

TAKING THE STRESS OUT OF STRESS TESTING: SIX STEPS TOWARDS A MORE COHERENT FRAMEWORK

Improving stress testing is at the top of bank executives' must-do lists for 2008. Regulators will work hard to keep it there because the ongoing credit crunch has highlighted many gaps in bank risk management that better stress testing can help to mend.

Another driver is Pillar II of Basel II, which makes stress testing a vital tool for extending risk analysis into areas not covered by Pillar I minimum capital requirements and for testing bank assumptions about worst-case scenarios.

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As critical as stress testing may be, it's not easy to get it right. Recent examples include the difficulties experienced by Bear Stearns and Northern Rock; Northern Rock's risk executives came under heavy fire for not considering an unprecedented shut-down of funding markets as part of their stress testing program – and for not taking account of the degree to which their bank's funding strategy was an 'outlier' among its peers.

What can banks learn from the past year's events to improve their stress testing approaches?

1. THINK BIG – THE PLAUSIBLE EXTREME, NOT THE EXTREMELY PLAUSIBLE

Surveys show that banks expend a fair amount of their stress testing resources on fairly likely events that would dent profitability, rather than searching for rarer and bigger events that would devastate profits and threaten bank solvency.¹

While most banks pay lip service to the idea that stress testing should focus on 'rare but plausible' events, they adopt too narrow a definition of plausibility. Almost by definition, extreme events are unprecedented and involve a concatenation of events that seems implausible before it happens.

Instead, banks must assess plausibility in terms of the characteristics of the projected worst-case scenario, the mechanics of the risk interactions and – above all – the relevance to the bank's business model. Stress testing should focus on extreme risks that lie well beyond the probability thresholds employed in the rest of the bank's risk management armory. Bank stress testing is not a budget planning exercise.

2. STRETCH YOUR IMAGINATION, NOT JUST YOUR RISK PARAMETERS

In the past, there has been a tendency for banks to focus on sensitivity stress tests – deteriorations in a specific risk factor in bank risk models – and to consider the job of stress testing largely done.

While necessary, sensitivity testing is not sufficient, as it essentially builds on existing thinking for a particular class of risk, asking, 'what would happen if things got a lot worse than we expected'. This approach does not help the bank think 'outside the box' in terms of the risk linkages, correlations and knock-on effects not covered in its usual risk modeling.

Augmenting sensitivity testing with some historical worst-case scenarios does not mend the problem. Historical scenarios are inevitably backward looking and cannot capture changing risk profiles and risk interactions in fast-evolving banking markets.

The solution is for banks to spend more time thinking through hypothetical 'what if' scenarios to understand the underlying risk mechanics, risk assumptions and risk implications.

But how can the bank hunt out the most relevant and comprehensive set of worst-case scenarios?

3. USE DIFFERENT PERSPECTIVES TO BUILD COMPREHENSIVENESS

The bank can make a good start by carrying out a formal survey of the various stress tests it is running, at the enterprise level.

Once this is accomplished, the bank can compare the results to various surveys of stress testing practice and regulator recommendations.² However, it's important that banks go beyond this and assess the comprehensiveness of their stress testing against a range of more dynamic and tailored perspectives:

Business model: Do unique aspects of the bank's business line models, profitability drivers, and growth drivers point to key risks and scenarios? Is the bank an outlier to its peer group in any respect? Or have the sources of profitability for the bank and its peers changed over recent history? It's not good enough just to run faster than the other guy; you have to run faster than the lion!

Agency and mis-incentive problems: It's tempting to think of extreme losses as random accidents, but banks often engineer their own extreme events through the way that they incentivize growth. Can stress testing make clear the effect of any mis-alignment between growth incentives and the bank's long-term interests, e.g., by quantifying the effect of mis-reporting key risk information in high-growth areas?

Bank evolution: The bank can use various business indicators to track how its risk profile has changed over the last few years and then ask whether its stress testing has evolved appropriately. For example, if the bank used to lend largely to farmers but now lends more generally to people in rural areas, has it changed its stress testing accordingly?

Enterprise wide: Can the bank identify enterprise-level portfolio concentrations and business risk interactions that should be stress tested, e.g., by exploring the key drivers of economic capital? Does the bank allocate stress testing resources in line with its biggest enterprise risks (e.g., credit and liquidity), or in line with the easiest risks to stress test (e.g., market risks)?

Market, systemic and behavior: Which stress tests are suggested by changes and trends in markets, e.g., new products, practices and counterparties? Do the bank's fortunes rest on fragile assumptions about human and counterparty behavior that should be stress tested?

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Macroeconomic: Does the bank understand how changes and trends in key macroeconomic variables relate to its key risks and does this inform its stress testing? Stresses that might have seemed implausible a couple of years previously might not seem so implausible in the light of the developing macroeconomic scenario.

The overarching theme here is that banks must build dynamic stress testing approaches that are more responsive to their business models and to changes in the external environment. Using different perspectives like this will also prompt the bank to consider severe risks that executives might otherwise be tempted to dismiss as 'inconceivable'.

This requires a degree of flexibility in terms of bank risk systems (e.g., the ease with which assumptions about correlations and basis risks can be changed), and bank risk forums and risk organization.

