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Stress Testing Credit Risk at Community Banks

The recent banking crisis illustrates how rapidly market conditions can deteriorate and subject banks to considerable strain. One result of this experience is that stress testing has come to occupy a more prominent place in the supervision of large banks. The Supervisory Capital Assessment Program, its successor the Comprehensive Capital Adequacy Review, and the stress-testing requirements of Section 165 of the *Dodd-Frank Wall Street Reform and Consumer Protection Act* are, collectively, an important set of supervisory expectations for large banking organizations.

Stress-testing expectations for community banks are more discrete and limited.¹ Existing supervisory guidance states that banks with significant concentrations in commercial real estate (CRE) or subprime lending should conduct portfolio stress tests of these exposures as part of their ongoing risk management activities (see text box on page 10). Outside the credit risk arena, standard asset-liability management techniques such as analyzing the effect of interest-rate shocks, or other interest-rate simulations, amount to a form of stress testing. Finally, interagency guidance states that all institutions should plan for ways to meet their funding needs under stressed conditions.

Community banks looking to conduct CRE stress tests in accordance with supervisory guidance, or otherwise considering the use of stress tests for risk management, may find that it is hard to know where to start. Confusion is understandable: some stress-testing approaches can be complex, and there

are a variety of analytical approaches from which to choose.

These difficulties notwithstanding, there are simple approaches to credit-risk stress testing that can be implemented by a community bank. While not a substitute for strong loan underwriting and grading, credit administration, risk limits and governance of the credit-granting process, stress testing can help institutions evaluate lending risks and capital adequacy under stressed but plausible scenarios. Some community banks have used stress tests to develop a more comprehensive understanding of potential loss exposure and incorporated the results into their risk management and capital planning processes. Experience from bank examinations suggests that community banks that proactively manage their lending function and attempt to plan for, measure and control their vulnerability to adverse events have been better able to make adjustments and improve performance over time.

This article describes the credit-related stress-testing process and explains how community bank boards of directors and senior management can use this process to better manage risk. The article emphasizes that smaller community banks can effectively perform stress testing in a simple and straightforward manner to achieve the goals of outstanding supervisory guidance. The article includes two simple examples of stress-testing methodologies. These are offered as an informational resource only, not as a supervisory directive.

¹ See FDIC Press Release 54-2012, *Agencies Clarify Supervisory Expectations for Stress Testing by Community Banks*, issued May 14, 2012 (<http://www.fdic.gov/news/news/press/2012/pr12054.html>).

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Outstanding Supervisory Guidance for Stress Testing Credit Exposures

The 2006 *Guidance on Concentrations in Commercial Real Estate Lending, Sound Risk Management Practices* and the 2001 *Expanded Guidance for Evaluating Subprime Lending Programs* state that institutions with CRE and subprime lending concentrations should perform portfolio-level stress tests or sensitivity analyses to quantify the impact of changing economic conditions on asset quality, capital, and earnings. These issuances recommend that institutions consider the sensitivity of the performance of portfolio segments with common risk characteristics to prospective changes in market conditions. Importantly, the guidance emphasizes that the sophistication of stress testing should be consistent with the size, complexity, and risk characteristics of the portfolios and balance-sheet structure.

Definition of a Stress Test

Stress testing is a forward-looking quantitative evaluation of stress scenarios that could impact a banking institution's financial condition and capital adequacy. These risk assessments are based on assumptions about potential adverse external events, such as changes in real estate or capital markets prices, or unanticipated deterioration in a borrower's repayment capacity. Stress tests are most useful when customized to reflect the characteristics particular to the institution and its market area, and can be used to evaluate credit risk in the overall loan portfolio, segments of portfolios, or individual loans. Stress tests also can be used to evaluate whether existing financial (such as capital and liquidity) and operational (such as staffing and internal systems) resources are sufficient to withstand an economic downturn or unexpected event.

