Square Pegs and Round Holes:
The Effectiveness of Monetary Policy and Macroprudential Regulation in the Post-Crisis Regulatory Regime

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ABSTRACT

This paper assesses the assumptions on which U.S. monetary policy and macroprudential regulation are premised to determine the extent to which their goals can be achieved given the structural changes in the U.S. financial system. The post-crisis financial framework is built on what was to be a firm foundation of effective micro- and macro-prudential policy based on sound monetary policy and informed by an understanding of the catastrophic financial-stability costs of unduly-lenient supervision and misguided central-bank actions. None of these bulwarks is performing as hoped.

Positive feedback loops between regulatory and monetary policy are shown in this paper to be short-circuited because improvements in bank resilience have been countered by regulatory arbitrage that shifts key financial-intermediation activities outside of banks, blunting the ability of the Federal Reserve to implement monetary policy. A negative feedback loop then results that can be interrupted only by effective macroprudential regulation. However, limits on the ability of U.S. regulators to reach beyond banks undermines macroprudential regulation and thus exacerbates negative feedback – macroprudential standards compound microprudential regulatory costs and spur still more finance outside regulated banks to entities that are unresponsive to monetary policy.

This poses significant financial-stability, macroeconomic, and even social-policy challenges. To the extent that banks lose their ability to provide financial-intermediation services that are either not replaced by non-banks or replaced in ways that raise costs or undermine market liquidity, under-served populations will lack access to sustainable credit and macroeconomic growth could become acutely procyclical at cost to national income inequality. The role of central banks becomes still more crucial because the choices made by the Federal Reserve to balance its goals become so critical that the central bank is essentially picking winners and losers across the economy and among specific asset classes.

It is thus critical to balance the policy framework regulators can affect – the rules that govern financial-market structure, monetary policy, and macroprudential regulation – to ensure that conflicts are quickly resolved and new mechanisms to protect financial stability and macroeconomic policy are put rapidly into place. It is suggested that policy-makers assess the cumulative impact of the new policy framework to identify unanticipated implications for monetary policy and financial stability. With an initial, market-focused assessment of cumulative effects, U.S. regulators can determine the best way to rebalance the prudential framework without watering it down, revising monetary-policy transmission channels and enhancing macroprudential regulation as needed.

Executive Summary

It has long been understood in medicine that well-intended prescriptions can have unintended and sometimes even deadly results when combined with other seemingly-appropriate treatments. Engineering constructs are also designed to anticipate unintended cumulative effects – the extra propeller that makes a plane too heavy to fly, the complex control board that distracts attention from the really important blinking red light, and so forth. Financial policy is no more immune to unintended, cumulative results. Although it was painfully clear in the wake of the financial crisis that "light-touch" rules were woefully inadequate, the body of reforms grew so large so fast that problematic regulatory reverberations were apparent as early as 2011.[1] Market developments since have shown that rules applicable only to banks may make banks safer, but can also so significantly reduce their role as to clear the way for "shadow" financial institutions immune from the post-crisis rulebook.[2] A growing number of "flash" events has also heightened concern about market illiquidity that may in part result from the cumulative impact of the post-crisis framework. At the same time, it is also clear that very large banks in the United States – as well as those in other "gold-plated" regulatory regimes – are considerably more robust and resilient than they were eight years ago,[3] enhancing financial-market stability and thus protecting national prosperity.

Reflecting all these developments, global regulators governed by the Financial Stability Board (FSB) have launched an effort to assess the cumulative impact of all of the new rules, focusing in particular on market illiquidity.[4] The European Commission has also launched a consultation designed to identify any cumulative regulatory effects with potentially adverse impact on liquidity, market integrity, consumer protection, systemic risk, and monetary-policy execution.[5] Although some in Congress have called for a comparable U.S. effort, none has yet been undertaken.

It is the goal of this study to promote such a review and indeed to encourage it by providing analytical insights based on prior studies and publicly-available data. We focus in particular on two critical questions:

- Can the Federal Reserve Board effectively implement monetary policy and protect financial stability given the structure of U.S. financial intermediation in the wake of post-crisis reforms and other market changes? If the ability of the central bank to promote maximum employment, limit inflation, counter procyclicality, and/or stabilize volatile or illiquid

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[1] Federal Financial Analytics, *A New Framework for Systemic Financial Regulation: Simple, Transparent, Enforceable and Accountable Rules to Reform Financial Markets* (November, 2011), available at http://www.fedfin.com/images/stories/client_reports/complexityriskpaper.pdf.

[2] Financial Stability Board (FSB), *Global Shadow Banking Monitoring Report 2015*, 1-16 (November 12, 2015), available at http://www.fsb.org/wp-content/uploads/global-shadow-banking-monitoring-report-2015.pdf.

[3] Office of Financial Research (OFR), *2015 Financial Stability Report*, 2 (December 15, 2015), available at https://financialresearch.gov/financial-stability-reports/files/OFR_2015-Financial-Stability-Report_12-15-2015.pdf.

[4] FSB Chairman Mark Carney, *Letter To G20 Finance Ministers and Central Bank Governors* 2 (February 22, 2016), available at http://www.fsb.org/wp-content/uploads/FSB-Chair-letter-to-G20-Ministers-and-Governors-February-2016.pdf.

[5] European Commission Directorate-General for Financial Stability, Financial Services and Capital Markets Union, *Call for Evidence: EU Regulatory Framework for Financial Services* (September, 2015), available at http://ec.europa.eu/finance/consultations/2015/financial-regulatory-framework-review/docs/consultation-document_en.pdf.

markets is challenged, then it is possible that new rules have combined with other market changes to blunt monetary-policy impact, threatening both national prosperity and financial stability.

- Can the Federal Reserve in concert with the Financial Stability Oversight Council promote macroprudential financial-market regulation to limit procyclicality and other dangerous threats to market stability and macroeconomic resilience? If not, then dramatic change to the structure of the U.S. financial system may combine with monetary-policy impediments to leave critical systemic risks unaddressed or even worse than before the crisis.

In two recent conferences, the Federal Reserve indicated that it is well aware of these questions.[6] The critical underlying question we investigate – whether changes in U.S. financial intermediation have bottled up the central bank – was in fact raised by Chair Yellen at the November 2015 conference when she said, "it is crucial to understand the effect of regulations and possible changes in financial intermediation on monetary policy implementation and transmission."[7] However, as the citations in this paper and the bibliography at the end indicate, the extensive literature survey conducted in concert with this paper found no definitive analyses of this question. There is considerable concern from senior regulators and policy-makers as evidenced in the many speeches and papers referenced here, but no forward-looking research.

That this issue has been added to the FRB's to-do research agenda is helpful, and other agencies are also beginning to take this on. But, as we shall also show below, the shape of the U.S. financial market is changing dramatically and immediately due to an array of factors, some of them within the scope of policy-maker action in the post-crisis regulatory framework. When markets change, sunk costs occur which post hoc recognition of problematic consequences cannot quickly reverse. As a result, this paper provides initial conclusions about the most critical policy actions that warrant immediate action even as the research agenda proceeds.

Key findings include:

- New rules rightly restrict the ability of banks to take on undue credit and liquidity risk, making them more resilient but limiting their capacity to support economic activity, especially when the financial cycle remains risky but monetary policy seeks to expand the business cycle.[8] If non-banks do not fill this void, then central banks will need to supply still more "gas" to stimulate growth, exacerbating artificial pricing and creating over-heating and inflationary risks. However, if non-banks substitute for banks in the absence of effective

[6] Board of Governors of the Federal Reserve System (FRB), Monetary Policy Implementation and Transmission in the Post-Crisis Period, Washington, DC (November 12-13, 2015), & Federal Reserve Bank of Boston (FRB Boston), 59th Conference of the Federal Reserve Bank of Boston: "Macroprudential Monetary Policy," Boston, MA (October 2, 2015).

[7] FRB Chair Janet L. Yellen, *Speech at the "Monetary Policy Implementation and Transmission in the Post-Crisis Period," Research Conference, Washington, DC: Welcoming Remarks* (November 12, 2015), available at http://www.federalreserve.gov/newsevents/speech/yellen20151112a.htm.

[8] BCBS, *Literature review on integration of regulatory capital and liquidity instruments* (March, 2016), available at http://www.bis.org/bcbs/publ/wp30.pdf. See also FRB Boston President and CEO Eric Rosengren, *Speech at the Federal Reserve Bank of New York (FRB-NY) Conference "Supervising Large, Complex Financial Institutions: Defining Objectives and Measuring Effectiveness,"* New York, New York: Observations on Defining the Objectives and Goals of Supervision (March 18, 2016), available at https://www.bostonfed.org/news/speeches/rosengren/2016/031816/index.htm?wt.source=bfo_ers_nn.

macroprudential-regulatory controls, then financial-stability risks will increase and central banks may be forced to be lenders of last resort to unregulated entities. This would exacerbate moral hazard due to heightened regulatory arbitrage, frustrating the end of "too big to fail."

- The sum total of microprudential rules does not appear to be making the financial system safer despite its beneficial impact on the resilience of U.S. banks. Although traditional risks (e.g., energy-sector problems) are well-handled to date, new risks (e.g., market illiquidity, volatility, and yield-chasing) are evident and of acute systemic concern to U.S. and global policy-makers.
- The effect of new rules and monetary policy on overall market illiquidity is unclear, but it is certainly possible that the combination of leverage and liquidity rules and increasing competition from entities not covered by them are creating or heightening market illiquidity that leads to problematic "fails" and other systemic concerns.
- Obstacles to effective macroprudential regulation (e.g., uncertain goals, the major role of non-banks, emerging technologies, jurisdictional disputes) may require reliance on monetary policy to protect financial stability, but conventional and nonconventional tools are both ill-designed to deploy monetary policy for financial-stability purposes.
- Current ultra-low rate conditions mask monetary-policy and macroprudential risks, especially those resulting from new leverage-capital and liquidity requirements. For example, these policies and rules force banks to hold longer-dated securities in hopes of realizing reasonable net-interest margins after taking the return of even riskless securities and the cost of rules into account. This creates liquidity risk outside the banking system and duration risk within it. The combination of these policies also may compound income inequality, damaging the prospects for long-term, stable growth.[9] Macroprudential standards may also lead banks to provide credit only to their most profitable customers, depriving under-served customers.
- Effective monetary policy is now an even more critical foundation of financial-market and macroeconomic stability because other stabilizers (e.g., microprudential regulation, fiscal policy) are not functioning effectively. Although the FRB might adjust its operations to handle some aspects of the changing nature of U.S. financial intermediation, additional reliance by non-banks on central-bank backstops and the preference under bank rules for holding reserves is likely to combine to make the FRB a still more powerful force with uncertain results that may include a still greater imbalance between monetary and fiscal policy.
- The impact of central-bank policy combined with those of the new regulatory framework create asset and liquidity classes that are made more costly, scarce, or are otherwise adversely affected. Monetary and regulatory policy thus combine not only to advantage institutions that provide like-kind services through different policy drivers, but also to do so for markets in ways that may lead to credit allocation or other direct and indirect governmental edicts.

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[9] Dietrich Domanski, Michela Scatigna and Anna Zabai, *Wealth Inequality and Monetary Policy* (March 6, 2016), available at http://www.bis.org/publ/qtrpdf/r_qt1603f.htm.

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I. The Changing Nature of U.S. Financial Intermediation

Financial intermediation is the critical function in which deposits acquired from individuals and businesses are converted into the loans that power economic growth and meet consumer needs. Effective financial intermediation requires not only safe and stable transformation of deposits into loans, but also an effective financial market in which payments are quickly and accurately transferred, equity and other trades are executed without risk, and assets housed for custody or long-term use are appropriately safeguarded. All of these financial-market functions were sorely tested in the financial crisis and have since changed dramatically due not only to the post-crisis regulatory framework, but also to technological changes and geopolitical factors.

