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Macroprudential Regulation

Remarks by

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Real world crises have a way of shaking up the intellectual foundations of policy disciplines. Elements of received wisdom are undermined, while certain heterodox or less mainstream views are seen as more valid or important than had been widely recognized. The financial crisis of 2007–2009 was no exception. Some ideas, such as the efficient markets hypothesis, have taken some hits, as others have risen to prominence. An example of the latter is the view that financial stability must be an explicit economic policy goal. A corollary of this view is that a “macroprudential” perspective—generally characterized as focused on the financial system as a whole as opposed to the well-being of individual firms—should be added to traditional prudential regulation.

A single speech cannot hope to touch on, much less do justice to, the many theoretical and policy issues encompassed by the term macroprudential. In my remarks this afternoon I will focus principally on the project of recasting the regulation and supervision of large financial firms so as to realize the macroprudential objective of reducing systemic risk. Specifically, I will offer five propositions that I think should guide this project over the next couple of years. In so doing, I will explain some of the key steps that have already been taken and identify some priorities that remain, though even here I do not pretend to comprehensiveness. Before addressing the macroprudential dimension of regulating large financial firms, however, let me provide some context by briefly reviewing the evolving idea of macroprudential policy.

Macroprudential Policy

Although the crisis and its aftermath have created a broader consensus for the proposition that financial stability should be a more explicit objective of economic

policy, there is considerably less convergence around theories of, metrics for, and policy prescriptions to promote, financial stability. Policy and academic writing generally limits the term “macroprudential” to measures directed specifically at countering risks in the financial system that, if realized, can severely impact real activity.¹ But adoption of consistent terminology does not itself resolve questions of whether, for example, increases in systemic risk are endogenous to the financial system and thus follow a somewhat regular cyclical pattern, or are instead somewhat randomized, albeit repeated, phenomena.²

Differences in views of the origins of systemic risk obviously affect views of the best ways to measure it and, of course, the best policies to contain it. One example, of particular interest to central bankers, is the ongoing debate about the circumstances under which monetary policy should be adjusted to take account of financial stability concerns. Lying behind the various positions in this debate are differing views on how systemic risk propagates, and thus on the relative efficacy of monetary versus macroprudential policies.

Progress in these debates is complicated by the fact that, by definition, financial stability policies are directed toward preventing or mitigating rare events, rather than outcomes such as inflation and unemployment that are continuously observable. This focus on tail risks raises important issues of accountability in the institutional design of

¹ Thus, for example, fiscal or tax policies would not be generally characterized as macroprudential tools, even though they could have implications for systemic risk in some circumstances. For useful overviews of macroprudential policy issues and debates, see International Monetary Fund (2011), “Macroprudential Policy: An Organizing Framework,” (Washington: International Monetary Fund, March 14), www.imf.org/external/np/pp/eng/2011/031411.pdf; Gabriele Galati and Richhild Moessner (2011), “Macroprudential policy – a literature review,” BIS Working Paper No. 337 (Basel, Switzerland: Bank for International Settlements, February), www.bis.org/publ/work337.pdf.

² For a recent study finding a correlation between the growth of credit aggregates and financial crises, and also suggesting a secular trend making such crises more of a risk, see Moritz Schularick and Alan M. Taylor (2012), “Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870–2008,” *American Economic Review*, vol. 102 (2), pp 1029–61, pubs.aeaweb.org/doi/pdfplus/10.1257/aer.102.2.1029.

macroprudential policies and also complicates the task of testing financial stability theories and proposed policies.

Yet even against the backdrop of what is still a comparatively underdeveloped understanding of financial stability,³ commentators and policymakers have compiled and, in some cases, developed so-called “toolkits” of possible macroprudential measures. These measures are thought available for use against one or both of two frequently identified dimensions of systemic risk: procyclicality and interconnectedness.⁴ Of course, the attractiveness of many of these tools will depend on one’s views of a variety of theoretical, institutional, and practical questions.

The tools identified can be variously categorized. One useful distinction is between measures designed to prevent systemic risk from building (often termed “lean-against-the-wind” measures) and those designed to increase the resiliency of the financial system should systemic risk nonetheless build sufficiently that broad-based stress ensues. Another distinction is between time-varying and time-invariant measures, with the former based on a response—either discretionary or in accordance with a rule—to some measured increase in risk.

³ There is actually quite a rich history of policy measures in the United States that we would today call “macroprudential.” See Douglas J. Elliott, Greg Feldberg, and Andreas Lehnert (2013), “The History of Cyclical Macroprudential Policy in the United States,” Finance and Economics Discussion Series 2013-29 (Washington: Board of Governors of the Federal Reserve System, May), www.federalreserve.gov/pubs/feds/2013/201329/201329pap.pdf. It is notable that the enactment and use of a number of tools waned as the integration of capital markets with traditional lending functions accelerated in the last quarter of the 20th century, though even if there is a causal relationship between these two phenomenon, it is not clear which way the causality runs (perhaps in both directions).

⁴ The terminology may differ among commentators. For example, “cross-sectional” is sometimes used in place of interconnectedness, a term that may have some appeal to the extent it moves away from the traditional domino image of one failing firm knocking down another, and also embraces dynamics such as contagion across the financial system arising from correlated asset holdings and sources of funding.

