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Financial Regulation Since the Crisis

Remarks by

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Last summer, when I accepted President Loretta Mester's invitation to speak at this conference, I thought it would be a good occasion to step back and assess where we stand in our post-crisis efforts to promote financial stability in the United States. This morning I will offer such an assessment. I will begin by reviewing what has been accomplished. Then I will suggest how to approach the work that remains--including both tackling continuing vulnerabilities to financial stability and rationalizing the measures that have already been taken.

The Crisis and Its Aftermath

To understand where we stand today, we should recall why we embarked on these efforts in the first place. There is little mistaking the motivation--it was the magnitude of the destruction wrought by the financial crisis and the Great Recession that followed it. The resulting losses in employment were on a scale not seen since the Great Depression. One model used by Federal Reserve staff[1] estimates that cumulative loss in output relative to potential over the period was on the order of one quarter of a year's worth of economic output.[2] While we cannot be certain that these losses were due solely to the financial crisis, losses of this magnitude appear broadly in line with estimates of the effects of prior financial crises.[3] Moreover, the shortfalls in jobs and income relative to potential may understate the total losses, as many current

[1] This estimate is from the FRB/US model, which is one model of the U.S. economy used by staff at the Federal Reserve Board. For a description of the model and access to the data, see www.federalreserve.gov/econresdata/frbus/us-models-package.htm.

[2] Losses attributable to the Great Recession have been estimated using different metrics and range widely. For example, one 2013 study suggests that total U.S. losses from the financial crisis could range from 40 to 90 percent of a year's worth of economic output, or $6 to $14 trillion. Tyler Atkinson, David Luttrell, and Harvey Rosenblum (2013), "How Bad Was It? The Costs and Consequences of the 2007-09 Financial Crisis," Federal Reserve Bank of Dallas, Staff Papers, no. 20 (July), www.dallasfed.org/assets/documents/research/staff/staff1301.pdf. For an alternative view that finds lower effects of moderate crises, but that excludes the recent crisis, see Christina D. Romer and David H. Romer (2015), "New Evidence on the Impact of Financial Crises in Advanced Countries," NBER Working Papers, no. 21021 (Cambridge, Mass.: National Bureau of Economic Research, March), www.nber.org/papers/w21021.pdf.

[3] For estimates that predate the recent crisis, see Stephen G. Cecchetti, Marion Kohler, and Christian Upper (2009), "Financial Crises and Economic Activity," in *Financial Stability and Macroeconomic Policy* (Kansas City: Federal Reserve Bank of Kansas City), pp. 89-135.

estimates of potential output are significantly below levels expected prior to the Great Recession. This may be due to the declines in investment, business dynamism, and labor force attachment brought about by the shortfall in aggregate demand through hysteresis effects.[4]

As evidenced by a continuing stream of scholarship, many factors contributed to the unsustainability and fragility of the pre-crisis financial system. But the inadequacy of regulation and supervision was clearly among them. Large banking firms had insufficient levels of high-quality capital; excessive amounts of short-term, wholesale funding; too few high-quality, liquid assets; and inadequate risk measurement and management systems. Systemically important nonbank financial firms whose failure could threaten the stability of the financial system were effectively outside the regulatory perimeter. Governments did not have resolution regimes that could provide for an orderly resolution of a systemically important financial firm. Shadow banking--which was funding long-term assets with short-term wholesale liabilities--exposed the financial system to a systemwide liquidity run.

Although we all lived through the fall of 2008, let me dwell for a moment on that frightening period. Six months had passed since the demise of Bear Stearns in March. Over that summer, it may have appeared as though the fallout from this episode had been contained. But by the fall, it became clear that other large, non-prudentially regulated financial firms threatened financial stability. American International Group (AIG) received direct government support. Two large freestanding investment banks converted themselves into bank holding companies to gain market confidence from the imprimatur of regulatory oversight by the Federal Reserve.

[4] For a discussion of these effects, see Laurence M. Ball (2014), "Long-Term Damage from the Great Recession in OECD Countries," *European Journal of Economics and Economic Policies: Intervention*, vol. 11, no. 2 (September), pp. 149-160; and Dave Reifschneider, William Wascher, and David Wilcox (2015), "Aggregate Supply in the United States: Recent Developments and Implications for the Conduct of Monetary Policy," *IMF Economic Review*, vol. 63 (March), pp. 71-109.