It is not within the scope of this paper to provide a detailed discussion of how financial intermediation and related functions have been transformed – that would require a book-length paper on its own. However, because the changing nature of financial intermediation directly affects both monetary-policy implementation and the prospects for macroprudential regulation, it is important to assess how actions within the scope of federal policy have altered the functioning of U.S. financial intermediation and how this in turn affects the ability and willingness of banks to participate in monetary-policy operations, the ability of the FRB to implement monetary policy, and the benefits of macroprudential regulation as a roadblock to potential procyclicality or other systemic risks.

Throughout this paper, we address not only what are often called "microprudential" regulations, but also macroprudential actions. Microprudential rules are those that govern individual banks to ensure capital adequacy, ample liquidity, and overall safe and sound operations. Although banking-system resilience is achieved to the degree each bank on its own becomes more resilient, financial-system stability may not be achieved or could even be undermined if microprudential rules in aggregate make banks less responsive to monetary-policy signals or if they restructure financial intermediation in new, risky ways. Macroprudential regulation is designed to ensure financial stability by changing the structure of financial markets and/or creating counter-cyclical push-backs against boom/bust trends. However, as we shall show, the intersection between microprudential and macroprudential rules is blurred by regulatory efforts to use each for different purposes and varying views on what macroprudential standards should accomplish.

The Office of Financial Research (OFR) in the U.S. Treasury has observed that credit risk is rising, macroeconomic fundamentals have "deteriorated," incentives to financial risk-taking are heightened, and improvements in U.S. financial-market resilience are "uneven."[10] From this and ongoing developments, one can conclude that, at least to date, the sum total of all the new microprudential rules is not having the desired impact on financial-market stability. We here assess why this is the case, guided in part by a recent report by the Committee on the Global Financial System (CGFS) of the Bank for International Settlements (BIS), the central bank of central banks.[11]

[10] OFR, *2015 Financial Stability Report*, *op. cit.* at 7.

[11] Bank for International Settlements (BIS) Committee on the Global Financial System (CGFS) Market Committee, *CGFS Papers No. 54: Regulatory change and monetary policy* (May, 2015), available at http://www.bis.org/publ/cgfs54.pdf.

A BIS official, Claudio Borio, has looked at the problem of microprudential regulation with specific regard to macroprudential rules, noting that macroprudential rules must be effective because microprudential regulations have two drawbacks:

> First, they set the same standards regardless of the impact of an institution's failure on the financial system. It is as if the same speed limit applied to both trucks and cars. Second, they set the same standards regardless of the financial system's condition. It is as if the same speed limit applied irrespective of traffic conditions.[12]

The analysis below highlights the rules the CGFS identified as most significant in terms of monetary-policy impact and expands on them also to assess macroprudential implications. We shall inform this discussion by going beyond the current rulebook also to consider the financial-intermediation implications of major pending initiatives so that forward-looking considerations are identified to guide future policy deliberations.

A. U.S. Financial Intermediation

As noted, it is not within the scope of this paper to provide a detailed discussion of how the financial market has changed in recent years. However, it is critical to recognize that the scope of these changes is profound when considering the regulatory issues applicable only to banks and their monetary-policy and macroprudential implications. Financial intermediation begins with the deposits banks gather that are then used to make loans. Recent research has highlighted the growing importance of what are often called "shadow liabilities."[13] Key to this sector are money-market funds (MMFs) that, despite the lack of deposit insurance, are able to bid away non-operational deposits (those most penalized under the liquidity regulations discussed below) by paying higher rates. The leverage-capital requirements (see below) also constrain the ability of banks to place these non-operational deposits in excess reserves or other cash-equivalent assets. However, MMFs can now put these deposits to considerable use in the FRB's alternative monetary-policy instrument: the reverse repurchase program (RRP) facility discussed below. Interestingly, recent data suggest that the RRP is serving increasingly as a backstop for MMFs that may be swamped with quarter-end redemption demands as non-U.S. banks subject only to quarter-end (not quarter-average) leverage rules adjust market-making activities to enhance reported results.[14] Mutual funds that take investments once housed largely at banks and deploy them for asset holdings (including loan products) have also become a major presence since the crisis, growing from approximately $13 trillion in 2007 to $18 trillion at year-end 2014.[15] The role of banks in the repurchase-agreement arena – another critical source of market funding – has declined by

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[12] BIS Head of Monetary and Economics Claudio Borio, *Speech for the 25th anniversary edition of Central Banking Journal: Macroprudential frameworks: (too) great expectations?* (August 5, 2014), available at http://www.bis.org/speeches/sp140813.htm.

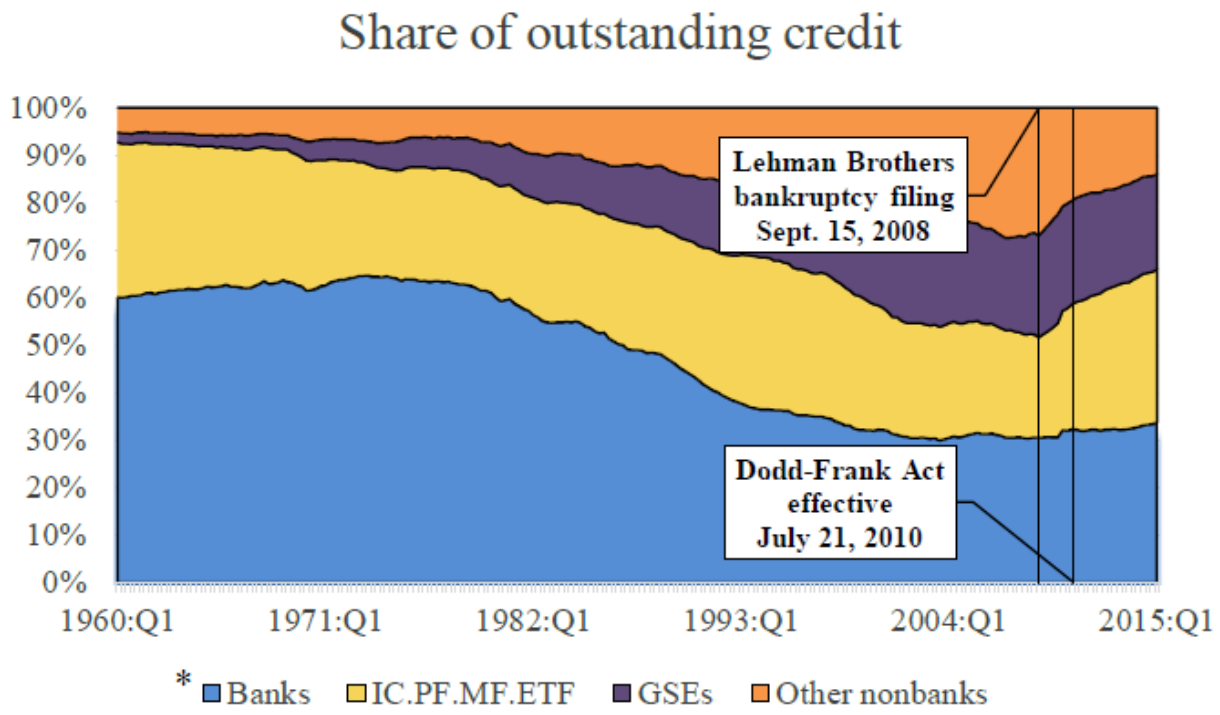
[13] Alan Moreira and Alexi Savov, *The Macroeconomics of Shadow Banking* (July 2014), available at http://www.frbsf.org/economic-research/files/P3-Moreira-Shavov.pdf.

[14] Jon Sindreu, *How European Banks Play Hide-and-Seek With Regulators*, Wall Street Journal, March 21, 2016 at http://blogs.wsj.com/moneybeat/2016/03/21/how-european-banks-play-hide-and-seek-with-regulators/.

[15] Financial Stability Oversight Council (FSOC), *2015 Annual Report*, 77 (May, 2015), available at https://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/2015%20FSOC%20Annual%20Report.pdf.

approximately 28 percent in the past four years, with this often attributed not only to large FRB holdings of the bonds typically used in these transactions, but also to the cost of regulations described below.[16]

The credit and market-making capacity of banks shows changes of similar magnitude to that of deposits, with credit increasingly reliant on non-banking institutions and government-sponsored enterprises (GSEs). The chart below presented by FRB Vice Chairman Fischer demonstrates that banks now supply only about one-third of the credit in the U.S. system:



(Source: Board of Governors of the Federal Reserve.[17] Note: Credit outstanding consists of domestic private nonfinancial sector debt (43 percent), domestic government debt (27 percent), domestic financial-sector debt (24 percent), and foreign bonds held in the U.S. financial system (5 percent). IC.PF.MF.ETF denotes insurance companies, pension funds, mutual funds, and exchange-traded funds. GSEs are government-sponsored enterprises. Other nonbanks are issuers of asset-backed securities, finance companies, mortgage real estate investment trusts, broker-dealers, funding corporations, and holding companies.)

Mr. Fischer concluded from these and other data that the FRB will face considerable obstacles to effective macroprudential regulation. Many analysts have also relied on these data to suggest that FRB monetary policy is increasingly "pushing on a string" because central-bank policy does not translate into meaningful adjustments in available credit.

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[16] Katy Burne, *Repo Market Sees a Lending Shift as Rules Bite*, Wall Street Journal, April 7, 2015 at http://www.wsj.com/articles/repo-market-sees-a-lending-shift-as-rules-bite-1428450643.

[17] FRB Vice Chairman Stanley Fischer, *Speech at the 59th Economic Conference of the Federal Reserve Bank of Boston: "Macroprudential Monetary Policy," Boston, MA: Macroprudential Policy in the U.S. Economy* (October 2, 2015), available at http://www.federalreserve.gov/newsevents/speech/fischer20151002a.htm.

B. Regulatory-Capital Requirements

In summary, regulatory-capital requirements in the U.S. are generally significantly more stringent than those applicable under the broader global regime established by the Basel Committee on Banking Supervision (BCBS). This results not only from the specific requirements noted below, but also because of the unique nature of a surcharge imposed on the largest U.S. banks found to be global systemically-important banks (GSIBs)[18] and a pending counter-cyclical capital buffer (CCyB) also unique to the U.S.[19] Relevant current and prospective requirements also include:

- risk-based capital (RBC) standards[20] that may come under new floors and other changes following final action in the Basel Committee. The Dodd-Frank Act[21] also requires U.S. banks that use the advanced, models-based rules to stay above older, more simple risk-based standards;
- the supplementary leverage ratio (SLR).[22] The U.S. SLR is considerably more stringent than the global leverage standards,[23] which also have yet to be widely implemented;
- trading-book requirements[24] soon to be revised under the Basel "fundamental review of the trading book" standards;[25] and
- operational risk-based capital (ORBC) requirements,[26] soon to be revised by a new standardized global approach.[27]

Importantly, there is no forward-looking analysis of the impact of all of these rules taken together even as the FRB finalizes still more capital standards and Basel builds out rules intended to bar use of internal

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[18] FRB Regulatory Capital Rules: Implementation of Risk-Based Capital Surcharges for Global Systemically Important Bank Holding Companies, 12 C.F.R. §§ 208 & 217 (2015), available at https://www.gpo.gov/fdsys/pkg/FR-2015-08-14/pdf/2015-18702.pdf.

[19] FRB Regulatory Capital Rules: The Federal Reserve Board's Framework for Implementing the U.S. Basel III Countercyclical Capital Buffer, 12 C.F.R. § 217 Appendix A (2015), available at http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20151221b1.pdf.