Macroprudential Foundation for the Regulation of Large Banking Organizations

It is worth noting that the term “macroprudential regulation” can be found in Bank for International Settlements (BIS) documents beginning more than 30 years ago. It appears to have originated in specific contrast to traditional banking regulation, which a 1979 background paper at the BIS characterized as focused on “sound banking practice and the protection of depositors at the level of the individual bank.”⁵ In fact, much of the New Deal legislation that would define the financial regulatory structure for more than 40 years was in direct response to what we would today call systemic concerns, including banking panics and excessive leverage in equity markets.⁶ In the late 1970s, though, there was indeed reason for the development of an explicitly macroprudential perspective. The New Deal regulatory system was beginning to break down in the face of profound changes in financial markets, most importantly the progressive integration of capital market and traditional lending activities. The forms of regulation that were evolving as substitutes—principally, though not only, minimum capital requirements—were largely based on what various BIS papers characterized as a microprudential approach to regulation.

It is, however, equally worth noting that the use of the term macroprudential—and, it would seem, the influence of the concerns lying behind the term—was somewhat irregular in the three decades after it was coined. Discussion of the concept and its implications for regulation was more likely to be found in the papers of a few academics and intrepid BIS researchers than in the pronouncements of senior regulators or other

⁵ Piet Clement (2010), “The term ‘macroprudential’: origins and evolution,” *BIS Quarterly Review* (March), pp. 2–3, www.bis.org/publ/qtrpdf/r_qt1003h.pdf.

⁶ The establishment of federal deposit insurance and the separation of commercial banking from investment banking—two key elements of New Deal financial reforms—were very much directed at what would today be characterized as systemic risks.

official sector representatives. One important exception is a speech delivered in September 2000 by the late Andrew Crockett, then the General Manager of the BIS.⁷ For several reasons, that speech is a good point of reference for us today—as a nod to Sir Andrew’s foresight, as an occasion for regret that his words were not more closely heeded by regulators,⁸ and as a way of illustrating how the challenge of macroprudential financial regulation has grown in the years since.

Sir Andrew’s speech contained much that is now familiar and broadly accepted, but was fairly uncommon at the time: He distinguished between the objectives of microprudential regulation—protecting against idiosyncratic risk in a bank—and macroprudential regulation—protecting against systemic risk. He set forth a description of the financial cycle that could be read as a loose paraphrase of Hyman Minsky’s theory of financial instability.⁹ He identified the procyclical and asset-correlation concerns regarding large bank activities that have commanded so much attention in the past several years. And, again foreshadowing many recent discussions, he suggested macroprudential tools both to increase resiliency (as through capital regulation with a systemic perspective) and to lean against the wind in an effort to slow or limit the growth of unsustainable asset bubbles (as through maximum loan-to-value ratio requirements).

⁷ Andrew D. Crockett, General Manager of the Bank for International Settlements and Chairman of the Financial Stability Forum (2000), “Marrying the Micro- and Macro-Prudential Dimensions of Financial Stability,” speech delivered at the Eleventh International Conference of Banking Supervisors in Basel, Switzerland, September 21, www.bis.org/review/rr000921b.pdf.

⁸ Reading between the lines, one wonders whether Sir Andrew anticipated that his call for action might not be taken up by banking regulators. He styled his remarks as “provocative” and concluded by suggesting they were but “a small awareness-raising step in what, if pursued, is likely to be a long road.”

⁹ Crockett, 2000 speech: “A review of the instances of financial instability would reveal some shared stylised elements. There is first an over-extension phase during which financial imbalances build up, accompanied by benign economic conditions. In this phase, asset prices are buoyant and their surge tends to feed, and be fed by, rapid credit expansion, domestically or internationally. Leverage, in overt or hidden forms, accumulates in balance sheets, masked in part by the favourable asset price developments. The trigger for a reversal is essentially unpredictable. It can originate either in the financial sphere (e.g., an asset price correction) or in the real economy (e.g., a spontaneous unwinding of an investment boom). The process then moves into reverse. Ex post, a financial cycle is evident.”

The Crockett speech holds up very well today. With the benefit of the experience gained from the intervening financial crisis, an intense period of analysis from a macroprudential perspective, and a variety of regulatory initiatives, I offer these five propositions both to reinforce and to supplement the views Sir Andrew expressed 13 years ago.

Five Propositions for a Macroprudential Approach to Regulating Financial Institutions

1. *A Macroprudential Perspective Should Dominate the Regulation and Supervision of Large Financial Institutions.* Sir Andrew entitled his speech “Marrying the Micro- and Macro-Prudential Dimensions of Financial Stability,” suggesting an equal partnership between the two regulatory dimensions, as he called them. My own sense is that we need to concentrate our post-crisis efforts to reshape the regulation and supervision of large financial institutions on measures reflecting the macroprudential dimension, at least for a time. This view is consistent with the Congressional emphasis on financial stability and systemic risk considerations in the Dodd-Frank Wall Street Reform and Consumer Protection Act.¹⁰

