

# **Post-Crisis Financial System Regulation and Its Research Foundation**



**Loretta J. Mester  
President and Chief Executive Officer  
Federal Reserve Bank of Cleveland**

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## Introduction

Good afternoon. It is hard for me to convey how honored I am to present the lunch keynote address at this year's Financial Intermediation Research Society (FIRS) conference. At the risk of dating myself, I am proud to say that I was a founding member of the society, and it's been a great pleasure to see how FIRS has developed and spread its wings to all parts of the globe. I thank George Pennacchi, president of the society, Vish Viswanathan, president-elect and this year's program chair, and Allen Berger, my friend and co-author, for the opportunity to speak today. It's been wonderful catching up with old friends and meeting new scholars who are pushing the envelope of financial intermediation research.

In his presidential address to the American Finance Association earlier this year, Luigi Zingales asked an important question: "Does finance benefit society?" He pointed out the dissonance between the view of academics, who typically say "yes," and that of the average American, who is much less certain.<sup>1</sup>

Zingales argues that academia has an important role to play in ensuring that finance will benefit society. I agree. Academic research can help detect those aspects of financial system design and practices that are beneficial to society and those that are harmful, and Zingales calls for academics to get more involved in policy issues. Today, I'm going to focus on one aspect of policy – the design and practice of financial system regulation after the financial crisis – and the role research has played in informing that regulation. I'll also discuss an area that needs further research: the interplay between monetary policy and financial stability policy. Before proceeding, I note that the views I'll present are my own and not necessarily those of the Federal Reserve System or my colleagues on the Federal Open Market Committee.

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<sup>1</sup> Zingales (forthcoming) cites the Chicago Booth-Kellogg School Financial Trust Index survey of a representative sample of about 1,000 American households, conducted by Social Science Research Solutions. Forty-eight percent of respondents to the December 2014 survey said that the U.S. financial system hurts the U.S. economy, while only 34 percent said it benefits the U.S. economy.

## **The Post-Crisis Supervision and Regulation Framework: A Micro- and Macroprudential Approach**

I do not need to tell this audience that financial institutions are able to provide valuable credit, risk-management, and liquidity services to businesses and households because they are designed to take risks and are highly leveraged compared with nonfinancial businesses. But this risk-taking and leverage raise the possibility of systemic problems that could threaten the functioning of the financial system, hurt real economic activity, and impose significant economic costs. The 2008 financial crisis exposed gaps in the regulatory and supervisory architecture, which contributed to a build-up in financial imbalances and systemic risk.

There are many lessons to be learned from the crisis and its aftermath. The crisis drove home the notion that incentives matter and regulation itself creates incentives. Finance and economic researchers do not need to be told this. Well-designed regulations create incentives that promote financial stability. But sometimes regulations, no matter how well intentioned, can create counterproductive incentives and unintended consequences. At least some part of the strong growth in financial intermediation that occurred outside of the regulated banking system was driven by the desire to avoid regulation. One strong lesson from the crisis is that when setting up regulatory systems, policymakers need to understand the incentives created by the regulatory system itself, incentives that influence the behavior of all market participants: the financial intermediaries and their investors and customers, and also the regulators. Of course, this was recognized in the finance literature well before the recent crisis. In fact, Ed Kane, who presented the lunch keynote address at the very first FIRS Conference, in 2004, has written extensively on the incentives of regulators.<sup>2</sup>

The crisis also taught us that we need to avoid designing regulations that attempt to work against market forces. Such regulations will be much more likely to fail or to distort incentives and create unintended

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<sup>2</sup> See Kane (1981) for one of his earlier works.

consequences. Instead, the regulatory system should attempt to harness market discipline to promote financial stability.

The financial crisis underscored the need for a new approach to financial system supervision and regulation. The regulatory reforms engendered in the Dodd-Frank Wall Street Reform and Consumer Protection Act, signed into law in 2010, aim to foster financial stability in two ways: first, by lowering the probability of a financial crisis, and second, by reducing the costs imposed on the rest of the economy when a shock hits the financial system. Under Dodd-Frank, the Federal Reserve and other financial regulatory agencies were directed to augment their traditional microprudential approach, which promotes the safety and soundness of individual institutions, with a macroprudential approach in which examiners and supervisors take a horizontal view of risk across institutions rather than looking at only one institution at a time. Such a macroprudential approach had been suggested by Crockett (2000), Borio (2003), and others at the Bank for International Settlements (BIS) well before the recent crisis, so there was a relatively large body of work to draw on. Indeed, according to Clement (2010), records at the BIS indicate the term “macroprudential” was first used in an international context in 1979 in a meeting of the Cooke Committee, which was the precursor to the Basel Committee on Banking Supervision.