[20] Federal Deposit Insurance Corporation (FDIC) Regulatory Capital Rules: Regulatory Capital, Implementation of Basel III, Capital Adequacy, Transition Provisions, Prompt Corrective Action, Standardized Approach for Risk-Weighted Assets, Market Discipline and Disclosure Requirements, Advanced Approaches Risk-Based Capital Rule, and Market Risk Capital Rule, 12 C.F.R. §§ 303, 308, 324, 327, 333, 337, 347, 349, 360, 362-365, 390, & 391 (2013), available at https://www.fdic.gov/news/board/2013/2013-07-09_notice_dis_a_res.pdf.

[21] Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203 (Jul. 21, 2010), § 171, available at https://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf.

[22] Office of the Comptroller of the Currency (OCC), FRB, and FDIC Regulatory Capital Rules: Regulatory Capital, Revisions to the Supplementary Leverage Ratio, 12 C.F.R. §§ 3, 217, & 324 (2014), available at https://www.fdic.gov/news/board/2014/2014-09-03_notice_dis_c_fr.pdf.

[23] Basel Committee on Banking Supervision (BCBS), *Basel III leverage ratio framework and disclosure requirements* (January, 2014), available at http://www.bis.org/publ/bcbs270.pdf.

[24] OCC, FRB, FDIC Risk-Based Capital Guidelines: Market Risk, 12 C.F.R. §§ 3, 208, 225, & 325 (2012), available at https://www.fdic.gov/news/board/2012/2012-06-12_notice_dis-a.pdf.

[25] BCBS, *Standards: Minimum capital requirements for market risk* (January, 2016), available at http://www.bis.org/bcbs/publ/d352.pdf.

[26] FRB, FDIC, OCC, Office of Thrift Supervision (OTS), *Interagency Guidance on the Advanced Measurement Approaches for Operational Risk* (June 3, 2011), available at http://www.federalreserve.gov/boarddocs/srletters/2011/sr1108a1.pdf.

[27] BCBS, *Consultative Document: Standardised Measurement Approach for operational risk* (March, 2016), available at http://www.bis.org/bcbs/publ/d355.pdf.

models. Although the CGFS study looked at this question in broad terms, its focus is international and thus provides only suggestive conclusions about the impact of all of these rules in the U.S. For example, as discussed below, it is vital to understand which capital constraint is the binding one to assess their impact on monetary policy. Because the risk-based capital rules do not impose a capital charge for holding central-bank reserves, they comport with longstanding expectations about the functionality of the money channel. However, the leverage rules do impose a capital charge on these reserves – one that is particularly binding in the U.S. due to the SLR. This creates a disincentive for bank reliance on fed funds that is, at present, masked by large holdings of excess reserves due to current, idiosyncratic conditions (e.g., ultra-low rates, slow growth). The GSEs and Federal Home Loan Banks (FHLBs) are now the principal users of fed funds. Although they may not earn interest on the reserves at the FRB, they do have accounts with the central bank that create an additional incentive for shadow liabilities, although those from the GSEs are backed by either an "effective" or implicit U.S. Government guarantee. It is thus thoroughly unclear how monetary policy will function with a high, binding U.S. leverage rule once interest rates normalize.

Further, because of the scope of these requirements, their impact varies across the type of financial intermediation and market function provided by U.S. financial institutions. For example, MMF or similar products offered by banks are subject to the operational risk-based capital standards that do not apply to like-kind products from other providers, adding costs and likely contributing to the transformation of financial intermediation described above. Additional considerations are summarized below based on the impact of the RBC and SLR rules for credit availability and the implications of these and the other rules for other market functions critical to monetary policy and macroprudential stability:

- The leverage rule increases the cost of holding cash balances and reserve accounts at central banks, as well as those associated with repurchase agreement (repo) activities and holding counterparty cash margins, affecting both sides of money-market operations in ways that challenge traditional monetary policy. Holding other factors equivalent, the leverage rule (especially when set as high as the SLR) reduces demand for cash in the money market and pushes rates down.
- The leverage ratio, especially as implemented in the SLR, may also heighten rate volatility due to lower volumes of cash-equivalent transactions which widen bid-ask spreads. When banks hold smaller reserves due to capital cost, sudden events that require larger reserves may also affect rates and make them volatile with adverse implications not only for monetary policy, but also market liquidity.
- The leverage ratio, again exacerbated by the SLR, may also adversely affect the overnight fed funds market, a concern cited as a particular worry by global regulators[28] due to the sharp drop in fed-funds lending since the financial crisis. The post-crisis FDIC deposit-insurance assessment scheme also combines with the leverage ratio's cost to make the fed-funds lending market one now dominated by foreign banks which tend to come in and out of it based on their own leverage regimes and related reporting requirements.
- The leverage rules, especially when set as high as the SLR, may pose macroprudential risk because of the incentive to hold unsecured assets. This is particularly true when the leverage rules combine with high RBC requirements unless an RBC-recognized credit-risk mitigation overcomes the cost of the leverage rules. Certain types of credit-risk transfer

[28] CGFS Market Committee, *Regulatory change and monetary policy*, *op. cit.* at 9.

structures which arbitrage all these standards have been highlighted by OFR[29] and the Basel Committee[30] as emerging risks.

C. Liquidity Regulation

There are two major liquidity regulations:

- the liquidity coverage ratio (LCR), which has been finalized[31] in the U.S. and requires holdings of high-quality liquid assets (HQLAs) to ensure liquidity over a thirty-day time horizon; and
- the net stable funding ratio (NSFR), finalized by global regulators[32] and just now proposed in the U.S.[33] This similarly relies on HQLAs, but the liquidity horizon extends to one year.

Each of these rules in the U.S. is or will be supplemented by FRB standards specifically applicable to BHCs with assets over $50 billion.[34] These standards add qualitative requirements to the largely quantitative ones noted above, requiring among other things that covered BHCs hold liquidity buffers sufficient to absorb stress – in essence, imposing a liquidity add-on comparable in some ways to the GSIB capital surcharge but for BHCs down to a significantly lower asset size. All of these microprudential liquidity rules affect monetary policy and macroprudential considerations because they work alone and in tandem with the capital rules to create strong incentives to rely on only certain types of funding sources and to hold large volumes of HQLAs (which are principally sovereign obligations but include limited amounts of GSE debt and certain other assets). Core deposits – i.e., retail deposits and operational ones from large customers that are not likely to flow from banks under stress – are favored under both the LCR and NSFR, with each rule also limiting reliance on encumbered funding sources.

The liquidity rules thus create incentives to hold unsecured assets and to shorten asset maturity to prevent funding mismatches. Global regulators have also concluded that the net effect of the LCR is a steepening of the short end of the unsecured yield curve, along with a drop in short-term unsecured lending.[35] That of the NSFR is more complex, but global regulators believe it also contributes to steepening the short-term yield curve and reducing the supply of unsecured credit, although this could be offset somewhat (albeit with macroprudential risk) if shadow liabilities create non-bank funding sources.[36] This same study also concludes that the NSFR will have a strong effect on the supply of cash

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[29] Jill Cetina, John McDonough, and Sriram Rajan, *OFR Brief Series 15-04: More Transparency Needed For Bank Capital Relief Trades* (June 11, 2015), available at https://financialresearch.gov/briefs/files/OFRbr-2015-04-bank-capital-reflief-trades.pdf.

[30] BCBS, *The Joint Forum, Credit Risk Transfer*, 26 (July, 2008), available at http://www.bis.org/publ/joint21.pdf.

[31] Department of Treasury, FRB, and FDIC Liquidity Coverage Ratio: Liquidity Risk Management Standards (LCR), 12 C.F.R. §§ 50, 249, & 329 (2014), available at https://www.gpo.gov/fdsys/pkg/FR-2014-10-10/pdf/2014-22520.pdf.

[32] BCBS, *Basel III: the net stable funding ratio* (October, 2014), available at http://www.bis.org/bcbs/publ/d295.pdf.

[33] OCC, FRB, and FDIC Net Stable Funding Ratio: Liquidity Risk Measurement Standards and Disclosure Requirements, 12 C.F.R. §§ 50, 249, & 329 (2016), available at https://www.fdic.gov/news/board/2016/2016-04-26_notice_dis_c_fr.pdf.

[34] FRB Enhanced Prudential Standards for Bank Holding Companies With Total Consolidated Assets of $50 Billion or More, 12 C.F.R. §§ 252(D) (2014), available at http://www.ecfr.gov/cgi-bin/text-idx?node=pt12.4.252#sp12.4.252.d.

[35] CGFS Market Committee, *Regulatory change and monetary policy*, *op. cit.* at 10-11.

[36] *Id*., at 12-13.

by banks, pushing up prices and reducing volume, especially for matched-book positions with other banks related to assets with tenors beyond six months. The sharp drop in bank repo activities cited above is believed by many to demonstrate the effect of the NSFR in combination with the SLR.[37]

It is important also to note that the LCR has yet to be tested under normal interest-rate conditions in the U.S. or, indeed, the world. This is also true of the NSFR as it has yet to be finalized in several key markets, including the U.S., and most analyses of the practical impact of the NSFR (not the theoretical ones cited above) are very preliminary if undertaken at all. It is certainly possible that problematic effects of the liquidity rules in concert with the capital standards are masked now because very low interest rates and continued market fragility have flooded banks with deposits and thus facilitated compliance. When these core non-operational deposits perceive that higher-return, minimally-risky options are available (e.g., funding for business operations or for direct investment), banks could face far greater challenges complying with these rules and thus promoting market intermediation and transmitting monetary policy.

D. Large-Exposure Limits

Although the Basel Committee has finalized global credit-exposure constraints,[38] the impact of these rules is generally not considered in the U.S. because the FRB has yet to finalize the single-counterparty credit limits (SCCLs) required by the Dodd-Frank Act that were re-proposed in March, 2016.[39] Findings by global regulators[40] suggest that these rules could further reduce the willingness of banks to engage in secured transactions because of exposure limitations based both on outstanding credit and collateral holdings. As a result, these microprudential rules could create macroprudential risk through disincentives to obtain securities (e.g., collateral from any counterparty other than a sovereign or similar entity exempt from the SCCL).

The rule may also have an adverse effect on monetary policy by restricting the flow of cash to counterparties as a bank approaches its SCCL for that counterparty, which constrains expansions particularly in concentrated markets (e.g., inter-bank exposures). Because the U.S. proposal is more stringent than the global framework, these problems could be particularly acute here, especially for liquidity provided by very large U.S. banks to other very large U.S. or foreign banking organizations.

Further, due to the interplay of the liquidity and SCCL standards, reductions in inter-bank liquidity might be accommodated under stress only by resorting to the central bank, increasing financial-system reliance on the FRB even though the LCR and NSFR seek to solve for this with tighter treatment of central-bank funding than required by the global LCR. Central-bank risk also rises because weaker banks will return first to the FRB instead of relying on private-sector liquidity facilities.

The U.S. version of the SCCL also raises questions about the relationship of a standard usually considered a microprudential one with the broader framework of macroprudential rules discussed

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[37] FSOC, *2015 Annual Report*, *op. cit.* at 53-54.

[38] BCBS, *Standards: Supervisory framework for measuring and controlling large exposures* (April, 2014), available at http://www.bis.org/publ/bcbs283.pdf.

[39] FRB Single-Counterparty Credit Limits for Large Banking Organizations (Regulation YY), 12 C.F.R. § 252 (2016), available at http://www.federalreserve.gov/aboutthefed/boardmeetings/sccl-fr-notice-20160304.pdf.

[40] CGFS Market Committee, *Regulatory change and monetary policy*, *op. cit.* at 8, 10.

below. When the standards were reproposed in March of this year, FRB Gov. Tarullo indicated that further attention will be given to using SCCLs for macroprudential purposes. He did not elaborate on how this might be done nor on how the current counterparty-risk assessments in the more recent iterations of the U.S. tests would relate either to the SCCLs or any further macroprudential requirements. Toughening the SCCLs beyond the proposed levels for any reason would likely exacerbate the implications discussed above.

