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Bank Supervisory Goals versus Monetary Policy Implementation

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Summary:

The global financial crisis of 2007–09 revealed substantial weaknesses in large banks' capital adequacy and liquidity. Bank regulators responded with a variety of prudential measures intended to strengthen both. However, these prudential measures resulted in conflicts with the implementation of monetary policy that helped alter the way the Federal Reserve conducts monetary policy. I review three such conflicts: regulation inhibiting interest on excess reserves arbitrage starting in 2008, regulation inhibiting banks' operations in the repo market in 2019, and regulation inhibiting their operations in the Treasury securities market in 2020. The article concludes with a discussion of the issues associated with changing specific banking regulations and some more general suggestions for dealing with these types of conflicts.

Key findings:

1. U.S. banking supervision and regulation imposes costs on bank holdings of reserves, U.S. Treasury securities, and repo on Treasuries.
2. These costs have reduced bank holdings of excess reserves and their market making in Treasury and repo markets.
3. During the last decade, the Federal Reserve has been forced on three separate occasions to adjust the way it conducts monetary policy in part because of the regulatory costs imposed on reserves, Treasuries, and repos.
4. The regulatory policies that have had the greatest impact on the implementation of monetary policy could be revised or significantly changed, albeit doing so comes with some other consequences.

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Key words: banking regulation, capital adequacy, bank liquidity regulation, interest on reserves, Treasury market, repo market

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1. Introduction

Three times in the last decade, bank supervision and regulation has significantly contributed to pressure on the Fed to adjust the way it implements monetary policy. The Fed allowed select money funds to sell reserves back to the Fed via a reverse repurchase facility in 2013, in part because banking policy raised the cost of domestic banks arbitraging differences between market rates and interest on excess reserves (IOER) paid by the Federal Reserve. Second, the Fed was forced to stop shrinking its balance sheet and began adding reserves in September 2019, in part because banking policies give incentives to the largest banks to hold a substantial portion of their liquidity reserves in the form of reserves. Third, the Fed was forced to make large-scale purchases in the Treasury market in March 2020 to mitigate liquidity problems in the Treasury market that arose in part because banking policies discourage banks from acting as market makers.

This paper reviews the recent conflicts between banking regulation and monetary policy implementations. The first subsection reviews both supervisory and regulatory changes that have had a significant effect on banks' activity in money markets. The next subsection reviews how these regulations contributed to market developments that resulted in changes in the way monetary policy is implemented. The third subsection discusses possible revisions to banking regulation to reduce the conflicts.

2. Regulations that impinge on banks' money market activities

Large banks' inadequate capital and liquidity were major contributing factors to the global financial crisis of 2007–09. In response, the Basel Committee on Banking Supervision identified a variety of weaknesses in banking regulation and proposed a variety of reforms that have come to be known as Basel III.[1] These reforms included a variety of measures intended to strengthen capital regulation and impose new quantitative liquidity requirements. The United States has adopted these regulations, often in a form that sets higher standards than the minimums set in Basel III. The United States has also supplemented the quantitative standards set by the regulation with stricter supervision, especially stress testing, that has the effect of increasing both capital and liquidity requirements. Additionally, the United States revised the formula for calculating an individual bank's deposit insurance assessments that results in assessments increasing in direct proportion to a bank's assets.

2.1 Capital regulation

U.S. banks are subject to a variety of minimum capital adequacy regulations. Theoretically the risk-based capital (RBC) ratios have the least distortionary effect on bank portfolio choices. However, RBC ratios use risk weights estimated from historical data, which provides banks opportunities to game both the estimation procedure and to exploit situations where the historical loss experience understates expected future risks. Thus, the United States has complemented the risk-based ratio with a supplementary leverage requirement (SLR), which limits banks' ability to exploit weaknesses in the RBC

[1] The various parts of the Basel Committee's third capital accord are available at https://www.bis.org/bcbs/basel3.htm.

ratio. The intent is that the RBC should ordinarily be the binding ratio but that the SLR would form a backstop to prevent banks from going too far in gaming RBC ratios.

The largest U.S. banks are subject to the same RBC and SLR as other banks, but the minimum requirements for both ratios is higher for the largest banks. The largest banks face an add-on to their RBC based on something called their G-SIB score, which stands for "global systemically important banks." The G-SIB score is intended to measure the extent to which a bank's distress or failure could weaken financial stability. The higher leverage requirement for the largest banks is known as the enhanced SLR (eSLR).