To be sure, idiosyncratic problems such as certain operational risks may threaten large institutions, and traditional regulation and supervision surely have an important ongoing role to play. But the dynamics observed during the financial crisis of highly correlated asset holdings, shared risks, and contagion among the largest firms suggest that the well-being of any one of these firms cannot be considered in isolation from the well-being of the system as a whole. Severe problems at such institutions are far more likely

¹⁰ Elsewhere I have discussed this emphasis at some length. See Daniel K. Tarullo (2012), “Financial Stability Regulation,” speech delivered at the Distinguished Jurist Lecture, University of Pennsylvania Law School, Philadelphia, PA, October 10, www.federalreserve.gov/newsevents/speech/tarullo20121010a.htm.

to arise from vulnerabilities to common stresses, and severe problems at such firms are far more likely to exacerbate systemic weaknesses. Since the health of any one of these large institutions is tied to the health of these firms as a group, good microprudential regulation may itself require a macroprudential dimension.

The reorientation of the Federal Reserve's supervision of large, complex financial firms is reflected organizationally in the Large Institution Supervision Coordinating Committee (LISCC). The LISCC was created three years ago to facilitate the execution of horizontal, cross-firm analysis of the largest firms and to centralize supervision of these firms so as to promote an integrated and consistent supervisory approach. The LISCC includes senior staff not only from the supervisory staffs of the Board and Reserve Banks, but also from the Board's Office of Financial Stability, Division of Monetary Affairs, Division of Research and Statistics, and other relevant divisions. This "interdisciplinary" approach to large bank supervision not only fosters more rigorous microprudential regulation, it also facilitates and formalizes a broader look at systemic risks by using quantitative methods to evaluate macroeconomic and financial risks, and how they could affect individual firms and the firms collectively.

2. *Building Greater Resiliency is Central to the Macroprudential Regulation of Large Financial Institutions.* In early 2009 there was widespread doubt about the solvency of the financial system as a whole, particularly at many of the large firms that had directly or indirectly been deeply involved in mortgage markets and associated securitizations. When we created the first supervisory stress test on the fly, as it were, our aim was to stabilize, and restore confidence in, the financial system as a whole by ensuring that the 19 largest bank holding companies were sufficiently capitalized that

they could continue serving as viable financial intermediaries. So the focus on resiliency was initially a matter of necessity.

But there is also logic to making the resiliency of the largest firms the most important part of our ongoing macroprudential regulatory agenda. Just as a microprudential approach to regulation has come to emphasize building up capital because it makes the individual firm better able to absorb losses from any source, including unpredictable ones, so an appropriately refocused set of macroprudential capital requirements can help make the financial system better able to withstand shocks from unanticipated, as well as familiar, sources. As mentioned by Andrew Crockett, a macroprudential perspective suggests two ways in which resiliency should be strengthened: the first is to treat the financial system as a whole as the “portfolio” of assets subject to safety and soundness oversight; the second is to apply stricter regulations on firms of systemic importance whose failure would carry a good chance of endangering the entire system. In the last four years, we have developed both kinds of measures to increase resiliency.

Following our use of stress tests of the nation’s 19 largest bank holding companies in the midst of the crisis, Congress included in the Dodd-Frank Act a requirement of annual supervisory stress tests for a larger group of firms: all those with greater than \$50 billion in assets. These stress tests, and an associated supervisory review of the capital processes and practices of the covered firms, have in just a few years become a core part of the oversight of these large firms.

Our stress testing program is one form of the first type of macroprudential resiliency measure. It also provides a good example of how sound microprudential

regulation of the largest banking firms can be difficult to distinguish from regulation with a macroprudential orientation. Conventional capital requirements are by their nature somewhat backward-looking, reflecting loss expectations based on past experience and loss recognition that often occurs well after the likelihood of loss has become clear. Rigorous stress testing helps compensate for these shortcomings through a forward-looking assessment of the losses that would be suffered under stipulated adverse economic scenarios, so that capital can be built and maintained at levels high enough for the firms to withstand such losses and still remain viable financial intermediaries. This forward-looking aspect of stress testing automatically builds capital, and boosts resilience, in the face of weakening loan-underwriting standards because, for any given adverse scenario, weaker underwriting standards will imply higher losses. Also, because the firms are stressed simultaneously, supervisors are able to identify and take account of correlated exposures and other common risks.¹¹ The firms covered by the Dodd-Frank Act supervisory stress tests account for more than 70 percent of U.S. banking sector assets, thus approaching Sir Andrew's standard of a supervisory perspective that examines the assets of the financial system as a whole.

The effectiveness of stress testing as a macroprudential tool depends, of course, on how the tests are constructed. For example, a macroprudential perspective must inform the construction of the scenarios against which the assets and revenues of the banks are stressed. Such a perspective argues for incorporating particular risks to the

¹¹ It is important to emphasize here, as we do in our annual capital reviews of large banking organizations, that our supervisory stress testing of all covered firms simultaneously does not supplant the need for firms to develop, and make capital decisions dependent upon, their own stress scenarios that incorporate risks more specific to the activities and portfolios of each firm. That is, the necessary emphasis on macroprudential measures at the present time does not obviate the need for solid microprudentially inspired measures.

financial system even when there is some uncertainty regarding the probability of a particular risk being realized. For example, the scenario might include a sharp drop in house prices if analysis suggested—but did not confirm—that there was overheating in the housing market, and if supervisors judged that large banks had correlated exposures to the housing sector. That is, the stress tests provide for resiliency in the event the risk comes to pass, without necessarily requiring other measures to restrict directly the lending or other activity lying behind the risk.

