cross-border exposures—which is 99% of all US banks—to make a onetime, “use it or lose it” election to opt out of the requirement to hold capital against changes in the AOCI account. The Fed did this knowing that it meant that capital regulation itself would not capture certain aspects of interest rate risk.⁸ The consciously adopted approach—in order to avoid the worse problem of creating a strong incentive to increase illiquidity—was to focus on supervision and stress testing of interest rate risk rather than capital regulation for that particular issue.

In that context, the Tailoring Changes relevant to AOCI do not appear in any way consequential for SVB. SVB had less than \$250 billion in assets, and banks with less than \$250 billion in assets have always been exempt from holding capital against changes in AOCI, even after the implementation of the relevant rules under Dodd-Frank in 2013.⁹ Equally important, however, even if SVB had been required to hold capital against its AOCI losses, it would still have been a very highly capitalized bank—with a Common Equity Tier 1 (CET1) capital ratio of over 10%, well above the 7% minimum. The AOCI rule would not have required SVB to raise a penny of capital.

One could argue that banks of SVB's size shouldn't have been exempt from holding capital against AOCI losses—but (a) that wasn't a result of the Tailoring Changes; (b) it didn't change SVB's capital adequacy; and most important, (c) the Tarullo Fed's concern about the incentive for moving securities to the HTM category was certainly borne out by SVB. Even without the AOCI capital incentive, it had a far larger amount of securities in the HTM category than held as AFS, and it was public concern about interest-rate-driven losses *in the HTM securities* that triggered the run that brought down the bank.¹⁰ Had SVB been subject to a requirement to hold capital against AOCI, it likely would have moved even *more* securities into the HTM account, resulting in an even more fragile institution when the run began.¹¹ In other words, not only did the Tailoring Changes not make any difference for SVB, the performance of SVB under stress is evidence that the Tailoring Changes' expansion of the AOCI opt-out to even larger firms than SVB was, in fact, a sensible, stability-enhancing adjustment.

But if the capital changes were not relevant, perhaps the liquidity changes were. The Tailoring Changes effectively excluded SVB from applying the net stable funding ratio (NSFR) and the most stringent version of the liquidity coverage ratio (LCR).¹² But these changes, too, did not matter for SVB's ultimate resilience.

The NSFR is perhaps the easiest. The NSFR seeks to mitigate the liquidity risks of firms by requiring them to maintain a minimum level of stable funding to support their assets, funding commitments, and derivative exposures over a one-year time horizon. The Barr Memo itself notes that SVB would have met the requirements of the full NSFR.¹³ In other words, even though the Tailoring Changes had exempted SVB from the NSFR, the firm still met those requirements, and even meeting those requirements did not protect the firm against failure.

The LCR is somewhat more interesting. The LCR seeks to strengthen firms' short-term resilience to funding shocks by requiring them to hold a minimum amount of high-quality liquid assets to meet total net cash outflows in a thirty-day stress period. In the absence of the Tailoring Changes, SVB would have become subject to the full LCR requirements, and the Fed estimates that SVB would have needed an additional \$8 billion in high-quality liquid assets to comply with the full LCR as of December 2022.¹⁴

But this would have been easy for SVB to do, and doing so would not have changed SVB's liquidity profile at all. Indeed, part of the problem with SVB's banking model was that its focus on venture capitalists and their start-up portfolio companies created relatively few traditional financing opportunities, leaving the bank to invest the deposits that it gathered in low-risk, highly liquid securities. As of the end of 2022, the bank had almost 60% of its assets in liquid securities, more than double the average for banks of its size. Indeed, over half of its assets were Treasury and agency securities. Had the bank shifted the composition of that liquid portfolio mildly away from agencies and mildly toward Treasuries, the bank would easily have come into compliance with the full LCR. Yet, it would still have had the same interest rate risk and fundamental liquidity position—which would not have been sufficient to withstand the March run.

Given the weaknesses of the regulatory analysis, the claims of the Barr Memo that have gained the most attention have been those regarding a supposed “shift in supervisory culture” at the Federal Reserve that resulted in a “less assertive stance” of SVB’s examiners: less willingness to raise supervisory concerns, longer delays in examination processes, more timidity in enforcement.¹⁵ These claims, however, are the weakest of the memo. The memo itself notes that “there was no formal or specific policy” that promoted this supposed change in culture,¹⁶ nor does it cite communications that directed a weaker stance. It simply states that a limited number of anonymous, mid-level examiners in San Francisco, on the opposite side of the continent from Washington, “felt” something was different.¹⁷ The only concrete example offered of the basis for this impression is bizarrely self-referential: supervisors in San Francisco developed a memorandum of understanding with Silicon Valley Bank around information technology in 2021 but subsequently dropped the matter on their own accord, because they “felt” it would not be pursued—without ever asking anyone in Washington about it, let alone sending it to Washington for review or hearing from anyone in Washington that it should be dropped.¹⁸ The Barr Memo supplies no other examples or evidence.

Those feelings flew in the face of repeated communication from Washington from 2017 onward that supervisors were expressly *not* to weaken supervision but to reduce the bureaucracy around supervision and focus on what was most important.

During 2018 and 2019, the Federal Reserve’s vice chair for supervision held town halls at every Federal Reserve Bank that included the entire examiner corps expressly to say, “We need to make supervision more assertive on the things that really matter and avoid being distracted by what doesn’t.” That message was entirely consistent with messages from the heads of supervisory agencies around the world, urging international best practices on

examiners. Andrea Enria, for example—the chair of the European Central Bank’s Supervisory Board—has introduced a new supervisory framework designed to allow examiners to focus on the true strategic priorities and key risks for each bank, concentrating efforts where they are most needed. And he expressly notes that such an approach does not mean “less supervision, or a ‘light touch’ approach, but rather more focused and impactful supervision, homing in on the most material risks.”¹⁹

The Barr Memo’s claims about supervisory culture also fly in the face of the actual supervisory practice, evidenced by the supporting materials released in connection with the Barr Memo. Rather than demonstrating a timid approach directed by political instruction that overrode the supervisors’ best instincts, the materials themselves show a quite athletic supervisory stance that was, however, diffused across too broad a range of administrative compliance minutiae and not focused on the items that really mattered.

A long-term problem with the culture of bank supervision—not merely at the Fed, but especially evident there—is a focus on process and governance rather than on actual evidence of risk. This problem has persisted for decades. As long ago as 2009, in the aftermath of the Great Financial Crisis, the Federal Reserve Bank of New York issued a “Report on Systemic Risk and Bank Supervision” concluding that the Fed should move away from focusing on banks’ general administrative processes and instead identify and make a priority of the key risks for a bank and focus on remediating those actual risks.²⁰

The actual risks at SVB were obvious and long-standing. SVB had constructed a government securities portfolio with a high degree of interest rate risk, it had a highly concentrated deposit base, and it lacked a clear liquidity strategy should those highly concentrated deposits move out of the bank quickly. A properly focused supervisory strategy—in line with the repeated instructions of the vice chair for supervision to focus on what was most

important—would have required the bank to reduce its interest rate risk, increase its liquidity, and reduce its deposit concentration. The Barr Memo asserts that the supervisors did not do this, because they were intimidated into passiveness by the culture fostered in Washington. The evidence, however, shows that this is almost exactly the opposite of what happened.

For example, at the end of 2022, SVB had thirty-one “matters requiring attention” (MRAs) and “matters requiring immediate attention” (MRIAs) open.²¹ MRAs and MRIAs are communications from a bank’s examiners to its management or board of directors identifying deficiencies in a bank’s practices or financial condition that the supervisory agency expects to see addressed. MRAs and MRIAs are not mandated by—or even referred to in—law or regulation but are simply supervisory conventions that have grown up over time. They have become, however, the principal mechanism for the execution of the supervisory process.

Thirty-one open MRAs and MRIAs are obviously a lot; it was almost three times the average number for banks of SVB’s size. This does not suggest a timid or passive supervisory team. Far from it—this team was quite willing to tell SVB what they believed the bank needed to do. But the great bulk of these communications had nothing to do with the most important problems at SVB. Three-quarters of them were routine administrative matters such as vendor management, password management, board effectiveness, Bank Secrecy Act compliance, systems development methodology, and steps for keeping track of laptops. All are very worthy but not existential. A small handful of the open items dealt with liquidity risk or interest rate risk—but almost all of those were MRAs, not MRIAs. For example, the sole item dealing with interest rate risk was an MRA (not an MRIA) about their interest rate risk models, not anything dealing with their actual, obvious interest rate risk itself. Of the twelve MRIAs (requiring the most urgent action), ten of them dealt with something other than liquidity risk, none of

them dealt with interest rate risk, and the two dealing with liquidity risk were focused on process, not actual risk.

Moreover, even among this welter of process checklists, the Fed established no priorities as to which were related to the most important matters. The sole effort to establish priorities was in designating some supervisory communications MRIsAs rather than MRAs, and as noted above, almost all of the MRIsAs would have distracted SVB from focusing on concrete actions to ameliorate actual, evident risk, and the Fed did not anywhere indicate that any MRIA was more important than any other. It is a basic truth of project management that when everything's urgent, nothing is.

Finally, the Barr Memo mentions in several places that an emphasis on due process in the supervisory function stymied assertive action and led to supervisors pulling their punches.²² This assertion does not comport with the memo's own evidence, as noted above. But even more important, it cannot be the case that supervisors must be allowed to ignore due process if they are to do their jobs effectively. Due process is simply the requirement that governments act transparently, consistently, and fairly. If the supervisory cadre at the Fed believed their jobs required them to be opaque, arbitrary, and unjust, there is a much bigger cultural problem than simply the overemphasis on process and governance and the failure to prioritize risks. An assertive, rigorous supervisory function is perfectly consistent with the principles of due process, and the Fed—together with its bank regulatory cousins—must learn to accommodate these principles and maintain its effectiveness. It is not a particularly hard thing to do, but even if it were, it is the bare minimum requirement of governmental action in a democracy. In the past, supervisors have not had to worry about their actions being challenged, given the reluctance of traditional banks to sue their supervisors and because of the historical deference of the judiciary to the financial regulatory agencies. Both of those factors are changing. There are many new entrants to the banking

system who are not traditional bankers, and they will not feel the traditional bankers' reluctance to call out overreaching behavior. And the judiciary has clearly signaled that it will no longer simply defer to an agency's own interpretation of the limits to its action.²³ If the Fed's supervisors continue to chafe at complying with due process—as the Barr Memo suggests that they are—then many of their actions will not survive contact with the modern judiciary. They will be found to be a farrago of inappropriate end runs of the Administrative Procedure Act and congressionally unauthorized resolution of major questions.