2.1.1 Supplementary leverage ratio

The SLR requires banks to maintain a minimum ratio of capital to total assets plus a measure of off-balance-sheet assets. Assets in this measure are not risk weighted, implying that Treasuries and reserves held at the Federal Reserve carry the same capital requirements as a leveraged loan. The equal weighting is problematic not only because Treasuries and reserves are less risky, but also because these assets carry a much lower expected rate of return. As the SLR approaches becoming the binding capital constraint, it produces a substantial disincentive to holding more reserves, holding more Treasuries, or providing additional liquidity in the repo markets. Along with the SLR, large banks are also subject to the eSLR, which raises the minimum required ratio from the 3 percent required of all banks to a 5 percent minimum required of U.S. G-SIBs.

2.1.2 G-SIB capital surcharge

The base of the RBC requirement is a minimum ratio of capital to risk-weighted assets (or more accurately, risk-weighted exposures). This minimum ratio is then augmented with several add-on requirements that raise the required ratio of capital to risk-weighted assets. One of these add-ons is the G-SIB capital surcharge, which increases with measures of a bank's systemic importance. Under the original Basel III accord, the G-SIB score increases with several factors that might relate to their market activities, including asset size, intrafinancial system assets and liabilities, and securities held in the bank's trading and available for sale. The United States supplemented the original G-SIB score with a second measure that incorporates reliance on short-term wholesale funding. A bank's G-SIB buffer, then, depends upon the greater of that required under Basel III and that required by the second measure, which incorporates short-term wholesale funding.

The size of the G-SIB capital buffer is a step function of the G-SIB score with a step size of 50 basis points (bp) in the minimum ratio of capital to risk-weighted assets. For these large banks, a 50 bp increase can be many billions of dollars more in minimum capital requirements. As a result, banks that project they will end the period near the cutoff for the next higher step have an especially strong incentive to manage their affairs to avoid going onto the next step up.

2.2 Liquidity supervision and regulation

U.S. banks are also subject to a variety of regulatory requirements and supervisory expectations regarding their liquidity management, the best known of which is the liquidity coverage ratio (LCR). The LCR requires banks to maintain a minimum amount of high-quality liquid assets (HQLA) in proportion to a measure of their net cash outflows over a 30-day horizon in a stressful situation. The reserves and

Treasury securities owned by the bank are both considered to be the best form of HQLA (level 1) and, as such, carry equal weight in the formula. However, the LCR does penalize bank participation in the repurchase agreement market because repos are not considered HQLA for the bank on the lending side of the transaction.

Along with the liquidity requirements set by the LCR, the largest banks must conduct internal liquidity stress tests. These tests have the effect of requiring banks to maintain specific minimum amounts of reserves. As Federal Reserve Board vice chair Randal Quarles (2020) explained:

> However, it may be difficult to liquidate a large stock of Treasury securities to meet large "day one" outflows. For firms with significant capital market activities, wholesale operations, and institutional clients (such as hedge funds), this scenario is not just theoretical. In the global financial crisis, several firms experienced outflows exceeding tens of billions of dollars in a single day.
>
> The LCR does not capture these on-the-ground realities. But supervision does. Under Regulation YY's enhanced prudential standards, large firms are required to conduct internal liquidity stress tests (ILSTs). Supervisors expect firms to estimate day-one outflows and to ensure that their liquidity buffers can cover those outflows without reliance on the Federal Reserve. For firms with large day-one outflows, reserves can meet this need most clearly.