Although there is still more to be done, regulators continue to make progress in developing tools to implement the macroprudential approach to promoting financial stability and to improve the monitoring of risks over the business and financial cycles. In general, the macroprudential tools can be classified into two categories: structural tools and cyclical tools.

The structural tools aim to build the resiliency of the financial system throughout the business cycle. These tools include the Basel III risk-based capital requirements, minimum liquidity requirements, central clearing for derivatives, and living will resolution plans.

In contrast, the cyclical tools are aimed at mitigating the systemic risk that can build up over the business cycle. These tools include the bank stress tests, the countercyclical capital buffer, and the capital conservation buffer. The countercyclical capital buffer allows regulators to increase risk-based capital requirements when credit growth is judged to be excessive and leading to rising systemic risk. The capital conservation buffer ensures that banks raise capital above regulatory minimums in good times so that when they cover losses in bad times, their capital ratio will stay at or above the regulatory minimum. Other possible cyclical tools, not yet established in the U.S. but used in other countries, include loan-to-value ratio limits and debt-to-income ratio limits that vary over the cycle and which have been targeted to particular sectors like housing credit or household credit.<sup>3</sup>

While the structural and cyclical tools show promise, as yet, their performance is largely untested. For example, a study by economists at the International Monetary Fund (IMF) examining the effectiveness of macroprudential tools in reducing systemic risk in 49 countries found mixed results (Lim, Columba, Costa, Kongsamut, Otani, Saiyid, Wezel, and Wu, 2011). The authors concluded that many of the most frequently used tools were effective in reducing the pro-cyclicality of credit and leverage, but the effectiveness depended on the type of shock hitting the financial sector.

### **Research Has Informed the Post-Crisis Supervision and Regulation Framework**

Legislated regulatory reforms and the work being done by financial regulators to implement those reforms have been informed by a body of academic research over many decades. Many of the people in this room have made significant contributions to this research agenda. Academic research has greatly aided our

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<sup>3</sup> For example, Canada tightened loan-to-value and debt-to-income limits on mortgage lending over the 2009 to 2012 period (Krznar and Morsink, 2014).

Beginning in 2010, Israel also implemented a package of macroprudential tools to restrict the supply of housing credit (Fischer, 2014).

Spain introduced dynamic loan-loss provisioning in 2000. This method builds up reserves during good economic times according to the historical losses experienced by the asset classes held in the bank's portfolio. This buffer is then available to absorb losses in bad times (Balla and McKenna, 2009).

understanding of how systemic risks can build up and propagate throughout the economy, and this understanding has put a firmer foundation under the regulatory reforms being undertaken. Indeed, well before the crisis, academic research on banking panics pointed to the importance of supplementing microprudential regulation with what we now call macroprudential regulation. The seminal work of Diamond and Dybvig (1983) explicitly modeled a financial crisis in which bank failures had macroeconomic consequences. Gorton (1985) distinguished runs on one bank from banking panics, which entail runs on many banks or the entire banking system.

A large body of research has explored the problems imposed on the financial system from fire sales of assets. While one firm might benefit from the ability to sell assets in response to a negative shock, if the shock hits the potential buyers of these assets at the same time, asset prices can decline sharply, which will affect the prices of similar assets held by other firms. In their *Journal of Economic Perspectives* paper, Shleifer and Vishny (2011) discuss the role of fire sales in the recent financial crisis. Their model of fire sales (Shleifer and Vishny, 1992) was developed well before the recent crisis and built on Kiyotaki and Moore's seminal work on the important role collateral plays in lending markets.

