

## **CRE stress testing: a new frontier in credit risk management**

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Stress testing of commercial real estate loans has effectively become mandatory for all banks and thrifts since the issuance of the joint agency guidance in January 2006 entitled *Concentration in Commercial Real Estate Lending – Sound Risk Management Practices*. As usual, such directives take months or years to filter through the system and find their footing regarding actual implementation and practice. Despite the regulatory impetus, CRE stress testing is rapidly developing into a new credit management best practice.

Although stress testing is certainly not a new concept in general--as that is effectively what interest rate risk management accomplishes--it is a new concept to most financial institutions in the credit department. Stress testing can appear daunting to those being asked to implement the practice, but in reality it can be a fairly simple and straight forward task.

The preliminary regulatory guidance to determine if an institution warrants the use of stronger risk management practices is determined by two issues:

- 1) Total reported loans for land construction, land development and other land represent one hundred percent (100%) or more of an institution's total capital.
- 2) Total reported loans secured by multi-family and non-farm residential properties and loans for construction, land development, and other land represent three hundred percent (300%) or more of the institution's total capital.

If either test is met, additional regulatory supervision through requirement of heightened risk management practices enters the picture. However, due to market conditions in late 2008 and during 2009, in practice regulators have begun asking most all CRE and construction lenders to conduct at least a cursory stress testing of their portfolios. The level of stress testing requested increases as does the size and complexity of the CRE portfolio.

This paper will examine the issues surrounding stress testing, define the parameters, and provide basic guidance as to its implementation. Stress testing is generally not predictive behavior modeling, though it can be, but rather is a series of "what-if" exercises.

## ***Why stress test***

Stress testing is a response to the high levels of commercial real estate concentration that were held in financial institutions in the early part of this decade and continue today. These levels were at all time highs, while capitalization rates were at or approaching all time lows. To regulators and analysts, this spelled certain disaster.

At the same time as these danger signs were building, the international regulatory community was busy developing the Basel II accord. This new accord calls for measure of capital built on various “pillars” of risk measurement within an organization. Stressing various risks through the credit portfolio and arriving at a statistically valid probability of default is one of the factors that determine the required capital for the organizations impacted by Basel II. This was a clear sign to domestic regulators that potential credit performance risk was recognized worldwide and that a somewhat standardized methodology was implemented to attempt to measure that risk.

From a purely logical and practical perspective, one would presume that any lender or underwriter would wish to know, at any given point including at underwriting, the risk to credit performance based upon the varying factors involved in the repayment of a credit. If trouble is just around the corner, or could be, it's sure nice to know, though some forms of very basic stress testing won't alert a lender to that fact. Those basic methodologies just let one know what the liquidated collateral may be worth in the event that a credit migrates to a problem credit—it's hardly a credit management tool but qualifies as stress testing.

Stress testing, as conducted by the average institution, does not provide predictive results, but rather performance results under given scenarios. If a stress scenario is conducted that a lender, chief credit officer, or analyst considers “probable” and the results are unfavorable, the institution can then begin steps to mitigate any potential situation prior to its possible occurrence and help a borrower maintain creditworthiness. It's far better to see smoke and take action than to wait for the fire.

Stress testing is rapidly proving its value when conducted at underwriting and during the course of the credit until maturity. Knowing potential problem situations at the time of funding can serve both sides of the transaction by providing an alert to potential problems as the inevitable variables behind a credit morph over time. Such knowledge may assist the credit department as to the proper structure of the credit to help avoid potential pitfalls. Certainly stress testing for negative variables during the life of the loan is wise by any standard.

### ***Which credits to stress test and when***

The joint agency release mandates stress testing for income-dependent commercial real estate properties. It does not specifically exclude owner occupied properties. Guidance is provided to exclude agricultural properties, such as active farming or ranching activities, but does not exclude properties generating income by farming or ranching activities.

In general, property types that are currently expected to be stress tested are:

- Office buildings/rental space
- Retail properties including food and beverage
- Multi-family residential
- Any other rental property including residential rentals
- Construction – commercial or single family
- Owner occupied if less than 50%

Loans that are not generally stressed under CRE standards are:

- Non-RE income producing C & I loans
- Agricultural loans
- Owner occupied loans >50%
- Construction loans where the loan is made to the owner-occupant, not the builder or developer.
- Marine loans, even if for a revenue dependent boat or ship

As a guideline, if in doubt, stress the loan if it is real estate-income dependent. This is especially true of partially owner occupied loans. In practice there does not appear to be a hard and fast line as to the percent of occupancy by the owner of a property at which stress testing is not encouraged.