Thus, U.S. bank supervisory requirements may limit banks' ability to purchase Treasury securities using their reserves.[2]

2.3 FDIC insurance premiums

A bank's Federal Deposit Insurance Corporation (FDIC) assessment is calculated by multiplying a bank's assessment rate times its assessment base. The assessment rate is a function of each individual bank's risk and the adequacy of the FDIC insurance fund. The rate was higher after the 2007–09 crisis, reflecting both the bank's elevated risk and the need to rebuild the FDIC fund. The FDIC fund recently reached its congressionally mandated minimum level, and the assessment rate for large and highly complex banks currently ranges from 1.5 to 40 bp.[3]

The Dodd-Frank Act (DFA) changed the assessment base in a way that raises the relative cost of banks participating in money market activities. Prior to DFA, the assessment base had been total average deposits. However, DFA changed the base to average total assets minus average tangible equity. As a result of the assessment base change, the FDIC assessment applies to all increases in assets, regardless of their funding source. For example, a bank that obtains additional reserves in the repo

[2] Basel III also provides for a second liquidity measure, the net stable funding ratio (NSFR). Interestingly, the NSFR exempts U.S. Treasury repo from having to be backed by available stable funding, putting it on comparable footing with reserves and Treasury securities; see Thiruchelvam (2021).

[3] The FDIC page explaining assessments is at https://www.fdic.gov/deposit/insurance/di-assessments.html. The FDIC (2021, p. 105) reports that the average assessment rates averaged 4.0 cents per $100 of assessment base in 2020.

market will incur a higher FDIC assessment post-DFA, whereas it would not have incurred this cost prior to DFA.

3. Market dislocations and monetary policy implementation responses

Monetary policymakers rely on banks to transmit changes in policy to the rest of the financial sector. Regulation that inhibits banks' ability to operate as intermediaries may adversely affect their ability to transmit policy to the broader financial system. This subsection discusses three cases where regulation inhibited banks' ability to transmit policy and contributed to changes in the way monetary policy is implemented.

3.1 Interest on reserves arbitrage, begun in 2008

The Federal Reserve had historically controlled short-term interest rates via its control over the supply of bank reserves. However, this method of control became infeasible when the Fed had to cede control over the supply of reserves in order to provide liquidity to distressed markets after the 2008 failure of Lehman Brothers. As a substitute for controlling rates via reserves, the Fed took advantage of its authority, newly authorized in 2008, to pay IOER. This reliance on IOER became a longer-lasting feature of monetary policy when the Federal Open Market Committee (FOMC) adopted a series of large-scale asset purchase programs starting in 2008 to help facilitate an economic rebound.

Fed policymakers originally believed that IOER would set an effective floor under the federal funds rate, with banks having no incentive to lend at a lower rate, according to Craig and Millington (2017). Almost immediately, it became apparent that IOER would not set a floor under the federal funds rate. In part, this realization reflected the fact that some organizations (especially Fannie Mae, Freddie Mac, and the Federal Home Loan Banks) were not eligible to earn interest on reserves and thus had an incentive to sell reserves at below rates earned by IOER so that they could at least earn a positive return on their reserve holdings. However, commercial banks also refused to bid money market rates up to IOER because of the balance sheet costs they incurred when engaging in this seeming arbitrage opportunity. As Kim, Martin, and Nosal (2020) observe, banks particularly argued that the leverage ratio and FDIC insurance assessment were creating balance sheet costs that made these seeming arbitrage opportunities unprofitable.

Although market rates were below the initial IOER rate of 25 bp, IOER was nevertheless sufficient to keep money market rates from becoming negative after the crisis despite the high level of reserves. However, as the FOMC decided to raise short-term interest rates, the Committee was uncertain about the extent to which an increase in IOER would be transmitted to other short-term rates. Thus, the Federal Reserve created the overnight reverse repurchase program (ON RRP) under which money funds could sell reserves to the Federal Reserve at a rate somewhat below IOER (initially 25 bp below IOER).[4] The creation of this program represents an early case in which the implementation of monetary policy had to be adjusted in response to banking regulation.

[4] See Federal Reserve Open Market Committee (2014) and Anderson and Kandrac (2017).

A potential problem with the ON RRP is that it could facilitate a run on the banks during a financial crisis, as depositors shift funds from banks to those money funds with access to the ON RRP program. This risk is now mitigated by a Fed policy that had limited individual money fund participation in the program to $30 billion but for which the cap was recently raised by the Federal Open Market Committee to $80 billion.[5]

3.2 Repo market—September 2019

Money market rates spiked on September 16–17, 2019. Anbil, Anderson, and Senyuz (2020) report that the Treasury market repo increased by 3 percent to 5 percent. The increase in the effective federal funds rate was smaller but still above the FOMC's target. Anbil, Anderson, and Senyuz (2020) observe that in response to the rate spike, the Fed started lending cash in the repo market on September 16. The Committee ordered the Fed's open market trading desk to buy Treasury bills at least into the second quarter of 2020 and to continue its repo operations. Additionally, the FOMC announced its intention to maintain an ample supply of reserves.