Merrill Lynch and Bear Stearns itself ceased to exist as independent entities and were absorbed into existing bank holding companies, with some form of government benefit facilitating the acquisition.[5] And, of course, as Fannie Mae and Freddie Mac teetered on the brink of failure, they were placed into government conservatorship, with accompanying full government guarantees of their liabilities. The absence of an option for orderly resolution was faced head-on in the case of Lehman Brothers, whose bankruptcy in September moved the financial crisis to its most acute phase.

Even insured depository institutions such as Wachovia and Washington Mutual, for which special resolution procedures *were* available, were merged into existing banks with, again, government benefits to make the absorption of these failing banks worthwhile for the acquiring institutions.[6] And a number of very large bank holding companies were under grave stress. Meanwhile, financial markets of all sorts had either ceased functioning or come dangerously close to it.

Unlike in some bank crises of the past, direct connections among large financial firms were only part of the problem. At the heart of the crisis were contagion effects among firms holding similar assets--particularly, tradable assets--and the withdrawal of much of the short-term wholesale funding on which many large financial firms and the shadow banking system had come to rely. Needless to say, the larger the firm with lots of tradable assets and runnable funding, the greater the additional threat to the system.

[5] In the case of JPMorgan's acquisition of Bear Stearns, the Federal Reserve provided credit to support the transaction. In the case of Bank of America's acquisition of Merrill Lynch, Bank of America sought an arrangement that would ring fence any losses incurred by Merrill so as not to impose those losses on the parent company. The Federal Reserve publicly announced its willingness to negotiate such an arrangement. Although subsequent developments obviated the need for a ring fence arrangement, the public announcement was perceived as benefiting Bank of America during the period of extreme market uncertainty in late 2008.

[6] Wells Fargo benefited from a significant tax advantage in the Wachovia acquisition, while the Federal Deposit Insurance Corporation agreed to share some losses in the Washington Mutual portfolio in order to facilitate its acquisition by JPMorgan.

If anyone harbored remaining doubts, it was clear by October that the nation's financial system faced not just severe liquidity problems, but a solvency crisis. In response, following enactment of the Troubled Asset Relief Program by Congress, Secretary Henry Paulson oversaw the injection of government capital into the nation's largest financial firms, as well as into many smaller banking firms. This first step toward stability was reinforced in early 2009 when Secretary Timothy Geithner initiated the stress test exercise to determine how much capital these firms needed to remain viable financial intermediaries and, perhaps as importantly, to share this information with markets. In the succeeding months, the Federal Reserve obliged the firms to raise enough private capital to replace the government capital and to meet the minimum capital levels established by the stress tests.

By the latter part of 2009, the U.S. financial system had been stabilized, but only with substantial injections of taxpayer capital and the complementary support of other guarantees and lending facilities variously provided by the Federal Reserve, the Treasury, and the Federal Deposit Insurance Corporation (FDIC)--both to banks and to non-bank financial actors. And the nation had meanwhile been plunged into the deepest economic downturn since the Great Depression.

Demands were widespread, both in the country and the Congress, for a regulatory response to protect against the reemergence of the conditions that had led to the crisis. While there were different views on exactly what should be done, on how much new authority was needed for the regulators who had not fully exercised their existing powers, and on the degree to which regulators should be required--rather than just empowered--to take certain actions, there was agreement that action was needed. Throughout 2009, discussion and debate ensued not just between, but within, the political parties on how best to respond. If there was one powerful,

widely held view that underlay the public debate, it was that the system needed to change to avoid a repeat of the taxpayer bailouts of so many large financial institutions.

It was only toward the end of the legislative exercise that resulted in the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) that the process took a more partisan turn. Indeed, the Dodd-Frank Act contains measures that commanded fairly wide consensus, such as the need for higher capital requirements for the largest banks. Furthermore, the origins of some features of the legislation rested as much or more with Republican than Democratic legislators, such as the section 165 requirement for resolution plans that will make systemically important firms resolvable in bankruptcy without requiring taxpayer support or resulting in major disorder in the financial system.