In Kiyotaki and Moore's (1997) model, because borrowers cannot be forced to repay, all lending is collateralized. When the economy is performing well, the value of the collateral increases, which supports further borrowing and higher output. But when a negative shock hits the economy and output declines, collateral values also fall, which means borrowing falls, which depresses output even further. Thus, the collateral constraint is a mechanism that amplifies and propagates the effects of temporary shocks on the economy. Brunnermeier and Sannikov (2014) build on the Kiyotaki and Moore model. In their model, an economic boom increases bank capital levels high enough so that credit is amply available to borrowers. This lowers the volatility of both output and asset prices. The lower volatility induces banks to increase their leverage and lend even more, so much so that the system is now vulnerable to a

negative shock. These models illustrate that systemic risk is endogenous, determined by the choices of the model's decision makers, and that systemic risk varies across the cycle.

The research also points out an important aspect of financial crises that, in my view, needs further study: the dynamics of distress in financial markets. In order to determine the appropriate response, regulators and supervisors need to be able to detect whether an institution's problems stem from temporary liquidity problems or broader solvency concerns. If the former, then the lender of last resort can be used to address the issue, as the institution would have sound, albeit illiquid, collateral to post for the loan. But the demarcation between illiquidity and insolvency is fluid. A temporary liquidity problem at one institution, if not adequately addressed, can morph into a solvency problem, which can then propagate to other institutions. Thus, it is imperative that supervisors stay attentive to the risks that might be developing at individual institutions, as well as across institutions, before those risks become a systemic issue. So, microprudential supervision continues to have an important role to play.

## **Implementing Supervision and Regulation Informed by Research**

### **A Tiered Approach**

While academic research has informed us about the benefits of augmenting microprudential with macroprudential supervision, it is up to the supervisors and regulators to actually implement this new framework as directed by the legislation. Let me discuss some of the recent efforts.

The Federal Reserve and other federal banking agencies in the U.S. are taking a tiered approach to banking supervision and regulation, which finds support in the literature (e.g., Brunnermeier, Crockett, Goodhart, Persaud, and Shin, 2009). This approach recognizes that the risk a banking organization poses to the financial system is likely to vary according to the bank's size, range of activities, interconnectedness both domestically and globally, complexity, and the extent to which there is a lack of readily available substitutes for the services it provides; oversight is then tailored appropriately. Doing so

helps to reduce the potential costs some banks might face if made to comply with rules that don't further the goal of a healthy and resilient financial system. It also frees up the bandwidth of examiners and supervisors so they can focus more of their attention on where the risks actually lie.<sup>4</sup>

### **Capital Regulation**

Two important focuses of post-crisis regulation and supervision are capital and liquidity. There is close to a consensus in the literature that high leverage was a major contributor to the severity of the financial crisis. Greenlaw, Hatzius, Kashyap, and Shin (2008) show that the concentration of losses in the leveraged financial sector exacerbated the negative effects of the crisis. They argue that leveraged financial institutions suffering from a shortage of capital were not in a position to take advantage of the central bank's liquidity injections meant to encourage balance-sheet expansion. Rather, these institutions contracted lending in order to be in a position to rebuild their capital levels, and this lengthened the time to recovery. Acharya and Schnabl (2009) argue that mechanisms meant to transfer assets off their balance sheets to other investors, like securitization, actually worked to increase the banks' effective leverage and raised systemic risk. Admati and Hellwig (2013) have been impassioned advocates for requiring significantly higher levels of bank capital, in particular, in the form of equity capital.

The Basel III international capital reforms do raise the minimum requirements for both the quantity and quality of capital held by banks, although not to the levels Admati and Hellwig prefer. For all banking organizations, the U.S. rules raise the minimum ratio of tier 1 capital to risk-weighted assets from 4 percent to 6 percent and impose a minimum leverage ratio of tier 1 capital to total assets of 4 percent.

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<sup>4</sup> The Federal Reserve has organized its supervision of institutions around four groups of banks: community banks, which are institutions with \$10 billion or less in assets; regional banking organizations, with assets between \$10 billion and \$50 billion; large banking organizations; and systemically important institutions. Since the actions community banks take do not typically impose costs on the rest of the financial system or create the kinds of contagion that can put the entire financial system at risk, these banks aren't subject to the same types of macroprudential rules and supervision that apply to systemically important institutions.



Common equity must now be the predominate form of tier 1 capital.<sup>5</sup> In addition, large, internationally active banking organizations are subject to a new minimum supplementary leverage ratio that takes into account off-balance-sheet exposures, including credit derivatives, repo-style transactions, and lines of credit.