This cultural focus on “governance and controls” rather than actual risk, accompanied by an equally culturally driven failure to establish priorities among the long list of MRAs and MRAs that the Fed had insisted that SVB focus on, may possibly have contributed to SVB's failure.²⁴ It certainly didn't help. But those are very different problems than the supposed passivity engendered by a culture of laxity emanating from Washington. Not only has that conclusion been disavowed by other Fed governors, including the chairman, but the Barr Memo's own supporting materials demonstrate that the supervisors of SVB were anything but lax; they were just urgently insisting that SVB focus on the wrong things.

Indeed, the Barr Memo itself recognizes the weakness of the case that the Tailoring Changes and the supposed cultural shift were relevant to the failure of SVB. In its summary conclusions, the memo states that “higher regulatory and supervisory requirements may not have prevented the firm's failure,” which is Fed-speak for “*would* not have prevented the firm's failure,” a conclusion that is inescapable in light of the above analysis.²⁵

It is also an entirely unsurprising conclusion, given the purpose of the original post-2010 regulatory reforms and of the subsequent Tailoring Changes. The express purpose of the original regulations was not to prevent all bank failures but to create a system resilient enough that any bank could fail. And, accordingly, the thesis of

the Tailoring Changes was not that no bank could fail after making them (because the hypothesis was that any bank could fail even before the changes), but rather that we could make moderate changes to the framework that would make the system more efficient and less costly, without changing the fundamental resilience of the system or the likelihood that any particular bank would fail. The facts of the collapse of SVB certainly support that thesis. Reasonable people can differ with the calibration of the Tailoring Changes or argue that Congress should not have authorized them at all. But SVB is not evidence for that view—to the extent it is evidence of anything, it is evidence that the Tailoring Changes were well calibrated not to change any expected outcome under stress.

If the Tailoring Changes were not at fault for SVB's failure, and if the cultural shift in supervision was a mirage, does that mean there are no regulatory or supervisory changes we ought to make? On the contrary, I believe that there are some significant questions we can study that can lead to some important regulatory and supervisory refinements that are the true lessons of SVB, though they are not the key takeaways of the Barr Memo.

Generally, the explanations of unexpected events that do not require everyone involved to be either a crook or a moron are the ones that are the most illuminating (although often not the most politically popular). But if we hypothesize that SVB's management was generally competent and that the supervisors of the bank were experienced and alert, what would explain their failure to address these existential issues?

The most surprising element of the entire SVB episode—and one that I believe explains more than anything else the behavior of the bank's management and its supervisors—is that the uninsured depositors at SVB behaved much differently than decades of experience had led all of us to believe that they would. This is my hypothesis for why both competent bank managements and smart, experienced supervisors would not have set their hair on fire

over the potential risks at SVB. They saw the risks developing—who could not? But they also saw that the bank was funded overwhelmingly by its core business depositors and therefore believed they had time to get the bank's financial position in order, because there would not be a run. History has shown that banks were unstable when funded by short-term wholesale funding, deposits from other financial institutions, or by brokered deposits acquired from noncustomers, but when funded by their core depositors—even large uninsured depositors, so long as they were business customers of the bank—that funding would be relatively stable. Business customers have a web of interactions with the banks at which they keep their deposits: the bank may handle the firm's payroll and cash management; there will be loans to the firm and to its executives; the bank may manage investment and retirement products for the firm; the bank may provide the business credit cards to the firm's employees on preferential terms, and so on. It takes quite a bit to upset those relationships and trigger a core business depositor to move its business elsewhere. They certainly don't move because of something the CEO read at lunch on Twitter [X].

Except that these deposits did, and did so at speed. As I noted at the outset, on Thursday, March 9, SVB experienced a deposit outflow of almost \$42 billion, and over \$100 billion was in the queue to leave the bank on March 10. Let's consider this in comparison to past bank failures. The largest bank failure in US history was the failure of Washington Mutual (WAMU), which experienced a large deposit run, ostensibly triggered by the failure of Lehman Brothers on September 15, 2008, before the Office of Thrift Supervision seized it on September 25, 2008. Over the course of that ten days, WAMU lost \$16.7 billion in deposits, averaging \$1.67 billion per day and totaling about 11% of its total deposit liabilities.²⁶ This was considered a massive run, requiring closure. SVB's \$142 billion over two days was over forty times as large per day and amounted to over 80% of SVB's total deposits.

Yet SVB had been almost completely funded by core business depositors. Over 90% of its deposits were uninsured, but virtually all of those were core business deposits, and the significant majority of those were operational deposits of nonfinancial companies. Because of the long historical record of how such deposits behave, the relevant liquidity regulations assign a relatively low probability of outflow to such liabilities and, thus, a relatively low liquidity requirement against them.²⁷ Similarly, bank managements and supervisors would expect that the liquidity needs of a bank funded by such deposits would be reasonably moderate. With those expectations, even a fairly severe asset-liability mismatch would be a problem that everyone might reasonably believe could be addressed over an extended period of time.

Those expectations turned out to be misplaced. The key question is why: was it because they were depositors of a particular type? Or because they were depositors at a particular time?

By depositors of a particular type, I mean that the business model of SVB resulted in a deposit base that was highly concentrated in a particular economic community: venture capitalists, their portfolio start-up companies, and the entrepreneurs running them. This is a particularly interconnected community famously subject to fads, enthusiasms, and herd behavior.²⁸ As the slowing economy put pressure on many of the tech firms in this fraternity, leading to a gradual but steady drawdown of deposits over 2022 because of the cash needs of the businesses, this led some of them to look at the financial position of their common bank, which they had not had particular reason to examine before. Some of them, most prominently Peter Thiel, withdrew their deposits and advised their portfolio companies to do the same—news that spread rapidly through this relatively close-knit group, a fact that many believe cascaded into an unprecedented bank run.²⁹

Alternatively, these depositors' unexpected behavior may not have been a function of their community but of their century. On

this account, the news that prominent depositors were withdrawing their deposits from SVB spread rapidly, not so much because the community was close knit and thus all the members of the community knew this was happening, but because we all knew this was happening when the withdrawers posted their views on Twitter. SVB was posted about on Twitter roughly two hundred thousand times on the day before it failed, many of those posts coming from executives stating they were pulling their funds from the bank and recommending others do so as well.³⁰ Many have reasonably hypothesized that “in the social media age, the psychological behavior around a bank run . . . may be amplified and go viral quicker than bank officers and regulators can successfully respond.”³¹

Depending on which of these two explanations is true—or most dominantly true—regulators and supervisors would need to emphasize differing responses. If the first (depositors of a particular type) predominated, then it would be reasonable for regulators and supervisors to place much more of a premium on depositor diversification than they have in the past: creating financial incentives, or administrative requirements, to reduce the concentration of deposits from a small number of individuals as well as individuals in the same industry or even geography, and to reduce the amount of uninsured deposits. Supervisors and bank managements have long emphasized asset diversification as essential to a stable bank; a similar effort on deposit diversification would be the logical flip side.

If the second (depositors in the twenty-first century) predominates, then the problems for the typical small regional or large community bank in the United States are much deeper. It is not uncommon for uninsured deposits to be well over half the total deposits at such a bank, and if that funding is now considered to be unstable, a bank would have to hold permanently high levels of high-quality liquid assets (HQLA) to be able to cover that potential liquidity need. Given the large number of such banks in the

United States and the importance of the lending they do in supporting small businesses and job creation in the economy, requiring a major shift in assets from credit extension to HQLA would lead to a material reduction in the ability of the US banking system to support growth in the real economy.

This problem would be especially severe in the United States, because of the insistence that banks must be prepared to self-insure their liquidity needs entirely. In evaluating a bank's liquidity resilience, the Fed—unlike many of its peer central banks around the world—does not give a bank any credit for its ability to obtain liquidity by borrowing from the central bank. Most central banks require a certain sturdy amount of HQLA at the bank as the first layer of liquidity resources but then also include a calculation of available central bank borrowing as a second layer. The Fed, by contrast, looks only at the HQLA currently on a bank's balance sheet. The HQLA includes actual reserves held at the Fed but does not include a bank's potential borrowing from the discount window or use of the Fed's standing repo facility or other potential Fed borrowing as available to satisfy a potential liquidity need.

The Fed's reluctance to give a bank credit for central bank borrowing access in assessing its liquidity resilience is a serious disincentive for banks to prepare themselves to use that access. It is well known that on the day before its failure, SVB was scrambling to get collateral released from the Federal Home Loan Bank of San Francisco and delivered to the Fed in order to support substantial Fed borrowing and that it was unable to complete this process before the bank was seized.³² This is unsurprising, because the Fed had given the bank no incentive to prepare for such borrowing—and, indeed, had provided a significant disincentive, as the potential lending would not count toward SVB's liquidity requirements, and the securities delivered as collateral to support such lending would not be available to support other liquidity sources that *would* receive immediate credit.

This is a result of deliberate Fed action, ill judged though well meaning. For decades, the Fed has been affirmatively eroding its core reason for being: providing liquidity to the banking system, especially in times of stress. The Fed's express mantra since the Great Financial Crisis has been that banks need to "self-insure" their liquidity needs. But we had a system in the United States where banks had to self-insure their own liquidity in the nineteenth and early twentieth centuries, and it proved to be wildly unstable—in large part precisely because banks had to self-insure their own liquidity. It simply isn't possible for a bank to rely solely on its own liquidity resources in a world where a very large percentage of bank liabilities are going to be highly runnable.

Addressing this issue is the core reason for the Federal Reserve's creation. It is why we don't call it the Bank of the United States or the Federal Central Bank—it was created to be a central *reserve* from which liquidity could be supplied to those parts of the banking system that needed it from those parts that were in surplus.

But if regional banks' core business deposits are found to be more unstable in the future due to modern methods of communication and increasingly frictionless bank technology, then this stance of the Fed will have to change. SVB had over 90% of its funding from uninsured business deposits, and while that was an outlier, a very large number of banks have 50% or 60% of their deposits in uninsured accounts. A bank that had to treat these deposits as entirely runnable in calculating its internal liquidity needs would need to dramatically restrict its lending in favor of holding larger amounts of HQLA, becoming something closer to a glorified government money market fund. This would either reduce the overall amount of financing support provided to the real economy or drive ever larger amounts of credit provision into the more opaque and less regulated private credit markets, and probably both.