E. Cumulative Implications

As noted, several of the rules described above remain to be finalized in the U.S. or are being phased in, possibly diminishing their observable impact despite the usual practice of investors to forward-price these effects in ways that make pending rules often final in all but name. In addition, current U.S. macroeconomic conditions remain very challenging, with frequent incidents of market volatility or illiquidity further hampering clear signals about the lasting policy implications of the rules described above and others governing U.S. banking organizations. Preliminary observations suggest that the sum total impact of these rules may be:

- The gap may widen between policy-desired and market interest rates. Policy-rate changes could mute the difference between risk-free rates and overall market rates, but only if rates other than the risk-free rate respond as desired to policy signals. This is challenging if doing so requires going below the zero-lower bound, or if banks cannot respond to policy rates due to the cost of regulation and/or non-banks choose not to do so.
- Risk-based capital incentives and other regulatory effects may alter the sectoral distribution of bank assets (e.g., away from commercial loans for higher-risk entities), creating structural incentives for under-served markets to turn to non-banks. This is likely to mute both monetary-policy and macroprudential-regulatory effectiveness, with significant macroeconomic impact if employment-generating sectors remain under-served. Procyclicality could spike for sectors served by non-banks.
- Short-term unsecured markets are likely to contract due to the capital rules and LCR. Combined with the NSFR, these rules should also result in diminished supplies of cash to the market. This could heighten market volatility and reduce safe-haven depositories, creating both monetary-policy and macroprudential challenges.
- Where the leverage rule is the binding constraint (increasingly likely in the U.S. especially for custody and trading banks),[41] limits apply to participation in FRB facilities (e.g., holding excess reserves), countering policy implementation by altering pricing across repos and other instruments and increasing transmission reliance on non-banks. Because of the interaction between the leverage rule as a binding constraint and the liquidity rules in concert with current ultra-low interest rates, large U.S. banks are increasingly declining to accept large cash deposits, challenging efforts to raise rates as well as increasing macroprudential risk (i.e., funds that would ordinarily go into safe cash now seek other repositories).

[41] Federal Financial Analytics, *Where the Money goes and Why it Matters: The Market and Policy Impact of Reduced Custody-Bank Deposit Capacity* (August 4, 2015), available at http://www.fedfin.com/images/stories/client_reports/FedFin%20Study%20-%20The%20Market%20and%20Policy%20Impact%20of%20Reduced%20Custody-Bank%20Deposit%20Capacity.pdf.

- Market reliance on non-bank providers of credit is likely to impede the ability of the FRB to use the bank-lending channel for monetary policy implementation and to constrain the effectiveness of counter-cyclical macroprudential interventions.
- Demand for unsecured funding and assets is likely to rise vis-à-vis demand for secured obligations. Global regulators expect migration of repos to non-banking institutions and increased incentives for regulatory arbitrage.[42]
- Shortages in HQLAs caused by the liquidity rules and compounded by new margin requirements[43] may create demand for "collateral-management" services in which banks, hedge funds, insurance companies, and other market participants transform scarce HQLAs into complex financial products or "rehypothecate" (i.e., re-used) ones that create an array of financial-stability risks.[44]
- Monetary policies premised on reserve forecasting will be challenged by the cost of the leverage-capital requirement and varying incentives in the LCR and NSFR. Policy could thus prove more uncertain, making markets volatile, especially at quarter-end and/or under stress.
- Leverage-capital requirements may lead banks to hold small reserve balances when economic conditions permit alternative asset holdings, reducing reserve buffers and either increasing bank exposure to liquidity risk or making it much more costly for banks to comply with liquidity requirements.
- Leverage rules may also create incentives to hold higher-risk assets (e.g., non-governmental repo collateral) or to exit low-margin businesses (e.g., bilateral clearing) that are essential to financial stability and promote macroprudential objectives. Transition of some of these businesses to central counterparties (CCPs) may allay some risks, but presents significant macroprudential and orderly-resolution challenges.
- The CCyB might lead to divergence between policy and bank-credit rates if monetary policy seeks to expand growth and macroprudential requirements dictate overall market or sectoral constraints. U.S. financial-market arbitrage could also be exacerbated because only large banks would be subject to the CCyB, leaving smaller banks and non-banks unconstrained in terms of providing credit during problematic financial cycles and/or for assets experiencing price "bubbles."
- The more markets rely on non-banks not directly involved in monetary-policy operations or permitted to have access to the central bank, the greater the need will grow to rely on them for maximum employment and price/market stability. Implementation of central-bank mechanisms that do so (e.g., the RRP, market-maker-of-last-resort facilities) is likely to exacerbate asymmetries in market regulation that create longer-term stability risks due to the absence of both micro- and macro-prudential regulation for many such non-banks.

[42] CGFS Market Committee, *Regulatory change and monetary policy*, *op. cit* at 15.
[43] BIS Committee on Payments and Market Infrastructures (CPMI), *Developments in collateral management services*, 19 (September, 2014), available at http://www.bis.org/cpmi/publ/d119.pdf.
[44] International Organization of Securities Commissions (IOSCO), *Securities Markets Risk Outlook 2016*, 8 (March 2, 2016), available at http://www.iosco.org/library/pubdocs/pdf/IOSCOPD527.pdf.

II. Challenges to Monetary-Policy Implementation

Although academic literature and central-bank thinking continue to assess the reasons why monetary-policy implementation has proven so problematic around the world, a set of unique challenges applies to the Federal Reserve because of the nature of the U.S. financial system. As described above, the U.S. is not a "bank-centric" financial system – a sharply different financial-market configuration from most other nations confirmed again in the most recent FSB data on the relative size of "shadow banking" in different national financial systems. These data show that, as of end-2014, the shadow sector in the U.S. was approximately 64 percent of that of the banking sector, a significantly higher number than all other countries surveyed other than Ireland (where idiosyncratic factors distorted the data).[45] We focus here on how this structural factor may affect Federal Reserve monetary-policy operations, taking into account the overall manner in which these have changed since the crisis and potential forward-looking challenges.

In summary, although there are doubts about its effectiveness, the FRB has long relied on the interest-rate channel and its impact on bank lending (credit) to affect growth through its open-market operations. Because this traditional approach has proven singularly ineffective in the most recent crisis, the FRB has relied upon a new tool – accommodative policies involving its own balance sheet – but this too has proved problematic as economic recovery has taken far longer than the FRB hoped even after years of combined rates at or near the nominal zero lower bound (ZLB), sustained rates well below the real ZLB, and trillions in unprecedented FRB asset purchases.

The Federal Reserve has thus been forced not only to engage in quantitative easing, but also to consider untested strategies such as going below the nominal ZLB or relying on non-banks in programs such as the RRP. Because going below the ZLB is so unprecedented and new programs pose financial-stability risk, some central bankers[46] have suggested that nations simply do away with physical cash to solve for transmission problems. Limitations in the credit channel despite trillions in accommodative purchases have also prompted some central bankers to explore direct intervention in the fiscal policy of their national economies,[47] perhaps through actions such as purchasing assets that fund national priorities or using "helicopter money" to fund targeted projects (e.g., infrastructure). Some central banks (e.g., the European Central Bank) also purchase assets (e.g., higher-risk asset securitizations) in accommodative policies designed not only to spur growth, but also to promote targeted sectors, leading to concerns that central bankers are increasingly also central planners.

Each of these non-traditional policy pathways is highly controversial, in part because of the changes they force to market behavior and the threat to central-bank political independence. That the more dramatic of these solutions are even being contemplated points all too clearly to the challenges now confronting monetary-policy execution. Building on the analysis of how new rules affect demand for money and credit, it shall be shown here that the challenges to traditional monetary-policy execution derive in part

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[45] FSB, *Shadow Banking Monitoring Report*, *op. cit.* at 12.

[46] Bank of England (BoE) Chief Economist Andrew G. Haldane, *Speech at the Portadown Chamber of Commerce, Northern Ireland: How low can you go?* (September 18, 2015), at 11, available at http://www.bankofengland.co.uk/publications/Documents/speeches/2015/speech840.pdf.

[47] Adair Turner, *The Case for Monetary Finance – An Essentially Political Issue*, 1 (November 5, 2015), available at https://www.imf.org/external/np/res/seminars/2015/arc/pdf/adair.pdf.

from post-crisis rules that dramatically affect the ability of banking organizations to play their traditional role in the delivery of well-understood monetary-policy signals.

A. Challenges to Traditional FRB Policy Tools

Traditional monetary-policy transmission channels are generally known as the interest-rate channel and the credit channel (also called the bank-lending, balance-sheet channel or financial accelerator). Tightening is designed to drive up the cost of transaction accounts and pressure bank profit on them, leading banks' liabilities and thereby assets (i.e., loans) that would otherwise spur continued growth. In expansionary policy, reserve requirements conversely drop to encourage banks to lend more.

Reserves were long considered the binding constraint on interest rates because banks do not wish to hold sterile reserves (i.e., non-interest paying ones) beyond those required of them. However, in the last decade or so, banks have developed many alternative funding sources – e.g., MMFs, debt, repurchase agreements, Federal Home Loan Bank advances – not subject to reserve requirements and thus insulated from FRB pressures. As a result, tightening may not be effective because banks are able to continue to lend or expand their balance sheets via reserve-exempt liabilities.

The decision by the FRB during the crisis to use its new authority and pay interest on excess reserves (IOER) has to date also dramatically upset this longstanding equation, creating a monetary-policy tool that is non-traditional for the U.S. and discussed in more detail below. Although the FRB dropped the fed funds rate to zero to boost lending, banks are able to earn higher rates on excess reserves and thus have been unwilling for many reasons (including the regulatory ones described above) to deploy cheap liabilities into growth-producing assets.

Further, borrowers and investors no longer rely solely on banks as funding sources, meaning that – even if reserve changes flowed as before through bank balance sheets – funding-cost hikes on credit prices by banks might well not be matched by other providers of financing, especially other sources that focus on higher-risk sectors not well-served by banks and often especially in need of short-term credit when monetary policy tightens.

Higher reserves that work as intended are likely to reduce bank assets, but banks are not believed to be at risk nor would the economy suffer significant credit "crunches" because securities have been considered a source of secondary reserves – that is, banks that shrink reservable transaction-account balances could still fund at least some assets by selling government or other highly-liquid securities. However, new rules – the LCR,[48] the NSFR,[49] new margin and collateral rules[50] and others – now require banks to hold large books of HQLAs for other, non-discretionary purposes. Liquidity rules also strongly favor "core" deposits – many of which are reservable transaction balances. Because the liquidity rules are also particularly onerous for non-operational deposits, many banks are also reducing these additional funding sources. These combined changes may make the money channel more effective and stable to the extent markets rely on banks (which as demonstrated in this paper is uncertain at least

[48] 12 C.F.R. §§ 50, 249, & 329 (2014), *op. cit.*
[49] 12 C.F.R. §§ 50, 249, & 329 (2016), *op. cit.*
[50] Treasury, FRB, FDIC, Farm Credit Administration (FCA), & Federal Housing Finance Agency (FHFA) Margin and Capital Requirements for Covered Swap Entities, 12 C.F.R. §§ 45, 237, 349, 624, & 1221 (2015), https://www.fdic.gov/news/board/2015/2015-10-22_notice_dis_a_fr_final-rule.pdf.

under non-stress conditions), but the absence of the secondary securities liabilities cushion because these are now "marooned" for liquidity purposes could combine with greater bank responsiveness to rate changes to lead to sharp discontinuities in credit availability.

The second traditional channel – the bank-credit channel – is based on findings that monetary-policy changes with relatively small impact on long-term rates have sometimes had significant aggregate-demand effects. Research summarized in a recent paper[51] posits that the problem results from the costs of higher rates that then leads to deterioration in the condition of industrial and financial firms. This creates additional reductions in demand beyond those intended by increases in rates above the risk-free levels. The credit channel thus operates not through affecting bank liabilities by influencing reserves, but rather through directly affecting bank lending decisions.