The FDIC does not endorse a prescribed method for stress testing, and outstanding stress-testing expectations for large institutions *are not* required for community banks.² Rather, the extent and depth of an institution's credit-related stress testing should be commensurate with its unique business activities, portfolio size, and concentrations. Stress tests can be performed effectively by bank staff or, at the institution's discretion, a competent third party, using methods ranging from simple spreadsheet computations to more complex software applications. For example, some smaller community banks have successfully implemented relatively simple, yet effective, CRE loan stress-testing processes while larger institutions have created similarly effective stress assessments with greater sophistication and complexity.

² Community banks and other institutions with total assets of less than \$10 billion are not subject to the stress-testing requirements established in Section 165 of the *Dodd-Frank Wall Street Reform and Consumer Protection Act* or the *Supervisory Guidance on Stress Testing for Banking Organizations with More Than \$10 Billion In Total Consolidated Assets*, issued May 14, 2012.

Types of Stress Testing

Financial institutions can create a variety of stress tests to evaluate credit portfolio risk and the potential impact on capital. These types of generalized stress tests can be used by community banks to meet supervisory expectations (e.g., expectations contained in the 2006 CRE Guidance) or by institutions seeking to complement and enhance their other risk management activities. As suggested by this list, there is no one right way to conduct stress tests.

Transactional Sensitivity Analysis – Before making a commitment for financing a commercial property or project, an institution can analyze financial and market assumptions provided by the borrower or through the appraisal process to determine the degree to which the cash flows generated by the property or project can withstand market fluctuations and service the loan per contractual terms. For example, a bank could assume the departure of a key tenant in a commercial real estate project and measure the resulting effect on loan performance. The results of such stress analyses can help an institution determine whether to make a loan and if so, formulate a more appropriate loan structure, pricing, or other prudential terms to mitigate credit risk. Further, individual stress tests can be aggregated and studied to assess the impact on the portfolio.

Stressed Portfolio Loss Rates – Applying a set of portfolio or portfolio-segment loss rates that might be expected during downturn conditions can help community banks identify

the extent to which capital might be at risk given the bank's balance-sheet structure and loan mix. For example, a bank could use portfolio loss rates from a previous economic recession and apply those to their current portfolio.

Scenario Analysis – An institution may want to evaluate how a certain portfolio or portfolio segment (e.g., second lien mortgages) may respond to different levels in a key performance metric (e.g., housing prices or interest rates).

Loan Migration Analysis – Institutions with larger portfolios and more comprehensive internal databases can evaluate how a downward migration in internal loan ratings, consistent with migrations that might be expected during adverse financial conditions, would impact asset quality and capital. This analysis would also assist institutions in determining possible actions to address potential migration or deterioration in the portfolio.

Reverse Stress Testing – With reverse stress testing, an institution assumes a known adverse outcome, such as severe credit losses that reduce regulatory capital ratios to below satisfactory levels, and determines the loss event and associated circumstances that could lead to that outcome. This type of analysis helps institutions quantify the level of capital and earnings buffer it has to absorb financial shocks and helps identify those circumstances that, either singularly or in combination, would have the greatest adverse impact.

Examples of Credit-Related Stress Tests that Can Be Used by Community Banks

Examples of credit-related stress tests are presented below for illustrative purposes.³ These relatively non-complex stress tests can produce useful information about a community bank's vulnerability to adverse circumstances and provide insights for boards of directors and manage-

ment to consider when determining if action should be taken to mitigate outsized risks.

Portfolio-level example using stressed loss rates

The first example illustrates a portfolio-level stress test using stressed loss rates in two scenarios corresponding to moderate and severe levels of stress. For each scenario, a set of portfolio loss rates and average balances

³ These examples are not intended to be viewed as a standard stress-testing format or methodology endorsed or expected by the FDIC. They are presented to illustrate that simple, straightforward stress tests can provide useful insight into concentrated credit portfolios held by community banks.