The Nature and Impact of the New Regulatory Regime

Now let us fast forward to the present. Less than a decade after being the epicenter of a global financial crisis, today the United States has the strongest and most diverse financial system of any major economy in the world. Credit default swap (CDS) spreads and other market indicators suggest that investors have remained confident in the solvency of large U.S. banks through several recent episodes of global financial volatility.[7] For example, during the market strains at the beginning of this year, the CDS spreads of U.S. banks increased only 25 to 50 basis points, and even so only briefly, while large banks in some other parts of the world saw their CDS spreads increase substantially more and for a longer period. The relative strength of, and

[7] Some have suggested that market-based measures of bank risk indicate that banks are not safer than before the crisis. For example, CDS spreads are well above their levels in early 2006. But this as likely suggests that investors were too sanguine in 2006 as that they believe there has been no change in bank safety since then. And, as reflected in the changes made by credit ratings agencies in their assessment of implied support for banks from the government, markets may rightly perceive that the government is less likely now to bail out a bank that gets in trouble. Moreover, equity prices may be down because some combination of economic conditions and regulation make profits likely to be lower than was expected and experienced in the unsustainable period leading up to the crisis.

resulting market confidence in, U.S. banks has allowed them to expand their lending, the growth of which has returned during the last couple of years to a pace similar to that in the pre-crisis, pre-bubble years.[8]

What accounts for this dramatic change in the position of the U.S. financial system? First, the crisis response by U.S. authorities was fairly quick and complete. The resolute actions of the Bush Administration in late 2008 and the Obama Administration early in 2009 helped stabilize banks and begin their recovery in fairly short order. Recapitalization proceeded quickly, even as the stress test compelled an early reckoning with actual and potential losses. The forceful monetary policy response, the liquidity programs of the Federal Reserve, and the FDIC's guarantee of bank debt prevented the bottom from dropping out of the badly shaken financial system. The emergency fiscal stimulus of 2009 helped prevent a downward spiral in the real economy from a Great Recession to another depression.

Second, and of more relevance for the subject of this conference, was the regulatory reform program put in motion even before the crisis had ended. This program has steadily strengthened the capital, liquidity, and risk management positions of large banks, with progressively more stringent measures applied to the most systemically important institutions. The new regulatory regime for large banks serves two important, complementary goals. One is to ensure that the nation's large financial institutions are sufficiently strong to continue to function effectively as intermediaries, lending to creditworthy businesses and households even in a period of substantial financial and economic stress. If they cannot do so because, for example, their capital positions have been too weakened, the result could be a deepening of what may already be a serious recession. The other goal is to address the too-big-to-fail problem. When

[8] Core loans grew at an average annual rate of about 7 percent from 1995 to 2004. Core loan growth was 5.4 percent in 2014, 6.5 percent in 2015, and 7.1 percent thus far in 2016.

some combination of the size, functions, portfolios, and interconnectedness of a financial institution are such as to make authorities fear that its failure could endanger the entire financial system, they will be tempted to rescue the firm through direct capital injections or indirect measures to strengthen its solvency. Knowing this, other market actors will be willing to lend to that institution at a premium lower than its actual risks would suggest is warranted, an effect that is particularly apparent during periods of stress.

Taking both these goals into account, the regulatory regime must aim for much greater resiliency in the large banks than in smaller ones, so that they can continue to function even under serious stress without solvency assistance from the government and, thus, avoid causing more harm to the economy. But the regime must also be able to contemplate failure by a very large bank--that is, to plan for the possibility that a larger bank may become insolvent notwithstanding much greater ex ante resiliency. The regime must promote market discipline and offset the moral hazard that comes if a bank and its creditors believe the government will have no real choice but to bail the bank out.

Much has been accomplished in the last six or seven years to build a regime that advances both these goals. I want to highlight four of its elements: capital, liquidity, risk management, and resolution planning. Capital is, of course, central to ensuring resiliency although, as I will explain shortly, the presence or absence of other regulatory requirements is relevant in setting minimum capital levels. Because no single capital measure can capture all possible sources of loss, U.S. banking regulation has for three decades required both a leverage ratio and a risk-based capital requirement. In responding to the crisis, we have applied a higher leverage ratio and stronger risk-based capital requirements, including a robust stress testing program to larger banks.