While the U.S. has required banks to meet a minimum leverage ratio requirement for some time, the Basel III reforms introduced this requirement in an international context. I see a lot of benefit to complementing the risk-based capital requirements with a non-risk-based leverage ratio requirement. It is simpler and more transparent and should serve as a further backstop against excessive leverage.

In my view, another lesson from the crisis is that regulatory complexity can complicate supervision, risk monitoring, compliance, and enforcement. Given the scope and ever-changing nature of the financial system, regulatory complexity is to a certain extent unavoidable. But the tradeoffs should be recognized. It is reasonable to require higher levels of capital to be held against higher-risk assets, but a system of risk weights that is overly granular and complex would be counterproductive. In practice, too much complexity would make it harder for regulators to assess compliance and to determine whether institutions were engaging in some practices merely as a way to hide risk and lower their capital requirements.

### **Liquidity Regulation**

In addition to higher capital requirements, large banking organizations are now subject to minimum liquidity requirements. The earliest research on financial intermediation recognized that, by the design of their assets and liabilities, banks are subject to runs. Deposit insurance and access to the lender of last

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<sup>5</sup> The rules include a new minimum ratio of common equity tier 1 capital to risk-weighted assets of 4.5 percent. Banks must also hold a capital conservation buffer of this type of capital equal to 2.5 percent of risk-weighted assets.

resort were meant to address the issue in a bank-centric financial system. But financial markets have evolved. The financial crisis showed that runs can occur not just at traditional banking institutions but in many parts of the financial system where short-term financing is used to fund longer-term assets, including money market funds and repo markets. Tirole (2011) reviews and models the role illiquidity played in the crisis and what he calls illiquidity's friends: market freezes, fire sales, contagion, and, ultimately, insolvencies and bailouts. Much of the academic research points to the role of the lender of last resort in addressing liquidity problems. Liquidity regulation has a role to play, too, by helping to lower the probability of a systemic event and making one more manageable should it occur.

International banking agencies through the Basel Committee on Banking Supervision have developed two quantitative liquidity standards: the liquidity coverage requirement (LCR) and the net stable funding ratio (NSFR). Under the U.S. rule implementing the LCR, the largest banking organizations must hold a buffer of high-quality liquid assets sufficient to cover net cash outflows during a 30-day stress scenario.<sup>6</sup> The revised and final NSFR was released by the Basel Committee last October. The NSFR is meant to be a complement to the LCR by looking at the bank's funding profile beyond the 30-day window.

### **Stress Testing**

Another important aspect of the new regulatory approach involves horizontal reviews of banking organizations, which augment the examinations of individual institutions. An example is the annual cross-firm evaluation of capital that the Fed performs at the largest institutions (those with \$50 billion or more in consolidated assets). One part of this assessment is the Comprehensive Capital Analysis and Review (CCAR), which evaluates the bank holding company's capital adequacy, the process by which the holding company ensures its capital adequacy, and its planned capital distributions, including dividend

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<sup>6</sup> In the U.S., the LCR applies to banking organizations with total consolidated assets of \$250 billion or more or total consolidated on-balance-sheet foreign exposures of \$10 billion or more. A simpler, less stringent version of the LCR applies to other banking organizations with \$50 billion or more in total consolidated assets. Banking organizations with total assets of less than \$50 billion are not subject to LCR requirements.

payments and stock buy-backs. Another part of the assessment is the Dodd-Frank Act stress test (DFAST), a forward-looking component that evaluates whether capital is sufficient to absorb losses under a stress scenario. These assessments of bank capital allow regulators to evaluate not only individual firms but also the resiliency of the group of institutions during times of stress.

### **Resolution Plans and Orderly Liquidation**

Many of the regulatory reforms I've been discussing foster financial stability by aiming to lower the probability that a financial crisis will develop. But the crisis made clear that it was also important to reduce the costs imposed on the rest of the economy when a shock hits the financial system. Dodd-Frank has taken steps in that direction. The act requires a systemically important financial institution to provide a resolution plan or living will detailing how, were the firm to fail, it could be wound down in an orderly way under the bankruptcy code without imposing severe adverse consequences on the financial system and the rest of the U.S. economy. The Federal Deposit Insurance Corporation (FDIC) and the Fed have provided guidance to financial companies on their submitted plans, asking them to address issues that are impediments to resolution under the bankruptcy code, such as funding and liquidity, counterparty risk, global cooperation, and the interconnectedness and complexity of their organizational and legal structures.<sup>7</sup>