For the bank-credit channel to work, the economy must either depend on banks or, as it did during the financial crisis, the FRB must open new facilities designed to expand lending outside the banking sector (e.g., via asset-backed commercial paper, finance companies, and other non-bank vehicles). This may counteract bank-regulatory limits on the extent to which banks can support expansion, but only at the risk of loss to the FRB and heightened moral hazard for non-bank providers of credit exempt from the microprudential rules described above and, as shall be shown below, also likely to be immune to macroprudential regulation.

Non-banks could to some degree substitute for banks as credit suppliers in expansionary policies. However, non-banks often rely on bank-related funding sources that are constrained by the liquidity and capital rules and on market funding (e.g., securitization) sharply reduced in stress scenarios. Non-banks also often specialize in specific lending sectors (e.g., insurance companies that focus on large commercial real estate projects), meaning that even well-funded non-banks that stick to their business model cannot replace capital-constrained banks to support broad based recovery. On the other hand, as the paper cited above notes, "To the extent that nonbank sources of credit are perfect substitutes for bank loans from the viewpoint of borrowers, borrowers will merely substitute these alternative sources of credit for bank loans when a tightening of monetary policy reduces the availability of bank loans."[52]

Securitization is a challenge to both the interest-rate and credit channels. Through it, the reserve and market drivers are blunted because bank originations are essentially funded by sales of loans to investors in asset-backed securities (ABS) and thus do not rely on transaction-account funding or, indeed, most of the other funding sources large banks have developed. Originations for ABS loans are also different because purchasers are often governmental agencies and GSEs insulated from market forces and subject to charter requirements unaffected by monetary-policy considerations. The ability of these agencies to create "private money" that offsets central-bank actions has also been found by a recent study to undermine traditional monetary policy.[53] Finally, as noted above, non-banks, especially the GSEs, have come to play major roles in an array of ABS sectors, further diminishing the impact of monetary-policy channels that rely on changing incentives only at banking organizations.

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[51] Joe Peek and Eric S. Rosengren, *The Role of Banks in the Transmission of Monetary Policy* (September 9, 2013), available at http://bostonfed.org/economic/ppdp/2013/ppdp1305.pdf.

[52] *Id*., at 7-8.

[53] Gary Gorton and Ping He, *Optimal Monetary Policy in a Collateralized Economy* (September 17, 2015), available at http://cms.sem.tsinghua.edu.cn/semcms/res_base/semcms_com_www/upload/article/image/2015_4/10_14/s27cifq9fyw1.pdf.

B. Challenges to the Non-Traditional Toolkit

As briefly described above, the traditional interest-rate and credit channels have significant challenges given the dramatic changes at both banks and across the U.S. financial system. As a result, the FRB was in fact forced in 2008 and thereafter to improvise, creating the aforementioned facilities for lending by non-banks because it became clear all too quickly not only how dramatically banks were being forced to reduce their assets under acute stress well outside the FRB's mitigation powers through traditional channels, but also how vital it was to ensure that non-banks sustained their credit-generating capacity. Although many of these crisis-era facilities were rapidly closed after the U.S. financial system escaped from the initial crisis, the failure of the interest-rate and bank-credit channels at the time suggests strongly that the FRB would need to reinvent them under comparable stress.

These FRB facilities were also not the only ones constructed for non-banks during the crisis. The U.S. Treasury was also forced to open a guarantee facility for MMFs when a relatively-small fund sank due to runs to protect the overall MMF sector. The FDIC created a debt-guarantee facility that backed liabilities across the financial system, extending an enormous safety net with long-lasting moral hazard implications even though it proved a crucial intervention containing market panic at the time. Again, these liability-focused facilities are closed, but similar structures could well be required under similar stress. Indeed, market changes since 2008 suggest that the U.S. Government might well need to establish still larger safety nets for non-banks.

After the U.S. financial system escaped from the initial crisis, the FRB's efforts proved insufficient to promote meaningful, sustained recovery. This reflects both the structural changes described above that led to the creation of these alternative monetary-policy and market-stabilizing facilities, but also the changes to market expectations and competitiveness resulting from their deployment. As a result, the Federal Reserve attempted to leverage traditional channels by engaging in a series of non-traditional policy efforts generally known as quantitative easing (QE), sometimes also described as the "floor" channel or quantitative targeting. QE could be deemed a policy through the traditional bank-lending channel, but its scope – the Federal Reserve held a balance sheet exceeding $4.4 trillion as of year-end 2015[54] – has ballooned the balance sheet to unprecedented and, some fear, dangerous size.

By this measure, QE has been non-traditional in scope. It is also non-traditional in that, to the extent it works through the credit channel, the Board does not rely on banks to spur economic activity.

The central bank's portfolio is comprised of U.S. Government securities and agency obligations, draining securities from secondary reserves in a manner more akin to the interest-rate channel despite its lack of effect on bank liabilities. In fact, bank deposits have soared in the crisis largely due to flight-to-quality and other drivers, but banks have not been able to deploy these liabilities into new, low-risk loans or even into holdings of agency and sovereign obligations that could be lent to other financial institutions (the supplementary leverage rule is punitive for these assets and the liquidity rules force banks to hold much of their HQLAs without encumbrance, blocking banks from putting them to economic use).

IOER has further blunted the traditional role of reserves as a binding constraint. The Board decided during the crisis to pay interest on excess reserves after receiving emergency authority to do so because

[54] FRB, *Federal Reserve Banks Combined Financial Statements As of and for the Years Ended December 31, 2015 and 2014 and Independent Auditors' Report*, 3 (March 8, 2016), available at http://www.federalreserve.gov/monetarypolicy/files/combinedfinstmt2015.pdf.

its sudden and extremely accommodative policies exerted downward pressure on federal funds, leading rates to deviate from the FRB's desired results.[55] Even as the crisis ebbed, banks proved unable to place deposit inflows into Treasury obligations or similar assets[56] and – more critical to growth – they were also often unable to find economically-productive, sound lending opportunities that met newly-toughened prudential and capital standards due to continued slow economic recovery and global market fragility.[57]

Banks now hold $2.4 trillion[58] in excess reserves, approximately 1,229 times their level at the beginning of the crisis. IOER has taken on such an important role that the FRB has felt compelled to add additional non-traditional tools to its monetary-policy arsenal: a term deposit facility (TDF) and the reverse-repo program.

The TDF has not been deployed beyond occasional FRB trials to determine its possible value; in it, the central bank accepts funds it then holds on deposit. However, the leverage ratio may well prove a binding constraint on the TDF since these deposits at the FRB are an asset comparable to excess reserves.

The RRP executes policy through non-traditional counterparties (e.g., MMFs and GSEs), creating significant financial-stability risk because the RRP supports large holdings by these non-banks even though none of these counterparties has traditional borrowing rights from the FRB or is directly affected by the traditional channels. Thus, if these RRP counterparties encounter liquidity or other problems, these cannot be reduced by the FRB resorting to the discount window. Reflecting this, the FRB intended to keep the RRP relatively small, but it quickly decided to expand it and eliminated the previous daily cap for RRP transactions of $300 billion, now making about $2 trillion of securities available for borrowing.[59] Shortly after the December, 2015 rate rise, the FRB absorbed a record $475 billion in reverse repos.[60] The minutes from the January, 2016 FOMC meeting on this action note considerable concern about the size of these operations, but also a determination to continue to use the RRP without limit as needed.[61] A recent paper makes clear that this will be a challenging task as rates rise, especially if IOER drives still more funds to the FRB.[62]

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[55] Morten L. Bech & Elizabeth Klee, *The Mechanics of a Graceful Exit: Interest on Reserves and Segmentation in the Federal Funds Market*, 58 Journal of Monetary Economics no. 5, (December 2009), available at https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr416.pdf.

[56] Federal Financial Analytics, *Where the Money goes and Why it Matters: The Market and Policy Impact of Reduced Custody-Bank Deposit Capacity, op. cit.*

[57] Javier Bianchi and Saki Bigio, *Banks, Liquidity Management, and Monetary Policy* (September, 2014), available at https://www.minneapolisfed.org/research/sr/sr503.pdf.

[58] FRB, *Federal Reserve Statistical Release: H.3. Aggregate Reserves of Depository Institutions and the Monetary Base* (March 17, 2016), available at http://www.federalreserve.gov/releases/h3/20160317/default.htm.

[59] Eric Platt, *Record $475bn parked with Fed at year end*, Financial Times, December 31, 2015 at http://www.ft.com/intl/cms/s/0/55511d1c-aff2-11e5-b955-1a1d298b6250.html#axzz3zaO55NJc.

[60] *Id*.

[61] Federal Open Market Committee (FOMC), *Minutes of the Federal Open Market Committee, January 26-27, 2016*, 9 (February 17, 2016), available at http://www.federalreserve.gov/monetarypolicy/files/fomcminutes20160127.pdf.

[62] Roc Armenter and Benjamin Lester, *Excess Reserve and Monetary Policy Normalization* (September 15, 2015), available at https://www.philadelphiafed.org/research-and-data/publications/working-papers/2015/wp15-35.pdf.

In accommodative policy, the FRB's primary challenge is to use IOER and the RRP to ensure an orderly exit. Neither of these new tools solves for the fundamental challenge of executing macroeconomic growth and price stability. As a result, a newly-clarified "risk-taking" channel has developed in which bank lending is expected to be affected by changes in risk appetite that result partly from traditional monetary policy and partly from the impact of new rules. In essence, this risk-taking channel is a hybrid between monetary policy and macroprudential regulation. Because the rules to which the central bank would turn in this channel are most likely the regulatory-capital ones, this channel is sometimes also called the bank-capital channel.

It is far from clear that this new channel – only recently recognized by academics and just now considered by the FRB – will function. Given the limits of both the interest-rate and bank-lending channels, the risk-taking one would be particularly challenging in expansionary policies because of prudential requirements and certain statutory restrictions applicable to the largest banks. Unless the FRB decided to ease these rules to promote monetary policy without regard to financial stability, non-banks could prove most responsive to expansionary policies given the absence of capital requirements, but this would create financial-stability concerns all too evident in the "yield-chasing" in the financial market occurring as new capital rules are put into place while extremely accommodative traditional and non-traditional policies drop rates to the ZLB or perhaps even below it. Dropping rates below the ZLB to promote expansion could also place banks under acute earnings pressure, complicating monetary-policy transmission and, if negative rates are sustained, creating additional financial-stability concerns.

Use of the risk-taking channel is even more uncertain in tightening scenarios. If the FRB is dissatisfied with the risk-appetite incentives resulting from its own regulations, it could of course tighten the rules still further on banks to restrict lending. It is unclear, however, if this would have that effect or simply create still more scope for non-banks. Further, it is possible that still more stringent prudential rules could prove so onerous that they undermine bank viability – the lower the profit investors expect, the less they invest in banks, the weaker banks grow, and the more fragile the financial system could well become. Non-banks can and have supported asset growth during expansionary policies, albeit at long-term risk to monetary policy and financial stability, but their own business incentives and insulation from monetary-policy drivers make them less responsive to tightening and thus makes the risk-taking channel potentially very procyclical.

III. Monetary Policy and Financial Stability

It might be argued not only that the risk-taking channel can protect financial stability, but also that the challenges to implementing effective macroprudential regulation (see below) may be countered through the use of monetary policy aimed expressly at reducing procyclicality. There is, however, considerable debate about whether monetary policy can or should be targeted to secure financial stability instead of or in addition to promoting macroeconomic growth and price stability. The FRB often considers financial stability in setting monetary policy,[63] but that does not necessarily mean that it also sets monetary policy to enhance financial stability, only that market conditions inform decisions based on traditional objectives.

[63] Joe Peek, Eric S. Rosengren, and Geoffrey M.B. Tootell, *Should U.S. Monetary Policy Have a Ternary Mandate?*, 1 (October 2, 2015), available at https://www.bostonfed.org/macroprudential2015/papers/Rosengren-Peek-Tootell.pdf.