A macroprudential perspective also counsels against injecting more procyclicality into the financial system by, for example, simply assuming a standard deterioration in economic conditions from whatever the baseline projections might be. Such an approach would overlook the tendency of systemic risk to build during strong, prolonged expansions, when underwriting standards decline, rising asset prices make secured lending seem safer, and defaults wane. The approach we are instead taking is that, under such conditions, our severely adverse scenario would assume a level of unemployment during the stress period comparable to that observed in past severe recessions, not simply an increase in unemployment comparable to the increase observed during those recessions.¹² Thus, the scenario's unemployment rate would feature a larger and sharper rise in the unemployment rate as economic expansions proceed.

Finally, stress tests must be modified so as to avoid incentivizing firms to correlate their asset holdings or adopt correlated hedging strategies. This potential

¹² For a full explanation of the Board's approach to scenario design, see "Policy Statement on the Scenario Design Framework for Stress Testing," Regulation YY—Enhanced Prudential Standards, 12 C.F.R. pt. 252 (2012), www.federalreserve.gov/bankinfo/bcreg20121115a4.pdf. See also Nellie Liang (2013), "Implementing Macroprudential Policies," speech delivered at the Conference on Financial Stability Analysis: Using the Tools, Finding the Data, Federal Reserve Bank of Cleveland and Office of Financial Research, May 31, www.clevelandfed.org/events/2013/financial_stability/pdf/Implementing_Macroprudential_Policies_May31-2013_final.pdf.

problem can be illustrated by reference to the market shocks we have applied to the trading books of the six largest financial firms in the last two stress tests. The shocks, designed to be severe, consisted of instantaneous, hypothetical jumps in asset prices based on those observed over the entire second half of 2008. The resulting trading losses are—as one would expect—quite large. Even so, had we simply used the same shocks that we used in the 2009 exercise, unchanged from the historical experience, we would have underestimated the potential losses associated with subsequent developments. For that reason, we modified the market shock scenario in 2011 to take account of Eurozone stress and then further modified the hypothesized stress in 2012 to include sharp moves in interest rates. We will continue to modify the market shock regularly to incorporate salient risks that were not necessarily present in 2008 and to ensure that firms cannot artificially improve their performance on the test through holding significant amounts of certain assets that happened to perform well in that period.

The second kind of macroprudential resiliency measure reduces the chances of distress or failure for financial companies of systemic importance to a greater degree than for other firms. Key provisions of Dodd-Frank aim at this form of resiliency. One extends the perimeter of regulation by authorizing the Financial Stability Oversight Council (FSOC) to subject nonbank financial companies to supervision and regulation by the Federal Reserve if the council “determines that material financial distress” at such a company, or its nature, size, or other characteristics or activities “could pose a threat to the financial stability of the United States.”¹³ Another requires the Federal Reserve to establish a broad set of enhanced prudential standards, both for bank holding companies

¹³ Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010), Section 113 (a)(1).

with total consolidated assets of \$50 billion or more and for nonbank financial companies designated by the FSOC as systemically important, “[i]n order to prevent or mitigate risks to the financial stability of the United States.”¹⁴ The required standards include capital requirements, liquidity requirements, stress testing, single-counterparty credit limits, an early remediation regime, and risk-management and resolution-planning requirements. These requirements are to increase in stringency in accordance with the relative systemic importance of the companies.

The capital surcharges that we will apply under this authority provide a clear example of this kind of macroprudentially motivated regulation. A microprudential requirement is informed by asking what level of capital would be necessary to allow the firm to remain a viable financial intermediary even after absorbing losses that, within a fairly high level of confidence, might be encountered over some relevant timeframe. A macroprudential capital requirement should take account of the fact that there would be very large negative externalities associated with the disorderly failure of any systemically important financial institution (SIFI), distinct from the costs incurred by the firm, its stakeholders, and the federal deposit insurance fund.

As already suggested, the failure of such a firm, especially in a period of stress, significantly increases the chances that other financial firms will themselves experience great stress, for two reasons. First, direct counterparty impacts can lead to a classic domino effect. Second, because losses in a tail event are much more likely to be correlated for firms deeply engaged in trading, structured products, and other capital market instruments, all such firms are vulnerable to accelerating losses as troubled firms sell their assets into a declining market. Enhanced capital requirements should take into

¹⁴ Dodd-Frank Act, Section 165.

account these costs. Thus, the aim of financial stability capital standards is to reduce further the probability that the firm might fail under stress through a requirement to hold additional capital. These additional capital requirements can also help offset any funding advantage derived from the perceived status of such institutions as too-big-to-fail.

In acting on this rationale for capital standards to mitigate risks to financial stability, we first sought to ensure that there would be an international initiative to develop financial stability capital standards for global systemically important financial institutions. The Basel Committee, an international body of supervisors that includes the U. S. banking agencies, took up this agenda and developed a framework covering more than two dozen large financial firms from around the world. Later this year, we will issue under the authority granted by Dodd-Frank a proposed set of capital surcharges congruent with that framework.