The question that researchers have focused on is why money market rates spiked even though banks had historically high levels of excess reserves, far above the levels banks held prior to the 2007–09 financial crisis. Why didn't the banks holding excess reserves supply liquidity and thus earn arbitrage profits, given the far higher rate of return on repos and fed funds? Afonso et al. (2020) provide an early analysis of the issue. They emphasize the decline in reserves and a decrease in money market funding interacting with banks' desired levels of reserves. They hypothesize that the reduction in reserves moved the supply curve out to the steep part of banks' demand curves, the zone where relatively small changes in their available reserves could have a large impact on market rates. In contrast, Afonso et al. (2020) downplay "long-lasting" factors such as "Basel III regulation and the changes that such regulation, and the associated supervisory programs," because these measures were in place long before rates spiked. Additionally, Powell and Williams (2019) noted that firms that ordinarily supply funding to the repo market but are not subject to bank liquidity regulation (such money market funds, government sponsored enterprises, and pension funds) seemed reluctant to step in when repo rates increased.

However, others pointed the finger at those liquidity programs. On September 3, 2019, Nelson and Waxman (2019) anticipated the likelihood that rates would rise sharply with regulation as a contributing factor. Then after the event, Covas and Nelson (2019) argued that the spike in rates was in part the result of nonpublic stress tests and liquidity requirements. Similarly, Jamie Dimon, CEO of JP Morgan Chase, stated in a quarterly earnings call that:

> So, if I remember correctly, you got to look at the concept of — we have a checking account at the Fed with a certain amount of cash in it. Last year we had more cash than we needed for regulatory requirements. So when repo rates went up, we went from the checking account, which … was paying (00:14:10) IOER into repo. Obviously makes sense, you make more money. But now the cash in the account, which is still huge — it's $120 billion in the morning and goes

[5] See the Federal Reserve Bank of New York notice on the change in its operating policy at https://www.newyorkfed.org/markets/opolicy/operating_policy_210317.

> down to $60 billion during the course of the day and back to $120 billion at the end of the day – that cash, we believe, is required under resolution and recovery and liquidity stress testing. And therefore, we could not redeploy it into repo market, which we would have been happy to do.[6]

These observations from bank-based observers have been subsequently supported by more rigorous modeling. Research by d'Avernas and Vandeweyery (2021) show that binding liquidity regulation could prevent banks from providing intraday liquidity to money markets and lead to a sharp rise in rates. Yang (2020) shows that a bank's reserve levels can exercise a binding influence even before bank reserves fall to regulatory/supervisory minimums. The added feature in Yang's (2020) model is that banks face stochastic demands on their reserve balances to satisfy outgoing payments. If supervisory minimum levels of reserves cannot be violated (except at a high cost), banks will restrict their supply of reserves to the repo market well before their reserves drop to the minimum level required by supervisors.

3.3 Treasury market dislocation—March 2021

Financial market participants in the United States and Europe initially underestimated the growing threat COVID-19 posed to the real economy and to financial assets.[7] However, these markets started pricing in the risks after the announcements of lockdowns in northern Italy. This turned into what many called the "dash for cash" after the World Health Organization declared a pandemic on March 11 and many countries started to institute strict containment measures. This sudden surge in the demand for the most liquid of financial claims (such as bank deposits) was accompanied by substantial reductions in the liquidity of many financial markets and sharp reductions in the price of many historically relatively stable financial instruments.

In what came as a shock to many market participants, the sudden reduction in market liquidity extended to the U.S. Treasury market (see Fleming and Ruela, 2020). Duffie (2020) shows that this reduction in liquidity came despite a sharp increase in the primary dealer's net inventory and a similar spike in the amount Treasuries for which the dealers obtained financing. Duffie (2020) observes that the Fed's Treasury purchases of Treasury securities help take the securities off banks' balance sheets. However, the reduction in Treasuries was accomplished by an offsetting increase in reserves, both of which are included in the SLR (and eSLR). He, Nagel, and Song (2020) model dealer behavior when subject to a potentially binding regulatory balance sheet regulations similar to the SLR. They find that the model explains both features of the repo market during the COVID-19 shock and the Treasury-overnight index swap spread during the Great Recession.