4. SILOS, CENTRALIZATION – OR INTEGRATION?

Banks need to build a more robust enterprise-wide view of their stress testing, for two key reasons:

- i) Individual business lines can't see the whole picture in terms of risk concentrations, and may not want to draw attention to any extreme risks they are attracting to the enterprise as a whole.
- ii) Stress tests run by the bank's separate risk management divisions (Credit, Liquidity, Market, etc) may not be designed to capture cross-risk interactions and knock-on effects, e.g., liquidity shocks after a credit deterioration.

Solving this problem will likely require some flexible integrative mechanism at the enterprise level such as the Chief Risk Officer or Group Risk Committee.

However, banks should not think of this as an exercise in centralization. The aim should be to encourage a more holistic, integrated approach without closing down local initiatives.

Supervisors suggested this Spring that firms should 'establish risk management committees that discuss all significant risk exposures across the firm, meet on a frequent basis, and include executive and senior leaders from key business lines and independent risk management and control functions...as equal partners'.³

Whichever integrative mechanism the bank selects, the mechanism should act as a clearing house for:

- applying the best stress-testing methodologies at the local level
- mending gaps from a cross-risk and enterprise-wide perspective
- building business line insights on risk accumulations and trends (in the firm and the market) into stress testing activities

5. QUANTIFY WORST-CASE RISK INTERACTIONS

Perhaps the most important function of stress tests is to make clear the potential extent of the damage when risk factors interact together to create a radically severe outcome.

Important risk factor inter-relationships may not be intuitively obvious because many appear only in exceptionally stressed situations, or after one risk factor (e.g., default rate) has crossed some threshold. The classic example of this is the relation-

ship between probability of default and loss given default in commercial real estate linked lending: in a severe downturn, both risk factors feed on each other in a vicious spiral that creates unexpected levels of loss. There are many other examples of potentially tricky interactions, however, including the sharp falls in interest rates that often precede a rise in the default rate (as central banks try to stave off recession).

A straightforward question for banks to ask themselves might be: 'What are the five key correlation risks we face as an enterprise, have we stress tested them using the latest quantitative techniques, and are the results reasonable from a intuitive perspective?'

It's therefore critical that the bank isolates the most potentially threatening financial risk factor dependencies, given its business model, and uses sophisticated quantitative stress tests to explore and quantify the effect of:

- intra-risk key risk factor correlations, such as the tendency for collateral values and recovery rates to fall at the same time that the probability of default rises
- inter-risk correlations, such as the tendency for credit risk to rise in some sectors as market risk rises (e.g., interest-rate driven credit risks; market price spike driven credit risks)

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6. DON'T IGNORE BEHAVIORAL AND SYSTEMIC EFFECTS

A particular worry for banks is the risk of a sudden change in customer, stakeholder, counterparty and market behavior under stress. It's this human element that makes bank stress testing so different from the stress testing which has evolved for insurable natural catastrophes such as hurricanes and rainstorms.

For example, depending on the product and on the customer's risk profile, there can be a strong tendency for retail

customers to draw down their full credit line just before default. Likewise, behavioral effects may be important in determining whether customers declare bankruptcy – or hand back their house keys – readily or reluctantly.

Stress testing is particularly important where banks suspect there may have been some kind of behavioral regime change. This implies that risk measurement based on historical risk factor analysis will have become less robust and that business intuitions at the local level might be wrong-footed. The bank should therefore explore how important the suspected regime change might be using stress testing.

Stress tests will show that some uncertainties are much more critical than others, in the light of the bank's enterprise risk portfolio and growth strategies.

Customer behavior is far from the only source of behavioral risk faced by banks. There are various classes of actors whose behavior can determine a bank's fate including regulators, rating agencies, investors, other banks, shareholders, market counterparties.

As a recent BIS review commented,⁴ banks often model the effect of severe macroeconomic shocks as if they were firm-specific events that occur to the bank in isolation. Yet the real risk may be that a survivable macroeconomic shock will trigger wider turmoil in the market and a series of behavioral after-shocks. Here, the stress tester is really looking

for potentially fragile assumptions about how key actors will behave under stress, and for growing pools of exposure to such behavioral changes – especially where these make the bank an outlier to its peer group. What will happen to our bank if certain historical assumptions about how markets behave suddenly break down?

CONCLUSION – NEXT STEPS

There is some danger that firms will try to learn the lessons of the latest banking crisis by increasing the number of historically-based stress tests they run in particular silo risk functions.

This would be to fail to learn the bigger lesson: banks must invest in the messy, at times unsatisfactory, enterprise-level business of understanding extreme, forward-looking risk interactions, dependencies and knock-on effects.

This is both an imaginative and a quantitative challenge – and it must be organized in ways that overcome the silo mentality of bank businesses and bank risk management. By starting with an enterprise-level survey of what the bank is doing presently, the bank can easily review and improve its stress-testing practices by following the six practical steps detailed above.

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Footnotes:

¹ For example, letter from the UK's FSA to bank chief executives, October 2006, Stress Testing Thematic Review: "We were struck by how mild the firm-wide stress events were at some of the firms we visited. On the evidence of our review, few firms were seeking out scenarios such as those that might require a dividend cut, generate an annual loss, or result in shortfalls against capital requirements while still remaining plausible."

² "For example, Stress Testing at Major Financial Institutions: Survey Results and Practice, Working Group – Committee on the Global Financial System, BIS, January 2005"

³ Senior Supervisors Group, Observations on Risk Management Practices during the Recent Market Turbulence, 6 March 2008.

⁴ Developing a Framework for Stress Testing of Financial Stability Risks, Nigel Jenkinson, Bank of England, July 2007, BIS Review 81, p.8

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