

## **Daniel K Tarullo: Lessons from the crisis stress tests**

Speech by Mr Daniel K Tarullo, Member of the Board of Governors of the Federal Reserve System, at the Federal Reserve Board International Research Forum on Monetary Policy, Washington DC, 26 March 2010.

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Effective responses to dire situations often require bold actions that would be unthinkable in calmer times. So it was in the financial crisis, when central banks undertook extraordinary monetary policy measures and governments made major financial firms wards of the state. Yet sometimes a crisis also accelerates adoption of policies and practices that might beneficially have been implemented beforehand and then are sensibly continued after the crisis has passed. This evening I will examine an instance of this latter phenomenon, as defined by the Federal Reserve's experience with comprehensive stress testing of major financial institutions during the crisis.

The Supervisory Capital Assessment Program (SCAP) was fashioned in early 2009 as a key element of a crucial plan to stabilize the U.S. financial system. The stress tests, as they have been popularly called, required development on the fly, and under enormous pressure, of ideas that academics and supervisors had been considering for some time. After describing the concept, design, and implementation of last year's tests, I will explain how our experience has helped prompt major changes in Federal Reserve supervision of the nation's largest financial institutions. Then I will discuss how this experience has stimulated debate over the merits of publicly releasing supervisory information.<sup>1</sup>

### **Origins and execution of the Supervisory Capital Assessment Program**

By February 2009, many steps had already been taken to restore the health of, and confidence in, U.S. banks. The U.S. Treasury had injected capital into banks under the Troubled Asset Relief Program (TARP). The Federal Deposit Insurance Corporation had expanded guarantees for bank liabilities under its Temporary Liquidity Guarantee Program. And the Federal Reserve had established a number of lending programs to provide liquidity to financial institutions in addition to its aggressive monetary policy actions.

Despite these actions, a great deal of uncertainty remained about future bank losses and solvency, which was only increased by the rapidly deteriorating macroeconomic conditions in early 2009. The Treasury determined that confidence could best be restored by making additional capital available to banks that were unable to raise from private sources the amounts necessary for them to continue to function as effective financial intermediaries even if economic conditions worsened appreciably. To evaluate how much capital individual institutions might require, U.S. bank supervisors, led by the Federal Reserve, undertook a stringent, forward-looking assessment of prospective losses and revenues – a stress test – for the 19 largest U.S. banks. Using TARP funds, the Treasury established the Capital Assistance Program (CAP) to provide any needed capital.

Let me summarize the mechanics of the stress tests. First, in February 2009, each of the SCAP banks was asked to perform a capital-adequacy stress test under two economic scenarios – baseline and more adverse – using specified assumptions for gross domestic product (GDP) growth, unemployment, and house prices. The baseline scenario reflected the consensus expectation among professional forecasters on the depth and duration of the

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<sup>1</sup> The views expressed in these remarks are my own and not necessarily those of other members of the Board of Governors.

recession. The more adverse scenario was designed to be severe but plausible, with a probability of roughly 10 to 15 percent that each of the macroeconomic variables could be worse than specified. The banks were asked to provide projections of losses and revenues under the two scenarios. Losses were to be projected over a two-year horizon for at least 12 separate categories of loans and a few other asset classes, using year-end 2008 financial statement data as a starting point. To guide the banks, supervisors provided indicative loss-rate ranges for the system as a whole, derived from both analysis of historical loss experience at large banks and quantitative models relating loan performance to macroeconomic variables. Banks were informed that loss estimates below the indicative range would be closely scrutinized.

Second, the supervisory teams evaluated the banks' estimates to identify methodological weaknesses, missing information, overly optimistic assumptions, and other problems. Examiners had detailed conversations with bank managers, which led to numerous modifications of the banks' submissions. Supervisors then made judgmental adjustments to the banks' loss and revenue estimates based on sensitivity analyses performed by the firms, comparative analysis across the firms, and the supervisors' own judgments.

Third, the supervisors supplemented these judgmental assessments with objective, model-based estimates for losses and revenues that could be applied on a consistent basis across firms. Each participating institution was asked to supply, in a standardized format, detailed information that supervisors could use to estimate losses and revenues, such as details about loan characteristics. These data allowed supervisors to make consistent estimates using independently constructed models. Finally, supervisors systematically incorporated all of these inputs into loss, revenue, and reserve estimates for each institution. These estimates were combined with information on existing reserves and capital to project capital buffers that the banks would need under the two scenarios.

As you know, unlike other countries that conducted stress exercises, we took the highly unusual step of publicly reporting the findings of the SCAP, including the capital needs and loss estimates for each of the 19 banks.<sup>2</sup> This departure from the standard practice of keeping examination information confidential was based on the belief that greater transparency of the process and findings would help restore confidence in U.S. banks at a time of great uncertainty. Supervisors released the methodology and assumptions underlying the stress test first and then, two weeks later, the results for individual institutions. The results showed that under the more adverse scenario, 10 of the 19 SCAP banks would need to raise a total of \$75 billion in capital in order to have the capital buffers that were targeted under the SCAP – Tier 1 capital in excess of 6 percent of risk-weighted assets and Tier 1 Common capital in excess of 4 percent of risk-weighted assets at the end of the two-year horizon.

