

Stress Testing: Putting the Pieces Together to Solve an Increasingly Intricate Puzzle



By Richard Reeves,
Will Newcomer and
Nancy Masschelein

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The global financial crisis and the aftermath that continues to unfold have created a justifiable obsession with stress among bankers and supervisors: how to prepare for it, guard against it and respond when it flares up by understanding the various sources of risk to which each institution is exposed and how the exposures interact with one another. The sharper focus has made stress testing a key component of the evolving global regulatory framework covering risk control, capital discipline and reporting.

Stress testing existed in many jurisdictions before the crisis, but after the recovery began and the shock wore off, a consensus formed that methods used before 2007 had not been up to the task – a reasonable deduction considering that they did little to prepare banks for the damage that occurred, let alone prevent it. The conclusion was that pre-crisis testing had been insufficiently rigorous and, well, somewhat naïve.

Earlier tests asked all participants to focus on simple, concrete factors in isolation, under one or a few scenarios. The interplay of various factors and, perhaps more important, adjustments made by bankers, customers and others were assigned a low priority, if they were studied at all. Such static, one-size-fits-all conditions were, in hindsight, the Achilles' heel of the tests; they may provide meaningful, predictive results when all else is equal, but in a financial crisis when chaos is erupting, it is nearly certain that all else will not be equal.



Stress Testing Today: Emphasising How And Why, Not Just What

There is nothing like a near-death experience to foster a desire to live a healthier, safer, more disciplined life – if not by the patient, then by the patient’s doctor on his behalf. The changes in stress-testing practices demonstrate that this also applies in financial services. Tests are conducted more often nowadays – some firms may wonder if they ever stop – and the exercises are far more comprehensive. And in case there is a temptation for supervisors or institutions to backslide or let their guard down, recent events in Europe should nip that in the bud and keep rigorous testing a top priority.

Bankers must make greater efforts to gather and report data and sharpen their critical-thinking skills, too, as supervisors shift from static testing models to dynamic ones with a number of continually interacting inputs and on-the-fly evaluations. There is heightened emphasis on analyzing and explaining decisions, not just making them. Like students sitting a math exam, managers have to show their work – not just the right answers but how they got them. In the new environment, supervisors are assessing not just how much strain banks can take, but how much bankers can take.

Stress testing is not being carried out in isolation, either. Stress scenarios must be incorporated into everyday practices related to liquidity monitoring, capital adequacy and risk analysis and management. Testing is a prominent feature of many regulatory rubrics, from Basel III to IFRS 9 Financial Instruments, the new International Accounting Standards Board system intended to account for impairments, to the Dodd-Frank Wall Street Reform and Consumer Protection Act in the United States.

A potentially significant silver lining

The extra work and added complexity will make stress testing more onerous and put unprecedented pressure on bankers and the risk-management models and systems they use. That presents fresh challenges, but also an opportunity to embrace stress testing as a discipline that is good for business, not just compliance. Firms can integrate testing results into risk-management and risk-control analyses and deploy structured processes that are easy to replicate and audit and can be extended throughout the enterprise. Beyond supporting regulatory compliance, such an integrated framework serves a broader strategic purpose by honing decision making and creating a more stable, efficient entity. To borrow a cliché used by those embarking on a new self-improvement regimen: No pain, no gain.

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The Global Landscape: Variations on a Theme

The primary stress-testing framework in any given country today would seem familiar to a banker or regulator operating almost anywhere else, much as someone fluent in one of the southwest European languages probably can make sense of a passage spoken or written in one of the others. The Latin in this analogy is Basel III, the supervisory framework established by the Basel Committee on Banking Supervision in 2010-11 and implemented through national and regional legislation and regulation.

Basel III calls for tests with a variety of time horizons, from a 30-day acute shock to more chronic scenarios featuring impairment for one year or longer. Stress should be assumed to derive from a combination of systemic and company-specific sources, and the tests envision banks continually being dealt wild cards that affect their creditworthiness and access to, and cost of, funding.

National and regional supervisors are given leeway to choose scenarios that they deem most suitable for their economy and financial-services sector, and they are encouraged to let institutions tailor the test conditions to their circumstances – size, business lines, idiosyncratic risks – and to focus on the decision-making process they employ to deal with each unfolding scenario. They are asked especially to factor in changes

that their own thinking undergoes as the crisis evolves, as well as the behavior of customers and counterparties.