Some global officials believe an entirely new focus on preserving financial equilibrium should be the prime directive of monetary policy, essentially using the same tools to transmit monetary policy and ensure financial stability.[64] To understand if this is possible in the U.S., it is critical to assess if monetary policy could reasonably be expected to "lean against the wind" to preserve financial stability. All of the changes to the U.S. financial system that challenge monetary policy, the risk-taking channel's problems, and financial-stability risk due to the RRP combine to make this a dubious proposition even if political judgments concur with an expanded central-bank role. We thus here do not address a new U.S. monetary-policy structure with what would prove a triple mandate, assessing only how changes to U.S. financial intermediation and all the forces affecting monetary-policy implementation may affect efforts to use more traditional monetary-policy channels to enhance financial stability. We draw heavily here on FRB research in this area.

A. Challenges to Monetary-Policy Efforts

Many of the questions affecting use of monetary-policy channels for financial-market stability are akin to those evaluated in more detail below for macroprudential policy. This is unsurprising since any monetary-policy reorientation for macroprudential objectives would have the same goal: limiting the adverse effects of procyclicality and smoothing the financial and business cycles to the greatest extent possible. Critical considerations include:

- the extent to which financial-stability goals (to the extent these are made clear) alter underlying macroeconomic expectations (e.g., on the likelihood of inflation);[65]
- the extent to which monetary-policy objectives (e.g., curbing inflation) conflict with actions to ensure stable financial markets (e.g., more growth). It may also be particularly challenging to raise rates to correct for yield-chasing (a significant financial-stability challenge) when growth is lackluster;
- obstacles to measurement of "excessive" financial risk. Research and central-bank thinking remain uncertain as to which indicators signal significant procyclicality versus those that reflect altered risk appetites that market losses or gains will correct. As discussed in more detail below, these risk indicators differ dramatically by national-market factors, regulatory jurisdiction, and political or policy considerations;
- uncertainty as to which changes in financial market indicators (once identified) result from technological innovations that will work their way through the market to enhance efficiency or customer service versus those that pose substantive threats to market stability that then could be altered through the interest-rate, bank-credit, or novel monetary-policy delivery channels better than may be possible through micro- or macro-prudential regulation;
- uncertainty also as to which changes to financial-market indicators (assuming again that these are agreed upon) may be attributed to broad market factors that could be offset by monetary policy versus those that might best be handled through macroprudential intervention (e.g., higher capital requirements for a financial-industry sector) or supervisory

[64] Claudio Borio, *BIS Working Paper No. 440: Monetary policy and financial stability: what role in prevention and recovery?* (January, 2014), available at http://www.bis.org/publ/work440.pdf.
[65] Federal Financial Analytics, *What Negative Rates Do to Financial Stability* (September 8, 2015), available at http://www.fedfin.com/images/stories/client_reports/FedFin%20Policy%20Brief%20-%20What%20Negative%20Rates%20Do%20to%20Financial%20Stability.pdf.

intervention (e.g., for a single activity or institution of size or scope sufficient to threaten market stability);

- doubts about how well central banks could "take the punch bowl away" from large financial-market players, given that doing so compounds threats to their political independence when similar efforts aim at stabilizing macroeconomic conditions;
- the need to know how to differentiate cyclical threats to market stability that may only be amenable to monetary policy from structural challenges (e.g., problematic weightings in risk-based capital requirements, liquidity challenges to MMFs, etc.);
- the uncertain interplay between monetary and fiscal policy, taking into account how monetary policy could correct for fiscal problems such as undue austerity or stimulus with or without additional macroprudential intervention; and
- the questionable ability of macroprudential policies to on their own ensure cyclical and/or structural stability. This issue will be addressed in detail below.

A recent paper from the International Monetary Fund (IMF) seeks to lay out financial indicators to guide monetary policy for financial-stability goals,[66] but it readily acknowledges that its thinking is very preliminary and that considerably more research is warranted on these issues as well as those outlined above.

B. Federal Reserve Research

Thinking continues to evolve at the Federal Reserve as to the role of monetary policy for financial-stability purposes. Chair Yellen's views are equivocal, arguing that the central bank should rely on macroprudential standards unless or until it is clear that these prove insufficient, when monetary policy could, she said, "get in the cracks" of the macroprudential framework.[67] The President of the Federal Reserve Bank of San Francisco, John Williams, has put this more succinctly, saying that, "Monetary policy is poorly suited for dealing with financial stability concerns, even as a last resort."[68] FRB Vice Chairman Fischer is also skeptical of monetary policy as a macroprudential tool except when asset-price bubbles are evident across the economy and can clearly be addressed by interest-rate changes.[69] Former FRB Governor Stein, however, backed his research[70] on monetary policy with public statements while on the Board strongly supporting the use of monetary policy to address asset-price

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[66] International Monetary Fund (IMF), *Monetary Policy and Financial Stability* (September, 2015), available at http://www.imf.org/external/np/pp/eng/2015/082815a.pdf.

[67] FRB Chair Janet L. Yellen, *Speech at the 2014 Michel Camdessus Central Banking Lecture, International Monetary Fund, Washington, D.C.: Monetary Policy and Financial Stability* (July 2, 2014), available at http://www.federalreserve.gov/newsevents/speech/yellen20140702a.htm.

[68] Federal Reserve Bank of San Francisco (FRB-SF) President and CEO John C. Williams, *Speech at the Symposium on Asian Banking and Finance, Singapore, Singapore: Macroprudential Policy in a Microprudential World* (May 28, 2015), available at http://www.frbsf.org/our-district/press/presidents-speeches/williams-speeches/2015/may/macroprudential-policy-microprudential-world/.

[69] FRB Vice Chairman Stanly Fischer, *Speech at the annual Meeting of the American Economic Association, San Francisco, CA: Monetary Policy, Financial Stability, and the Zero Lower Bound* (January 3, 2016), available at http://www.federalreserve.gov/newsevents/speech/fischer20160103a.htm.

[70] Jeremy C. Stein, *Monetary Policy as Financial Stability Regulation*, 127 The Quarterly Journal of Economics 57, 89 (January, 2012) at http://scholar.harvard.edu/files/stein/files/qje-2012.pdf?m=1401745178.

bubbles.[71]

Reflecting this debate, the Federal Reserve Banks, in tandem with the Board of Governors, last year evaluated the effectiveness of both monetary policy and macroprudential tools to address financial stability.[72] We will turn to the study's conclusions on macroprudential actions, but these are informed by findings on whether monetary policy can effectively stabilize financial markets. The FRB study found that monetary policy could act more decisively than macroprudential policy since it relies only on the Federal Reserve's own actions, not the inter-agency deliberations that impede macroprudential rules resulting from the structure of U.S. financial regulation and the significant exemptions and variations within it. However, monetary policy is still found to be problematic as a tool to protect financial stability because:

- monetary policy does not well address specific asset-class or sectoral concerns;
- there may be conflicts between monetary-policy and financial-stability objectives; and
- there appear to be unintended effects on the risk-taking channel (e.g., empowerment of non-banks, incentives for banks to hold higher-risk assets to compensate for the earnings problems resulting from more stringent capital rules).

IV. Macroprudential Policy

As laid out in the FRB's table-top exercise, the goals of macroprudential policy are to prevent or counter:

> fire sales in financial markets, destabilizing runs on banking and quasi-banking institutions, shortages of money-like assets, disruptions in credit availability to the non-financial business sector, spikes in risk premia, disorderly dissolution of systemically important financial institutions, excessive spillovers from disruptions in international funding and currency markets, and disruptions of the payments system.[73]

None of these goals is clarified with specific targets akin to those used for monetary policy (e.g., inflation targets), but all are ambitious ones that are not always shared by global policy-makers. The head of the BIS, Jaime Caruana, has cautioned that macroprudential tools may work well to advance financial stability but are challenged when seeking to constrain macroeconomic cycles.[74] Another BIS official

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[71] FRB Governor Jeremy C. Stein, *Speech at the "Restoring Household Financial Stability after the Great Recession: Why Household Balance Sheets Matter" research symposium sponsored by the Federal Reserve Bank of St. Louis, St. Louis, MO: Overheating in Credit Markets: Origins, Measurement, and Policy Responses* (February 7, 2013), available at http://www.federalreserve.gov/newsevents/speech/stein20130207a.htm.

[72] Tobias Adrian, Patric de Fontnouvelle, Emily Yang, & Andrei Zlate, *Macroprudential Policy: Case Study from a Tabletop Exercise* (December, 2015), available at https://www.bostonfed.org/bankinfo/qau/wp/2015/qau1501.pdf.

[73] *Id*., at 3-4.

[74] BIS General Manager Jaime Caruana, *Speech at the Tenth High-Level Meeting for the Middle East and North Africa Region on "Global banking standards and regulatory and supervisory priorities," Abu Dhabi, UAE: Macroprudential policy: opportunities and challenges* (December 9, 2014), available at http://www.bis.org/speeches/sp141219.pdf.

goes farther, arguing that macroprudential regulation is only a different "philosophy/orientation" of microprudential regulation, not something substantively apart from it.[75]

As these comments and the broad FRB definition suggest, the line remains blurred between micro- and macro-prudential rules, complicating both meaningful implementation beyond individual institutions under express prudential regulation and threatening the extent to which macroprudential standards can do more than compound the unintended consequences of microprudential rules and complicate monetary-policy transmission.

A key challenge thus for the FRB is to specify in a clear policy statement what it intends macroprudential regulation to do so that its efficacy can be better assessed in light of the obstacles to macroprudential regulation discussed in more detail below in concert with potential unintended consequences. A critical question obscured by the diffuse nature of the FRB's goals is the extent to which macroprudential regulation has any chance of success given the significant role of non-banks. A new Basel Committee study concludes that tough capital and liquidity rules enhance bank resilience only if it is clear that banks may draw down their buffers under stress – uncertain in the U.S. – and that overall macroprudential regulation is a questionable backstop to bank risk because of the role of shadow banks.[76] A new IMF study[77] provides the first attempt to empirically assess the impact of macroprudential rules, finding that different instruments (see below) have different effects, but that the compound impact of macroprudential rules applied only to banks does not effectively "lean against the wind" because non-banks replace banks as credit providers in advanced economies. It is unclear if this not only undermines counter-cyclical goals, but also creates systemic risk, but the IMF paper notes that significant changes to non-bank regulation may be warranted to ensure that this substitution effect does not in fact pose a broader threat to financial stability.

In this section, we consider the ambitious goals set for U.S. macroprudential regulation to assess:

- how well some or all of current U.S. policies achieve some or all of these goals; and
- the extent to which microprudential requirements create macroprudential risk that may be exacerbated by the potential conflicts between microprudential rules and monetary policy described above.

A. Micro- and Macro-prudential Conflicts

The line between micro- and macro-tools is not always clear – for example, stress tests and liquidity buffers have elements of each. The CCyB is seen by many as the most clearly macroprudential tool in the FRB's kit, but some at the FRB believe its principal value is to protect individual banks, essentially making it microprudential. For example, FRB Vice Chairman Fischer recently said that, "the higher levels

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[75] Claudio Borio, *Speech at the SUERF-Deutsche Bundesbank-IMFS Conference "SSM at 1," Frankfurt, Germany: Seven don'ts and one hope: The nexus between prudential and monetary policies* (February 3, 2016), available at http://www.bis.org/speeches/sp160203_slides.pdf.

[76] BCBS, *Literature review on integration of regulatory capital and liquidity instruments*, op. cit.