The risk-based capital regime that has been built since the crisis contains several distinct components: a minimum capital requirement, a buffer requirement, and a surcharge on systemically important banks.[9] Let me explain the rationale for each component. The minimum capital requirement represents the amount of capital that experience suggests a bank needs so as to retain the confidence of its customers and counterparties and thus function as an intermediary. Recognizing that a bank operating below its minimum capital will be vulnerable to a sudden loss of market confidence, the regulatory consequences of falling below the minimum are severe and intended to force such a bank to quickly take steps to raise its capital level back above the minimum. The buffer capital requirement is sized so that, if the economy suffers a severe recession that leads a bank to suffer a substantial loss, the bank will still be above its minimum capital level and thus able to continue operating and lending to support economic growth. The buffer is intended to be useable in times of stress, and the regulatory consequences of falling into the buffer are accordingly less severe than the consequences of falling below the minimum. The surcharge on systemically important banks requires systemically important firms to recognize, and hold capital against, the costs that their failure would impose on the broader economy.

The minimum and buffer requirements were calibrated using historical data on bank losses across a number of countries in a way that would be appropriate for all large banks across a range of countries, although we recognized at the time that these requirements might not reflect market circumstances in all situations. The surcharge for global systemically important banks (G-SIBs) was calibrated to provide a sufficient amount of additional capital to reduce sufficiently the chances of a G-SIB's failure so that the impact of its failure, discounted by the probability of

[9] In addition to increasing minimum capital ratios, post-crisis reforms also placed more emphasis on the quality of regulatory capital by introducing the common equity tier 1 capital ratio, which reflects the focus by bank investors and counterparties during the crisis on common equity.

that failure occurring, would approximately equal the impact of the failure of a large bank holding company that is not a G-SIB, discounted by the somewhat higher probability of its failure.[10]

As I explained recently, we will soon consider adopting a "stress capital buffer" to integrate the post-crisis capital regime with our supervisory stress test.[11] In this approach, each firm would have a buffer requirement derived from our annual stress test, taking the place of the existing buffer requirement, which is the same for all firms. This change would make the capital regime more risk-sensitive by using firm-specific information on risks drawn from the stress test. Using the supervisory stress test to guide a risk-sensitive capital regime seems far preferable to reliance on a bank's internal models, which have proven problematic as a basis for risk-based capital requirements under Basel II.[12]

The progressive implementation of this capital regime has substantially increased the resiliency of the largest banks. Although there can be reasonable differences over just how to compute minimum requirements, the post-crisis regime differs from pre-crisis days precisely because there is now a well thought through rationale for those much higher minimum requirements. Because of this regime, banks subject to the annual supervisory stress test have to this point more than doubled their high-quality capital, while shedding many of their riskiest assets and activities.

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[10] The reason why the non-G-SIB's probability of failure is higher is because its capital ratio requirement is lower without a surcharge. For an explanation of this "expected impact" methodology, see Board of Governors of the Federal Reserve System (2015), "Calibrating the G-SIB Surcharge," white paper (Washington: Board of Governors of the Federal Reserve System, July 20).

[11] See Daniel K. Tarullo (2016), "Next Steps in the Evolution of Stress Testing," speech delivered at the Yale University School of Management Leaders Forum, New Haven, CT, September 26, www.federalreserve.gov/newsevents/speech/tarullo20160926a.htm.

[12] See Daniel K. Tarullo (2014), "Rethinking the Aims of Prudential Regulation," speech delivered at the Federal Reserve Bank of Chicago Bank Structure Conference, Chicago, IL, May 8, www.federalreserve.gov/newsevents/speech/tarullo20140508a.htm.

A second important feature of the post-crisis regulatory regime for large banks has been the introduction of quantitative liquidity regulations. The financial crisis was, in the first instance, as much about liquidity as solvency. What proved in retrospect to be excessive liquidity for some types of assets turned into scarcity nearly overnight, confirming the view that liquidity is most available when you need it least and least available when you need it most. The period was defined by runs, not on bank deposits (at least not insured bank deposits), but on short-term wholesale funding. Because of deep uncertainty about the condition of counterparties and the value of assets serving as collateral, investors refused to roll over existing repurchase agreements (or repos) and similar extensions of credit, much less to offer new lending. Many trading activities ground to a near halt, and dealers were forced into fire sales of the assets on their balance sheets that remained liquid. Indeed, it was difficult at times to distinguish between liquidity and solvency crises at particular firms.

The Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) have placed the funding of large banks on a firmer footing. The LCR requires a large bank to hold enough high-quality liquid assets to cover the net cash outflows the bank would expect to occur over a 30-day stress scenario. This requirement establishes a buffer against liquidity risk that reduces the bank's vulnerability to a run, such as materialized in the recent crisis. In the event a bank does encounter liquidity difficulties, the LCR's 30-day buffer will give the authorities time to assess the bank's condition and react as appropriate.

The NSFR complements the LCR by requiring an amount of stable funding that is tailored to the liquidity risk of a bank's assets and liabilities, based on a one-year time horizon. The NSFR creates an incentive for banks to extend the maturity of their funding, making them more resilient to market stress. To offset the risks of the short-term wholesale funding structures

that proved so dangerous in the recent crisis, the NSFR requires more stable funding for short-term loans to financial firms.

It is important to note how liquidity requirements also affect the capital needed by a bank, as can be illustrated by a simple, if admittedly improbable, example. Assume two banks with exactly the same assets and the same amount of capital. One funds those assets entirely through insured (sticky) deposits and longer-term debt, while the other funds its assets entirely through short-term uninsured deposits and repo borrowing. Assume now that an external shock reduces the value of the assets dramatically, with lingering uncertainty as to whether the value will continue to drop. It is readily apparent that the two large banks face very different risks, since the second bank's funding will at best become more expensive and at worst decline or disappear. A sound regulatory regime will align the riskiness of the two banks more closely, by requiring the second bank to change its funding profile, increase its capital, or some combination of the two. In fact, the LCR and NSFR would require more stability in funding at my second hypothetical bank, while one of the factors used to calculate the capital surcharge applicable to the largest banks is its relative reliance on runnable funding.

I will not go into detail in explaining a third key factor of our post-crisis regulatory regime--the requirement for rigorous risk management at large banks. But a brief example should make the point. During the height of the crisis in the winter of 2009, as we were conducting the first stress test, we found that some of the largest banks were literally unable to determine in any reasonable time their aggregate exposures to particular counterparties and business lines across their varied operations. That deficiency made it easier to understand how they could have gotten themselves in such trouble. Because of the supervisory expectations for risk management in our annual Comprehensive Capital Analysis and Review (CCAR) exercise,

the information and risk management systems of all banks have improved substantially, though work remains to be done at some of the largest banks.

A fourth key element of the post-crisis regulatory regime is to develop credible options for resolution so that even one of the largest financial firms could be allowed to fail without bringing the financial system down. Without such options, market discipline will remain lacking. Moral hazard will lurk in the background, since market actors will doubt that a large institution would be allowed to fail. Moreover, government officials must themselves have confidence in the viability of orderly resolution and bankruptcy procedures, or else during periods of high stress, they will be tempted to use some form of government help to keep the firm solvent.

Next Steps

While it is perhaps a bit soon for a full evaluation of the regulatory regime for large banks, several studies affirm its beneficial economic effects, particularly when the destructive impact of a financial crisis is taken into account.[13] This assessment should obviously be adjusted as warranted by new studies and data. But even as this work proceeds, we should continue to ask two questions.

First, are we reasonably confident that the largest U.S. banks could weather a period of stress, and, in the more remote event they could not, that they would no longer present the

[13] Early assessments include Macroeconomic Assessment Group (2010), "Assessing the Macroeconomic Impact of the Transition to Stronger Capital and Liquidity Requirements: Final Report" (Basel, Switzerland: Bank for International Settlements, December), www.bis.org/publ/othp12.pdf; and Basel Committee on Banking Supervision (2010), "An Assessment of the Long-Term Economic Impact of Stronger Capital and Liquidity Requirements" (Basel, Switzerland: Bank for International Settlements, August), www.bis.org/publ/bcbs173.pdf. More recent assessments include William R. Cline (2016), "Benefits and Costs of Higher Capital Requirements for Banks," Petersen Institute for International Economics Working Paper, no. 16-6 (March), https://piie.com/system/files/documents/wp16-6.pdf; and Ingo Fender and Ulf Lewrick (2016), "Adding It All Up: The Macroeconomic Impact of Basel III and Outstanding Reform Issues," BIS Working Papers No. 591 (Basel, Switzerland: Bank for International Settlements, November), www.bis.org/publ/work591.pdf.