The guidelines emphasize that the test conditions are the minimum that banks should prepare for. That has stirred fears that banks and even supervisors will take that too much to heart. Concerns have been raised that the free-form elements of some tests may encourage participants to select scenarios and make assumptions about events and their responses to them that are flattering and unrealistic. Critics warn that institutions will eliminate black swans from consideration and scout only for grey or off-white specimens, missing the greatest potential hazards.

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Europe: Where Stress Testing is Tested

All of the key trends in stress testing, and in the monitoring of risk control procedures and capital planning generally, are on display in Europe. Tests and other requirements apply to more banks than in the past, they are becoming more frequent and complicated, and the onus increasingly is on institutions to employ their own models as prisms through which common macroeconomic scenarios used in the tests are translated into impacts on balance sheets and profit-and-loss statements.

The added rigor in part reflects a widely held view that a round of tests conducted between 2009 and 2011 by the Committee of European Banking Supervisors, the predecessor to the European Banking Authority (EBA), featured scenarios that were far too lenient and unrealistic. The updated procedures follow the 2013 adoption by the European Parliament of CRD IV, the fourth iteration of the Capital Requirements Directive, which integrates the Basel III principles into the European Union's legal framework. That made CRD IV the law in each member state and charged the EBA with enforcing the directive's Binding Technical Standards and other provisions – the small print – including those related to stress testing.

In recognition of differences from country to country and bank to bank, the EBA deputized regulators in each state to interpret CRD IV and implement it using standards appropriate to circumstances within its borders. As a practical matter, national variations within the region are small, so the European Central Bank (ECB) presides over testing within the euro zone, and central banks in some other countries, such as Sweden and Poland, allow the ECB to take the lead in setting test conditions.

As in many facets of European life, Britain stands somewhat apart from its peers on the Continent in stress-testing practices. The Bank of England's Prudential Regulation Authority (PRA) requires banks to examine the impact of stressed conditions on certain sources of risk in line with EBA guidelines, including cost and availability of different types of funding, changes in the value of underlying collateral and potential impairment to fund flows between subsidiaries. But the PRA emphasizes flexibility and encourages banks to determine many of the inputs in its stress tests, defining their own risk appetite, for instance, and identifying the types and amounts of risk they anticipate most.

More banks, more often

The latest round of European tests, in 2014, comprised 124 banks, compared to 91 in 2011, and the banks tested last year were not the only ones affected. Small- and medium-sized institutions do not undergo stress testing per se, but national regulators have imposed ancillary requirements, seeking qualitative and quantitative information on certain aspects of their business related to risk mitigation under various scenarios.

The 2014 test examined two scenarios – baseline and adverse – using a three-year horizon instead of two, as in 2011, implying a more dire financial or economic crisis under the adverse scenario and extremely high risk aversion. The tested banks fared well collectively. From a weighted average Tier 1 common capital ratio of 11.1 percent of assets at the end of 2013, participating banks would lose 261 billion euros under the adverse scenario, mostly from credit losses, taking the capital ratio to 8.5 percent. Fourteen banks failed the test under the baseline scenario, defined as an inability to maintain a capital ratio above 8 percent, and 24 failed to maintain a ratio above the 5.5 percent benchmark established for the adverse scenario.

The results raised eyebrows when announced last October, in particular the failure of three Greek banks, with a total projected shortfall of 8.7 billion euros, under the adverse scenario. Some analysts found that outcome unrealistically benign, and the extraordinary impairment to the Greek financial system since then shows how right they were. Indeed, the adverse scenario may not have been all that adverse. It asked banks, for example, to factor in an annual inflation rate of one percent, which is run of the mill these days in Europe, rather than assume a malevolent, deflationary backdrop. ECB officials said



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they did not incorporate deflation into the test because they did not consider it a likely development, but that seems to miss the point of the exercise.

Another problematic aspect was the use of static balance-sheet assumptions. The adverse scenario assumed that a bank would not alter its business model or funding structure or sell any assets, even amid such a crippling operating environment – business as usual under the most unusual conditions.

A more dynamic approach

The EBA and ECB want to conduct stress testing at least once a year, with banks required to submit more exhaustive information than in the past. That would raise the cost of compliance, of course, and complaints from institutions persuaded regulators to postpone the next tests until 2016.

Testing is expected to change qualitatively, too. The clear inadequacies of static assessment make it likely that supervisors will shift toward methods with a greater behavioral component and an emphasis on feedback mechanisms that lead to continual revisions of models as bankers adjust to fluid events on the ground. That would better reflect a commonsense understanding of reality during crises and would conform to test procedures in other jurisdictions, notably the United States.