While the principal lesson of SVB is that overly generous fiscal policy—even in the pursuit of worthy public purposes—will have

inescapable consequences for the financial system, there is a lesson for regulatory and supervisory policy as well. It is not, however, a more restrictive capital regime, or ever larger amounts of self-insured liquidity, or a more assertive but unfocused supervisory regime, but rather a rethinking of the misguided undermining of the Fed's core liquidity mission that we have been engaging in for quite some time, and a creative reinvigoration of its role as the financial system's central lender. This will require a reorientation of Fed policy, as well as a robust educational effort: banks must learn to integrate Fed borrowing into their general funding practices, and politicians and the public must learn that the use of this credit is not a scarlet letter but instead one of the most important public benefits for which the Fed was created. In today's world of social media and online banking, this may well be the only way to maintain the benefits of our highly diversified banking system.

Notes

1. Michael S. Barr, "Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank," Board of Governors of the Federal Reserve System, Washington, DC, April 2023 (hereafter, "Barr Memo").
2. See, for example, Governor Michelle Bowman, "Responsive and Responsible Bank Regulation and Supervision," speech at the Salzburg Global Seminar on Global Turbulence and Financial Resilience: Implications for Financial Services and Society, Salzburg, Austria, June 25, 2023.
3. Jeremy Newell and Pat Parkinson, "A Failure of (Self-) Examination: A Thorough Review of SVB's Exam Reports Yields Conclusions Very Different from Those in the Fed's Self Assessment," BPI.com, May 8, 2023.
4. "Supervision and Regulation after Silicon Valley Bank," Center for Financial Stability, forthcoming.
5. Zachary Warmbrodt, "Barney Frank Blames Crypto Panic for His Bank's Collapse," *Politico*, March 13, 2023.
6. Capital Account Substack, June 21, 2023 (<https://www.capitolaccountdc.com/p/sec-takes-a-stab-at-assessing-swap>), recounting Chair [Jerome] Powell's testimony before the House Financial Services Committee:

“Democrat Nydia Velazquez brought up the Fed’s recent SVB report, which detailed a ‘cultural shift’ under former vice chair for Supervision Randal Quarles that led to less aggressive oversight. She asked Powell whether he was aware of the change, and if he discussed it at the time with Quarles.

“The Chairman responded that he wouldn’t characterize what happened during Quarles’ tenure as a ‘cultural shift.’ Powell added that Quarles prioritized having staff focus on ‘the most important issues’ instead of being distracted by less pressing matters.”

7. Prudential Standards for Large Bank Holding Companies, Savings and Loan Holding Companies, and Foreign Banking Organizations, 84 Fed. Reg. 59,032, November 1, 2019.
8. See the transcript of the Fed’s open Board Meeting adopting the Basel III capital standards (<https://www.federalreserve.gov/mediacenter/files/open-board-meeting-transcript-20130702.pdf>) and Governor Jeremy Stein’s question on pp. 30–33: “The question I have is, however, if we leave this AOCI filter in place, we’re left in a situation where there’s really no regulatory capital device in place that attempts to capture interest rate risk. The staff’s response was: So, from the overall standpoint, what we are advising firms and have instructed our supervisory staff to do is to continue to be vigilant in their pursuit of interest rate risk management. . . . It just remains as a task for us as supervisors to be vigilant as rates increase or change in this environment, to follow up with firms as they implement appropriate changes to their strategies so we don’t invariably fall behind.”
9. The Tailoring Changes also raised the threshold of cross-border exposures that would require holding capital against AOCI from \$10 billion to \$75 billion, and on the day it failed, SVB had \$14 billion in cross-border exposure. But this excess was neither relevant to SVB’s failure nor important to its business—had SVB remained subject to the pre-2018 AOCI rule, it would simply have kept its cross-border exposures below \$10 billion and would still never have been subject to the AOCI capital requirement.
10. Christiaan Hetzner, “SVB Collapse Highlights \$620 Billion Hole Lurking in Bank Balance Sheets,” *Fortune*, March 10, 2023.
11. One could, of course, try to address the incentive to move securities into HTM by requiring capital to be held against HTM securities rather than by reducing the amount of capital to be held against AFS securities. While

worth considering in light of the SVB failure, it will require close analysis to be sure that all the potential unintended consequences of such a move have been considered. The accounting profession has repeatedly reconsidered the general rule for HTM securities over the years and repeatedly concluded that changes in the value of such securities should not be recognized in the financial statements. In any event, any deficiency in the capital treatment of HTM securities was certainly not a result of the Tailoring Changes.

12. This statement is a mild oversimplification. SVB passed the asset threshold at which it became subject to the NSFR in June of 2021, but under the applicable transition rules, SVB had a grace period during which it could prepare to comply, and that grace period had not expired by the time the bank failed. Similarly, SVB would have been subject to a more stringent version of the LCR in the absence of the Tailoring Changes, but only because its cross-border exposures were \$14 billion, and the Tailoring Changes had raised the threshold for application of the full-strength LCR from \$10 billion to \$75 billion of cross-border exposures. But just as in the analysis of the AOCI opt-out above, that relatively small excess cross-border exposure was not relevant to SVB's liquidity needs nor important to its business, and in the absence of the Tailoring Changes, SVB would simply have kept its cross-border exposure below \$10 billion and the full LCR would never have applied. For ease of exposition, however, we can posit that the Tailoring Changes resulted in an exemption from these two rules and show that application of the rules still wouldn't have mattered for SVB's ultimate resilience.
13. See Barr Memo, 88.
14. See Barr Memo, 88.
15. Barr Memo, 11.
16. Barr Memo, 11.
17. Barr Memo, 11.
18. Barr Memo, 11.
19. Andrea Enria, "A New Stage for Banking Supervision," a keynote speech at the 22nd Handelsblatt Annual Conference on Banking Supervision. Frankfurt am Main, March 28, 2023.
20. David Beim and Christopher McCurdy, "Report on Systemic Risk and Bank Supervision," Federal Reserve Bank of New York, August 2009.
21. Barr Memo, 28.
22. See, e.g., Barr Memo, iii.

23. See, e.g., *Sackett et ux. v. Environmental Protection Agency et al.*, 598 U.S. ____ (2023) (<https://www.law360.com/articles/1682992/attachments/0>); *Axon Enterprise, Inc. v. Federal Trade Commission et al.*, 598 U.S. 175 (2023).
24. Although we should always keep in mind that given the high inflation created by two years of excessive fiscal stimulus, even the deftest supervisory intervention and management response would have been hard pressed to keep SVB sustainable.
25. Barr Memo, iii.
26. Office of Thrift Supervision, “OTS Fact Sheet on Washington Mutual Bank,” September 25, 2008.
27. William Nelson, “Update on SVB’s LCR,” March 27, 2023.
28. Hadrien Comte, “FOMO, or the Mimetic Desire Theory Leading to Herd Behavior in Venture Capital,” Medium.com, March 25, 2021.
29. Christopher Hutton, “SVB Collapse: Peter Thiel’s Role Scrutinized as Spark of Bank Run,” *Washington Examiner*, March 13, 2023.
30. Kali Hays, “SVB Is the First Social Media Bank Run in History,” *Business Insider*, March 13, 2023.
31. Jonathan Yerushalmy, “The First Twitter-Fueled Bank Run,” *The Guardian*, March 16, 2023.
32. See, e.g., “Improving the Government’s Lender of Last Resort Function: Lessons from SVB and Signature Bank,” Bank Policy Institute, April 24, 2023.

7

What We Can Learn about Financial Regulation from Silicon Valley Bank's Collapse and Beyond

Amit Seru

Thank you, John Taylor, for the opportunity to speak today, and congratulations on the thirtieth anniversary of the Taylor rule. I probably disagree somewhat with the rest of the conference panelists on some of the aspects being discussed. In the rest of the talk, I will move beyond anecdotes and beyond Silicon Valley Bank (SVB). I will use data to describe what I see as the core problem in what happened to SVB and to other banks during the recent monetary tightening cycle. Then I will talk about what I see as the short-term diagnosis and solution before discussing the long-term solution to this problem. There'll be a lot of common themes with what Darrell Duffie and Randal Quarles have already said. But the way I think about these things is a bit different, and that will be reflected in my solutions to the problem. So here it goes.

Figure 7.1 illustrates the failures in the US banking system over the past two decades. One can see the large failures in the 2007 financial crisis, such as Washington Mutual. More recently, when the turbulence in the banking sector started in mid-March of 2023 with SVB, the rhetoric was that SVB's problems were unique because it had very high uninsured leverage relative to other banks.

My frequent collaborators (Erica Jiang, Gregor Matvos, and Tomasz Piskorski) and I had been studying the structure of bank liabilities—in particular, the uninsured leverage of banks—for some time and naturally found this issue interesting.¹ Uninsured leverage

Bank failures, 2001–23

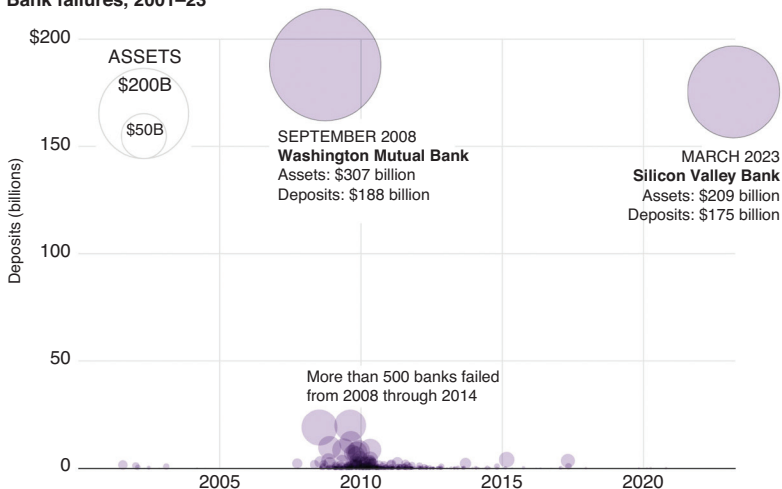


FIGURE 7.1. Bank Failures in the United States over the Last Two Decades.

Note: Figures for assets and deposits are estimates.