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are estimated in step #1, covering a two-year period of projections. These loss estimates could be derived, for example, from the bank's own experience during stress periods or from peer portfolio performance. Projections that assume historical or peer loss rates will be more informative and relevant if potential losses are adjusted, even if only judgmentally, to reflect the risk in the bank's own portfolio. The

loss rate estimates are then applied to portfolio balances to produce an estimate of aggregate losses. The next steps (step #2 and step #3) estimate the impact of these portfolio losses on earnings (which also are estimated) and capital. In this example, the bank's construction and development lending concentration and other exposures could affect the capital position in the assumed severe scenario.

1. Estimate Portfolio Losses Over the Stress-Test Horizon

	Estimated Portfolio Balances, in \$	Stress Period Loss Rates Over Two Years		Stress Period Losses Over Two Years	
		Moderate Case Stress	Severe Case Stress	Moderate Case Stress, in \$	Severe Case Stress, in \$
Construction & Development	124	14.0%	25.0%	17	31
Commercial Real Estate	22	2.5%	5.0%	1	1
Residential Mortgage	372	2.9%	6.5%	11	24
Other Loans	125	5.0%	10.0%	6	13
Totals	643			35	69

2. Estimate Revenues and Impact of Stress on Earnings

	Moderate Case Stress, in \$	Severe Case Stress, in \$
Pre-provision net revenue (over two years)	31	25
Less Provisions (e.g., set to equal estimated losses from step 1)	35	69
Less Tax Expense (Benefit)	(1)	(13)
Net After-Tax Income	(3)	(31)

3. Estimate Impact of Stress on Capital

	Moderate Case Stress, in \$	Severe Case Stress, in \$
Beginning Tier 1 Capital	88	88
Net Change in Tier 1 Capital (e.g., set to equal Net After-Tax Income from step 2)	(3)	(31)
Ending Tier 1 Capital	85	57
Estimated Average Assets	850	816
Estimated Tier 1 Leverage Ratio	10%	7%

Risk-Stratification Matrix for a CRE Loan Portfolio

Another relatively simple analysis is a risk-stratification matrix based on debt-service coverage (DSC) and loan-to-value (LTV). In this three-step example, an institution could:

1. Stratify and aggregate a segment of CRE loans that represents a meaningful sample of the portfolio based on current DSC and LTV, and slot the results in the matrix as a percentage of total risk-based capital. For a smaller institution, the largest 10 or 20 CRE loan exposures may be sufficiently representative. The intensity of potentially higher risk exposures is highlighted in pink (elevated risk) and red (more severe).
2. Devise plausible assumptions about adverse trends in cash flows and collateral values for the 10 or 20 exposures, and then re-slot the results to create a stressed scenario. In some cases, this may be as simple as applying a uniform “haircut” (for example, 20 percent) to the current cash flows and collateral values.
3. Compare the pre-and post-stress-test results to assess the portfolio’s vulnerability to certain realistic stress events that could impact the institution. Portfolios with strong DSCs and LTVs may show limited migration to problem-credit status, while the opposite may be evident for portfolios with a large volume of loans originated at or near the institution’s minimum acceptable underwriting standards.

Institutions embarking on a stress-testing process may want to prioritize work based on the largest exposures or portfolio concentrations, the riskiest segments of the portfolio, and

watch-list credits. Insight gained from initial stress testing can provide the foundation for more expansive tests if this is deemed necessary. Consistent with outstanding supervisory guidance, stress testing of concentrated non-owner occupied CRE and subprime lending portfolios should be a primary focus. However, community banks seeking to enhance their risk management processes may find value in evaluating risks in owner-occupied CRE and other concentrated lending categories (such as C&I or residential loans) given a downward adjustment in regional and local economic circumstances or collateral values.

Pre-Stress

Debt-Service Coverage	CRE Loan-To-Value			
	60-69%	70-79%	80-89%	90+%
>1.75x	5.0%	45.5%	38.0%	7.5%
1.51x to 1.75x	19.0%	74.0%	53.0%	15.0%
1.26x to 1.50x	22.5%	58.0%	60.0%	12.5%
1.16x to 1.25x	7.5%	35.0%	17.5%	0.0%
1.01x to 1.15x	0.0%	5.0%	25.0%	0.0%
<=1.0x	0.0%	0.0%	0.0%	0.0%

Note: Cell data represent the volume of loans, as a percentage of total risk-based capital, that meet the LTV and DSC criteria for that cell.