When an orderly resolution by bankruptcy is not possible, the Dodd-Frank Act's Title II provisions establish an orderly liquidation authority (OLA) to resolve troubled nonbank financial companies, including bank holding companies, securities broker-dealers, and other nonbank financial firms. This authority resides in the FDIC, the agency also responsible for resolving failed banks. Among other powers, the authority includes the ability to establish a bridge financial company, to terminate certain financial contracts, and to convert debt to equity. If a failing firm is taken into receivership by the FDIC

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<sup>7</sup> FDIC Chairman Gruenberg (2015) provides additional information on the status of financial firms' living wills.

under this authority, the act compels the FDIC to ensure that shareholders and creditors bear losses and that the management responsible for the losses is replaced.

Jackson and Skeel (2010) and Jackson (2010), among others, have made the case that a modified bankruptcy code could work even for large, complex financial firms and that it might work better than Dodd-Frank's orderly liquidation authority because, for one thing, it is less discretionary.<sup>8</sup> However, because systemically important institutions operate globally, U.S. laws would need to be harmonized with those of other countries. Of course, global operations are also a challenge for resolution under the orderly liquidation authority.

There continues to be active discussion among academics and policymakers because effective resolution remains a key task in promoting financial stability. Ironically, we will have a more stable financial system if we build a system that allows insolvent institutions to fail and involves less regulatory intervention to prevent closure of these firms. When managers and creditors do not expect to be bailed out ex post, they will have increased incentives to monitor the risks their institutions are taking and to take adequate precautions to avoid failure.

It is too soon to know how well the new orderly liquidation authority will work in practice, and whether it represents a credible resolution mechanism so that no institution is treated as too big to fail and the moral hazard issues engendered by too big to fail are solved. If too big to fail remains a problem, it seems reasonable to ask whether breaking up the institutions would solve it. My answer is "no." To evaluate such a potential solution, it is important to know *why* banks have gotten so large. A body of research

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<sup>8</sup> A Board of Governors study (2011), compelled by Dodd-Frank, summarizes the principal arguments for and against various amendments that would be needed in the bankruptcy code regarding financial firms.

suggests that some institutions have grown in size, not to game the system, but for reasons of efficiency.<sup>9</sup> More research is needed to calibrate these efficiency benefits against the potential systemic risks posed by large, complex institutions. However, to the extent that market forces and efficiencies encourage banks to grow larger, I remain skeptical that breaking up the banks, however well intentioned, will be effective. Indeed, if the scale economies are large, size restrictions would create great incentives for firms to try to evade the restrictions by moving activities outside of the more regulated sector without necessarily reducing systemic risk. That is, the risk would migrate elsewhere but would not be eliminated. I believe a better approach is to couple a credible resolution method with the imposition of more stringent requirements on institutions that impose more systemic risk on the financial system. This approach, which is a goal of Dodd-Frank, would spur institutions to internalize some of the externalities of taking on risk.

### **Monitoring Emerging Risks**

Up to now I have focused mainly on regulation, but to promote financial stability, we need continued vigilance in monitoring the buildup of risks in the financial system. Better monitoring will be aided by data being collected by the Office of Financial Research (OFR) and by metrics being developed by academic and central bank economists, such as the Cleveland Fed's financial stress index, which summarizes movements in a number of financial variables associated with stress.<sup>10</sup> It is important to remember, however, that many of these metrics quantify correlations in the data rather than telling us something about the structure of the underlying financial markets or what has caused the movement in the

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<sup>9</sup> Mester (2008) and Hughes and Mester (2014) review the literature. See also Hughes and Mester (2013), a study that finds large economies of scale in banking, which are not driven by too-big-to-fail considerations.

<sup>10</sup> There appears to be an active research agenda in this area. For example, an OFR working paper surveys 31 quantitative measures of systemic risk in the economics and finance literature and provides the computer code for most of these measures to encourage further research (Bisias, Flood, Lo, and Valavanis, 2012).

metric and whether it requires a policy response. Moreover, integrating such metrics into day-to-day supervision remains a challenge.<sup>11</sup>

Financial stability surveillance is also receiving regular attention in Federal Open Market Committee meetings. Federal Reserve staff are using a framework, described in Adrian, Covitz, and Liang (2013), that tracks a standard set of financial system vulnerabilities, including the pricing of risk, leverage, maturity and liquidity transformation, and interconnectedness and complexity, across four broad areas of the financial system: asset markets, the banking sector, shadow banks, and the nonfinancial sector. This regular and systematic analysis is already helping us to better identify changes in conditions over time. But more research is needed to determine what such changes signal about financial stability. Of course, an even bigger question is how policy should respond to signs of emerging financial stability risks and, in particular, how financial stability concerns should be incorporated into monetary policymaking.