Source: Federal Deposit Insurance Corporation. Reprinted with permission of the *Wall Street Journal*, copyright © 2023 Dow Jones & Company, Inc. All Rights Reserved Worldwide. License number 5658940219616.

is interesting, because uninsured depositors are, well, “uninsured.” This makes this form of debt more sensitive to information than insured debt. In other words, this type of debt is more “run prone.” And if a bank has a lot of uninsured leverage, negative shocks to the asset side could lead to fragility. So when the run at SVB occurred over that weekend last March, and SVB collapsed, we decided to stress test the whole US banking system of 4,800 banks. In other words, we asked, what did the increase in interest rates over the monetary tightening from Q1 2022 to Q1 2023 do to the market value of the banks’ assets, and what did it mean for the banks’ solvency, given the structure of their liabilities? (Jiang et al. 2023a)

So to give you a sense, we are talking about SVB on this panel, but looking beyond that one bank’s situation. Here is the entire US banking system: \$24 trillion of assets held in securities, loans, and so on (see figure 7.2).

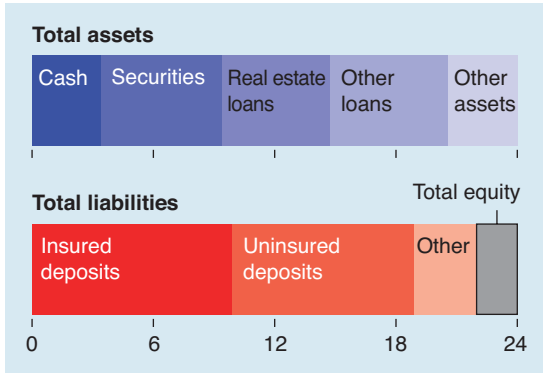


FIGURE 7.2. Between the Balance Sheets.
The aggregate balance sheet of US banks as of Q1 2022 (in trillions).
Source: Jiang et al. (2023a).

But what's interesting is that when you look at \$24 trillion of liabilities, there are \$9 trillion of insured and \$9 trillion of uninsured deposits. A side note: in mid-May 2023, the data suggests that uninsured deposits had decreased to \$7 trillion. This makes sense since, as you can imagine, some uninsured deposits left the banking system during the recent turbulence in the banking sector.

There is also \$2 trillion in equity, which is a very important number in the aggregate. That's the capital in the banking system that we usually talk about. Now, why is this number important to remember? Because we took the assets of the banking system and marked these assets to their market values. Since interest rates went up, the value of fixed-rate-long-dated assets went down. So what did we find? We found that marking to market would lead to the banking system having \$2 trillion of losses. I want to emphasize that this is not just the marking to market of securities. We also marked to market loans since we have details on the maturity structure. At the same time, it is also worth noting we are talking about securities such as Treasuries and the other liquid assets that banks invest in, like residential mortgage-backed securities (RMBS). So this is not the typical, "Hey, there are these long-term illiquid loans that

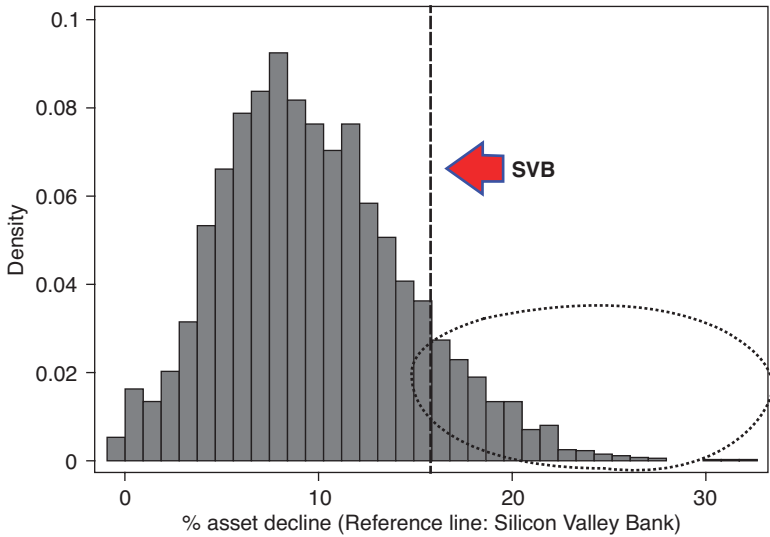
banks have invested in, and banks have a special ability to invest in these illiquid, but positive, NPV loans.” Here we have a collection of liquid and safe securities the banks invested in. Loans of the “typical” type are not really that big a part of a bank’s mark-to-market exercise. But these safe and liquid securities all went down in market value when interest rates rose over the last year. And we ended with \$2 trillion of mark-to-market losses across the banking system.

Recall that the aggregate equity in the banking system is \$2 trillion. The losses, when compared with equity, tell you that there might be a few banks that could be underwater. When you look at the entire distribution, this is how it looks for the 4,800 banks in the system (see figure 7.3).

The average loss here is around 10%, so about \$2 trillion on \$24 trillion, roughly. If you look at the vertical line—that’s basically where SVB is in terms of its mark-to-market losses. If you thought that SVB was an outlier and special just because it has huge mark-to-market losses, there could be another five hundred banks that should have faced a similar kind of run as SVB. But they didn’t.

And we know why. I want to remind everyone that around the time the turbulence in the banking sector started, there was some discussion that maybe these mark-to-market losses would not be realized, because banks do a lot of hedging. But if you look inside the banks and ask how much hedging is going on, the answer is not a lot (see figure 7.4).

One simple way to look at how much hedging is going on is to look at the duration of assets a bank has after it does its hedging. There are two distributions of the duration of assets of banks in figure 7.4. One (orange) depicts the duration of bank assets before the monetary tightening, and the other (black) is the duration of assets during the monetary tightening. And what you see is, on average, you’re talking about a duration of four or five years after hedging. Thus, whatever interest rate hedging the bank is doing, this tells you there is not a lot of hedging going on. If there were a lot of hedging,



| | Total | RMBS | Non-RMBS security | Residential mortgage | Other loans |
|----------|-------|------|-------------------|----------------------|-------------|
| MTM loss | 2.2 | 1.0 | 0.3 | 0.6 | 0.3 |

FIGURE 7.3. Distribution of Unrealized Losses in the Banking System. Based on our analysis (as of the end of Q1 2023), substantial unrealized losses may exist throughout the banking system. Source: Jiang et al. (2023a).

this number would be close to zero in both distributions. So those mark-to-market losses we computed over the monetary tightening, even though they're unrealized, are still with the banks.

Many banks had losses that were larger than SVB's. So why did we see a run in the case of SVB? And what does it tell us about the solvency of other banks? The answer has to do with uninsured leverage. Figure 7.5 depicts how the uninsured leverage in the system looks across banks.

The vertical line again here is SVB. And if you look at SVB now, you can see why its run happened. It had very high uninsured leverage and was, in fact, in the top percentile of banks when looking at the distribution of uninsured leverage.

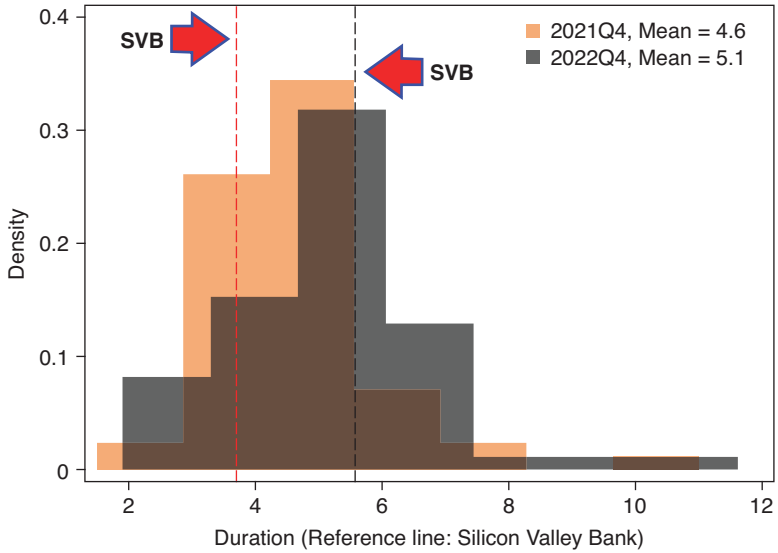


FIGURE 7.4. Not as Much Interest Rate Hedging in the Banking Sector as You'd Think.

The duration of assets for banks that report these in their disclosures.

Source: Jiang et al. (2023b).

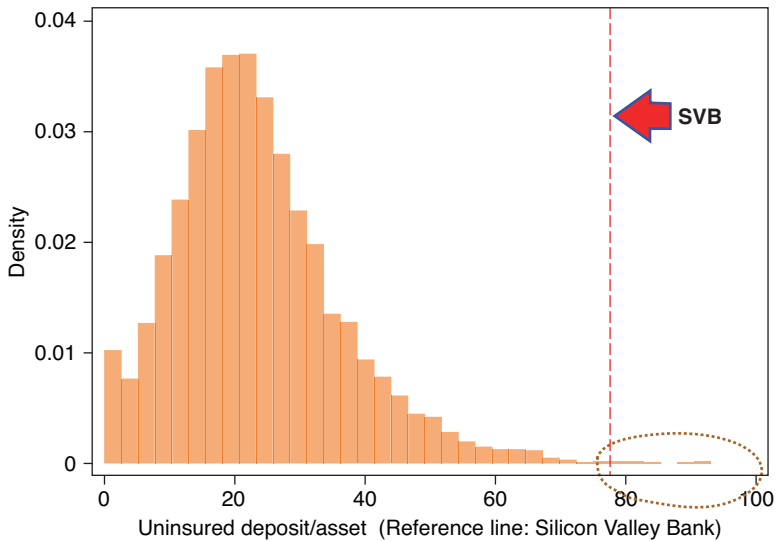


FIGURE 7.5. Distribution of Uninsured Leverage across US Banks.

Based on our analysis, SVB was an outlier in terms of its uninsured leverage.

But there are quite a few other banks with similar uninsured leverage as SVB.

Source: Jiang et al. (2023a).

Now how do we think about uninsured leverage and how it contributes to a possible run on a bank? Is it just that venture capitalists (VCs) are talking to each other, triggering a run, as in the case of SVB? If so, will a policy banning VCs from social media mean everything will be fine in the future? That's where economics comes in and tells us how to think about this.

Uninsured deposits are runnable. They are sensitive to information. But when do such depositors run? Well, uninsured depositors run if enough of them think other uninsured depositors will run. In other words, there could be multiple equilibria depending on the beliefs about how many other uninsured depositors would be running. There could be a "good" equilibrium where given some losses, uninsured depositors do not run because other uninsured depositors would not run. Alternatively, there could be a bad run equilibrium where depositors would have beliefs that enough uninsured depositors would run.