Future ECB stress scenarios may require institutions to assess a wider array of exposures, perhaps delving into liquidity risk under different funding structures. The 2011 tests focused on credit and market risk, while the 2014 exercise added sovereign risk into the mix. It downplayed the prospect of sovereign default, however, a decision that regulators might have reconsidered if they had suspected that events would play out as they have in recent months.

Part of a greater whole

Stress testing in Europe is not intended as a standalone exercise but as an integral component of the capital-planning process that permeates the procedures for measuring, analyzing and managing risk. Stress testing is a primary feature of ILAAP/ICAAP, or the Internal Liquidity Adequacy and Internal Capital Adequacy assessment processes. These are standards under Basel III, applying to all institutions, and are used to measure and monitor liquidity and determine capital needs, respectively, based on various risk factors. Other rules mandate stress testing in such areas as proprietary trading and data management, with sufficient flexibility to produce forward-looking risk analytics in a user-friendly form for regulators and bank officials, and also to devise a detailed recovery plan for a severe stress scenario.

Japan: A Focus On Feedback Mechanisms

Japan has been stress-testing banks since the 1990s, initially studying the impact on specific firms. Events such as the regional-bank crisis toward the end of that decade led authorities to expand the tests to consider systemic risks.

Tests today examine potential effects from "exceptional but plausible macroeconomic shocks," as the Bank of Japan puts it. Several scenarios are used, with particular emphasis placed on manager responses and feedback mechanisms between the economy and financial system.

The latest scenario featured a combination of a two-percentage-point rise in global interest rates, an appreciating yen and weaker stock market, resulting in a recession. The test concluded, unsurprisingly, that internationally oriented banks would fare worse than those with a domestic concentration. But the former had stronger capital positions to begin with, so both types would have nearly the same average Tier 1 common capital ratio, just over 11 percent, after the stress scenario.

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The United States: Looking Out For Number One

Stress-testing procedures in the United States were strengthened and made more consistent after the financial crisis highlighted a significant and troubling truth: The regulatory and risk management frameworks that evolved over the last few decades were wholly inadequate to accurately measure and manage the risks of the products and complexity of the financial institutions and system that evolved over the same time period.

In hindsight, it's obvious the highly compartmentalized and autonomous risk management functions within the institutions coupled with relatively unchanged prescriptive risk measurement regulations were a recipe for disaster. Changes to both the internal risk management processes within financial institutions and to the regulatory framework overseeing them were long overdue before the crisis, and they are coming in very significant ways after the crisis.

In early 2009, the Federal Reserve introduced the Supervisory Capital Assessment Program (SCAP), which evaluated potential capital losses for 19 large financial firms under a uniform stress scenario that was worse than the outcome anticipated at the time from the crisis. Ten of the 19 failed to maintain the minimum standard under the scenario, a 6 percent Tier 1 common capital ratio. Most of the 10 were able to add private capital within six months to alleviate the projected shortfall.

Stress-testing bankers, not just banks

The following year, SCAP evolved into CCAR, the Comprehensive Capital Analysis and Review, a Fed programme that remains the cornerstone of American supervisory architecture. The CCAR, which applies to the 30 financial holding companies with at least \$50 billion of consolidated assets, monitors and evaluates their ability to meet capital needs based on the firms' ongoing assessments of market conditions and their own operations. The aim is to ensure that each institution can continue its primary activities, notably providing credit and honoring counterparty agreements, as losses mount and conditions remain distressed.

The CCAR relies on a more free-form assessment than its predecessor to determine how a bank is likely to respond under stress. The review examines potential consequences of events not just on capital positions, exposures and soundness, but on policies and



practices – covering capital management, risk control and decision making in general – implemented by managers as they react to, and perhaps influence, developments.

Rather than hand managers a set of givens to consider, the CCAR presents a Rorschach test, asking what assumptions they would factor in as they envision a scenario. It's not just the strength of the balance sheet that regulators are trying to gauge, but the strength of the individuals who are the balance sheet's stewards. Capital plans are evaluated for comprehensiveness and how reasonable their assumptions are.

Working out the kinks

CCAR stress testing isn't the only such procedure for American institutions to contend with. The Dodd-Frank act, an attempt by Congress to shore up financial supervision in response to the crisis, has the Fed test firms with at least \$10 billion of assets annually under three scenarios: baseline, adverse and severely adverse.