Hobson's choice of disorderly failure endangering the entire financial system or some form of solvency bailout? While they are strong relative to their peers in other major economies and have held up well during the few bouts of moderate financial stress we have experienced over the last several years, these firms have not yet faced a major financial challenge. Second, should we adjust statutory or regulatory provisions that are not needed for, or are less efficient means for achieving, financial stability? Let me offer some perspective on answering both questions, along with a handful of specific proposals.

With respect to the first question, there is certainly room for discussion over the most suitable minimum capital standards for the most systemically important financial firms. As I noted when we were deciding on the expected impact approach as the best available method for calibrating capital surcharges, there is no magic to that method.[14] Indeed, even within that approach, we should be open to research that suggests new or improved ways to determine the relative systemic importance of firms. However, I think it *is* important to have a methodology that is clearly explained and is based on the research that has been done. Let me note in passing two points that can be drawn from that research. First, there is work subsequent to the formulation of the Basel III capital standards suggesting that the costs of higher capital requirements may be somewhat lower, and the benefits broader, than previously thought. Second, however, the reduction in the probability of a financial crisis associated with increasing capital levels will begin to level off at some point, thereby creating diminishing benefits for tighter capital standards.[15]

[14] See Daniel K. Tarullo (2011), "Regulating Systemically Important Financial Firms," speech delivered at the Peterson Institute for International Economics, Washington, DC, June 3, www.federalreserve.gov/newsevents/speech/tarullo20110603a.htm.

[15] See, for example, Jihad Dagher, Giovanni Dell'Ariccia, Luc Laeven, Lev Ratnovski, and Hui Ton (2016), "Benefits and Costs of Bank Capital," IMF Staff Discussion Note SND/16/04 (Washington: International Monetary Fund, March).

Moreover, as important as capital is to promoting systemic stability, it is not the only relevant consideration. The relative presence or absence of other regulations that mitigate risk in banks should affect minimum capital levels. To my mind, the most important of these are regulations limiting dependence of financial firms on runnable funding sources.[16] If a firm is not vulnerable to runs, it is far more likely to weather a financial storm without resorting to fire sales or cutting off customers from credit, and thus far less likely to wreak havoc on the financial system.

In short, I think it healthy that discussion continues over the right type and levels of capital requirements and, more generally, over whether we have the right mix of policies. To that end, here are a few relatively near-term steps that we at the Federal Reserve can take to further advance financial stability goals. First is to continue focused work on making the largest, most systemically important firms resolvable in order to minimize both moral hazard and any harm that may befall the economy if such a firm were to fail. This means continued work by the Federal Reserve and the FDIC to require these firms to develop their resolution plans and, more importantly, modify their organizational structures and day-to-day practices such as liquidity management so as to enable an orderly resolution, should it become necessary. Along these lines, I would hope that Congress will move forward with a set of changes to the bankruptcy code to facilitate the resolution of large financial firms and, thereby, limit the number of instances in which the government would need to use the Title II procedures of Dodd-Frank.

In the very short term, we will also finalize our rule requiring the most systemically important firms to hold a sizeable amount of long-term debt, which would be available to the

[16] For a discussion of the relationship between capital and liquidity standards, see Daniel K. Tarullo (2013), "Evaluating Progress in Regulatory Reforms to Promote Financial Stability," speech delivered at the Peterson Institute for International Economics, Washington, DC, May 3, www.federalreserve.gov/newsevents/speech/tarullo20130503a.htm.

FDIC or a bankruptcy judge for conversion into equity should the firm fail. Note that this requirement is intended to prepare for the possibility that the firm fails despite all the measures we have taken to strengthen resiliency. Having identifiable instruments for conversion that would survive the loss of most or all of the firm's equity is necessary for a private recapitalization of the firm to be successful.