And so, how do we want to take this and figure out how much fragility is in the system? Well, one thing we can do is to take an extreme view and say 100% of uninsured depositors get spooked by the mark-to-market losses of a bank and run. We can ask what would happen to a bank in that scenario. This exercise can give you some sense of who the potentially insolvent banks in the system might be if one looked at what the value of equity might be after uninsured depositors withdraw all their money. In other words, we are looking at "turbulence" on the asset side due to mark-to-market losses versus "flight risk" due to uninsured depositors. Here is what that looks like (see figure 7.6).

Figure 7.6 shows the distribution of banks in the system that would be insolvent. That is, this plots banks whose equity would be underwater. The y-axis plots losses, and the x-axis shows the amount of runnable uninsured leverage the banks have. The size of the bubble tells you how big the bank is. So, the biggest bank has over a trillion dollars of assets. There is SVB there, but it's not an

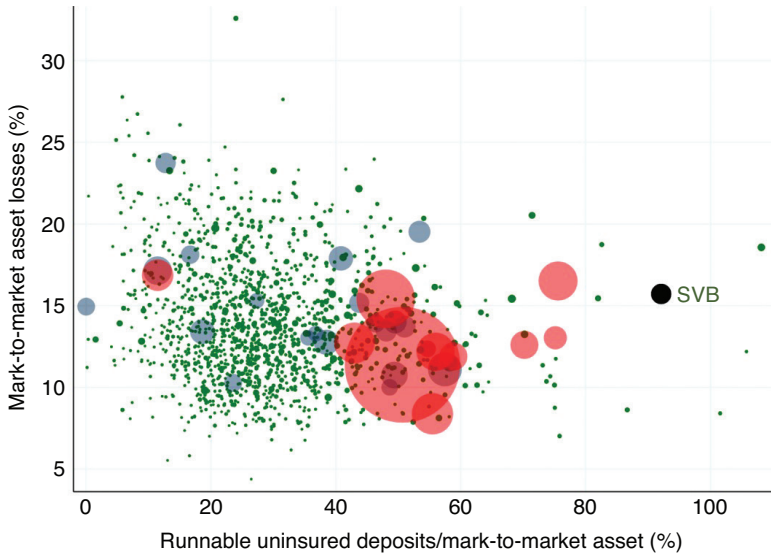


FIGURE 7.6. Uninsured Leverage and Unrealized Losses (“Flight Risk” versus “Turbulence”).

A plot of the full set of “insolvent” banks. A bank is considered insolvent if the mark-to-market value of its assets—after paying all uninsured depositors—is insufficient to repay all insured deposits. On the x-axis is a measure of “flight risk.” On the y-axis is a measure of “turbulence.”

Source: Jiang et al. (2023a).

outlier. There are several other banks of similar or even larger size than SVB in the system that would be insolvent under the extreme view. Put another way, in this extreme scenario, this is basically the whole distribution of all the banks in the system. There are two distributions here; orange is before the tightening, and black is after the tightening (see figure 7.7).

If you look at the equity in the system, the banking system was well capitalized before the monetary tightening (the orange distribution is where the mean and the whole distribution are well above 0%). And then, after the tightening, assuming that all the uninsured depositors run, you see from the other distribution that several banks have equity below 0%. What that means is that the

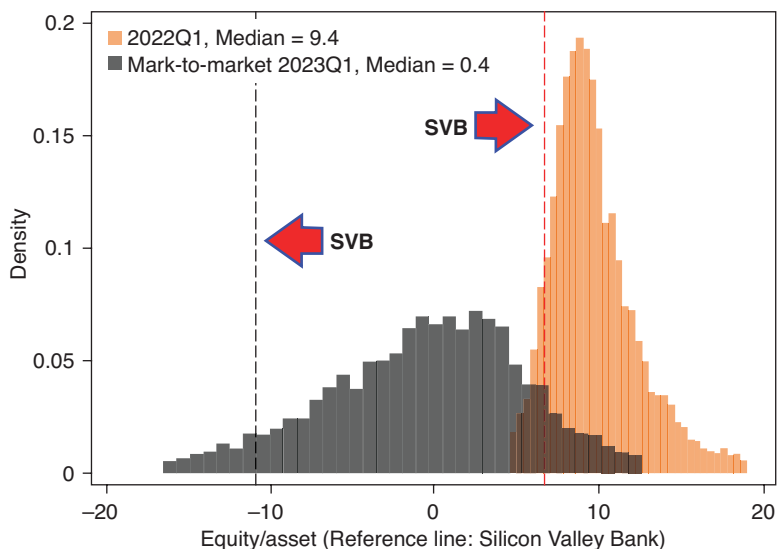


FIGURE 7.7. Distribution of Equity/Assets of US Banks.

Prior to the monetary tightening, the banking system was well capitalized, based on the orange distribution of the chart. The black distribution illustrates that after the tightening, the equity at several banks was underwater.

Source: Jiang et al. (2023a).

equity of these banks is underwater. So when I showed you those bubble plots before and said a lot of banks are insolvent, this is the distribution that supports that statement since it shows several banks could, in fact, potentially be insolvent.

How should we then think about this? Is this only showing up because we took the extreme view of all uninsured depositors running in a bank? Is this the right way to think about it? Kind of, because it depends on what type of equilibrium we have in mind. Note that this setting is not the classic “Diamond-Dybvig” model of bank runs. Those runs are liquidity runs; they are not solvency runs. A solvency run, which applies to our situation, is different. It happens when the interest rate rises sufficiently such that there is a significant unrealized loss to assets. That’s the first condition that has to be true. Enough uninsured depositors have to think

that other uninsured depositors will run because of the losses they see. Recall that the unrealized mark-to-market losses due to an increase in interest rates are based on assets (such as Treasuries) that are liquid. When these two conditions hold, we could end up in a “bad” equilibrium, as we saw in the case of SVB and First Republic (and other regional banks). When this occurs, the bank then has to go to the market and take those securities and loans and sell them to satisfy these uninsured depositors. Those unrealized mark-to-market losses become realized. This prompts more depositors to withdraw, and we get a self-fulfilling run.

Are there conditions that make such runs more of a possibility? Well, it happens if banks have lower equity capital. Such banks have a limited ability to absorb the losses (see figure 7.8).

If there were enough equity, that would alleviate the concerns of uninsured depositors that the bank might not have enough of a buffer to absorb its losses. The fundamental thing here, therefore, is that a bank can sustain the stress if it has enough equity.

But leaving that aside, what will also be true is that a bank will face more of a solvency run if it has a higher proportion of uninsured depositors. The reason is, as discussed before, a solvency run will depend on how many other uninsured depositors will be running. We considered an extreme version earlier where all uninsured depositors ran, but we can really consider different scenarios. So that’s what figure 7.8 does. On the x-axis in both charts are different scenarios regarding the proportion of uninsured depositors running, ranging from zero to 100%. The chart on the top plots the number of insolvent banks on the y-axis (i.e., banks with underwater equity under the scenario on the x-axis on uninsured depositors). The chart on the bottom reflects the assets (in trillions) at risk of such a run for different scenarios. I want to highlight the two numbers in red. Assuming half the uninsured depositors run, we have about two hundred banks potentially underwater, and \$300 billion of assets with these banks are at risk.

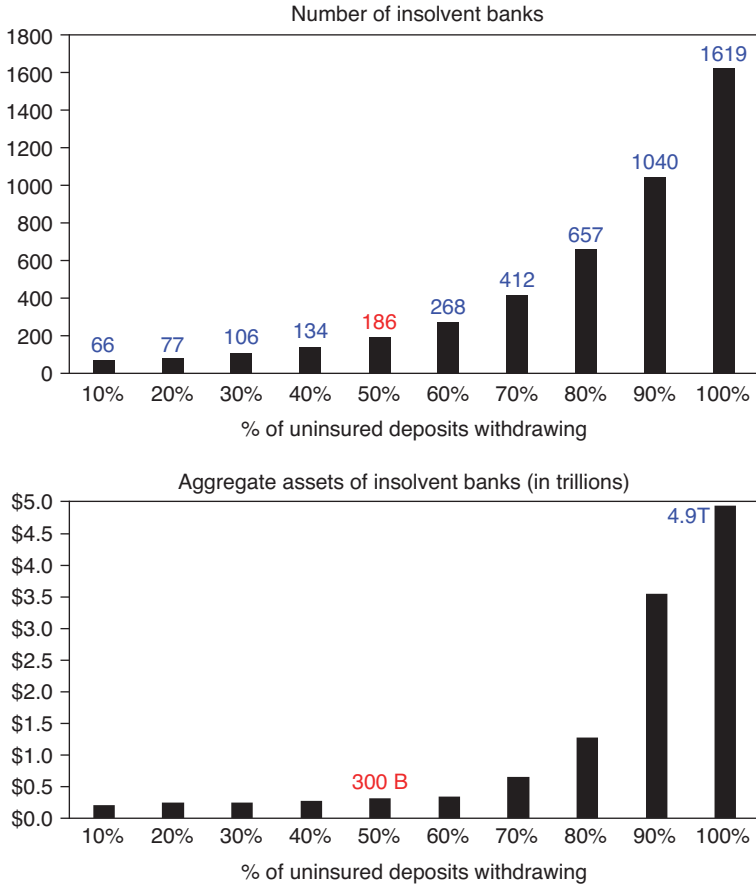


FIGURE 7.8. Where Are Self-Fulfilling Solvency Runs Possible?

Based on our analysis and model, when interest rates rise, solvency runs are more likely in banks where equity capital is low and where a substantial proportion of uninsured depositors provide funding to the bank.

Source: Jiang et al. (2023a).

But of course, if we take a more stressful scenario, the equilibrium is different, and you can pretty quickly get higher numbers that are worse for the banking system.

Since this session is about SVB and beyond, what about the role of regulators in all this? Well, regulators, as has been mentioned, have diagnosed this problem as a liquidity problem. The “Barr

Memo” on the situation at SVB mentions the word “liquidity” in relationship to SVB a staggering 320 times.² “Solvency” is only mentioned once, which almost suggests it may have been a typo. More seriously, as I have already stated, this is not the traditional illiquidity of assets issue that prompts a lender-of-last-resort intervention to prevent a “bad” bank run. We are talking about the most liquid assets banks hold that have fallen in value. Yet, we saw the central bank intervene in dramatic ways. SVB suddenly became systemic overnight.