The immense scale of the dash for cash that COVID-19 induced required a package of measures to restore orderly market functioning and prevent the financial system from amplifying the pandemic's shock to the real economy. The Federal Reserve undertook a wide variety of actions in response to the

[6] https://www.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/investor-relations/documents/quarterly-earnings/2019/3rd-quarter/3q19-earnings-transcript.pdf

[7] This brief history of the COVID-19 pandemic's effect on financial markets is drawn from the Financial Stability Board (2020).

unfolding shock as summarized by Federal Reserve Board (2020b). Among these actions was a substantial increase in purchases of Treasuries and mortgage backed securities. Additionally, to support large banks' ability to serve as intermediaries, the Federal Reserve announced a one-year change in the calculation of the supplementary leverage ratio to exclude banking organizations' reserves and Treasury security portfolios (Federal Reserve Board 2020a, c). These changes had the effect of allowing banks to expand their reserve holdings to accommodate the additional reserves resulting from the Fed's asset purchases and loans, supporting banks' role as dealers in the Treasury market and freeing up capital for additional lending.

4. Regulatory reforms

This article has so far highlighted the ways in which monetary policy needed to be adjusted to offset bank regulatory and supervisory requirements. This section considers some possible changes to banking regulation and supervision that would reduce the conflicts they create with monetary policy implementation.

4.1 Supplementary leverage ratio

The obvious solution to the problems created by the SLR and eSLR are to exclude money market instruments from the calculation of the leverage ratio. There are, however, two objections to doing so. The first objection comes from those who think bank capital requirements are too low and are opposed to measures that reduce the requirements.[8] For two reasons, this objection is not persuasive. First, it mistakenly equates a stable banking system with a stable financial system, a fallacy that the events of March 2021 highlighted. Second, bank capital requirements can be raised without distorting banks' incentives in money markets. For example, the Bank of England Prudential Regulatory Authority (2017) decided to exclude reserves from the calculation of the leverage ratio but accompanied that exclusion with a 25 bp increase in their minimum leverage requirement for United Kingdom banks. The debate over whether banks should be required to hold more capital should focus on the minimum required capital ratios—not on distorting financial markets by including extremely low-risk instruments in the SLR.

The second argument against excluding money market instruments is more subtle and unavoidably political. This argument observes that the leverage ratio intentionally avoids risk-weighting any asset so that it is simple and difficult to game. If regulators were to risk-weight some assets, they may well find themselves on a slippery slope in which it will prove difficult to avoid reducing the weightings on other, riskier assets.

This second argument would seem to carry the least weight as an argument against excluding bank reserves from the SLR. Bank reserves carry no risk of loss and are perfectly liquid. No other asset can make that claim. However, Nelson and Covas (2019) observe that excluding only reserves from the leverage ratio that would raise the cost of engaging in reverse repos relative to holding the funds as reserves. Although they do not extend their argument to banks' holdings of Treasuries, the same logic should apply.

[8] For example, see Gelzinis (2020).

Unfortunately, the slope does get a bit slippery if Treasuries are excluded, and even more so for repos. Treasuries are less liquid than reserves, and longer-dated securities are likely to bear some interest rate risk.[9] Repos add an element of credit risk, though that risk should be tiny if the Treasury securities are used as collateral.

4.2 G-SIB capital surcharge

Adjusting parts of the calculation could reduce the impact of the G-SIB capital charge on monetary policy implementation. For example, one technical change that could help at quarter's end is to shift from a mixture of point-in-time and quarterly averages to the use of quarterly averages for all variables. However, the deeper source of the conflict lies with the purpose of the G-SIB capital surcharge—to make the largest, most complex banks either become less systemically important (such as taking a smaller role in financial markets) or hold more capital to reduce their risk of becoming distressed. Any reform intended to encourage dealers to provide more liquidity in Treasury markets is likely to conflict with the goal of making the large banks less systemically important in financial markets.

