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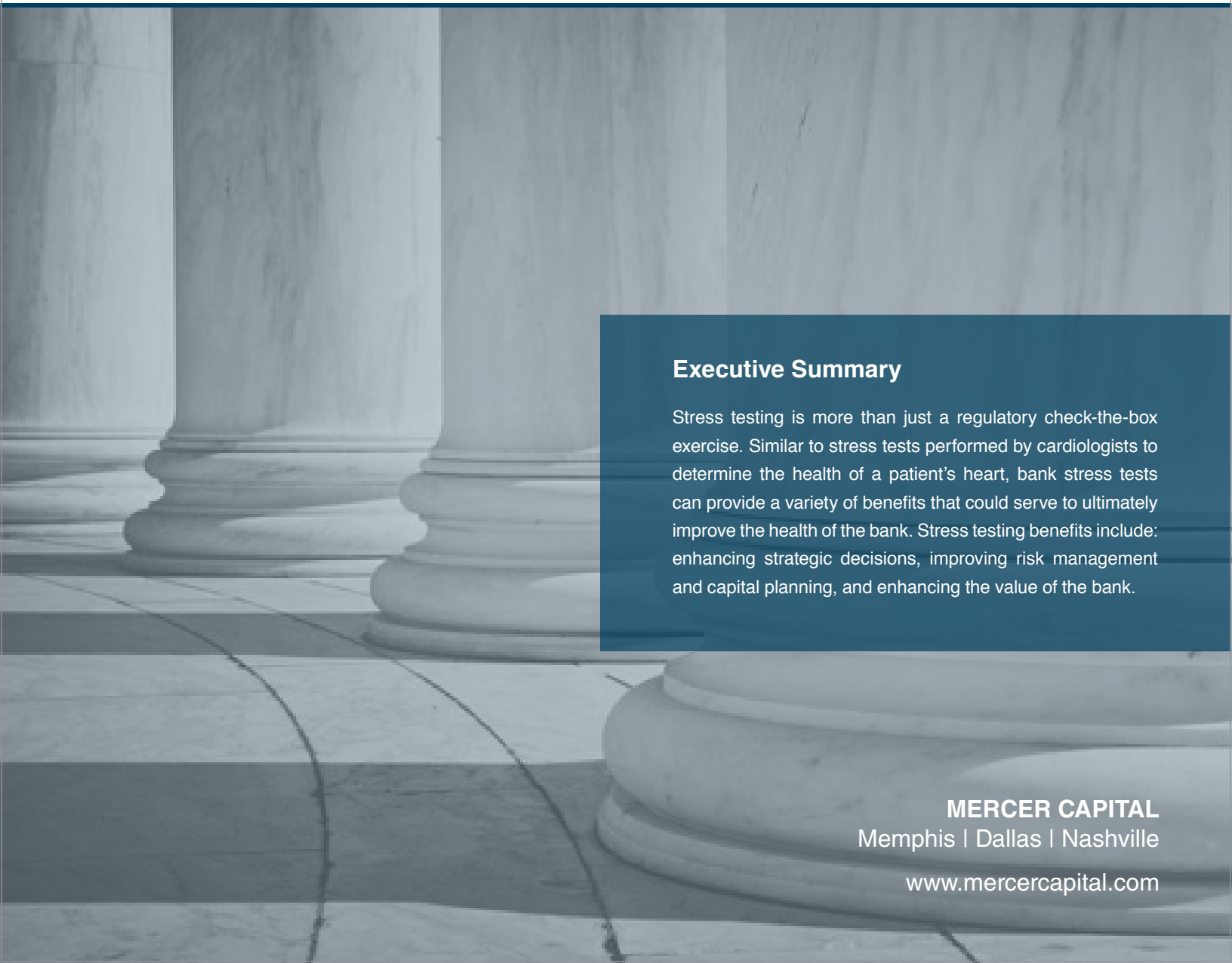
VALUATION EXPERTISE

# Community Bank Stress Testing

by Jay D. Wilson, Jr., CFA, ASA, CBA




## Executive Summary

Stress testing is more than just a regulatory check-the-box exercise. Similar to stress tests performed by cardiologists to determine the health of a patient's heart, bank stress tests can provide a variety of benefits that could serve to ultimately improve the health of the bank. Stress testing benefits include: enhancing strategic decisions, improving risk management and capital planning, and enhancing the value of the bank.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While community banks may be insulated from certain more onerous stress testing and capital expectations placed upon larger financial institutions, recent regulatory guidance suggests that community banks should be developing and implementing some form of stress testing and/or scenario analyses. For perspective consider the following excerpts from different regulatory pieces:

- The OCC's supervisory guidance in October 2012 stated, "Community banks, regardless of size, should have the capacity to analyze the potential impact of adverse outcomes on their financial conditions."[1] Further, the OCC's guidance considers, "Some form of stress testing or sensitivity analysis of loan portfolios on at least an annual basis to be a key part of sound risk management for community banks."[2] A stress test can be defined as "the evaluation of a bank's financial position under a severe but plausible scenario to assist in decision making with the bank."[3]

- "Supervisory stress testing has fundamentally changed the way we think about capital adequacy. The need to specify scenarios, loss estimates, and revenue assumptions — and to apply these specifications on a dynamic basis — has immeasurably advanced the regulation of capital adequacy and, thus, the safety and soundness of our financial system. **The opportunities it provides to incorporate macroprudential elements make it, in my judgment, the single most important advance in prudential regulation since the crisis**." (emphasis added)[4]

The hallmark of community banking has historically been the diversity across institutions. Guidance from the OCC suggests that community banks should keep this in mind when adopting appropriate stress testing methods by taking into account each bank's attributes, including the unique business

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1 OCC 2012-33 "Supervisory Guidance" on Community Bank Stress Testing dated October 18, 2012 and accessed at www.occ.gov/news-issuances/bulletins/2012/bulletin-2012-33.html.

2 Ibid.

3 "Stress Testing for Community Banks" presentation by Robert C. Aaron, Arnold & Porter LLP, November 11, 2011.

4 Federal Reserve Governor Daniel K. Tarullo speaking at the Federal Reserve Third Annual Stress Test Modeling Symposium, Boston, Massachusetts Jun 25, 2014: Speech accessed here: http://www.federalreserve.gov/newsevents/speech/tarullo20140625a.html.

strategy, size, products, sophistication, and overall risk profile. While not prescriptive in regards to the particular stress testing methods, the guidance suggests a wide range of effective methods depending on the bank's complexity and portfolio risk. However, the guidance does note that stress testing can be applied at various levels of the organization including:

- **Transaction Level Stress Testing**. This method is a "bottom up" analysis that looks at key loan relationships individually, assesses the potential impact of adverse economic conditions on those borrowers, and estimates loan losses for each loan.

- **Portfolio Level Stress Testing**. This method involves the determination of the potential financial impact on earnings and capital following the identification of key portfolio concentration issues and assessment of the impact of adverse events or economic conditions on credit quality. This method can be applied either "bottom up," by assessing the results of individual transaction level stress tests and then aggregating the results, or "top down," by estimating stress loss rates under different adverse scenarios on pools of loans with common characteristics.

- **Enterprise-Wide Level Stress Testing**. This method attempts to take risk management out of the silo and consider the enterprise-wide impact of a stress scenario by analyzing "multiple types of risk and their interrelated effects on the overall financial impact."[5] The risks might include credit risk, counter-party credit risk, interest rate risk, and liquidity risk. In its simplest form, enterprise-wide stress testing can entail aggregating the transaction and/or portfolio level stress testing results to consider related impacts across the firm from the stressed scenario previously considered.

- **Reverse Stress Testing**. This method assumes a specific adverse outcome that is sufficient to breach the bank's capital ratios (often referred to as a "break the bank" scenario). Management then considers what types of events could lead to such outcomes. Once identified, management can then consider how likely those conditions are and what contingency plans or additional steps should be made to mitigate this risk.

Regardless of the stress testing method, determining the appropriate stress event to consider is an important element of the process. Little guidance was provided to this end although the OCC's guidance did note that the scenarios should include a base case and a more adverse scenario based on macro and local economic data. Examples of adverse economic scenarios that might be considered include a severe recession, downturn in the local economy, loss of a major client, or economic weakness across a particular industry for which the bank has a concentration issue.