The task of determining how much additional capital is needed to reduce the probability of a systemically important firm's failure to more acceptable levels is not a straightforward one. In calibrating the surcharge, the Basel Committee, with a good bit of input from the Federal Reserve, began with what has been termed the "expected impact" approach, which calls for additional capital to reduce the probability of the firm's failure sufficiently to equalize the expected impact on the financial system of the failure of a systemically important firm and the failure of a banking firm just outside systemic status.¹⁵ But implementing this concept is complicated by the fact that, despite some very useful metrics that have been developed in the past few years for measuring the systemic

¹⁵ For example, if the loss to the financial system from the failure of a systemically important firm would be five times that resulting from failure of the non-systemic firm, then the firm would have to hold additional capital sufficient to make the expected probability of failure one-fifth that of the non-systemic institution.

risk associated with a particular firm, there is certainly no generally accepted approach.¹⁶ Indeed, differences among reasonable assumptions in applying the expected impact approach led to a fairly broad range of potential surcharges. The 1–2½ percent amounts negotiated within the Basel Committee are at the low end of that range, reflecting a good deal of caution—frankly, more caution than I think would have been desirable, even given the uncertainties. Regardless of one’s views on calibration, though, the motivation and methodology for what have become known as “SIFI surcharges” are clearly macroprudential.

One last point on macroprudential resiliency measures is that they can have secondary effects that serve the lean-against-the-wind aim of macroprudential policies. For example, a supervisory stress test can assign a higher loss rate to a certain class of assets in a hypothesized adverse scenario because they are particularly vulnerable to potential shocks and thus susceptible to particularly sharp declines in a serious recession. To the extent that firms learn over time that such assets will be treated that way, there is at least a mild disincentive to hold them. As I will discuss in a moment with respect to countercyclical capital requirements, we should not overstate this lean-against-the-wind effect, but perhaps not dismiss it out of hand either.

¹⁶ Among the useful efforts along these lines are a measure of Conditional Value-at-Risk (CoVaR) (see Tobias Adrian and Markus K. Brunnermeier (2011), “CoVaR,” Federal Reserve Bank of New York Staff Reports 348 (New York: Federal Reserve Bank of New York, September), www.newyorkfed.org/research/staff_reports/sr348.pdf) and a measure of systemic risk based on each firm’s contribution to the expected capital shortfall of the entire financial system in a crisis (see Christian T. Brownlees and Robert F. Engle (2011), “Volatility, Correlation and Tails for Systemic Risk Measurement,” New York University Working Paper (New York: New York University, June), <http://ssrn.com/abstract=1611229>). The concept behind the latter measure is also described in Viral V. Acharya, Christian Brownlees, Farhang Farazmand, and Matthew Richardson (2011), “Measuring Systemic Risk,” in *Regulating Wall Street: The Dodd-Frank Act and the New Architecture of Global Finance* (New York: Wiley Publishers), pp. 87–119. Updated systemic risk rankings are maintained by the authors at <http://vlab.stern.nyu.edu>. A helpful review of the efforts to measure systemic risk is Monica Billio, Mila Getmansky, Andrew W. Lo, and Liora Pelizzon (2010), “Measuring Systemic Risk in the Finance and Insurance Sectors,” MIT Sloan School Working Paper 4774-10 (Cambridge, MA: MIT Sloan School of Management, March), <http://dspace.mit.edu/bitstream/handle/1721.1/66679/systemic9.pdf>.

3. *Time-Varying Measures Will Play a More Limited Role.* Some discussions of macroprudential policy appear to contemplate a somewhat regular adjustment – up and down – of both resiliency and lean-against-the-wind measures. The idea is to proceed in an intentionally countercyclical fashion by attempting to restrain rapid, unsustainable increases in credit extension or asset prices and to relax those restraints as economic conditions deteriorate. This is a conceptually appealing approach, but, as various commentators on macroprudential policy options have noted, one that raises a fair number of significant issues: the reliability of measures of excess or systemic risk, the appropriate officials to be making macroprudential decisions, the speed with which measures might realistically be implemented and take effect, and the right calibration of measures that will be effective in damping excesses while not unnecessarily reducing well-underwritten credit flows in the economy.

If the measures are designed to be targeted, questions of efficacy may be raised by those who believe that suppression of excess credit or asset price increases in one sector will likely result only in the redirection of credit and speculation to other sectors until underlying macroeconomic and financial conditions have ceased enabling such activities. If, on the other hand, the measures are designed to be fairly broad-based, the more basic question of the appropriate role of monetary policy may be raised by those who are focused on reactive policies that “get in all the cracks” of the financial system, not just the heavily regulated portion occupied by large financial firms.

Finally, we should probably be skeptical as to how effective a macroprudential relaxation of regulatory requirements can be on the downside of economic cycles. Market discipline, which may have been lax in boom years, tends to become very strict

when conditions deteriorate rapidly. Even if supervisors were to announce a relaxation in regulatory requirements, in stressed economic conditions, investors and counterparties may well look unfavorably on reductions in capital levels (even from higher levels) or relaxation of underwriting standards at any one firm, notwithstanding the potential benefits for the economy as a whole were all large firms to follow suit. Anticipating such a reaction, senior management of banks may thus have strong non-regulatory incentives to act as if microprudential regulation continued to dominate.

