Stress Testing
the Commercial Loan Portfolio
Why and How

by Marc Intrater

Stress testing is an important and evolving tool in risk mitigation, and banking regulators increasingly look for its use in institutions of all sizes. It is important to view stress testing as a risk management supplement—not a catchall—and to know which tests are most appropriate for a given portfolio. The following is the first of two articles on stress testing in this issue of the Journal.

Stress testing is examining an alternative future that could cause problems in your portfolio. It enables you to determine how bad those problems could become and prepare for them if that scenario develops. It also enables you to verify whether your institution would be able to handle the problems. You also can test alternative scenarios based on what you put in your portfolio, how you manage the portfolio, and how you capitalize it.

Stress testing is not limited to a particular analysis. It also involves the set of tools and information you need to be able to perform stress tests. It’s the process for using stress tests as part of the risk management process. Stress tests are best used as a complement to other types of risk management.

Banks use stress testing because traditional types of risk management, which examine the portfolio for expected losses, provision levels, criticized classified loans, and distribution across industries or geographies, don’t give you a full picture of how the portfolio could be affected by unexpected events.

Today, stress testing typically is performed by people in the risk areas, or sometimes the business areas, as a one-off study. The purpose is to get a sense of how much risk might be missing from routine risk reports, particularly presumed risk for the worst potential losses.

A more advanced step is to use stress testing as part of an ongoing process, and in particular to have controls based on stress tests. To do so, banks set explicit limits for their exposures, which must be met by the stress test. For instance, they place limits on the amount of their losses, amount of provisions, and percentage of criticized loans in the portfolio. Those limits are periodically evaluated to make certain that the bank’s exposure will...
never be more than the limit. If the stress test shows the limits have been exceeded or the portfolio is approaching those levels, the bank will consider rebalancing the portfolio, hedging, or discontinuing certain types of lending to keep within those levels.

**Other Uses for Stress Tests**

Stress tests are sometimes used for capital adequacy and for pricing. The problem with this use, however, is that it’s hard to know just what to do with the explicit number from the stress tests and how to convert that number into a capital adequacy figure or into a cost-of-risk in pricing.

Stress tests are sometimes used as a scare tactic, particularly when a risk manager or a credit officer is concerned about a certain type of exposure or about the concentration of exposure the institution has in interest rate-sensitive or oil price-sensitive companies, for instance. A stress test can show that if a given situation were to occur, the institution would face large losses or risks or capital adequacy problems.

Stress tests also can be used to prepare for contingencies. By evaluating all the things that would happen if a given situation were to occur, you can prepare for the contingency and help limit the severity of losses you would experience if that situation, or anything similar, does indeed occur.

**Stress Tests for Credit Area**

The most common type of stress test examines industries or sectors. It would, for example, test what would happen if there were a downturn in the transportation industry. Or if there were a regional recession in the Southwest.

Typically, the stress test assumes an increase of default levels in that sector or, equivalently, a downgrade across-the-board of all loans in that sector by a certain amount. Second-order effects should be examined as well. If the transportation sector would be affected, what would that do to the hospitality sector? What would that do to the energy sector? Would there be lower-magnitude impacts on other sectors?

The most common way to do that is to look at what would happen to loan grades. Examine what would happen if the bank were to reduce its rating across each of those loans and then recalculate its typical risk assessment in that situation. What would happen to the bank’s:

- Expected losses?
- Provisions?
- Ratio of criticized loans to the whole book?
- Ratio of nonperforming loans to provisions, or ratio of nonperforming loans to the whole book?
- Economic capital?

The stress test would enable the bank to see how well it would be able to withstand those situations.

**Stress Testing Using Macroeconomic Factors**

Another direction for doing stress testing, involving somewhat more complex tools, would be to have them based on macroeconomic factors, such as interest rates, energy, or unemployment.

If you have models that link macroeconomic factors to the health of different industries, you can perform such a stress test. It’s a two-step process.

First, determine the macroeconomic stress and its impact on the financial health of different industries. Then examine your portfolio to determine how much exposure the bank has in each of those industries. What is the impact in terms of increased credit risks?

The macroeconomic stress test is similar to the first, sector-based stress test. But unlike the first test, in which the stress is
very concentrated in one industry, it will probably be diffuse across a number of different industries affected by the macroeconomic factor.

**Parameter Stress Tests**

Parameter stress tests are used on the bank’s own internal risk measurement systems. For example, in their credit risk analysis, banks typically assume that when cash-collateralized loans go bad, their loss severity would be very, very low, and they set the severity (or loss in event of default) parameter at, say, 5%. But what would happen if something systemically were to change that, and you start experiencing losses on cash-collateralized loans of 20% or 30%?

The stress test may indicate that the bank is very sensitive to a change in that parameter, which may mean that you have to reconsider how much to trust that assumption. When banks make complex assumptions with the aid of sophisticated risk management tools, all sorts of correlation assumptions are made. It’s important to stress the assumptions built into your risk management models.

**Stress Testing the Consumer Portfolio**

Although less commonly used, stress testing is also possible in consumer lending. You must be able to relate macroeconomic factors to your consumer portfolios. To do that you must examine your underwriting and grading evaluation of consumer loans. For example, if you look at a mortgage or a home equity portfolio, a large part of the evaluation is based on the monthly-income-to-debt-service ratio.

Consider the impact of interest rates changing. Many of those loans have a variable rate. What would that do to the debt service requirements? And even assuming no change in income, what would that do to the ratio? How many of the loans would become so substandard by your criteria that you now wouldn’t be booking them? What is the higher rate of loss you expect on those substandard loans?

Using the same criteria you used for evaluating and pricing loans when they come in, you can adapt a lot of those to get models to say what would happen to your consumer portfolio given some changes in the outside world.

**How Credit Risk Intersects with Other Risks**

Credit risk intersects with other types of risk at two levels. At one level the intersection occurs with individual exposures, particularly very complex exposures that result from some types of derivative transactions. Sometimes it occurs when the institution has multiple transactions with the same counterparty or with related counterparties. The intersection also can occur with collateral whose value is tied to the creditworthiness of the borrower, which most commonly occurs in commercial real estate.

By performing stress tests to see what would happen if interest rates were to change at the same time the creditworthiness of the borrower were to change, banks can get a better understanding of the risk picture.

On the macro level, banks are trying to determine their combined risk situation. They do stress testing to examine what could go wrong and what combinations of events could be too extreme for the institution. Then they determine if they’re comfortable that those events will not occur or they take the steps necessary to preserve the bank’s assets in a worst-case scenario.

**Creating a Reasonable Scenario**

If you downgrade everything in the retail portfolio by three grades and determine the consequences, how can you know if the scenario you built is reasonable?

The main limitation of stress testing is that it’s hard to make explicit use of the numbers. It’s hard to know exactly what the appropriate dimension or the appropriate extent of the stress test is, even if you then agree on the type of stress test you should be doing.

Another key challenge with stress tests is that you only find what you look for. You can decide what it is you want to stress, and you’ll find out the impacts of stressing that. But if there’s another risk that exists and you don’t recognize it as a risk, you won’t find it. Stress testing is an ongoing process of thinking through what risks you have. That’s what makes it such an interesting field to work in.