The simplest method described in the OCC guidance as a starting point for stress testing was the "top-down" portfolio level stress test. OCC Supervisory Guidance noted, "For most community banks, a simple, stressed loss-rate analysis based on call report categories may provide an acceptable foundation to determine if additional analysis is necessary."[6]

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[5] OCC 2012-33 "Supervisory Guidance" on Community Bank Stress Testing dated October 18, 2012 and accessed at www.occ.gov/news-issuances/bulletins/2012/bulletin-2012-33.html.

[6] OCC 2012-33 "Supervisory Guidance" on Community Bank Stress Testing dated October 18, 2012 and accessed at www.occ.gov/news-issuances/bulletins/2012/bulletin-2012-33.html.

# What Should We Do with the Stress Test Results?

The answer to this question will likely depend on the bank's specific situation. For example, let's assume that your bank is relatively strong in terms of capital, asset quality, and recent earnings performance, you approach stress testing proactively. A well-reasoned and documented stress test could serve to provide regulators, directors, and management with the knowledge to consider the bank's capital levels more than adequate and develop and approve the deployment of that excess capital through a shareholder buyback plan, elevated dividend, capital raise, merger, or strategic acquisition. Alternatively, let's consider the situation of a distressed bank, which is in a relatively weaker position and facing heightened regulatory scrutiny in the form of elevated capital requirements. In this case, the stress test may be more reactive as regulators and directors are requesting a more robust stress test be performed. In this case, the results may provide key insight that leads to developing an action plan around filling the capital shortfall (if one is determined) or demonstrating to regulators and directors that the distressed bank's existing capital is adequate. The results of the stress test should enhance the bank's decision-making process and be incorporated into other areas of the bank's management of risk, asset/liability strategies, capital and strategic planning.

# Top-Down Hypothetical Situation

In order to have a better understanding of this process, consider the following illustrative example of the primary steps to construct a "top-down" portfolio-level stress test.

## Step 1. Determine the Economic Scenarios to Consider

While this step will vary depending upon a variety of factors, one way to determine your bank's economic scenario could be to consider the supervisory scenarios recently announced by the Federal Reserve in January 2016. While the more global economic conditions detailed in the supervisory scenarios may not be applicable to community banks, certain detail related to domestic variables within the scenarios could be useful when determining the economic scenarios to model at your bank. The domestic variables include six measures of real economic activity and inflation, six measures of interest rates, and four measures of asset prices. Consider the following U.S. economic conditions included in the scenarios presented by the Federal Reserve:

- **Baseline Scenario**. The baseline scenario is consistent with projections from *Blue Chip Economic Indicators*. The baseline scenario includes a moderate economic expansion over the projection period (2016 through first quarter of 2019). Real GDP was forecast to grow at an average rate of 2.5% per year while the unemployment rate was to decline to 4.5% in mid-2017 and remain at that level thereafter. Accompanying the moderate expansion, Treasury yields were forecast to increase steadily across the maturity spectrum. Equity prices were forecast to increase about 4.75% per year while house and commercial real estate (CRE) prices were forecast to rise 2.75% and 4.50% per year, respectively.

- **Supervisory Adverse Scenario**. The adverse scenario includes weakening economic activity with a moderate recession starting in the first quarter of 2016 accompanied by a period of defla-

tion in the US. The recession is forecast to end in mid-2017 and real GDP growth was forecast to return to a 3% rate by mid-2018. Short-term interest rates were forecast to remain near zero over the projection period while the 10-year yield was forecast to decline in early 2016 before rising to approximately 3% in the first quarter of 2019. Equity prices were forecast to decline sharply (drop approximately 25% through the end of 2016) while house price and commercial real estate prices were forecast to decline approximately 12% (housing and CRE).

- **Supervisory Severely Adverse Scenario**. The severely adverse scenario includes a severe global recession, accompanied by heightened corporate financial stress and negative U.S. short-term Treasury yields. Real GDP was forecast to contract from the first quarter of 2016 through the first quarter of 2017 before returning to 3.0% growth in the fourth quarter of 2017. The unemployment rate was to decline to 10.0% in mid-2017 and decline further to around 9.0% by year-end 2018. Accompanying the recession, short-term Treasury yields were forecast to decline with the 3 month Treasury yield being negative over the forecast while the 10-year was forecast to be below 1% until mid-2017 and end 1.7% at the end of the forecast period (Q1 2019). Equity prices were forecast to decline sharply (drop approximately 50% through the end of 2016) while house price and commercial real estate prices were forecast to decline 25-30% (housing and CRE), respectively.