A second step is to determine if we can develop metrics that would reflect a firm's particular vulnerabilities to funding shocks, liquidity shocks, and fire sale dynamics in their needed capital as part of the annual stress test.[17] These measures would directly take into account macroprudential concerns of financial system stability. They might well counsel increased capital requirements for some of the largest banks.

A third step is to take another look at the capital and liquidity positions of large U.S. branches of some foreign banks. As has become apparent, the actual consolidated capital positions of some such banks can be difficult for us to discern when the bank uses internal models to compute its required regulatory capital. It is critical to ensure that large U.S. branches of foreign banks do not create financial instability in the United States if their parents' global positions come under stress.

Although I have been focusing mostly on the risks to financial stability posed by the largest financial firms, I would not want to leave a discussion of future work without offering another reminder that they are not the only source of vulnerabilities. The kinds of "shadow banking" that grew up around the private-label mortgage backed securities markets have largely disappeared, but other forms of runnable liabilities remain outside prudentially regulated institutions. There is also good reason to believe that new forms of shadow banking will develop

[17] See Tarullo, "Next Steps in the Evolution of Stress Testing."

in the future and, as I have explained at some length elsewhere, continued attention to such activities will be needed.[18]

Turning now to an agenda for rationalizing what has already been done, I will not attempt to lay out a list of appropriate measures so much as to suggest some key considerations in forming such an agenda.

First, it is critical that we not forget our still quite recent history. Earlier in this talk I recounted the origins and effects of the financial crisis as a reminder as to why we now have the stronger capital requirements and other measures I have described. There is surely a need to review over time the changes that have been implemented to assess how much additional stability we have gained and at what cost. As we gain experience with the statutory and regulatory measures that have been implemented, we have begun assessments of the efficacy and efficiency of these measures. Thus, for example, we are proposing to remove the qualitative assessment exercise in CCAR for most firms with less than $250 billion in assets.[19] As part of our continuing examination of changes in market liquidity in the post-crisis period, we are assessing whether refinements might usefully be made in any of the regulations that have generally had beneficial effects in containing excessive and unsustainable liquidity. And as part of our efforts to tailor our regulations according to the business models of firms, we are considering ways to address the special issues posed for the large custody banks by certain elements of our regulatory framework. But in considering these and other changes, we will not weaken the essential elements of the existing regime that guard against another financial crisis.

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[18] See, e.g., Daniel K. Tarullo (2016), opening remarks delivered at the Center for American Progress and Americans for Financial Reform Conference, Washington, DC, July 12, www.federalreserve.gov/newsevents/speech/tarullo20160712a.htm; and Daniel K. Tarullo (2015), "Thinking Critically about Nonbank Financial Intermediation," speech delivered at the Brookings Institution, Washington, DC, November 17, www.federalreserve.gov/newsevents/speech/tarullo20151117a.htm.

[19] See Amendments to the Capital Plan and Stress Test Rules, 81 Fed. Reg. 67,239-60 (September 30, 2016), www.gpo.gov/fdsys/pkg/FR-2016-09-30/pdf/2016-23629.pdf.

Second--and here is an affirmative argument for rationalization measures--we need to have a more explicit and thorough tiering of requirements within the prudential regulatory regime. The flip side of the observation that the largest banks need stricter and more wide-ranging regulation because of the special risks they pose is that the smaller and less interconnected a bank is, the less risk it presents and thus the less strict its regulatory requirements need be. The Dodd-Frank Act reflects this principle, not only in its mandate of progressively more stringent requirements as the systemic importance of a financial firm increases, but also in the asset-size thresholds it establishes for various new regulations. However, as I have noted in the past, I think these thresholds were set too low in places.[20] For example, I would raise the threshold for enhanced prudential standards from its current $50 billion level, perhaps to $100 billion. And I would entirely exempt community banks--by which I mean those with less than $10 billion in assets--from some regulations, such as the Volcker rule and the incentive compensation rule.