Yes, there was bad management, and the board of directors is the usual scapegoat. But I actually think something else is going on, which has not been talked about much. That is the political economy of regulatory enforcement. As you might know, regulation and its enforcement in the banking sector are pretty complex. If you look at all the midsized banks—and actually not just midsized, pretty large banks now—like SVB and First Republic Bank, they are regulated by multiple regulators—state and federal—with overlapping jurisdictions. Why is the fact that multiple regulators oversee these banks important?

Because political economy comes into enforcement when you have state and federal regulators. In a study ten years ago, we pointed out that there is a huge amount of inconsistency in the enforcement of straightforward rules (see figure 7.9). What does that mean? For much of the banking system in the US, federal and state regulators regulate a given bank in rotation. One finds that these regulators never implement the same rule for a given bank in the same way. The state regulators tend to be too soft on the bank. Why? Because it’s “too big to fail” in their local economy.

The white vertical zone in figure 7.9 indicates when state regulators are in charge of enforcement at a bank, and the gray zone is when federal regulators are in charge of the same bank in rotation. This is how SVB and First Republic Bank were regulated. What is plotted is the CAMELS rating, which is everything a bank lives

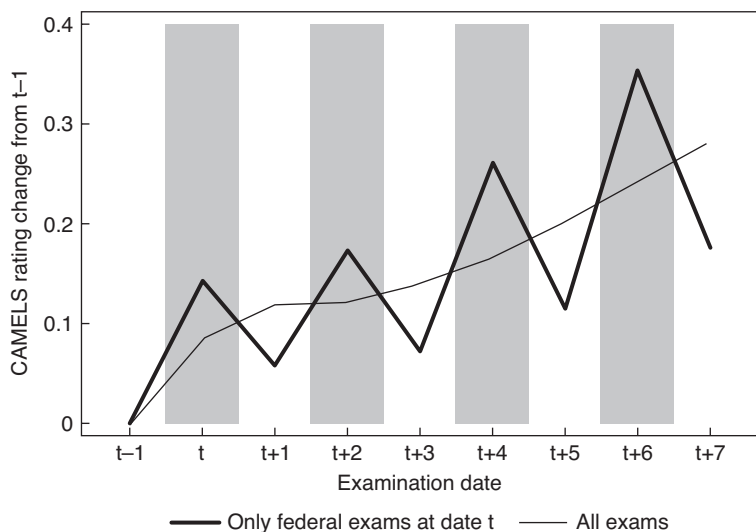


FIGURE 7.9. What about Regulatory Enforcement?

Based on our analysis, banks such as SVB (and First Republic), which are regulated under dual regulators in rotation, face potentially inconsistent enforcement of regulation.

Source: Agarwal et al. (2014).

and dies for.³ A good rating—a smaller number—implies good things for the banks, such as approvals to acquire. And a bad rating—a higher number—means bad things are happening for the bank since it is deemed unsafe, such as higher FDIC deposit insurance premiums. And what does this tell you? Whenever the federal regulator comes in, they raise the CAMELS rating. When the states come in, they undo it and make it easier for the bank. Why? Because, for example, a bank like SVB is pretty important to a state regulator, given its importance to the local economy. It is possible that might have prompted the state regulators to look away from the brewing problems at both SVB and First Republic Bank.

And that gets me to the last couple of things I want to mention, which are beyond SVB. So we've already seen SVB is not an outlier. The question is, is this really a "tech phenomenon" occurring

only to banks in California and maybe on the East Coast? (see figure 7.9). The answer is not really. If you look at the chart I showed you about insolvent banks and ask what deposits in the US across regions are at risk, this is how the map looks (see figure 7.10).

The map demonstrates that the problems are not confined to banks in Silicon Valley. The market has not been blind to all this. You can see how the market reaction has been to the regional banks across the country. The equity value of these banks is pretty depressed. And it's telling you loud and clear that a bunch of banks in the system are potentially insolvent. We can try giving these banks a lifeline with liquidity from the government as we did with First Republic Bank. But these banks are, in fact, insolvent.

So what next? The Fed has extended the deposit insurance to uninsured deposits. We have the Bank Term Funding Program established by the Fed that buys at par, even though the assets are underwater. All of this has been useful in the short run to alleviate short-term risks. But because there are many potentially insolvent banks, we need to worry about scenarios similar to what happened in the early 1980s during the savings and loan crisis. That crisis resulted in similar short-term help from the government and incentivized many insolvent institutions to gamble for resurrection.

Put simply, what we saw during the savings and loan crisis was that a bunch of insolvent banks took inordinate and imprudent risks when their liability side was protected by the government—not too dissimilar to what we are seeing now.

So what is the right way to ensure we do not fall into the same trap? In the short run, we've got to figure out a "market test" to separate insolvent banks from solvent but illiquid banks. The idea that we are going to just keep pumping in taxpayer money to save all the banks, many of which are insolvent, is inefficient. A few of my colleagues at Stanford University (Peter DeMarzo and Arvind Krishnamurthy), as well as my collaborators on the referenced study (Erica Jiang from the University of Southern California,

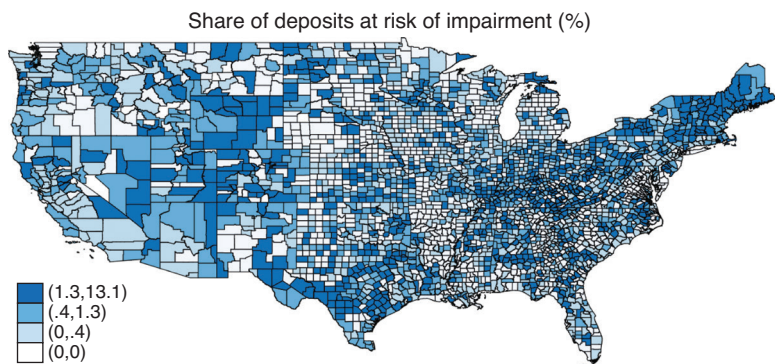


FIGURE 7.10. Beyond SVB? A Look at the Geographic Distribution of “Deposits at Risk.”

Based on the analysis, the extent to which deposits in banks are at risk (darker colors convey more bank deposits are at risk).

Source: Jiang et al. (2023a).

Gregor Matvos from Kellogg School of Management, and Tomasz Piskorski from Columbia University), wrote a proposal following the analysis that we had done. The idea is that the banks should promptly raise equity or other private or public capital. This will reduce fragility and provide a real market test to identify truly solvent but illiquid banks from insolvent ones. This is something that Anat Admati, who is moderating the panel, wrote a long time ago in a proposal with other collaborators as well.

If banks can't raise equity right now for various reasons, at least the regulators need to come out and do a stress test so that the market can get a sense of which banks are solvent and which are insolvent. This will also help regulators craft a plan to consolidate or merge insolvent banks.

And what about the long run? The rhetoric coming from regulators includes the message that careful regulations are needed to address complex, unanticipated, and unprecedented risks. Last time I checked, interest rate risk is in the first chapter of any finance textbook. And if four collaborators working two days over

a weekend can do a stress test of the banking system as we did, it is unclear what the real issue is. I think the ultimate answer is, rather than trying to tweak this into an amazing physics laboratory-based experiment, we need to just realize there are limits to regulation and what regulators can do. Both because these regulators have their biases and blind spots as well as deal with a political economy of enforcement. And I think the right answer is right in front of our eyes. Here is an example from a \$10 trillion mortgage market in the US (see figure 7.11).

What I have plotted is how much mortgage lending financial institutions are doing. That's the x-axis. And the y-axis is how much equity they have in their capital structure. The orange line

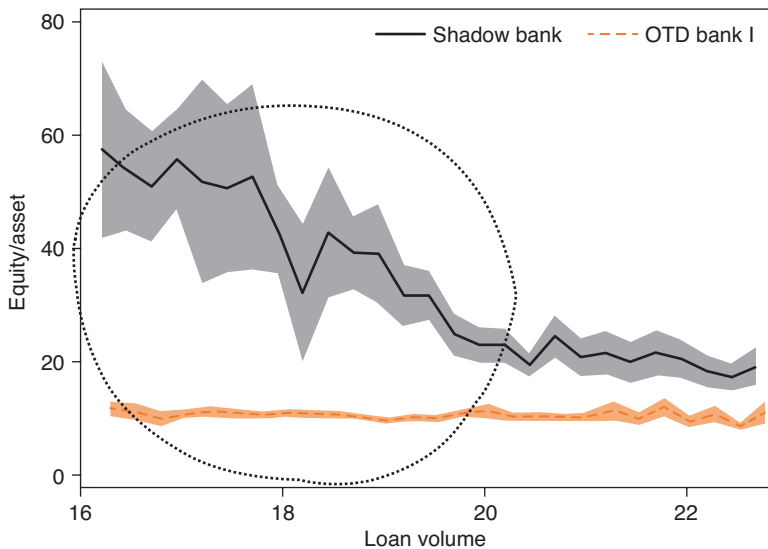


FIGURE 7.11. What about Regulating the Bank in the Long Run?

More equity capital is the least costly way to ensure the financial system remains stable while providing adequate intermediation services. The black line plots the equity-to-asset ratio of shadow lenders (i.e., nondepository institutions) providing mortgages to US households. The orange line plots the equity-to-capital ratio of traditional banks providing the same service. The lending volume of various institutions is on the x-axis, and the y-axis plots the equity-to-assets ratio.

Source: Jiang et al. (2020).

is for traditional deposit-taking banks. Remember, banks have a huge amount of government-backed insured liability structure. And the dark black line represents the shadow banks or nonbanks, which are largely funded by uninsured debt. When an institution is funded by so much uninsured debt, what does the market do? Well, these institutions end up taking a lot of equity. Why? Because these institutions and the market understand there's a lot of runnable risk in these institutions. Thus, these institutions provide the same amount of services that banks provide. But they have significantly more equity capital than traditional banks to account for the higher runnable risk of uninsured debt that they have. So I think in the long run, the answer is not liquidity or more liquidity requirements. Nor is the answer additional regulators or regulations. The answer is asking banks to have a significant amount of equity capital. And that's where I'll end it.

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- . 2023a. "Monetary Tightening and US Bank Fragility in 2023: Market-to-Market Losses and Uninsured Depositor Runs?" National Bureau of Economic Research Working Paper 31048 (April).
- . 2023b. "Limited Hedging and Gambling for Resurrection by US Banks during the 2022 Monetary Tightening?" Social Science Working Paper 4410201 (April 3).