Based upon these scenarios, one might then consider the characteristics of the Bank's local market, specific niches, as well as the recent historical performance of the market, and decide how those variables might interact with the Federal Reserve's scenarios and ultimately impact the Bank. For example, the Bank might consider applying the following scenarios within your community bank's stress test:

- The **Community Bank Baseline Scenario** could include moderate economic expansion in the local communities served by the Bank with home and CRE prices expected to growth 3-5% annually, unemployment rates to remain relatively stable, and interest rates to rise gradually.

- The **Community Bank Adverse Scenario** could include a moderate recession in the U.S. and moderately weak economic conditions within the local communities served by the bank, which will include a decline in collateral values (notably housing and CRE of roughly 12%), a rise in the unemployment rate to about 7%, and short-term interest rates to remain near zero near term; and,

- The **Community Bank Severely Adverse Scenario** could include a strong recession for both the U.S. and very weak economic conditions within the local communities served by the bank and margin pressure from negative interest rates, which will include a decline in collateral values (notably housing and CRE of 25-30%) and the unemployment rate reaching 10%.

## Step 2. Segment the Loan Portfolio & Estimate Loan Portfolio Stress Losses

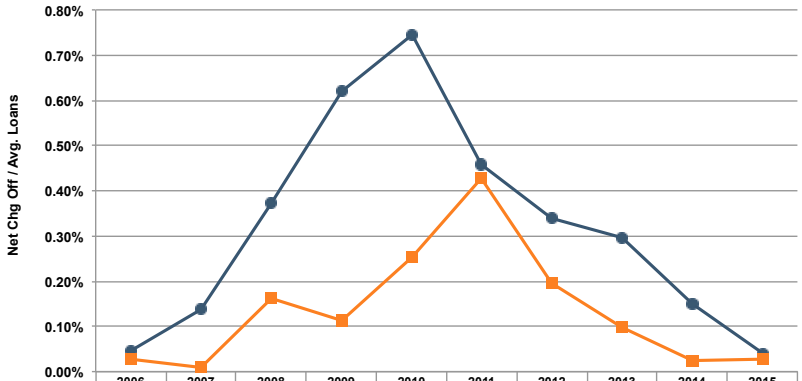
This step entails segmenting the loan portfolio into smaller groups of loans with similar loss characteristics. One way cited in the OCC guidance is to segment the loans through Call Report categories in Schedule RC-C (such as construction and development, agricultural, commercial real estate, etc.). Additional segmentation may be needed beyond Call Report categories to address other key elements such as risk grade, collateral type, lien position, loan subtype, concentration risk and/or the vintage of

the loan portfolio (i.e., loans primarily originated pre- or post-financial crisis). Other assets that could decline significantly in value, such as the investment portfolio and/or other real estate owned, may also need to be considered. Further, certain loans (or segments of loans) such as larger, higher risk grade loans may need to be segregated as they lend themselves to a more "bottom up" type of analysis (i.e., evaluated individually to determine their likely loss rate in a stress environment).

Once the assets have been segmented appropriately, the next step involves estimating the potential loan losses over a two-year stress test horizon (or potentially longer) for the entire loan portfolio. In order to estimate the losses, the OCC guidance suggests using the bank's historical default and loss experience during prior recessions or financial stress periods as a starting point. Beyond that, the bank may also look to outside references for ranges of loss rates for community banks during stress periods and/or certain other peer average loss rates during financial stress periods.

Let's assume that the subject bank is headquartered in Texas, has $500 million in loans, and has experienced historical loss rates moderately in line with its peers (one comprised of banks located in the same geographic area (Texas) and the other consisting of banks located throughout the U.S.).

**Loan Loss Overview: Commercial Real Estate**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| U.S. Banks, Assets from $100M to $5BN at 12/15 (Wtd. Avg.) | 0.05% | 0.14% | 0.37% | 0.62% | 0.74% | 0.46% | 0.34% | 0.30% | 0.15% | 0.04% |
| Texas Banks, Assets from $100M to $5BN at 12/15 (Wtd. Avg.) | 0.03% | 0.01% | 0.16% | 0.11% | 0.25% | 0.43% | 0.19% | 0.10% | 0.03% | 0.03% |

To estimate the appropriate loss rates during the stress periods, one might then consider annual charge-off rates as a percentage of average loans of the two peer groups for each loan portfolio segment (as outlined below).