It is worth noting that the burden of these rules for small banks is often less in the substantive constraints they impose on bank activities than in the compliance costs they impose. Even with efforts by banking agencies to streamline implementing regulations for smaller banks, the relatively scarce compliance resources of those banks must still be directed towards assuring that no changes in substantive activities are needed and possibly documenting their compliance. Indeed, I would generalize this point to suggest that the smaller the bank, the greater the likelihood that a potential disconnect between costs and benefits of regulation is rooted in the disproportionate costs of exams, audits, and reporting. So while I think it is worthwhile to continue, for example, efforts to simplify capital rules for small banks, the greater value for those

[20] See, for example, Daniel K. Tarullo, "Rethinking the Aims of Prudential Regulation."

banks may lie in efforts to streamline the number of rules that apply to them and to reduce the number of separate compliance exams and exercises to which they are subject. While especially applicable to small banks, this point has broader application, as in our earlier-mentioned proposal to exempt most banks with less than $250 billion in assets from the qualitative component of our annual CCAR exercise.

My third suggested consideration in rationalizing the regulatory regime is a caution against being excessively attracted to simple answers to a set of risks posed by complicated and diverse activities. There is no question, in my mind at least, that regulations can become excessively complicated. A prime example is the Basel II approach of basing banks' capital requirements on their internal models. It is exceedingly difficult and costly for supervisors to validate those models rigorously and, even so, the potential remains for intentional or unintentional mistakes that are hard to detect in a timely manner. But this example does not mean that the simplest possible regulation is always optimal.

Consider, in this regard, the idea of substituting a somewhat higher leverage ratio requirement for all other capital standards and many other regulatory requirements. While this idea has a surface appeal, since the imposition of, say, a 10 percent leverage ratio on the *current* balance sheets of large banks would yield a very well-capitalized set of banks. But one needs to look at the dynamic effects of such a requirement. Since a higher leverage ratio would also make banks significantly less profitable, and with the constraints of risk-based capital and liquidity requirements lifted, they would be strongly incentivized to change the composition of their balance sheets dramatically, shedding safer assets like Treasuries in exchange for riskier but higher-yielding assets. After all, with a leverage ratio as the only significant constraint, the regulatory cost of a short-term Treasury bill is identical to that of a junk bond.

Thus, to truly assure the safety and soundness of the financial system, a leverage ratio serving as the sole or dominant form of prudential regulation would probably have to be set considerably higher, at a level where the impact on financial intermediation could be quite extensive, particularly in what are today regarded as relatively safe capital market activities. Using both a leverage ratio and a strong set of risk-based capital requirements best combines the goals of safety and soundness, on the one hand, and efficient economic intermediation on the other. We should remember that it was because of the limitations of a stand-alone leverage ratio that risk-based capital requirements were introduced in the 1980s.

Conclusion

This conference is a good moment to remember just how bad things can be when financial stability is not effectively safeguarded and a financial crisis ensues. It is, accordingly, also a good moment to caution against backsliding on the considerable progress that has been made toward a regulatory system that will provide just such a safeguard, particularly with respect to the largest, most systemically important banks. While other modes of reform might have been taken, the one we have followed has provided a strong foundation for financial stability. And, although I am sure some large banks would like to pare back our liquidity and risk management requirements or reduce required capital levels, both they and the economy have now largely adjusted to the new regime.

After compelling banks in the depths of the crisis to raise capital sufficient to keep them at the minimum level necessary to function as effective intermediaries, we have since increased their resiliency through requirements to increase the quality and quantity of their capital. But we have done so with a long transition period that allowed them mostly to build capital through retained earnings. And we have generally left to the banks choices about reducing size or exiting

activities in response to the incentives created by regulations calibrated with credit and funding risks in mind. Our stress test and CCAR exercises should ensure that the largest banks will not maintain distributions of capital to their shareholders in the face of rising financial stress, as they did in 2007 and 2008, which left them more vulnerable to the crisis.

There are surely refinements that can be made to the regulatory regime that has emerged, particularly--though not exclusively--with respect to smaller banks that pose neither systemic nor macroprudential risks. And, as I have suggested, there is surely a healthy debate to be had as to whether additional strengthening of resiliency measures is appropriate for the largest institutions. But I do not think there is a sound economic case for generally weakening the regulatory requirements applicable to the largest banks. And I certainly do not think the taxpayers should bear the risk that would be entailed by any such weakening.