[77] Janko Cizel, Jon Frost, Aerdt Houben, & Peter Wierts, *Effective Macroprudential Policy: Cross-Sector Substitution from Price and Quantity Measures* (April, 2016), available at http://www.imf.org/external/pubs/ft/wp/2016/wp1694.pdf.

of capital [i.e., in the CCyB] would increase the resilience of the largest banks because they would be better positioned to absorb the losses."[78]

Micro- and macro- tools are meant to complement each other by creating strong institutions that reinforce positive incentives and resilience across the financial system as a whole, perhaps explaining some of the confusion between these regulatory categories. However, OFR has observed that micro- and macro tools can also conflict, finding that, "[W]hen banks are subject to multiple capital and liquidity regulations, their decision-making in a crisis — for example, whether to sell assets or raise capital — could be affected by which limit they are closest to violating as well as the type of financial shock."[79] The mechanism at work here leads each bank on its own to ensure it meets microprudential standards that deprive markets of liquidity under stress and constrain bank ability to provide market-stabilizing services (e.g., market-making operations and securities financing). Margin requirements are generally seen as microprudential standards that protect individual institutions or clearing counterparties, but they can also have conflicting effects by leading banks subject to capital requirements on cash or other collateral provided by counterparties to reduce their willingness to support settlement-and-clearing services that ensure market function and permit cost-effective risk hedging.[80] Time-variant margin requirements (i.e., those that would be raised or lowered based on procyclicality fears) are more clearly macroprudential, but would similarly interact with bank capital and liquidity rules, as well as with large-exposure limits, and thus potentially prove very challenging to implement to desired effect when macroprudential goals suggest lower margins, but these margins are not allowed under microprudential standards.

The integration of micro- and macro-prudential rules is also complicated by interactions among micro tools. For example, the leverage capital standards stipulate high capital charges against cash and the sovereign and low-risk assets counted as HQLAs, meaning that banks coming up to the SLR will seek to reduce HQLAs even if market conditions warrant greater liquidity. Conversely, the HQLA requirements could lead banks to hold higher-risk assets when the risk-based capital rules are not a binding constraint in hopes of countering the cost of the leverage requirement on HQLA stocks. Numerous other conflicts – e.g., those generated by the NSFR for matched-book repos and those in both the LCR and NSFR for held-to-maturity HQLAs – also create risk incentives for unsecured or unhedged positions and for classifying assets in ways that significantly diminish the ability of a bank to liquidate its HQLAs under stress, creating macroprudential consequences when the sum total of microprudential rules is considered.

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[78] FRB Vice Chairman Stanly Fischer, *Monetary Policy, Financial Stability, and the Zero Lower Bound*, *op. cit.*

[79] OFR, *2015 Financial Stability Report*, *op. cit.* at 42.

[80] The chairman of the U.S. Commodity Futures Trading Commission (CFTC), Timothy Massad, has observed that, "there is a concern that the requirements are driving business decisions, such as about whether a clearing firm can afford to maintain certain customers, or be in the business at all. And if the clearing member industry becomes weaker, then it may become harder to address the very concerns about clearinghouse resiliency that these workstreams are considering."[81]

[81] CFTC Chairman Timothy Massad, *Speech at the CME Group Global Financial Leadership Conference, Naples, FL: Remarks of Chairman Timothy Massad* (November 16, 2015), available at http://www.cftc.gov/PressRoom/SpeechesTestimony/opamassad-34.

B. Macroprudential Tools

The following is a brief description of macroprudential actions implemented and under consideration by U.S. and global banking regulators. They are differentiated into structural tools (the principal focus in the U.S.) and counter-cyclical ones, consistent with the initial goal of post-crisis macroprudential standards as prophylactics against procyclicality.

1. Structural Tools

These are designed to make financial markets as a whole more resilient, although as discussed they are often part and parcel of or linked to microprudential standards. They include:

- Stress Tests: These are a combination of micro- and macro-prudential instruments because the FRB's supervisory and company-run stress tests[82] are aimed both at ensuring that each tested banking organization is resilient and that "horizontal" issues across the banking and financial systems are identified. Because of the critical importance to investors of capital distributions – which can be barred if the FRB is dissatisfied with stress-test results – these tests are the binding constraint on large-BHC capital. They thus exacerbate the challenges identified above in the discussion of microprudential regulation. Further, stress tests now only apply to large banks, limiting their macroprudential effect because the FRB has few tools with which to address problems identified in the horizontal review outside its regulatory purview and limited ability to spot emerging risks beyond those observed at big banks. To the extent FRB models dictate bank credit allocation and trading strategies, they may also correlate risks across the banking sector, a particular concern when risks addressed by the stress tests (principally credit and market) are correlated with risks outside the stress-test scope (e.g., liquidity and operational risk). A BIS official has also worried that stress tests are poor macroprudential tools because they only capture those forward-looking risks that regulators already foresee.[83]
- Moral Suasion: Akin to forward guidance for monetary-policy purposes, moral suasion for macroprudential goals would involve statements from the Federal Reserve and, if possible, other regulators and policy officials highlighting growing concerns about financial stability. Such statements would, it is hoped, lead senior management and directors across the scope of financial-services firms to reduce risk even if not directly required to do so. In the limited instances in which the Financial Stability Oversight Council established by the Dodd-Frank Act has sought to do so (e.g., with regard to MMF risk), the response to such statements both from relevant prudential regulators and the industry has been far from acquiescent.
- Sector Specific Guidance: Examples here include a series of edicts from the banking agencies on leveraged lending[84] and commercial real estate (CRE).[85] Although bank

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[82] FRB Amendments to the Capital Plan and Stress Test Rules, 12 C.F.R. §§ 225 & 252 (2015), available at http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20151125a1.pdf.

[83] Claudio Borio, *Presentation at the Bank of Italy Conference: Macroprudential policies: What have we learnt?* (November 24, 2015), available at http://www.bis.org/speeches/sp151124_slides.pdf.

[84] FRB, FDIC, *Interagency Guidance on Leveraged Lending* (2013), available at https://www.fdic.gov/news/news/press/2013/FR-LL-Preamble-and-Guidance.pdf.

[85] FRB, FDIC, OCC, *Statement on Prudent Risk Management for Commercial Real Estate Lending* (2015), available at http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20151218a1.pdf.

regulators tried to limit bank CRE lending before the financial crisis[86] with no apparent success, only the leveraged-lending guidance has been deployed by U.S. regulators since the crisis for long enough to assess its value as a macroprudential tool. OFR has found that, while banks reduced their risk, the standards created "opportunity for nonbank entities not subject to the guidance such as CLOs, private equity firms, and business development companies to expand their participation in the riskiest deals, particularly in the middle-market segment."[87] As a result, procyclicality in corporate finance was addressed only to a limited degree by these bank-specific standards. It remains to be seen if the CRE guidance will have meaningful effect given the significant role of insurance companies, real estate investment trusts (REITs), and other non-banks in this arena. Reflecting these concerns, FRB Gov. Jerome Powell has argued[88] that initiatives that seek to "lean against the wind" related to credit risk should be sparingly used and only when it is obvious that counter-cyclical risks can be addressed through bank-specific actions.

- Sector-Specific Risk-Based Capital Ratios: It is possible that regulators could alter the RBC requirements for specific assets or asset categories when the ordinary risk expectations on which the capital rules are premised appear to be out of whack due to yield-chasing or other macroprudential concerns. As with microprudential RBC requirements, the higher these macroprudential risk-based ones, the more likely it is that non-banks will hold covered assets. However, because risk weightings for macroprudential purposes might not be aligned with market judgments of economic risk, regulatory-arbitrage incentives would be higher.

2. Counter-Cyclical Tools

Of more limited use to date in the U.S., these include:

- Counter-Cyclical Capital Buffers: The CCyB has recently been proposed by the FRB for BHCs with assets above $250 billion under circumstances to be determined on an apparently case-by-case basis by the FRB.[89] The substance of this proposal combined with other FRB rules (e.g., stress testing) suggest that the CCyB's macroprudential benefits may be muted or even negligible because the buffer may well become another *de minimis* capital requirement despite provisions in the proposal indicating it will be removed as needed. The CCyB's counter-cyclical systemic benefits are also questionable if its principal result is in fact to make individual banks still stronger as Mr. Fischer suggested, since – as his U.S. credit-market table provided above makes clear – banks in general provide only one-third of U.S. credit and the CCyB is not applicable to all banks. Even if the CCyB proves effective as a macroprudential constraint on U.S. banks, the FRB's table-top exercise notes that it is weakened by regulatory arbitrage (e.g., ready access by borrowers to the bond market and

[86] OCC, FRB, FDIC, *SR 07-1: Concentrations in Commercial Real Estate Lending, Sound Risk Management Practices* (December 12, 2006), available at http://www.federalreserve.gov/boarddocs/srletters/2007/SR0701a2.pdf.
[87] OFR, *2015 Financial Stability Report*, *op. cit.* at 64.
[88] FRB Governor Jerome H. Powell, *Speech at the Stern School of Business, New York University, New York, New York: Financial Institutions, Financial Markets, and Financial Stability* (February 18, 2015), available at http://www.federalreserve.gov/newsevents/speech/powell20150218a.htm.
[89] 12 C.F.R. § 217 Appendix A, *op. cit.*

competition from shadow banks and international lenders). The U.S. CCyB is at odds with the global approach in key respects,[90] as well as the newly-adopted U.K. requirements.[91]

- Counter-Cyclical Liquidity Buffers: The LCR and NSFR are both micro- and macro-prudential rules in that they require each bank to be resilient in idiosyncratic and liquidity-stress events, with these requirements buttressed by systemic liquidity rules[92] expressly focused on liquidity resilience across the financial cycle. In addition, as the table-top study notes, higher liquidity requirements, including those in the NSFR, run counter to enhanced credit availability, creating a macroprudential vise if stress is occurring across the financial system as was the case in 2007-11.
- Time-Variant Margin Requirements: These have been suggested by FRB officials[93] in expectation that these would curtail what a former FRB chairman once called "irrational exuberance."[94] The mechanism for implementing them has not been framed, making their impact uncertain. The impact of time-variant margin requirements will also depend on the extent to which the FRB can impose them across the spectrum of trading and clearing firms. Given its limited jurisdiction, this is uncertain.
- Time-Variant Sectoral Guidance: The guidance referenced above is generally issued when regulators fear undue credit expansion, but it is not removed when market conditions tighten. Counter-cyclical sectoral standards – e.g., sanctions that clearly will be removed when stability returns – have yet to be deployed in the U.S. It is unclear how effectively counter-cyclical these could in fact be due to the time it takes to reach meaningful agreement among different regulators and then to issue regulatory actions under applicable procedures.
- Time Varying Risk-Based Capital Standards: These would similarly not just be applied when risks are building up, but also come off when conditions tighten. They also have yet to be used in the U.S. Time-lag and jurisdictional concerns also apply here.
- Dividend Restrictions: A BIS official has proposed these as counter-cyclical macroprudential tools.[95] He did not elaborate, but presumably means that capital ratios and/or stress tests could be adjusted to force capital retention under certain conditions. The FRB believes its stress tests meet this objective since scenarios are changed based on forward-looking risk assessments, although to date the tests have only been made more stringent and thus do not support expansionary policy. It is unclear that they would or could do so as it is likely that the FRB would have significant concerns about allowing large BHCs to distribute capital after a stress event out of fear that another one may lurk around the corner. As noted above, stress tests to date have only gotten tougher even though the FRB has conducted

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[90] BCBS, *Basel III: A global regulatory framework for more resilient banks and banking systems*, 57-60 (June, 2011), available at http://www.bis.org/publ/bcbs189.pdf.

[91] Bank of England Financial Policy Committee, *Supplement to the December 2015 Financial Stability Report: The framework of capital requirements for UK banks*, 15-21 (December 1, 2015), available at http://www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrsupp.pdf.

[92] 12 C.F.R. §§ 252(D), *op. cit.*

[93] FRB Governor Lael Brainard, *Speech at the Hutchins Center on Fiscal and Monetary Policy, The Brookings Institution, Washington, DC: The Federal Reserve's Financial Stability Agenda* (December 3, 2014), available at http://www.federalreserve.gov/newsevents/speech/brainard20141203a.htm.