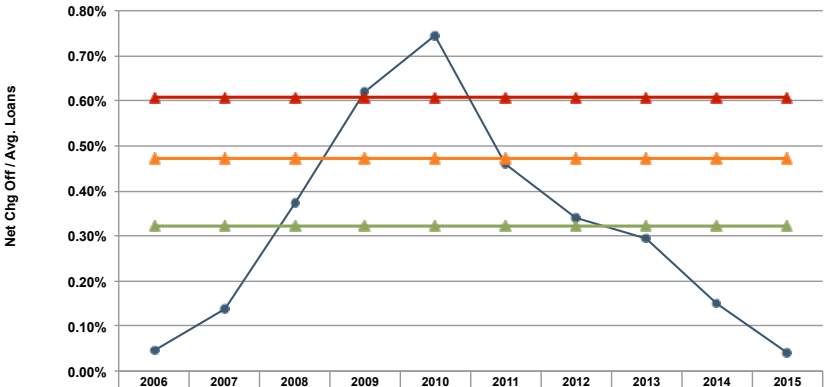
- **Baseline Scenario**. To estimate stress period losses under the baseline scenario, one might rely primarily on the peer group loss rates observed over the entire 10-year period. This would encompass a full credit cycle with periods of both economic expansion and contraction (both locally and nationally).

- **Severely Adverse Scenario**. To estimate stress period losses under the severely adverse scenarios, one might rely primarily on the peer group loss rates observed during the Great Recession when CRE losses were elevated (for example, from 2009 through 2011).

- **Adverse Scenario**. To estimate losses under the adverse scenario, one could focus on periods when economic conditions were still relatively weak but includes some additional periods where credit had improved from the depth of the financial crisis and consider the charge-off levels observed from 2008 through 2013. A similar process could then be repeated for other loan portfolio segments to derive the appropriate two-year stressed loss rates.

Repeating a similar process can help to estimate estimated annual loss rates for other portfolio segments and then one can utilize those loss rates to estimate the potential losses in each scenario (baseline, adverse, and severely adverse).

**Loan Loss Overview: Commercial Real Estate with Scenarios**




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| Peer - Weighted Average | 0.05% | 0.14% | 0.37% | 0.62% | 0.74% | 0.46% | 0.34% | 0.30% | 0.15% | 0.04% |
| Baseline (Annual Est.) | 0.32% | 0.32% | 0.32% | 0.32% | 0.32% | 0.32% | 0.32% | 0.32% | 0.32% | 0.32% |
| Adverse (Annual Est.) | 0.47% | 0.47% | 0.47% | 0.47% | 0.47% | 0.47% | 0.47% | 0.47% | 0.47% | 0.47% |
| Severely Adverse (Annual Est.) | 0.61% | 0.61% | 0.61% | 0.61% | 0.61% | 0.61% | 0.61% | 0.61% | 0.61% | 0.61% |

## Step 3. Estimate the Impact of Stress on Earnings

Now that the loan portfolio losses have been determined, the next step entails estimating the potential impact on net income from the scenario(s) analyzed previously. Estimating pre-provision, pre-tax income in the different scenarios can be tricky as the impact of higher non-performing assets on revenue (i.e., nonaccrual loans) and expenses (i.e., collection costs) should be considered. Further, the impact on liquidity (i.e., funding costs) and interest rate risk (i.e., net interest margin) should also be considered.

Once pre-provision, pre-tax income has been determined the next step entails estimating the appropriate provision over the stressed period. The provision can be broken into two components: the provision necessary to cover losses estimated and the portion of provision necessary to maintain an adequate allowance for loan losses (ALLL) at the end of the two-year period. When determining the portion of provision necessary to maintain an adequate ALLL at the end of the stress period, management should consider that stressed environments may increase the need for a higher ALLL. Finally, the income tax expense/benefit arising from the estimate of pre-tax income should be applied.

The table on page 8 details an example of this step.