In short, the task of buffering the financial system against a tail event seems more tractable than that of moderating the financial cycle. But these questions of economic knowledge and institutional capacities should be grounds for proceeding cautiously, not for eschewing time-varying measures entirely. It is true that the state of the art of financial stability risk assessment is still in a relatively early stage. But it is reasonable to think that the amount of effort being put into these efforts in governments, central banks, international organizations, and universities will produce some well-conceived and well-tested metrics over time. Some deviations from historical patterns are, even under existing states of knowledge, surely clear enough to justify some action.

Moreover, in the absence of time-varying macroprudential tools, the burden of systemic risk containment will rest entirely elsewhere. For time invariant measures to bear this burden, it might be necessary to have through-the-cycle constraints that strengthen financial stability at greater cost to economic activity. If a central bank is reluctant ever to use monetary policy in pursuit of financial stability goals at the expense of more immediate employment and price stability goals, the burden on time invariant measures would be large indeed. Even if financial stability objectives are effectively

incorporated into monetary policy, monetary tightening will surely not be the correct response to most instances of increasing leverage or asset prices that raise macroprudential concerns. Well-developed time-varying measures might be effective in slowing the increase in systemic risk to give monetary policymakers more time to evaluate the need for a monetary policy response.

There are two obvious places to begin a considered development of time-varying tools. One is in the traditional supervisory oversight of practices at regulated institutions, as enhanced by the increasingly horizontal, interdisciplinary features of large bank supervision. Good supervision is always time-varying, in that it should respond to potential and growing problems in a directed fashion.¹⁷ The coordination engendered by the LISCC and parallel efforts facilitates the identification of potentially risky trends in, for example, underwriting certain forms of lending. The greater use of data, both for the regulated sector as collected by supervisors and for the economy as a whole as analyzed by our Office of Financial Stability, further increases the prospects of timely supervisory responses.

I do not want to overstate the significance of this evolution in supervisory practice, however. For one thing, as was shown by the experience with commercial real estate lending guidance issued before the crisis, supervisory guidance is an imperfect tool. In addition to the issues surrounding real-time interventions mentioned earlier, that episode revealed the potential for substantial political resistance to supervisory actions directed at specific sectors. Still, with the institutionalization of financial stability concerns at the Federal Reserve and the FSOC, and with the ongoing improvements in relevant analytic capacities, there is room to develop this tool further.

¹⁷ One should note that “time-varying” supervision should not mean excessively procyclical supervision.

The second place to work on time-varying tools is found in another element of the new capital regime, the countercyclical buffer provision of Basel III. This provision envisions an increase in the applicable risk-weighted capital requirements of financial companies by up to 2½ percentage points when “credit growth is excessive and is leading to the buildup of system-wide risk.”¹⁸ While stress testing has a built-in degree of time-variance (since macroeconomic scenarios must be constructed annually), the countercyclical buffer is intended to be purely time variant, in that it is to be activated when, and only when, there is “excess aggregated credit growth,” a condition that the Basel Committee anticipates will occur only infrequently.¹⁹

The principal macroprudential rationale of the countercyclical buffer is one of increasing resiliency: that the banking system as a whole will have enough capital to continue effective intermediation, even if a period of stress follows what turned out to be a period of unsustainable, rapid credit growth that leads to unusually high losses as asset prices plummet thereafter.²⁰ The Basel Committee also noted that there could be a

¹⁸ Basel Committee on Banking Supervision (2011), “Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems,” (Basel, Switzerland: Bank for International Settlements, June), p. 57, www.bis.org/publ/bcbs189.pdf. Basel III introduced the concept of a capital “buffer” to supplement the long-established concept of minimum capital requirements. In brief, the idea is that a bank’s distribution of capital to shareholders or employees will be progressively more restricted as capital levels fall below required buffers, but—unlike the case where capital levels fall below minimum requirements—a bank need not bring its capital levels above the buffer by shedding assets or raising new capital. Basel III introduced a “fixed” capital buffer of 2½ percent of common equity on top of the 4½ percent minimum capital requirement. The countercyclical capital buffer would be placed on top of the fixed buffer. If applied at its maximum 2½ percent amount, the countercyclical buffer would thus require that a bank maintain equity capital of at least 9½ percent of risk-weighted assets in order to remain unencumbered by restrictions on capital distributions. There is a view held by some that large banks would be under considerable market pressure to maintain their capital levels above the 7 percent total minimum requirement and fixed buffer (as well as the added systemic surcharge for those banks subject to it), even in stressed periods.

¹⁹ Basel Committee on Banking Supervision (2011)

²⁰ Basel Committee on Banking Supervision (2010), “Guidance for National Authorities Operating the Countercyclical Capital Buffer,” (Basel, Switzerland: Bank for International Settlements, December), p. 1, www.bis.org/publ/bcbs187.pdf.

secondary, lean-against-the-wind effect if the higher capital requirements raise the cost of, and thus dampen, credit extension.