Notes

1. Erica Jiang is a professor of finance and business economics at the University of Southern California Marshall School of Business. Gregor

Matvos is a Howard Berolzheimer Chair in Finance at the Kellogg School of Management, Northwestern University. Tomasz Piskorski is the Edward S. Gordon Professor of Real Estate in the Finance Division at Columbia Business School.

2. On April 28, 2023, the Federal Reserve Board released its “Review of the Federal Reserve’s Supervision and Regulation of Silicon Valley Bank” report. Vice Chair for Supervision Michael S. Barr led the review.
3. The CAMELS rating system is used to assess a bank’s overall condition. It is an acronym for capital adequacy, assets, management capability, earnings, liquidity, and sensitivity.

GENERAL DISCUSSION

ANAT ADMATI (INTRODUCTION): Last evening, John Taylor quoted Secretary [George P.] Shultz, saying that governments should set the rules and then let the markets work. So I'm going to say the obvious. Markets can't operate without rules, just like sporting events, driving on the roads, or building buildings—they all need rules. And rules constrain somebody. I should also note the obvious, and I am sure Secretary Shultz knew, that enforcement of rules is part of the issue, and that the rules are useless without effective enforcement. So when we talk about rules and how well they work, we have to talk about how they're designed and how they're enforced. That is the topic of this session.

There are many governments in the world again, using the word “government” here, as opposed to the word “rule.” When a government sets a rule, like a US federal government, oftentimes it's done through the legislature and then it is called a law, an act, or a statute. Then you have the dreaded word “regulations,” which is also a government rule, except it's often an agency of the government that writes the details and then might engage in enforcement. So the difference between laws, acts, statutes, and regulations is only technical. All are rules, and all need to be enforced by somebody. That's just the basics.

In the case of banking, enforcers might include the Department of Justice, if rule violations involve crimes, and all sorts of regulatory agencies involved in enforcement. Some of them engage in supervision and examinations in the process. Enforcement involves actions by the enforcer if a rule is broken to create consequences and deter future rule violations. Often the devil is in

the details. Therefore, a lot of lawyers are always involved when rules are written and enforced, and there are the courts hovering over this process.

This policy conference is about central banks, and a lot of what we talk about here is monetary economics. It's very rare that we have a discussion on regulations. But the rules actually matter to central banks, and central banks actually play a big role. First of all, central banks need the private-sector banks in order to transmit their policies. They need a stable banking system. And secondly, central banks are often involved in the regulation, in writing the rules, in enforcing the rules, and in supervision. In the US, there are many federal and state regulators.

In addition to this, and importantly, central banks are serving as lenders of last resort. So they actually play a role in private markets by buying assets and lending to private-sector institutions. And that role has expanded in the last fifteen years, certainly during the financial crisis, and certainly during COVID—we already heard some of that—and again in the recent situation that evolved or came into the open in March, which is why we're here today discussing this topic.

Current events set the stage for this panel. We had three banks sizable enough to really deserve a lot of news coverage fail in the US—all over \$100 billion, two of them over \$200 billion, and two of them in this area. It was Silicon Valley Bank [SVB]. Then it was Signature Bank on the same weekend in mid-March. And it was then more recently First Republic Bank, right here. Meanwhile, in Switzerland, Credit Suisse, one of the thirty—now twenty-nine—global systemically important financial institutions [SIFIs], was sort of forced into marriage with another SIFI, UBS, creating a monster SIFI in Switzerland, twice the country's GDP. What happened there is another issue related to regulation. Because one of our panelists was the chair of the Financial Stability Board, we note that banking regulations

involve other international bodies, like the Basel Committee on Banking Supervision, etc. It's important to talk about the global banks as well as the local banks in every jurisdiction. In the US on this issue, one of our biggest SIFIs, JPMorgan Chase, which already violated the law about having more than 10% of deposits in the US (together with Bank of America, by the way), bought First Republic Bank recently from the FDIC [Federal Deposit Insurance Corporation], serving as the bank's receiver and entering a loss-sharing agreement.

This is the background. I will just mention three points of fact that I hope come out of the discussion by our panelists or come out in the questions afterward. First, the supervision and enforcement of the rules. The banks that failed in the US were supervised by different agencies. SVB was supervised by the Federal Reserve as a bank holding company. Signature and First Republic were supervised by the FDIC, and there were state regulators, but they weren't that involved. All these banks received high CAMEL ratings, namely the ratings that the supervisors gave, including about this thing called "capital," a piece of the regulation that I know well about. So they were considered "well capitalized," as was also claimed by FINMA [the Swiss Financial Market Supervisory Authority] about Credit Suisse right before it failed. The question arises: How can we have well-capitalized institutions fail within a very short amount of time, and should we rethink the definition of "well capitalized" so that it can be more reassuring? In particular, and relevant to these three US banks, or at least two of the three US banks, the risk that they took that ended up leading to their demise was interest rate risk, which is of course relevant for monetary economics and this monetary policy conference. The capital rules, however, tend to ignore interest rate risk. Risk weights only take into account credit risk, not interest rate risk and accounting measures may also obscure them.

Regulators also run stress tests, which raises another question about how much they took reasonable scenarios into account, and how much they used accounting rules, which do not recognize losses on held-to-maturity assets. We're going to hear more about this later.

I just raised the question of what it means to be well capitalized, and how a well-capitalized bank can default or go into insolvency very shortly after being well capitalized, and whether it would be useful to have the definition of “well capitalized” in the rules such that violating it does not mean you're basically at insolvency, that there is time to intervene before insolvency, for prompt corrective action, which is a principle of the regulation. And whether we should also have market-based stress tests, the one I call “raise equity.” Those who fail to raise equity are clearly insolvent.

In 2014, Mark Carney, who chaired the Financial Stability Board—before Mr. [Randal] Quarles took the job—declared that the “too big to fail” problem is solved through the use of total loss-absorbing debt, so-called TLAC [total loss-absorbing capacity]. Supposedly, TLAC investors will absorb losses in the resolution of nonviable banks without disruption or need for bailouts. Yet in Switzerland—and the Swiss were among those cheering for TLACs—the authorities chose not to go to resolution and not to impose losses on 50 billion Swiss francs of TLAC securities. They did wipe out some 17 billion in “alternative tier one capital.” We have to wonder, therefore, what happened to those promises that the TLAC will prevent bailouts. Clearly, Swiss regulators were afraid to send Credit Suisse to resolution and impose losses on TLAC holders.

On this topic, one issue has to do with cross-border resolution. One of the reasons the Swiss authorities did not trigger is that, as the Financial Stability Board report *Key Attributes of Effective Resolution Regimes* notes, the huge wish list that would

make cross-border resolution work is simply not going to happen. It involves collaborations across countries and trusting other countries for “single points of entry” resolution to allocate losses of global banks that are systemic in multiple jurisdictions, like Credit Suisse was and JPMorgan definitely is systemically important in multiple jurisdictions. We have to confront the question of whether it is okay in a market economy to have institutions that cannot actually fail. I will now turn to our panelists, Darrell Duffie first, then Randal Quarles, and then Amit Seru.

Thank you very much.

* * *

ADMATI: Fortunately, I don’t have to say as much, because Amit Seru articulated some of what I would say. It was not just a liquidity problem. I agree with other panelists that because we have central banks, we don’t necessarily need “self-funded liquidity,” but I want to add that we *do* want and we need *self-funded solvency*. And that’s what it’s about, really.

Credit Suisse also had a run. The cause of its insolvency wasn’t interest rate risk, but still the reason for the run was concerns about insolvency. Credit Suisse has been on the edge for three years, managed to have bad business, bad management, and just not a viable business model in parts of its operation. It finally caught up with them and they became nonviable. That’s why they needed all the support to make the takeover by UBS happen. We did not hear anything about being too big to fail from the panel. So I can take the liberty of asking, especially Mr. Quarles, what he thinks about Credit Suisse.

RANDAL QUARLES: So, Credit Suisse has triggered a lot of discussion about resolution structures and resolution planning, with the theme being, “So, was all of that work on resolution planning a complete waste?” It was very hard, very expensive work,

and it seems to have been completely ignored. But after talking with a number of the regulators who were involved in the Credit Suisse-UBS merger, I take it as an example of what I, at least, always expected would be the end result of the resolution structuring and resolution planning effort, which would be to prove [General] Dwight Eisenhower's maxim as he prepared for D-Day: plans are useless, but planning is essential. And that was the theme that I've heard, at least from a number of the folks who were involved in that process, which was: we had a lot of plans as to how Credit Suisse could be resolved. And having them was, in fact, very useful when it came time to figure out exactly what we were going to do. But it should never have been expected that we were going to take one of those plans off the shelf and implement it—whether it was bail-in or the TLAC, or any other plan—exactly as expected. We had thought through a number of the dynamics in different situations, and it was very helpful to have done that. So, you know, I probably would have resolved it in a different way. But I don't think it demonstrates that if you're going to have something like Credit Suisse-UBS, that's an indication that the official sector has thrown all of that resolution planning work in the trash. It's exactly what we should have expected to be the result of that effort.

ADMATI: I'm going to connect the two cases here by just asking the following, because Amit Seru was talking about equity and I talk about equity. What is it that makes TLACs debt better than equity for the purpose of absorbing losses? When you need to trigger it, when you need to go into resolution, couldn't you avoid the entire trouble of triggering resolution if, instead, the bank had issued equity *instead* of TLAC, which is debt to absorb losses? This is the kind of question I've been asking for about fifteen years and have never gotten an answer to, so I'm trying again to ask this question, asked from society's perspective.

QUARLES: Well, if you're directing that to me, I've never been the world's biggest fan of TLAC. So maybe you should direct that to someone else on the panel.

ADMATI: Okay.

DARRELL DUFFIE: I'm with Randy on this issue.

ADMATI: Okay. Good. I hope you agree that equity dominates debt for loss absorption.

DUFFIE: I want to repeat what I said in my opening remarks. This was not a liquidity crisis. It was a solvency crisis.

ADMATI: But then your balance sheet didn't have equity, and you only talked about liquidity. We can talk about trapped liquidity, but capital is not "trapped." The issue is the funding mix. If you have sufficient loss absorption through equity, then you can take risks. That's how Silicon Valley operates in general—not the Silicon Valley Bank, but the place, Silicon Valley. A lot of equity in the tech sector, and if they fail, it's not a big problem for society.

I think Mike Boskin wants to ask a question here.