At present, guidelines for frequency of stress testing do not appear to be standardized, from a regulatory perspective. From a credit management perspective, smaller, less complex portfolios may not need to be stressed more than annually, while other more complex portfolios or sectors may be prudently stressed every quarter or monthly. Individual portfolios aside, the mere nature of the market in which the portfolio itself resides may well be grounds for management's assessment of the need for frequent stress testing. To wit, a portfolio held primarily in a major metropolitan area is generally acknowledged as holding more market risk than a portfolio in a non-metropolitan area

with stable and diversified employment. Each institution should be its own judge of the frequency of stress testing, based upon the amount of risk the institution is willing to accept and management's desire for measurement and monitoring. Consideration of current economic factors is also a must-do in frequency determination.

Accurate stress testing of debt service coverage (DSC) ratios requires current financial results of the operation of the property. That fact alone can define frequency of testing, though hypothetical DSC stressing may be conducted while awaiting receipt of financial results. Also, financial results impact the capitalization rate (Cap rate) at which a property can likely be liquidated. As with any credit risk tool, stress testing from factual information is far superior to even the most educated guesses.

### ***What results are sought***

As mentioned earlier, stress testing needs vary by institution. From a regulatory perspective the number one focus is potential exposure to capital and adequacy of the ALLL account. Given that definition, an institution could simply play "what-if" games on a spreadsheet that assume ever lower market values to financed properties and define potential exposures at various percentage loss values. As an example, an institution could calculate any overall loss as each property is devalued in 5% increments. Then the results could be compared to capital and the ALLL account to determine at what point the ALLL is depleted and capital becomes inadequate. Such a simplified approach may satisfy regulators regarding very small, non-complex portfolios, but even then it really does not serve to help mitigate any potential loss. In other words, this approach does little to advance or improve credit risk management.

From a more practical standpoint, a quality stress test methodology should include the key components of Cap rate, interest rate, occupancy rate, expense ratio, and market value as each and every generally independently of each other. For example, it is often true that as interest rates and occupancy rates rise, capitalization rates fall. At the same time as gross revenues are rising, operating expenses also may be rising, thereby raising the expense ratio and negatively impacting net operating income. An overbuilt or developed sector may result in rising capitalization rates while other sectors have falling capitalization rates.

Each independent variable should be stressed to provide results for DSC and loan to value (LTV) under each stress scenario conducted. Larger institutions with sizeable portfolios may wish to go further and conduct Probability of Default analyses on a global and/or a sector basis.

Standardized stress "shocks" to a portfolio cannot be applied universally, but rather must be applied by sector. Every type of property trades at its own Cap rate average, and each type of property has a unique occupancy ratio profile. This and other facts make it necessary to assign the stress factors to the variables by sector. Small institutions and those in small communities may even be quite familiar with individual properties and should apply their direct knowledge to each individual credit for stress purposes.

The objective should be to conduct stress testing in a meaningful fashion that produces actual credit risk management benefits. To accomplish that goal requires some additional modeling, and output may be readily utilized by lenders, credit analysts, management, and CFOs to improve credit risk measurement and management.

### ***Stress testing***

For purposes of this section we are going to discuss stress testing from a perspective of credit risk management, not just as a response to a regulator. This requires initial analysis at the instrument level, not at the portfolio level. Once each loan is stressed, then the results may be rolled up into sector or global results. As such the calculated output results that should be viewed are:

- Net Operating Income (NOI)
- Capitalization rate (Cap rate)
- Estimated collateral value
- Debt service coverage (DSC) ratio
- Estimated loan to value (LTV) ratio

Every institution makes adjustments from income to arrive at an NOI number. The formula is not important--what is important is consistency. As long as all loans are measured by the same yardstick, then the formula utilized for NOI is not relevant for testing purposes.

To achieve desired results, an institution should incorporate the ability to modify key variables. Those variables are, at a minimum:

- Rental income
- Other non-rental income
- Operating expenses
- Cap rate
- Interest rate
- Vacancy rate

Each loan should be measured at its current level and then by conducting two more stressing iterations of each variable. By operating in fashion, especially if the original expected performance of the credit at underwriting is available, a credit officer can determine how the credit has migrated since inception and what future performance may be under varying conditions and property performance. This is especially helpful if a negative or positive trend is obvious in that a stress run can be conducted that further recognizes that trend.

An important point to note is that stress testing only examines the ability of the income producing property to satisfy the debt. It does not include the ability of the borrower or guarantors to satisfy the debt regardless of the property's performance. Obviously

those factors may mitigate any potential Loss Given Default (LGD), but are not included in direct stress testing of the property's performance itself.