It is probably not surprising that the regulators represented on the Basel Committee have chosen capital requirements as a time-varying macroprudential tool. Capital regulation is central to prudential regulation and, as already noted, is being used in service of macroprudential objectives. Both regulators and financial institutions are accustomed to capital regimes (although the post-crisis changes have altered that regime quite significantly).

Still, it is uncertain just how useful this tool will be.²¹ In addition to some of the limitations affecting use of all time-varying instruments, such as judging when leverage or asset prices have become excessive, it is quite blunt. If “turned on,” it would apply to all large banks in all parts of the country. So it would not be useful to deploy in response to asset bubbles or leverage in particular sectors, since the additional capital required for lending in those sectors would be no greater than in less frothy parts of the economy. Indeed, it could in some circumstances have the unintended effect of encouraging banks to do *more* lending in the booming areas of concern, at the expense of lending in more stable areas. The precise impact on bank lending behavior is further muddied by the one-year period given to build the additional capital cushion.

These potential shortcomings notwithstanding, the tool is available in the United States to the three federal bank regulatory agencies. It could, in fact, serve as a complement to the more targeted actions available through the supervisory process. The

²¹ For a useful discussion of the pros and cons of variants on countercyclical capital buffers, see Douglas J. Elliott (2011), “An Overview of Macroprudential Policy and Countercyclical Capital Requirements,” (Washington: The Brookings Institution, March 10), www.brookings.edu/research/papers/2011/03/11-capital-elliott.

banking agencies included the countercyclical capital provision in the capital regulation to implement Basel III adopted this summer. However, because it will not take effect in the United States until 2016 and because other regulatory and supervisory tasks created by Dodd-Frank and other initiatives need to be completed more quickly, we have not yet built out this tool through policy statements or other institutional steps.

Fortunately, when we do turn to the countercyclical capital buffer, we should have the benefit of a good deal of thinking and experience by the Bank of England. The setting of countercyclical capital buffers is now committed to the Financial Policy Committee (FPC) under the reorganization of regulatory functions effected in the United Kingdom on April 1, 2013. The FPC is required to set forth a general statement of its policy and to make quarterly determinations of whether to impose or change a countercyclical buffer.²² I should note, however, that Parliament extended the countercyclical power beyond the broad measure in Basel III and also granted the FPC authority to direct increases in the risk-weights applicable to specific sectors judged to pose a risk to the financial system. While bank regulators in the United States certainly have similar authority as part of our broad power to set capital requirements, we have not to date considered, much less adopted, any regulation along these lines.

4. *High Priority to Developing Measures to Control the Structural Vulnerability Presented by Short-Term Wholesale Funding.* The shared vulnerabilities of large banking organizations as a whole are underscored by something omitted from Sir Andrew's otherwise prescient speech: the potential for damaging fire sales, itself

²² A draft policy statement was published even before the April 1, 2013, effective date of the new FPC authority. See Bank of England (2013), "The Financial Policy Committee's powers to supplement capital requirements," (London, U.K.: Bank of England, January), www.bankofengland.co.uk/financialstability/Documents/fpc/policystatement130114.pdf.

exacerbated by the prevalence of short-term funding. The use of short-term wholesale funding was hardly unknown among major financial firms in the 1990s, but broadened significantly thereafter, both within large firms and in sponsored entities such as the now infamous Structured Investment Vehicles (SIVs) used to fund asset-backed securities. This trend was a dramatic example of the ways in which traditional lending and capital market activities had become increasingly integrated and another example of how prudential regulation had not quickly enough adjusted to that trend.

Earlier this week, as we reached the five-year anniversary of Lehman Brothers' failure, numerous retrospectives on the crisis reminded us of its multiple causes. But the practice of many firms, including all those with sizeable broker-dealers, of funding large amounts of assets with short-term wholesale funding was an accelerant of all the problems that had grown within the financial system. When questions arose about the quality of some of the assets on which short-term funding had been provided, investors who had regarded short-term secured lending as essentially risk-free suddenly became unwilling to lend against a wide range of assets. Then ensued the classic adverse feedback loop, as liquidity-strained institutions found themselves forced to sell positions, which placed additional downward pressure on asset prices, thereby accelerating margin calls on leveraged actors and amplifying mark-to-market losses for all holders of the assets.

Although the amounts of short-term wholesale funding have come down from their pre-crisis peaks,²³ this structural vulnerability remains, particularly in funding

²³ In 2006, just before the onset of the stresses that eventually led to the financial crisis, the largest U.S. financial firms relied on short-term wholesale funding for about half their total funding needs, and deposits for just over one-third. Today (or, more precisely, as of the end of the second quarter of this year) those proportions are almost exactly reversed. Some of the change is likely due to changes in risk assessment

channels that can be grouped under the heading of securities financing transactions (SFTs).²⁴ The use of such funding surely has the potential to increase again during periods of rapid asset appreciation and ready access to leverage. While SFTs are an important and useful part of securities markets, without effective regulation they can create a large run risk, and thus can increase systemic problems that may develop in various asset and lending markets.