American stress testing in its various guises is still a work in progress, with banks and the Fed ascending a learning curve, but banks seem to be getting the hang of things. Success in monthly data submissions is increasing, for example. Based on reports from a number of firms, the proportion of submissions that meet Fed standards has risen from barely 50 percent to more than 80 percent.

Much improvement has been observed, as well, in risk measurement, integrated capital planning and the creation of models and systems appropriate for executing stress tests. The Fed announced in March that the common capital ratio of the 31 holding companies tested in 2015 had more than doubled to 12.5 percent of risk-weighted assets from 5.5 percent in 2009. It also noted that the firms collectively expected to continue raising capital through the first half of 2016.

A long road ahead that may have no end

So far, so good, but questions and challenges remain. Banks wonder, for instance, when the Fed will throttle back, allowing the scrutiny, requests for new modelling procedures, data submissions and so forth to level off. But supervisors are adjusting to the evolving review process, too. Their message to bankers is: We're getting there, but we're not there yet.

Indeed, we may never get there. The Fed continues to emphasize that the CCAR is more a journey than a destination and that it wants firms to develop procedures for monitoring and measuring risk that work best in the context of their own business models. Supervisors do continue to shift their gaze, however, and point banks in one direction or another. Lately, they have been focusing more on loss and revenue estimation practices.

Also on the agenda are processes for identifying risk sources and linking them to business models, products and counterparties in order to determine capital needs. Banks will have to design their own stress scenarios, and the Fed will have to sign off on them. Another priority is internal controls and data integrity, which authorities will assess, in accordance with Basel guidelines, by scrutinizing such factors as data management, data security and internal auditing practices.

Banks will be asked to document what they did, identifying the scenarios and risk measurement methods they used. They will have to specify others that they considered and rejected and explain the choices they made. This is consistent with the Fed's broad interest in processes above results. If the Fed has an ultimate goal in its stress-testing and capital-planning reviews, it's to gauge how each firm integrates risk management into its over-all operations and then to put the parts together to determine the state of the financial system and potential vulnerabilities.



Challenging times

Regulators are also insisting on greater agility in stress testing, in particular that banks "should be able to generate aggregate risk data to meet a broad range of on-demand, ad hoc risk management reporting requests, including requests during stress/crisis situations" (BCBS239). One approach to this requirement for swifter responses is the use of top-down models combined with standard bottom-up analysis. Top-down models also have the benefit of providing a sanity check of bottom-up results, fulfilling the role of a "challenger model" – the one that an institution considers the leading alternative to its best model – espoused by regulators. Such an approach can allow banks "to gain greater comfort around their primary model estimates, as the strengths of one approach could potentially compensate for the weaknesses of another" (U.S. Fed: Capital Planning at Large Bank Holding Companies: Supervisory Expectations and Range of Current Practice, August 2013).

Getting Up To Speed Slowly

As stress testing around the world becomes more intricate, a lot will be asked of the systems in place to monitor activities, gather data and apply models to analyze it. Can testing 2.0 be executed effectively with system 1.0? A poll of market participants who attended a recent Wolters Kluwer Financial Services stress testing webinar shows that institutions are concerned that they are not yet where they need to be. When asked: "Are you comfortable you can leverage your legacy systems to fulfil these stress-testing requirements?" 14 percent offered an unqualified "yes" and 32 percent an unqualified no; the remaining 54 percent declared themselves "not fully comfortable."

Firms often report adequate capabilities in analyzing scenarios from one or another perspective, say liquidity or credit. Where their systems let them down is in amalgamating the parts into a whole. Tests are applied inconsistently, often due to conflicting priorities between departments, leading to delayed reporting and difficulty reconciling results, especially for larger firms.

This is no modest drawback. The message that supervisors are sending via stress testing – what the tests have in common, no matter how frequent they are or what scenarios are used – is that banks should view tests not merely as tasks to be complied with before moving on to the next spreadsheet. They want firms to incorporate stress scenarios into everyday capital planning, in every activity.

One risk at a time

Banks tend to install systems that focus on individual risk components or business segments. If they are multinational, they probably repeat the process from scratch in each country of operation. The systems are fine, typically best of breed in each location and niche, but they do not lend themselves to the holistic approach that supervisors are imploring firms to adopt in everything from stress testing to forward-looking budgeting or in devising plans that incorporate myriad interconnected and rapidly changing factors into multiple scenarios and what-ifs.