Post-Stress

Debt-Service Coverage	CRE Loan-To-Value			
	60-69%	70-79%	80-89%	90+%
>1.75x	0.0%	5.0%	15.0%	7.5%
1.51x to 1.75x	0.0%	7.5%	45.0%	12.5%
1.26x to 1.50x	5.0%	12.5%	20.0%	25.0%
1.16x to 1.25x	0.0%	20.0%	17.5%	12.5%
1.01x to 1.15x	0.0%	50.0%	125.0%	70.0%
<=1.0x	0.0%	10.0%	35.0%	5.0%

Note: Cell data represent the volume of loans, as a percentage of total risk-based capital, that meet the LTV and DSC criteria for that cell.

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Common Risk Measures for Developing Stress Tests for Individual CRE Loans

These risk measures have been used to assess the effect of financial, economic, and market factors on CRE loan repayment. Many of these measures also apply to other loan categories. Institutions may find it beneficial to conduct stress tests using one or a combination of these risk factors:

- debt-service coverage
- loan-to-value ratios and capitalization rates
- property net operating income
- collateral value depreciation (regional and local)
- CRE sector performance (office, retail, multi-family, warehouse/industrial, lodging)
- interest-rate levels on variable-rate loans
- contractual terms (amortization, balloon payments) that may introduce refinancing or repayment risk
- occupancy status
- lease rates
- unit absorption rates for real estate developments
- economic factors such as changes in local employment and house prices

Using Stress-Test Results

Banks gain the most benefit from stress-testing exercises when they are incorporated into the overall risk management and strategic planning processes. For example, results of portfolio-level stress tests can be reviewed by boards of directors and senior management as one component of their analysis of lending concentrations, the adequacy of capital and the allowance for loan and lease losses, and the overall risk facing the institution. Additionally, stress-test results for individual loans can be used by loan officers and credit committees to better understand a borrower's or property's risk characteristics and position the bank (as lender) for unexpected adverse circumstances. Also, institutions with sound risk management practices

surrounding stress testing, including board oversight and direction, appropriate policy guidance, and an effective internal control and validation process, will have greater confidence in the reliability of stress-test results.

The strategic value of stress testing may be greatest during the expansionary phase of business cycles. During times when losses are minimal and property values are rising, stress-testing assessments of riskier assets and concentrated positions can help management anticipate potential risks arising from lower-than-expected obligor cash flows, deteriorating local or regional economic circumstances, or declining real estate values. Directors can use stress-test results as part of establishing risk tolerances and ensuring that remedial or mitigating action is taken when elevated risks become evident. If a board determines

that the institution's current risk profile exceeds tolerable levels, it may want to review credit-exposure limits, loan underwriting standards, the need for additional capital or staffing, or other financial, operational, or administrative measures.

Conclusion

Community banks can implement an effective stress-testing process in a straightforward manner to help the board of directors and senior management understand the potential impact of adverse scenarios. Clearly, institutions with total assets of less than \$1 billion tend to have less complex credit portfolios and a particularly intimate understanding of their borrowers and local economic conditions. Therefore, when an institution is subject to a supervisory expectation to conduct stress tests (as with the 2006 CRE guidance) or otherwise wishes to conduct stress tests, it may be sufficient for such institutions to analyze the portfolio in a simple spreadsheet to simulate base-case and severe stress scenarios. To the extent loan portfolios include speculative, risky, or concentrated elements, an institution can stress test these exposures to identify

potential vulnerabilities to enable the board of directors to make informed strategic decisions. Used in this way, stress testing can be a valuable tool to assist institutions in strengthening credit-risk management practices.

This article should not be construed as supervisory guidance or establishing regulatory expectations.

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