The following chart provides an example of basic output that, at a minimum, should be viewed.

### Sample Stress Testing

	<b>Baseline Conditions</b>	<b>Moderate Stress</b>	<b>Severe Stress</b>
<i>Cap Rate</i>	7.50%	8.00%	8.50%
<i>Interest Rate</i>	7.50%	8.50%	9.50%
<i>Vacancy Rate</i>	7.50%	12.50%	17.50%
<i>NOI</i>	102,188	95,313	88,438
<i>P+I Payment</i>	86,462	94,212	102,223
Core Collateral	1,363,000	1,191,000	1,040,000
DSC Ratio	1.18	1.01	0.87
LTV Ratio Core Collateral	0.72	0.82	0.94
LTV Ratio All Collateral	0.62	0.70	0.79

The parameters chosen here are arbitrary and are not intended to be recommended stress parameters. The first four items in italics are entered values while the other four items are the calculated results.

In this very basic sample the LTV ratios are discovered by calculating the estimated value of the property which is accomplished by using the capitalization rate and the expected NOI. Knowing both those factors, or using them as input variables, allows the calculation of an estimated property value of a specific property based on its financial performance or stressed financial performance. So the resulting Core Collateral value is a calculated amount, not entered. The resultant core collateral valuation estimate is a Level 3 valuation under FASB #157, not a Level 2 as is an appraisal.

When choosing stress parameters, be certain to gather evidence of support for measurement under current conditions by sector, even if it comes from general knowledge of the market, though with current financial information most of the variables at current conditions can easily be calculated. Be certain to save the support information for your choices. Also save the justification for the stress scenarios calculated.

To achieve results with useable value, the loan amount should be compared to the calculated core collateral value and the amount of excess of loss clearly shown on the

report. Also to be realistic, an amount of estimated liquidation expense should be entered when a loan nears negative DSC and/or an LTV in excess of 1.0.

### ***Analysis of the results***

Output is dependent upon the desire of each institution. From a purely regulatory perspective, minimum output should be formatted to demonstrate potential LTV losses by sector and by the global portfolio under rate shock conditions. Included in the minimum output is a comparison of exposure to capital. This output will assist in the understanding of the adequacy of current and potential ALLL funding. For institutions that are equally interested in managing potential credit risk, the similar output should be developed for DSC ratios.

As institutions go through the stress process, why not get as much value out of it as possible, rather than just satisfying a regulatory requirement? Once the data is loaded and stresses calculated, a tremendous amount of data is available. Sector analysis is a good example. Rather than just segregate office buildings from retail buildings, also segregate by origination date, location or region such as by zip code, loan balance ranges, credit grade, SIC/NAIC codes, borrower, guarantor, branch of origination, lender, and so forth. This provides management a clear understanding of the portfolio.

The same exercise can be applied when conducting capital and ALLL analysis. Overall exposure to capital and potential ALLL funding is important, but sector analysis is imperative. In this instance, basic sector analysis such as construction, hospitality, lodging, retail, etc. is required. Again, though, as long as the data is there, move forward to break each sector down further such as all lodging loans less than 2 years old, those from 2 to 5 years old, and those 5 years and older. Doesn't this make a lot of sense from a credit management and understanding perspective?

When looking at capital, a comparison should be conducted to the overall exposure of CRE loans to Tier 1 capital and the same analysis conducted by sector. This should first be done at the base (current conditions) case and then from the stressed levels. Savings or archiving this information then allows an analyst or CFO to easily monitor credit migrations. The same is true when calculating and retaining DSC ratios, as credit managers can quickly see to where, and in which sectors, their likely exposures are trending. Then is either LTV or DSC is high by sector, or even if not, individual credits can then be viewed to understand the exposure at the instrument level. This is where the true credit management portion of CRE stress testing proves its value.

### ***Summary***

CRE stress testing can be conducted only for regulatory purposes or for credit management and regulatory purposes. One is required; the other is the new best practice in CRE credit management. This is one of those rare opportunities where a mandated change from regulators likely adds more value for the institution than for the regulator. By understanding current and potential LTV and DSC changes, the institution can avoid any major surprises down the road. High credit losses translate into high

ALLL reserves, which ultimately translate into potentially declining capital levels. CRE stress testing can help avoid those surprises and provide a lender a bit of a crystal ball to the future, allowing for loan mitigation in advance of certain problems.

Manage for the regulators or manage for the shareholder. The choice is yours.

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