Existing processes generate compartmentalized results that are necessarily inconsistent and whose broader significance cannot be gauged effectively until they can be reconciled through an overarching system that assesses each number in the context of the portfolio from which it was derived. In Humpty Dumpty fashion, all the bits of information, from all business lines and locations, must be put back together to form coherent, valid, firm-wide projections of P&L, credit loss provisions, capital adequacy, liquidity and other key criteria. Add in the various reviews and adjustments and the challenge becomes that much greater.

Capital-management systems allow firms to treat functions like financial reporting and risk control as matters of information technology, not banking. Having a dedicated platform, accessible from a single station, that integrates stress testing into all facets of capital planning and risk control, including budgeting, impairment, IFRS 9 or similar standards, with

scalability and an ability to introduce new variables – hallmarks of any technology – should ease the burden of conducting stress tests and allow firms to derive more useful information from them. Banks highlight two benefits in particular:

- **Relieving wear and tear on staff.** It's common at some firms for compliance with stress-testing requirements to become a full-time job, with overtime, often for senior employees. Any technology is first and foremost a labor-saving device, and comprehensive capital-management systems are designed to facilitate the kind of labor that technology is best at saving: tedious chores, repeated continually to the Nth degree, that carry a high risk of error. Firms find that employees can meet their goals in fewer hours and with less stress.

- **Executing a wide range of tasks in a standard way.** The idiosyncratic nature of many of the minutiae of stress testing and other facets of risk management makes it vital to have a system that can reconcile discrepant procedures and fold them into a common framework that can be understood throughout an organization. A major advantage of such a system is its ability to handle two-way traffic, not just accepting inputs from multiple sources but sending new instructions back down the line to all relevant departments in response to scenario adjustments and other modifications. The standardization allows firms to report results to regulators in a more user-friendly way, too, and approach the Fed's goal of an efficient, transparent and repeatable process.

As firms adjust to the new stress-testing and capital-review procedures, they increasingly acknowledge the merits of such a system, but it should be emphasized that there is more at issue here than meeting regulatory requirements. Having this capability can satisfy supervisors and shareholders alike by creating institutions that control risk better, use capital more efficiently and press their advantage over the competition.



Conclusion

As Dodd-Frank, CCAR, and Basel III are implemented and enforced, authorities are mandating more rigorous stress testing, creating added strain on bank resources. But this is more than a compliance issue. Stress tests are intended to qualify and quantify risks and capital needs related to a variety of interconnected sources, across business lines and borders, in an increasingly complex and challenging operating environment. Their further objective is to evaluate how firms respond to a crisis, ultimately improving decision making and building stronger and more profitable institutions.

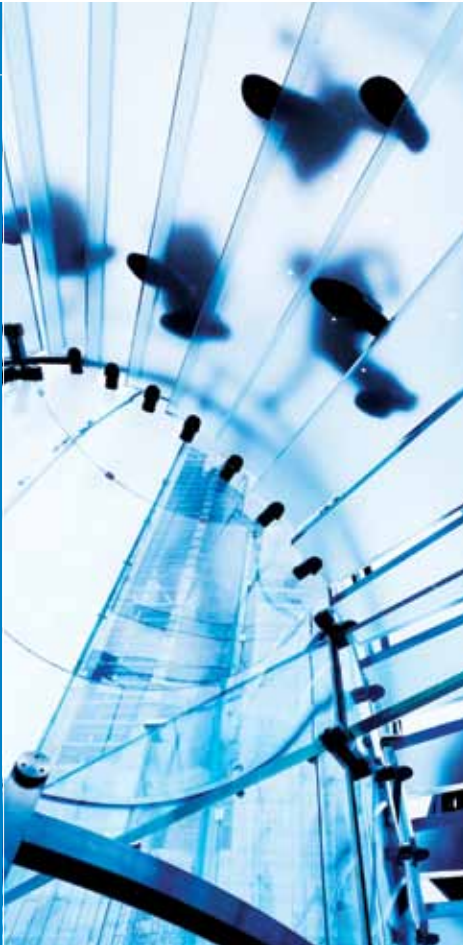
If there were no regulations to comply with – if all the supervisors vanished and banks were left with only their shareholders and customers to satisfy – this is still information that they would want and need to know. It's better for institutions to test their managers' skill and mettle now than to wait for the next crisis, when these stress scenarios, and perhaps some that weren't contemplated in the tests, play out in real life.

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