The merits of publicly releasing firm-specific SCAP results were much debated within the Federal Reserve. In particular, some feared that weaker banks might be significantly harmed by the disclosures. In the end, though, market participants vindicated our decision. They appeared to be reassured for three reasons. First, the results were deemed credible by most market participants, owing in part to the release of details about our assumptions and methods, as well as the variation in assessment of the banks. Second, the results were released at a time when uncertainty about bank conditions was very high, and some market participants feared the worst. That is, perceptions of tail risk were very high, and the SCAP results helped reassure market participants that under a severe but plausible scenario, the capital needs of the largest U.S. banks were manageable. Third, the Treasury stood ready to

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<sup>2</sup> Board of Governors of the Federal Reserve System (2009), "Federal Reserve, OCC, and FDIC Release Results of the Supervisory Capital Assessment Program," press release, May 7.

make capital available to any SCAP bank with capital needs through the CAP if they were unable to raise private capital.

In retrospect, it is clear that the public release of the SCAP results played an important role in stabilizing the financial system, as has our supervisory follow-up on improving capital levels. By November 2009, the 10 banks that required additional capital had increased their Tier 1 Common equity by more than \$77 billion, primarily by issuing new common equity, converting existing preferred equity to common equity, and selling businesses or portfolios of assets. None of the SCAP banks received CAP funds.<sup>3</sup>

Many observers initially criticized the stress tests as overly optimistic. On the one hand, they noted that GDP growth was weaker and unemployment higher in 2009 than projected in the more adverse scenario. On the other hand, house prices did not fall as much as assumed under the more adverse scenario. As of the end of 2009, actual losses at the 19 banks were less than one-half of the two-year loss estimates under the more adverse SCAP scenario, and actual revenues were more than one-half of the two-year revenue estimates. Nevertheless, there is wide variation across the firms, and it is too soon to tell whether firms will perform better over the full two years than the SCAP estimates.

### **The lessons of the SCAP**

As I suggested at the outset of my remarks, I doubt that anything as ambitious as the SCAP would have been tried – at least as soon as it was – but for the exigencies of the financial crisis. Yet the approach we took in the SCAP was informed by discussions that had been taking place among supervisors and academics for some time. Not surprisingly, against the backdrop of the crisis, the SCAP experience elaborated and confirmed principles that had been advocated internally by some supervisors, but that had not been broadly incorporated into the practice of regulatory agencies.

First, whether conducted by banks or supervisors, stress tests must consider severe but plausible scenarios, including low probability events with potentially highly adverse effects. In the period leading up to the crisis – characterized by strong profits, excess liquidity, and low credit losses – too many banks and regulators were skeptical of the possibility of a rapid and severe deterioration such as ultimately occurred in the U.S. housing, mortgage, and short-term funding markets. If the crisis taught us anything, it is that we must test to the tail, not to the mode. A related point is that a stress test will be most useful if applied to the full range of credit and trading exposures.

Second, good management-information systems are critical to the ability of firms to manage their risks. Assessing risk exposures across an entire organization is essential to understanding the potential effect of correlated risk exposures that may reside in distinct business lines as well as different legal entities and regulatory jurisdictions. Yet during the SCAP, many of the banks were unable to quickly and consistently consolidate risk exposures across products, business lines, legal entities, and geographies. It does little good to run a stress test, even one using a sophisticated quantitative model, if it does not effectively capture all relevant exposures because the bank's information systems are poorly managed or integrated.

Third, the SCAP highlighted the importance of having multiple inputs into the risk-assessment process. It was critical to have, and use, the best available data. But it was equally important not to become a slave to any one model or method of estimating losses. It was precisely the combination of rigorous, data-driven analyses and considered judgment

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<sup>3</sup> GMAC did receive a capital injection from the Treasury through the TARP's Automotive Industry Financing Program.

that made the stress test successful. The interactive and iterative nature of the process helped refine each method of assessment.

Fourth, the SCAP underscored the importance of both horizontal and macroprudential perspectives in supervising banking organizations. During the SCAP, simultaneous, consistent, and comparative cross-firm assessments allowed a broader analysis of risks, easier identification of outliers, and better evaluation of individual firm estimates. Because SCAP banks held the majority of U.S. banking assets, it also allowed for a better understanding of interrelationships and systemic risks.

Turning now to how the SCAP experience has informed our supervisory policies, I think its effects are best understood in the overall context of the reforms motivated by the financial crisis. Like regulators around the world, we are developing and implementing improvements in capital and other prudential rules. The Congress is considering legislative proposals to enhance market discipline through such means as a special resolution mechanism for large financial firms and to affect the structure of the financial services industry through such measures as the Volcker rule and limitations on acquisitions by systemically important firms. These three modes of reform – rules, market discipline, and structural measures – must be complemented by more-effective supervisory oversight, particularly of the largest, most complex financial institutions. To this end, the Federal Reserve is now implementing a more closely coordinated supervisory system in which a cross-firm, horizontal perspective is an organizing supervisory principle. We will concentrate on all activities within the holding companies that can create risk to the firm and the financial system, not just those that increase risk for insured depository institutions.