MICHAEL BOSKIN: I have two questions, but I want to make an observation, because it was mentioned: You spoke about the political economy, the regulation, and the knowledge of the regulators. Back when we were cleaning up the savings and loans and banks, I asked the four regulatory agencies, what was the experience level, the distribution of experience levels, of the examiners, and a very large fraction had never been through a large, deep recession. Now, nobody under sixty has been through a big increase in inflation in their working life. So that's a wrinkle in this. It probably has something to do with the delay and inertia.

The second point I wanted to make was, back then, banks were extending 70–75% of credit. And nonbanks [involved in] the credit markets may have [accounted for] a quarter or a little more. Now that's flipped. And so my first question is, how does that affect your thinking, not just about prudent regulation of

an individual bank but how does it impact prudent regulation of the system embedded in this larger credit system? And second is if we're thinking about capital for the overall banking system rather than for each individual bank and its potential—Apple's basically becoming a bank. And back then we were trying to change things, we were trying to get the Fed to go along with letting Walmart become a bank, for example, to get more heavily capitalized institutions into banking. And [the Fed] resisted that. And by the way, we also tried to push the idea of unifying the regulators, something outside the Fed. And the Fed deeply resisted us (getting back to the last panel), because they said we needed the information from our regulation and supervision to conduct monetary policy. So just a couple of observations, two questions about how's the big shift in where credit is coming from in the economy, and about other sources of capital rather than the current individual banks raising capital.

ADMATI: Anybody want to take you there? Let's take another one from [Michael] Bordo.

MICHAEL BORDO: My question is for Darrell Duffie. An anecdote from history that might be relevant was an article by [economist] Phillip Cagan presented at a [1963] conference on the hundredth anniversary of the National Banking System. One of his explanations for why the National Banking System did not prevent banking panics was the high reserve requirements placed on the different categories of banks, to solve the problems of the preceding free-banking era when there were few reserve requirements. What happened was that the panics were worse during the national banking era, and the reason Cagan gave was that it was because the banks believed that they could not dip into their required reserves.

ADMATI: One more behind him, and then we'll answer. I think we don't have time for a lot, but we can continue.

WILLIAM NELSON: Thank you. I'm Bill Nelson from BPI. So in the mid-1950s, during one of the Fed swings away from the discount window, when they were trying to actively encourage institutions not to use the discount window, they created and used a combined capital and liquidity metric, in which basically assets were lined up by liquidity, and liabilities were lined up by runnability. And your capital was evaluated as some measure at sort of fire-sale prices to the extent that it was needed. I don't know if that's exactly the right approach needed now, but I'm wondering if you all see this as attractive—some kind of combined liquidity capital test?

ADMATI: Okay, let's go quickly here. And then there are a few other questions I want to get to maybe Jeffrey Lacker? Or do you want to answer?

QUARLES: Let me take the bank-nonbank question. Obviously, nonbanks have been a huge factor in many of the recent stresses, certainly during both COVID and the Great Financial Crisis. The Fed has had to develop a number of ad hoc mechanisms to provide liquidity to the whole financial system outside of the banking system, given how large the nonbank sector is. Clearly, if you were designing the Federal Reserve today instead of in 1913, it would not occur to you to say that its authorities and focus should be solely on the banking system. Instead, the Fed would be the central flywheel of an integrated financial system. And we should regularize that. We should acknowledge that nonbanks are an important, integral, and totally appropriate feature of the financial system. The Federal Reserve has a totally appropriate mandate to provide liquidity for the financial system, and connected with that it should have a totally appropriate regulatory and supervisory mandate over that nonbank system as well. And we should just absolutely rationalize that, because we are effectively trying to impose it in each period of stress on the fly, ad hoc, with limited and unclear authority, and having

really not thought through the full implications of trying to do that in an integrated way.

ADMATI: Darrell?

DUFFIE: I do think there's an issue about whether the central bank should also be the banking supervisor. In Canada, the Bank of Canada does not regulate banks. That's done by the Office of the Superintendent of Financial Institutions. The United Kingdom has gone back and forth on who does bank supervision. That responsibility is definitely up for grabs. When Axel Weber, former head of the Bundesbank, was asked, "What about doing bank supervision?" he replied, in effect, "No, we don't want to do that, because we don't want that conflict of interest. We want to focus on monetary policy."

For the United States, I think it deserves a lot of study before one just goes ahead and proposes a separation of bank supervision and the central bank, but it should be an issue that is up for discussion in terms of costs and benefits.

Michael [Bordo], on your question about the national banking era, absolutely, yes. I referred in my prepared remarks to Charles Goodhart's last-taxi analogy, regarding the cost of trapped high-quality liquid assets [see chapter 5]. Gary Gorton has a related paper on the national banking era and the financial instability caused by trapped liquidity at that time. Gorton has brought that forward into modern liquidity regulations and explained that this is not a good idea. As you can tell from my remarks, I'm all in favor of having a central bank serve its intended role as the lender of last resort, so as to provide financial stability. Notwithstanding the very good points that Amit and Anat have made about—

ADMATI: —insolvent banks.

DUFFIE: The importance of starting with capital is that the issues of liquidity for solvent banks are important. The Fed is not legally permitted to lend to insolvent banks.

ADMATI: But it is.

DUFFIE: And on this last idea of combining liquidity and capital regulations that Bill Nelson raised, I definitely believe that banks should be given an incentive to raise their capital by being given a trade-off between required liquidity and required capital so that we end up with the situation that Amit described, in which bank shareholder capital at risk does not end up putting us into a—I think you called it—physics laboratory in which we’re trying to titrate all of these complicated liquidity regulations. Just make it simple. Provide an incentive for banks to raise enough equity capital that these liquidity considerations drop into the background.

ADMATI: Or maybe cancel liquidity regulation altogether.

AMIT SERU: Let me just say one thing related to nonbanks. Michael, I think your point is very relevant, because nonbanks have a large market share now across many sectors. At the same time, we have 4,800 banks. And I think that there is a lot of political economy that drives how big nonbanks can become, in what sectors, and in what parts of the country. The political economy that drives why we have so many banks in every state and in the country is also what explains why nonbanks aren’t an even larger part of the economy—despite banks having a very clunky business model. That’s what I take from all of what I am hearing.

JAMES BULLARD: Jim Bullard, St. Louis Fed. I would like to make two points. The first is about the insolvency issue. This is based too much on mark-to-market accounting. Sure, if you had that, you’d have a different system. But this was all set up to not do mark-to-market accounting. There was a good reason for that. Interest rates can fluctuate for a variety of reasons. You don’t want to reevaluate the capital in all these institutions and have a crisis on your hands whenever interest rates increase. So there’s a good reason to say that maybe it is set up wisely.

My second point is about the distinction between insured and uninsured deposits. The uninsured deposits should be managed by somebody. There should be private insurance for that or some other arrangements. If you talk to bankers, there do appear to be other arrangements behind those so-called uninsured deposits. So they aren't as runnable as they appear. That's why SVB probably was a quirky institution. These other banks that have deposits that look like they're uninsured are really not in the same situation. I think the issue is more subtle than it's being portrayed by the panel here.

ADMATI: Okay, we were a little bit over time. Maybe one other question and then final, quick remarks.

HARALD UHLIG: Harald Uhlig from the University of Chicago. The time inconsistency of regulation really concerns me here. We thought there could be uninsured deposits, and now we have learned that they're all insured. We thought we should only lend to illiquid but solvent institutions. That is the Bagehot principle, which the Fed is supposed to abide by. But now we are also bailing out the insolvent banks. The government was supposed to intervene beyond that only for systemically important banks. But in April, the US Treasury Department, Federal Reserve, and Federal Deposit Insurance Corporation announced a systemic risk exception for Signature Bank, which is rather small. So it seems to me that there is always a taxpayer put at the end. When we design regulation, we have to think really, really hard about what regulators do at the end when the house is on fire, and that their promise not to do something beforehand is likely to be broken when the crisis is there.

ADMATI: Okay, final comment. I would just say to Amit, with regard to inconsistent regulators, that all the federal regulators gave high ratings to these banks, all of them, so that makes you pause.

QUARLES: So I'll take up Jim's challenge. I do think that we should recognize a difference between an institution that has assets that

will in fact, cover its liabilities if they can be held to maturity (which is why they put them in a hold-to-maturity account), compared to an institution that has assets with significant credit losses. In thinking about the provision of liquidity, the central bank should consider that institution differently than an institution that has a huge credit loss in its loan portfolio that is much more difficult to resolve. The Fed did try to address that in the terms of the BTFP [Bank Term Funding Program] by lending against the hold-to-maturity securities at par rather than at a discount. That is irregular in the Fed religion and in traditional central banking practice. But, I think it is reasonable to think about how to regularize and institutionalize that approach for securities with no credit risk that will only recognize a loss if they must be sold in a liquidity squeeze.

ADMATI: By the way, when interest rates go up, depositors also want higher interest rates. So the assumption that the debt is going to stay where it is when it is the short-term debt is also questionable, I would say.

DUFFIE: On mark-to-market accounting, it's difficult to do with regulatory capital accounting, but we do also have stress tests that can emulate the effect of mark-to-market accounting for purposes of ensuring adequate capital. And, agreeing with Amit, it's kind of weird that an interest rate shift of 400 to 500 basis points, which the Fed itself was implementing, had important implications for bank solvency that deserved greater attention. Whether you mark the assets to market or not, a stress test for that sort of shift in rates was an obvious thing for the Fed to have done before the Fed got well into its interest rate rise.

SERU: So just one last thing, which is related to the comment that Jim made. But before I do that, I note that I fully agree with what Harald [Uhlig] was saying—inconsistency in regulation driven by political economy is the core issue here. Back to Jim's point, when the accountants pushed for hold-to-maturity accounting

for banks the way they did after the Global Financial Crisis in 2007, there was some discussion about looking at the structure of liabilities and whether the banks are solvent when allowing banks to pick this sort of accounting. The whole idea that a bank is allowed to pick some assets that can be “held to maturity” makes sense when the banks are solvent and perhaps facing a temporary illiquidity issue that they might avoid. Moreover, banks that are allowed to pick hold-to-maturity accounting for some assets don’t have significant runnable liabilities like uninsured depositors, since there might be no bank in the long run if there is a run. Somewhere along the way, we did the hold-to-maturity accounting but we completely forgot about allowing this for banks that are solvent and do not have runnable liabilities. This policy definitely needs to be fixed in my view, going forward. To Jim’s second point, I think while SVB was special, it is not that special relative to many other banks, as I showed in my presentation.

ADMATI: Well, we are past time, so thank you all very much for attending.