[94] FRB Chairman Alan Greenspan, *Speech at the Annual Dinner and Francis Boyer Lecture of The American Enterprise Institute for Public Policy Research, Washington, DC: The Challenge of Central Banking in a Democratic Society* (December 5, 1996), available at http://www.federalreserve.gov/boarddocs/speeches/1996/19961205.htm.

[95] Claudio Borio, *Speech at the SUERF-Deutsche Bundesbank-IMFS Conference*, *op. cit.*

aggressive and non-traditional expansionary monetary policy since the tests were introduced in 2009.

Other nations have also used sector-specific tools such as loan-to-value (LTV) and/or debt-to-income (DTI) ratios to limit home-price bubbles or other worrisome trends with macroprudential impact. Although uncertain as to their macroprudential benefit as counter-cyclical tools, global regulators view these as more effective than capital requirements in restraining risk, noting that the Swiss experience with a CCyB had little impact on mortgage cyclicality even though it improved bank resilience.[96] A BIS study of these limits in Japan found them more effective from a counter-cyclical perspective, but suggested this might have been the case because Japan is so dependent on bank-provided credit.[97] This is a particularly important consideration in the U.S. – the FRB's table-top exercise[98] found that these tools would not prove successful in the U.S. In addition to requiring considerable inter-agency cooperation, the U.S. has GSEs, the Federal Housing Administration, and other mortgage-related facilities that would be barred by law or significantly constrained from complying with any such limits. Mortgage finance business would thus move even more quickly from banks to non-banks and then on to the government's books.

C. Challenges to Effective U.S. Macroprudential Regulation

In addition to the potential conflicts between monetary policy and macroprudential regulation and those between micro- and macro-prudential regulation, challenges to macroprudential regulation include:

- "Financialization:" Many once-physical activities have become "financialized" – that is, converted into assets that can be readily traded or exchanged in financial markets as opposed to physically transported for sale and purchase. Physical-trade risk has long been financial in that goods are produced, bought, and sold with the support of loans, meaning that the inability of large companies, producers, or suppliers to honor their debt obligations can and has posed systemic risk (e.g., the "LDC" debt crisis in the 1980s, frequent boom-bust cycles sparked by energy prices). Equity instruments also "financialize" risk (e.g., the "dotcom" bubble). However, the growing reliance on derivatives to hedge and trade risk related to physical-commodity transactions adds a new dimension to these systemic-risk drivers, especially given the significant shift in recent years of commodity trading from commodity producers to banks, hedge funds, and other entities that creates another potential risk driver (possibly accelerated by mark-to-market accounting) not yet well recognized in macroprudential-regulatory considerations.
- Concentrated Non-Bank Risk: Given the application of capital, liquidity, and large-exposure rules only to banks and the continued absence of stress tests and resolution protocols for CCPs and other non-bank clearing entities, risk is shifting due to both policy and regulatory factors from dealer banks to these new entities. The transition improves microprudential stability and market transparency, but concentrates risk in new entities that may pose both

[96] Jaime Caruana, *Speech at the Tenth High-Level Meeting for the Middle East and North Africa Region*, *op. cit.*
[97] Katsurako Sonoda and Nao Sudo, *Is macroprudential policy instrument blunt?* (January, 2016), available at http://www.bis.org/publ/work536.pdf.
[98] Tobias Adrian et al., *Macroprudential Policy: Case Study from a Tabletop Exercise*, *op. cit.*

micro- and macro-prudential risks that to date has been only minimally addressed by these central clearing entities and their functional regulators. Further, anticipated limits on banks in areas such as repos are leading to consideration of additional central-clearing entities that may also pose significant macroprudential risk if implemented without advance planning. New technologies (e.g., blockchain) may also concentrate risk in unanticipated ways, especially if providers of clearing, settlement, and/or payment services cannot or do not invest in cybersecurity or otherwise establish operational-risk safeguards.

- Charter and Political Obstacles: The U.S. has a strong predisposition to promoting credit availability, especially in sectors such as residential real estate, that create an array of obstacles to implementing macroprudential rules outside regulated banks (and sometimes even for them due to strong inter-agency conflicts among federal and state agencies). Further, even if some regulators see a macroprudential risk and wish to address it, it is not clear that they have the statutory authority to do so. For example, the charter of the Securities and Exchange Commission (SEC)[99] stipulates that its focus should be, among other things, on "capital formation." Acting to constrain capital formation for counter-cyclical purposes is thus likely to be called into question.
- Time Lags: It may take time for regulators first to spot emerging macroprudential risks and then to demand and thereafter to achieve compliance with the relevant macroprudential tool. In most such cases (see above), implementation will be significantly complicated, if not compromised, by regulatory jurisdictional and political challenges. Even where these do not apply, what we will call macropolitical forces – e.g., strong constituencies for residential housing, commercial real estate, small-business lending – could counteract macroprudential interventions or, even where regulators have unassailable power to impose them, lead to undesirable delay or leniency.
- Indicators: The Basel Committee's final capital rules[100] use a ratio of assets to gross domestic product (GDP) measure to trigger the CCyB, but the FRB's rule would, as noted, leave this solely to the Board's discretion. Research cited above[101] indicates no consensus as to which indicator(s) signal procyclicality, especially on a forward-looking basis that correctly recognizes that old trouble spots (e.g., residential mortgages) may not be the new ones threatening financial stability.
- Cross-Border Harmonization: Even if the U.S. implements effective macroprudential standards, foreign financial-services firms doing business here may not be covered by them if sanctioned lending or other financial products are domiciled outside the U.S. Home- or host-country regulators could in theory solve for this by applying U.S. sanctions to U.S. assets housed under their jurisdiction, but no agreement to ensure this has been proposed, let alone implemented across the sphere of relevant financial products that may pose macroprudential risk.
- Goals: As noted, the table-top study lays out a panoramic vision of the value of macroprudential regulation not necessarily shared by senior FRB officials or global regulators. Given the growing focus on macroprudential tools due to the limits on the ability of monetary policy to secure financial stability, clarity on these goals and a statement about which indicators best signal emerging risk would help to ensure an effective, forward-looking macroprudential framework.

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[99] Securities Exchange Act of 1934 § 4, 15 U.S.C. § 78(d) (2012), available at https://www.sec.gov/about/laws/sea34.pdf.

[100] BCBS, *Basel III: A global regulatory framework for more resilient banks and banking systems, op. cit.*

[101] IMF, *Monetary Policy and Financial Stability*, *op. cit.* at 31.

Reflecting all these challenges, one global regulator has proposed hard-wiring macroprudential constraints so that they can be quickly deployed as needed regardless of competing regulatory jurisdictions and interests.[102] The President of the Federal Reserve Bank of New York, William Dudley, also supports this concept in theory, but suggests that predicting well in advance which financial excess will be problematic hinders this construct.[103] Even if these problems could be addressed, it seems unlikely that this could be accomplished in the U.S. given current attitudes about financial regulation and regulators.

V. Conclusions

A global regulator has opined that, "If the quest for financial stability has proved so elusive, it must be for a reason."[104] Some of the reasons are outside the scope of this paper – for example, austerity requirements, geopolitical risks, cross-border disagreements, and political disputes that stymie effective fiscal policy. However, even taking these problems into account, financial stability has remained at best uncertain as the post-crisis rulebook has been filled in over the past nine years. The framework is built on what was to be a firm foundation of effective micro- and macro-prudential policy, buttressed by monetary policy and informed by and understanding of the catastrophic financial-stability costs of unduly-lenient supervision and misguided central-bank actions.

None of these bulwarks is, though, performing as hoped. If the post-crisis monetary-policy and macroprudential-regulatory planks are wobbly, as we have demonstrated, then risks organic to the financial system remain problematic and those outside it may be all the more destructive since the unintended effects of post-crisis actions have encouraged regulatory arbitrage and undermined monetary-policy effectiveness.

As demonstrated above, these arbitrage and monetary-policy problems also pose significant social-policy challenges. To the extent that banks lose their ability to provide financial-intermediation services that are either not replaced by non-banks or replaced in ways that raise costs or undermine market liquidity, under-served populations will lack access to sustainable credit and macroeconomic growth could become acutely procyclical at great cost to national income inequality. Quite simply, the wealth effect of asset-price appreciation for financial instruments (e.g., stocks and bonds) is dramatically different than that resulting from longer-term, slower growth in owned residential real estate and long-term savings instruments with stable returns.[105]

As a result, it is critical to balance the policy framework regulators can affect – the rules that govern financial-market structure, monetary policy, and macroprudential regulation – to ensure that conflicts are quickly resolved and new mechanisms to protect financial stability and macroeconomic policy are put rapidly into place. The 2008 crisis made it all too clear that regulators and central bankers forced to

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[102] Claudio Borio, *Speech for the 25th anniversary edition of Central Banking Journal*, *op. cit.*
[103] FRB-NY President and CEO William Dudley, *Speech at the Macroprudential Monetary Policy Conference, Federal Reserve Bank of Boston, Boston, MA: Is the Active Use of Macroprudential Tools Institutionally Realistic?* (October 3, 2015), available at https://www.newyorkfed.org/newsevents/speeches/2015/dud151003.html.
[104] Claudio Borio, *Speech for the 25th anniversary edition of Central Banking Journal*, *op. cit.*
[105] Dietrich Domanski et al., *Wealth Inequality and Monetary Policy, op. cit*.

improvise may well be able to save the financial system and avert macroeconomic catastrophe, but only at the cost of taxpayer bail-outs, harm to individuals and their prosperity, and tremendous private- and public-sector cost.

Current regulation meant to make banks more resilient is also intended to facilitate monetary policy by enhancing financial-market stability with beneficial macroeconomic impact. However, this positive feedback loop is short-circuited because improvements in bank resilience have been countered by regulatory arbitrage that, as described above, shifts key financial-intermediation responsibilities outside of banks, blunting the ability of the Federal Reserve to implement monetary policy. A negative feedback loop then results that can be interrupted only by effective macroprudential regulation. However, limits on the ability of U.S. regulators to reach beyond banks undermines macroprudential regulation and thus exacerbates negative feedback – macroprudential standards compound microprudential regulatory costs and spur still more finance outside regulated banks that are unresponsive to monetary policy as described above.

Is the solution to water down bank prudential regulation? That might well minimize regulatory arbitrage by allowing banks, especially the very largest ones most burdened by all the rules, to resume their place in financial markets on which both monetary policy and macroprudential regulation are premised. However, the tremendous cost of the financial crisis makes it clear that regulatory rollback poses its own profound macroeconomic cost.

Options to resolve these profound challenges include developing new monetary-policy implementation channels, but as we have shown here, these pose considerable risk because they are untested and rely on non-banks largely exempt from prudential regulation. A new focus of monetary policy expressly on financial stability could in theory also cure for policy risk resulting from the changing structure of U.S. financial intermediation, but the FRB has concluded that any such additional mandate is highly problematic. This leaves macroprudential regulation as the safety net below all the conflicts and unintended consequences that we have demonstrated result from the microprudential framework now applicable to U.S. banks, but the same regulatory-arbitrage and market-structure factors that limit monetary-policy transmission apply at least as much to the effectiveness of U. S. macroprudential regulation.

As a result, it appears that microprudential regulations are the root cause of both monetary-policy and macroprudential-regulatory impediments. Careful consideration of how rules can be adjusted to minimize these costs without sacrificing prudential benefits is thus required.

It is suggested that policy-makers assess the cumulative impact of the new policy framework – the only market driver directly under their control – to identify unanticipated implications for monetary policy and financial stability. This would need to go considerably beyond FRB research to date which is, as described above, either inconclusive or highly theoretical. With an initial, market-focused assessment of cumulative effects, U.S. regulators can determine the best way to rebalance the prudential framework to revise monetary-policy transmission channels and enhance macroprudential regulation.

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