### **The Nexus Between Monetary Policy and Financial Stability Policy**

Recent experience has renewed the discussion of how central banks should respond to emerging systemic risk. We saw that financial imbalances can build up even in a low-inflation environment. While price stability may promote financial stability, it is not a sufficient condition. We also saw that when financial markets are not functioning well, the transmission of monetary policy to the economy can be disrupted. In addition, the FOMC has recognized that nonconventional monetary policy, including large-scale asset purchases and the extended period of essentially zero interest rates, could pose potential risks to financial stability by affecting market functioning and spurring risk-taking in a search for yield.<sup>12</sup>

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<sup>11</sup> Cleveland Fed supervisory staff, among others, are working on various applications (Oet, Bianco, Gramlich, and Ong, 2012).

<sup>12</sup> The Board of Governors discusses developments related to financial stability in its monetary policy report to Congress. For example, see Board of Governors, 2015.

Before the crisis, the conventional approach generally taken by the Fed was to use monetary policy to respond to asset price movements – whether driven by fundamentals or not – only to the extent that those movements contained information about inflation and output growth. Monetary policy would not try to limit the size of imbalances as they developed, but would opt to mop up the consequences of a correction after the fact.

But others argued for a more activist approach, with monetary policy being used to try to stem developing imbalances *before* they caused harm to the real economy. White (2009) characterized these approaches as using monetary policy to clean up the mess after a bubble bursts versus using it to lean against a bubble that appears to be forming.

In deciding whether or not to take action against a growing imbalance, policymakers need to balance the expected improvement in future economic conditions against the potential cost of unduly limiting credit extension. If policymakers decide to intervene, the next question is, what tools should they use? Should macroprudential tools be used for financial stability concerns, with monetary policy focused only on its macroeconomic objectives of price stability and maximum employment? Even in this case, there will be interactions between the two types of policy – very loose monetary policy increases the likelihood that financial instabilities will develop, thereby increasing the likelihood macroprudential policy tools will be needed. Tight macroprudential policy could tighten financial conditions more generally, necessitating a monetary policy response.

A necessary ingredient in gaining insights into the interactions between monetary and macroprudential policy is the development of structural general equilibrium models that seriously incorporate financial markets and the possibility of financial stress, borrower defaults, and financial institution failures. These models need to be fairly complex. While I earlier argued that simpler regulations may have benefits, the models in which we evaluate such regulations and policies, by necessity, need to be complex. Before the

financial crisis we may have convinced ourselves that we could rely on representative agent models, linearized around a steady state, with one interest rate. But the nature of the financial crisis pointed out the inadequacies of these models for understanding the impact of severe financial stress on the real economy. By their nature, financial crises involve nonlinearities, potentially multiple equilibria, and financial frictions that limit arbitrage. So our models need to include these features. In addition, macroprudential tools focus on the allocation of credit in the economy and work through redistribution. To study the effects of such tools, our models need to include heterogeneous agents with different rates of risk tolerance and time preference, and multiple interest rates.<sup>13</sup> Of course, monetary policy also entails some redistributions of income and wealth, and understanding the dynamics of the effects of monetary policy also requires the use of more complex models.<sup>14</sup>

An ongoing research agenda in academia and central banks aims to build models useful for such policy analysis. I don't have time to review the growing literature in this area, but Adrian and Liang (2014) provide a very useful summary. It is important that research continues to expand our understanding of the interactions between financial markets and the real economy and our ability to monitor developments in each.

In the meantime, policymakers need to acknowledge that in the lead-up to the financial crisis, some of the vulnerabilities of the financial system were not fully recognized. Despite our best attempts, there likely remain gaps in our ability to assess the risks in every part of the financial system. This is not an argument that we should use monetary policy as the main tool to address financial stability concerns. Given the state of our knowledge, I would opt to use the macroprudential tools as the first line of defense, since they can be more targeted to the markets and institutions where the risks are emerging. However, I do think

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<sup>13</sup> For an informative discussion of the nature of the models, see Leeper and Nason (2014).