4.3 Regulation and supervision of bank liquidity

Existing liquidity rules give banks an incentive to hold reserves rather Treasury securities. Here the problem doesn't lie with the LCR, that regulation gives equal weight to reserves and Treasury securities. Rather the problem is that the ILST effectively sets minimum levels of reserve holdings, which can exercise a binding effect on a bank's behavior before the bank's reserve level hits minimum regulatory requirements. A simple fix would be for the ILST to follow the LCR in giving equal weight to reserves and Treasuries. The difficulty with this simple fix is that the concern underlying the ILST's differential treatment has a basis in reality; Treasury securities can become less liquid during a crisis, as the events of March 2021 showed. Thus, any decision to change the ILST should be accompanied by consideration of whether the Fed should make Treasury securities more liquid during times of crisis—for example, by creating a standing repo facility (see Andolfatto and Ihrig (2019).

4.4 FDIC insurance assessments

The change in the FDIC's assessment base raises the cost to banks of creating new money market assets. A simple solution is to exclude money market instruments that carry a very low risk—an exclusion that should certainly include reserves. Arguably, that exclusion should extend to Treasury securities and possibly even repos, given the concern of Nelson and Covas (2019) about giving reserves preferential treatment in the SLR. The difficulty of making such a change is that the FDIC and Congress are the only

[9] This reference to longer-dated securities having more interest rate risk is somewhat misleading. Whether and to what extent a bank faces interest rate risk depends upon the interest rate sensitivity of its entire portfolio of assets, liabilities, and off-balance-sheet instruments. As a general rule, longer-dated Treasury securities will carry more interest rate risk for banks as the duration of a bank's assets generally exceeds that of its liabilities. However, any serious attempt to incorporate a large bank's overall sensitivity to interest rate change would make the calculation of the leverage ratio far more complex and model dependent.

two bodies that could implement this change, and the small bank beneficiaries of the current rule exercise substantial influence over them.[10]

5. Conclusion

Monetary policy works through the banking system to affect conditions in money markets and the overall financial system. Bank supervision and regulation relies heavily on minimum liquidity and capital adequacy requirements to keep banks safe and sound. In many respects the goals of supervision and regulation are supportive of the conduct of monetary policy; a distressed banking system cannot serve as a conduit for changes in monetary policy. However, this article also shows three cases in the last decade where regulatory and supervisory policy inhibited how banks functioned in money markets and thereby forced changes in the conduct of monetary policy.[11]

These conflicts raise two questions: first, what should be done about existing conflicts, and second, what should be done about future ones. The first key is recognizing that the existence of conflicts is likely. Regulatory policy that inhibits banks' ability to operate in money markets will also inhibit their ability to support the efficient operation of markets and their ability act as conduits for monetary policy.

The next step is to consider such interaction as a part of setting banking supervision and regulation policy—as well as of determining how best to implement monetary policy. Given that the Fed has sole responsibility for monetary policy implementation and substantial authority over banking policy, the Fed is in a good position to consider the options. This should be done at the time both when changes in bank supervisory policy and changes in monetary policy implementation are being considered. However, because a one-time review may not be sufficient, the trade-off should be reconsidered as new information arises. For example, the Federal Reserve Board (2014) discussed the merits of including reserves in the leverage ratio but was satisfied with staff analysis suggesting it would not inhibit the conduct of monetary policy.

Specifically, in terms of the regulation and supervision policies identified in this article, simple reforms would undo their effect on monetary policy implementation. Each of these reforms, however, raises some additional issues that would merit further consideration before the adoption of any policy change.

Finally, it is important to recognize that no change in regulatory policy can eliminate the potential need to alter monetary policy to accommodate financial market shocks. Banks will not stop shocks to fundamental asset values from being quickly transmitted through to prices.[12] On the other hand, appropriate regulatory policy should allow banks to better absorb liquidity shocks without extraordinary assistance from the Fed. However, some Fed intervention will still be required to offset the largest shocks. Thus, the goal of recalibrating regulatory policy should be to better balance the

[10] See Wall (2015) for a discussion of why this change in the assessment base can be viewed as a subsidy of smaller banks by the largest banks.

[11] See Horvitz (1983) and Wall and Eisenbeis (2000) for a general discussion of the potential for conflicts to arise between different regulatory goals and different ways of resolving these conflicts.

[12] In market terms, banks cannot be expected to try to "catch a falling knife."

Federal Reserve's objectives for a prudent banking system with its goal of reducing the size and frequency of Fed monetary policy interventions needed to offset financial market shocks.

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