The risks associated with short-term funding are as much or more macroprudential as they are firm-specific. From a microprudential perspective, SFTs are low risk, because the borrowing is short-dated, overcollateralized, marked-to-market daily, and subject to remargining requirements. Capital charges are low because credit risk is low. The Liquidity Coverage Ratio (LCR), recently adopted by the Basel Committee and soon to be implemented in the United States through a proposed rulemaking, is an important step forward for financial regulation, since it will be the first broadly applicable quantitative liquidity requirement for banking firms. But it, too, has a principally microprudential focus, since it rests on the implicit premise that maturity-matched books at individual firms present relatively low risks.

While maturity mismatch by core intermediaries is a key financial stability risk in wholesale funding markets, it is not the only one. Even if an intermediary's book of securities' financing transactions is perfectly matched, a reduction in the intermediary's access to funding can force the firm to engage in asset fire sales or to abruptly withdraw credit from customers. The intermediary's customers are likely to be highly leveraged

and supervisory expectations. But it is also true that deposits were a safe haven for many households and non-household investors during the crisis. It may be that, as financial and economic conditions continue to normalize, households and other investors will move more deposits into other investment vehicles.

²⁴ Included in this grouping are repo, reverse repo, securities lending and borrowing, and securities margin lending.

and maturity-transforming financial firms as well, and, therefore, may then have to engage in fire sales themselves. The direct and indirect contagion risks are high.

The dangers thus arise in the tail and apply to the entire financial market when normally safe, short-term lending contracts dramatically in the face of sudden and significant uncertainty about asset values and the condition of counterparties. A macroprudential regulatory measure should force some internalization by market actors of the systemic costs of this intermediation. As I have argued elsewhere, one or more such measures should be the highest priority in filling out reform agendas directed both at the largest institutions and at systemic risk more generally.²⁵

One reason I place a high priority on initiatives to address the vulnerability created by short-term wholesale funding is that the development of these and other structural measures does not depend so heavily on identifying when credit growth or asset prices in one or more sectors of the economy have become unsustainable. Instead, an externality analysis can help identify the points of vulnerability and guide the fashioning of appropriate regulations. Indeed, what I described as structural policies may be better suited to containing certain kinds of risks than would policies requiring regular adjustment. Obviously, judgment will still be needed to determine the degree of constraint to be imposed on relevant activities of large banking organizations. But unlike real-time measures – where time will presumably be of the essence if those measures are to be effective – the adoption of structural constraints can proceed with the full opportunity for debate and public notice-and-comment that attends the rulemaking process.

²⁵ Daniel K. Tarullo (2013), “Evaluating Progress in Regulatory Reforms to Promote Financial Stability,” speech delivered at the Peterson Institute for International Economics, Washington, D.C., May 3, www.federalreserve.gov/newsevents/speech/tarullo20130503a.htm.

5. *Migration of Financial Activities Outside the Regulatory Perimeter Must be Closely Monitored.* Whenever increased regulation of similar activities applies only to some firms, incentives increase for the unregulated actors to step up their engagement in those activities. The very considerable strengthening of capital, liquidity, and other regulations in the wake of the financial crisis has presumably created commensurately significant opportunities for just such a shift of activities toward firms not subject to prudential regulation. As more macroprudential regulations applicable to large financial firms come into effect, one can expect that market actors will be exploring possibilities for regulatory arbitrage.

In the short term, the potential for migration outside the perimeter of regulated firms may be somewhat limited, precisely because of the dominance of large commercial banks in certain lending markets, of large broker-dealers in intermediation in securities markets, and the absence of ready alternatives to the major clearing and custody banks. But, if the arbitrage gains promise to be high enough, over time, unregulated market actors may find ways to, for example, deal directly with one another in some forms of securities financing. New kinds of firms, perhaps acting solely as agents, might be formed to facilitate these direct transactions between unregulated firms.

It is for this reason that the Federal Reserve and our counterparts in other member countries of the Financial Stability Board have been evaluating ideas for market-wide measures even as we move forward with steps directed principally at prudentially regulated firms. Interest in broader, if not universal, regulatory charges on securities financing transactions has developed in recognition of the systemic risks that may

develop if, for instance, only certain prudentially regulated firms must incorporate such a charge into their borrowing or lending activities.

As we make more progress in reorienting the regulation of large financial firms toward more macroprudential objectives, we will need to watch carefully for such leakage of financial transactions. This concern returns us to the larger project of macroprudential regulation, which implicates a more complicated set of issues around legal authorities and institutional capacities for prudential regulation of markets, as well as firms. But it would be preferable to confront these issues now, before too much of this migration has occurred, than to wait until the problem manifests itself in growing systemic risk.

Conclusion

The five propositions I have laid out this afternoon are generally intended to outline the contours of a macroprudential approach to the regulation and supervision of large financial institutions, not to identify or elaborate specific policies. But I will close by saying that specific policies to counteract the structural vulnerabilities created by short-term wholesale funding are a priority, not just for the stability of our large prudentially regulated institutions, but for the financial system as a whole. A macroprudential reorientation of our bank regulatory policies will require a range of continuing work on resiliency, on other structural measures, and on the effective blending of macroprudential with traditional microprudential regulatory and supervisory policies. But, even as we make more progress in these areas, our efforts will not be complete without measures addressing what I have termed an accelerant of systemic problems.