<sup>14</sup> Mersch (2014) discusses some of this research.



that when we are making policy decisions, we should be cognizant of the linkages between our nonconventional monetary policy of an extended period of essentially zero interest rates and financial stability. And I encourage the researchers in this room and everywhere to continue pushing out the frontier of our knowledge with some urgency, since the world is not going to stop and wait. I recommend the same sense of urgency to central bankers and financial system supervisors, as we work to implement the new supervision and regulation framework.

### **A Final Thought on How Research Should Inform Legislation**

Let me leave you with one final thought. The complexity of balancing monetary policy with financial stability considerations does not absolve policymakers from having to clearly explain the rationale for their decisions. If anything, it makes clear communication and transparency even more imperative, so that policy can be more effective and so that the public has the information it needs to hold the central bank accountable.

Congress has set the Fed's goals but it has also given the Fed independence in making monetary policy decisions in pursuit of those goals. That is, monetary policy decisions do not have to be approved by the president or Congress. This is consistent with a large body of research showing that when central banks formulate monetary policy free from government interference and are held accountable for their decisions, better economic outcomes result. I believe that allowing political considerations to influence monetary policy decisions would be a tremendous mistake because it would ultimately lead to poorer economic performance. The research on this point is clear: the Federal Reserve's independence in setting monetary policy is worth preserving.

## References

- Acharya, Viral V., and Philipp Schnabl. 2009. "How Banks Played the Leverage Game," Chapter 2 in *Restoring Financial Stability: How to Repair a Failed System*, Viral V. Acharya, and Matthew Richardson, eds. Hoboken, New Jersey: John Wiley and Sons: 83-100.
- Admati, Anat, and Martin Hellwig. 2013. *The Bankers' New Clothes: What's Wrong with Banking and What to Do About It*. Princeton: Princeton University Press.
- Adrian, Tobias, Daniel Covitz, and Nellie Liang. 2013. "Financial Stability Monitoring." Finance and Economics Discussion Series (FEDS) paper 2013-21, Divisions of Research and Statistics and Monetary Affairs, Federal Reserve Board (March).
- Adrian, Tobias, and Nellie Liang. 2014. "Monetary Policy, Financial Conditions, and Financial Stability." Federal Reserve Bank of New York Staff Reports 690 (September).
- Balla, Eliana, and Andrew McKenna. 2009. "Dynamic Provisioning: A Countercyclical Tool for Loan Loss Reserves." Federal Reserve Bank of Richmond *Economic Quarterly* 95: 383-418.
- Bisias, Dimitrios, Mark Flood, Andrew W. Lo, and Stavros Valavanis. 2012. "A Survey of Systemic Risk Analytics." Office of Financial Research Working Paper 0001 (January 5).
- Board of Governors of the Federal Reserve System. 2011. "Study on the Resolution of Financial Companies under the Bankruptcy Code." (July).
- Board of Governors of the Federal Reserve System. 2015. "Developments Related to Financial Stability." In the *Monetary Policy Report*: 24-25 (February 24).
- Borio, Claudio. 2003. "Towards a Macroprudential Framework for Financial Supervision and Regulation?" *CESifo Economic Studies* 49: 181-215.
- Brunnermeier, Markus, Andrew Crockett, Charles Goodhart, Avinash D. Persaud, and Hyun Shin. 2009. "The Fundamental Principles of Financial Regulation," Geneva Report on the World Economy, International Center for Monetary and Banking Studies.
- Brunnermeier, Markus K., and Yuliy Sannikov. 2014. "A Macroeconomic Model with a Financial Sector." *American Economic Review* 104: 379-421.
- Clement, Piet. 2010. "The Term 'Macroprudential': Origins and Evolution." *BIS Quarterly Review*: 59-67.
- Crockett, Andrew D. 2000. "Marrying the Micro- and Macro-Prudential Dimensions of Financial Stability." Remarks before the Eleventh International Conference of Banking Supervisors, Basel, Switzerland (September 20-21).
- Diamond, Douglas W., and Philip H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91: 401-19.
- Fischer, Stanley. 2014. "Macroprudential Policy in Action: Israel." In *What Have We Learned? Macroeconomic Policy After the Crisis*, George A. Akerlof, Olivier J. Blanchard, David Romer, and Joseph E. Stiglitz, eds. Cambridge, Massachusetts: The MIT Press: 87-98.