An essential component of this new system will be a quantitative surveillance mechanism for large, complex financial organizations that will combine a more macroprudential, multidisciplinary approach with the horizontal perspective. Quantitative surveillance will use supervisory information, firm-specific data analysis, and market-based indicators to identify developing strains and imbalances that may affect multiple institutions, as well as emerging risks to specific firms. Periodic forward-looking scenario analyses will enhance our understanding of the potential effects of adverse changes in the operating environment on individual firms and on the system as a whole.

In fact, I believe that the most useful steps toward creating a practical, macroprudential supervisory perspective will be those that connect the firm-specific information and insight gained from traditional microprudential supervision to analysis of systemwide developments and emerging stresses. Here, precisely, is where our SCAP experience has helped lead the way.

### **The question of transparency**

One important element of the SCAP that has not yet been incorporated into our ongoing supervisory plans is the public disclosure of stress test information. I think this issue deserves consideration. As I recently testified, access to higher-quality and more-timely information about financial products, firms, and markets is necessary for effective supervision.<sup>4</sup> Making data public – to the degree consistent with protecting firm-specific proprietary information – would have additional benefits. In the specific context of greater transparency in supervisory stress tests, I see at least two.

First, the release of details about assumptions, methods, and conclusions would expose the supervisory approach to greater outside scrutiny and discussion. Sometimes those

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<sup>4</sup> Daniel K. Tarullo (2010), "Equipping Financial Regulators with the Tools Necessary to Monitor Systemic Risk," statement before the Subcommittee on Security and International Trade and Finance, Committee on Banking, Housing, and Urban Affairs, U.S. Senate, February 12.

discussions will help us improve our assumptions or methodology. At other times disclosure might reassure investors about the quality of the tests. Either way, the public's reaction to our assumptions and methods would be useful.

Second, because loan portfolios are inherently difficult to value without a great deal of detailed information, increased transparency could be an important addition to the information available to investors and counterparties of the largest institutions. If, as I believe, progress on the too-big-to-fail problem is integral to an effective reform of financial regulation, we must enhance market discipline. The market discipline made possible by such means as special resolution mechanisms and contingent capital will be most effective if market participants have adequate information with which to make informed judgments about the banks.

There are, to be sure, countervailing concerns. In more normal economic times, when market participants are not fearing the worst and when banks do not have access to government capital injections as a backstop, the revelation that some major banks may have capital needs under a stress scenario might be unnecessarily destabilizing. This possibility would be increased if market participants attached undue weight to specific capital or loss numbers released by the government.

In practical terms, there are several ways we might increase transparency. One, of course, would be to follow the SCAP precedent, with periodic release of detailed information about the assumptions, methods, and results of a cross-firm, horizontal, forward-looking exercise, including firm-specific outcomes. This approach would probably maximize both the potential benefits and potential risks. Note, however, that the possibility of a destabilizing market reaction may be lower if such information is released frequently, as major unpleasant surprises would be less likely with frequent, detailed disclosures. Of course, significant changes in the economic environment might still lead to unpleasant surprises when the results are released.<sup>5</sup>

A second option would be to provide details about the assumptions and methods supervisors employed in the stress tests but withhold public release of results for individual banks. This practice could be coupled with a requirement for more systematic, timely, and consistent disclosure by the largest banks of information on material firmwide risk positions and exposures, funding and liquidity profiles, operating performance, and other measures. Like the first approach, this option would have the benefit of opening supervisors' methods to discussion. By increasing the disclosure of banks' risk exposures, this approach would also enhance market discipline, as market participants could make their own forward-looking assessments of banks' conditions. However, some benefit would be lost, since the information from individual banks would not have been standardized or verified by regulators. Concomitantly, while the risk of an overreaction to the release of information would still exist, there would be no single number on which market participants could focus.

A third possibility would be to have supervisors release aggregate results of their horizontal, forward-looking assessments, along with details about their assumptions and methods, without requiring additional disclosure by firms. This approach could still confer considerable benefits by providing information to the public about the overall condition of the banking system as well as about supervisory methods. It has, in fact, been applied by Japan's Financial Services Agency (FSA), which conducted a special bank inspection in 2002 and 2003, when Japanese banks were still recovering from a crisis. The FSA publicly released aggregate results showing the differences between the banks' and the FSA's assessments of loan quality, which showed that the FSA's assessments were more stringent than the banks'. Many of the major banks subsequently increased their loan loss reserves, and the

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<sup>5</sup> In addition, it would be important to assure that the routine release of selected supervisory information did not undermine our ability to maintain the confidentiality of other supervisory information.

inspections appeared to increase confidence in the banking system. Of course, the informational benefit to market participants could be substantially diluted if they are unable to distinguish the conditions of individual firms as reflected in the aggregate numbers.

## **Conclusion**

To conclude, you should now have a sense of the degree to which our experience with SCAP experience has informed changes in our supervision of large institutions as part of the broader enterprise of regulatory reform. As to the issue of stress test transparency, I look forward to hearing how others assess the merits of the alternative approaches I have described and, of course, any new ideas.