- Gorton, Gary B. 1985. "Bank Suspension of Convertibility." *Journal of Monetary Economics* 15: 177-93.
- Greenlaw, David, Jan Hatzius, Anil K Kashyap, and Hyun Song Shin. 2008. "Leveraged Losses: Lessons from the Mortgage Market Meltdown." Proceedings of the U.S. Monetary Policy Forum.
- Gruenberg, Martin J. 2015. "A Progress Report on the Resolution of Systemically Important Financial Institutions." Remarks to the Peterson Institute for International Economics, Washington, D.C. (May 12).
- Hughes, Joseph P., and Loretta J. Mester. 2014. "Measuring the Performance of Banks: Theory, Practice, Evidence, and Some Policy Implications," in *Oxford Handbook of Banking, Second Edition*, Allen Berger, Philip Molyneux, and John Wilson, eds. Oxford, U.K.: Oxford University Press.
- Hughes, Joseph P., and Loretta J. Mester. 2013. "Who Said Large Banks Don't Experience Scale Economies? Evidence from a Risk-Return-Driven Cost Function." *Journal of Financial Intermediation* 22: 559-85.
- Jackson, Thomas H. 2010. "Chapter 11F: A Proposal for the Use of Bankruptcy to Resolve Financial Institutions." Chapter 11 in *Ending Government Bailouts as We Know Them*, Kenneth E. Scott, George P. Shultz, and John B. Taylor, eds. Stanford, California: Hoover Institution Press: 217-52.
- Jackson, Thomas H., and David A. Skeel, Jr. 2010. "Bankruptcy, Banks and Non-Bank Financial Institutions." Manuscript prepared for the Wharton Financial Institutions Workshop: Cross-Border Issues in Resolving Systemically Important Financial Institutions (February 8).
- Kane, Edward J., 1981, "Accelerating Inflation, Technological Innovation, and the Decreasing Effectiveness of Banking Regulation." *Journal of Finance* 36: 355-367.
- Kiyotaki, Nobuhiro, and John Moore. 1997. "Credit Cycles." *Journal of Political Economy* 105: 211-48.
- Krznar, Ivo, and James Morsink. 2014. "With Great Power Comes Great Responsibility: Macroprudential Tools at Work in Canada." IMF Working Paper WP/14/83 (May).
- Leeper, Eric M., and James M. Nason. 2014. "Bringing Financial Stability into Monetary Policy." CAMA Working Paper 2014-72, Australian National University (November 11).
- Lim, C., F. Columba, A. Costa, P. Kongsamut, A. Otani, M. Saiyid, T. Wezel, and X. Wu. 2011. "Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences." IMF Working Paper WP/11/238 (October).
- Mersch, Yves. 2014. "Monetary Policy and Economic Inequality." Keynote speech, Corporate Credit Conference, Zurich (October 17).
- Mester, Loretta J. 2008. "Optimal Industrial Structure in Banking." Chapter 5 in *Handbook of Financial Intermediation*, Arnoud Boot and Anjan Thakor, eds. Amsterdam: North Holland: 133-62.
- Oet, Mikhail V., Timothy Bianco, Dieter Gramlich, and Stephen Ong. 2012. "Financial Stress Index: A Lens for Supervising the Financial System." Federal Reserve Bank of Cleveland Working Paper 12/37 (December).

Shleifer, Andrei, and Robert W. Vishny. 1992. "Liquidation Values and Debt Capacity: A Market Equilibrium Approach." *Journal of Finance* 47: 1343-66.

Shleifer, Andrei, and Robert Vishny. 2011. "Fire Sales in Finance and Macroeconomics." *Journal of Economic Perspectives* 25: 29-48.

Tirole, Jean. 2011. "Illiquidity and All Its Friends." *Journal of Economic Literature* 49: 287-325.

White, William R. 2009. "Should Monetary Policy 'Lean or Clean'?" Federal Reserve Bank of Dallas Globalization and Monetary Policy Institute Working Paper No. 34 (August).

Zingales, Luigi. Forthcoming. "Does Finance Benefit Society?" (August 2015), *Journal of Finance*.