**Impact of Losses on Pro Forma Earnings**

| | Previous Two Years Actual ($M) | Pro Forma Baseline ($M) | Pro Forma Adverse ($M) | Pro Forma Severely Adverse ($M) |
|---|---|---|---|---|
| PPOI (Pre-Provision, Pre-Tax Income) | 4,750 | 5,000 | 5,282 | 4,000 |
| Less: Provision to Cover Two Year Losses | (250) | (5,050) | (10,100) | (20,200) |
| Less: Provision to Maintain Adequate ALLL | (250) | (500) | (750) | (1,000) |
| *Pre-Tax Income* | *4,250* | *(550)* | *(5,568)* | *(17,200)* |
| Income Tax (Expense) / Benefit | (1,488) | 193 | 1,949 | 6,020 |
| **Net Income** | **2,763** | **(358)** | **(3,619)** | **(11,180)** |

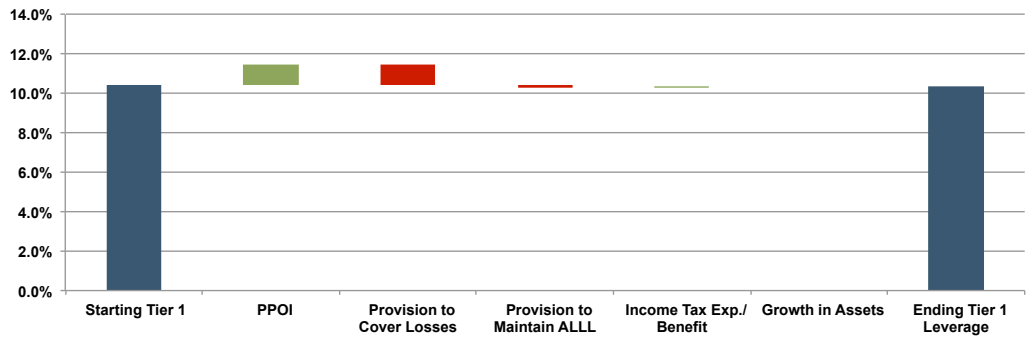
Other key considerations here might include: How will loan migrations in the different scenarios impact pre-provision net income? How might the economic scenarios forecast impact pre-provision net income? How will the elevated level of losses over the stress periods impact the provision necessary to maintain an adequate ALLL? How will the losses impact the bank's tax expense/benefit? Should capital uses such as shareholder dividends, share repurchases, or acquisitions be modeled into the stress test as well? Should additional stress testing methods be performed (bottom-up, enterprise, and/or reverse stress testing methods)?

## Step 4. Estimate the Impact of Stress on Capital

This step entails estimating the bank's capital ratios at the end of the stressed period. To accomplish this, the estimated changes in equity, Tier 1 capital, average assets, and risk-weighted assets during the stressed period should be considered.

The following chart illustrates a summary of the results of the Stress Test under the Severely Adverse scenario.

**Baseline Tier 1 Waterfall**



Other key considerations here might include: What are the potential impacts on capital and risk-weighted assets from Basel III? What is the projected balance sheet growth/contraction over the stressed period? What other items might impact capital such as share repurchases, dividends, acquisitions?

## How Mercer Capital Can Help

Having successfully completed thousands of community bank engagements over the last 30 years, Mercer Capital has the experience to solve complex financial issues impacting community banks. Mercer Capital can help scale and improve your bank's stress testing by assisting your bank in a variety of ways, ranging from providing advice and support for assumptions within your Bank's pre-existing stress test to developing a unique, custom stress test that incorporates your bank's desired level of complexity and adequately captures the unique risks facing your bank. Regardless of the approach, the desired outcome is a stress test that can be utilized by managers, directors, and regulators to monitor capital adequacy, manage risk, enhance the bank's performance, and improve strategic decisions.

Mercer Capital has developed a Stress Testing & Capital Planning Toolkit that allows banks to perform their own stress test using our excel model as well as a wealth of qualitative data to assist your bank with the preparation of its Stress Test and Capital Plan. It was created specifically for community banks and intended to provide all the tools needed to perform a sound Stress Test.

Mercer Capital's Toolkit contains the following analyses specifically tailored to your institution:

- Local Economic and Market Demographics Snapshot
- Overview of Key National Economic Conditions
- Overview of Potential Stressed Scenarios to Consider (including key variables as outlined in the most recent Federal Reserve's Stressed Scenarios)
- An Overview of Historical Loss Rates for Different Loan Categories for Your Institution vs. Peer Group(s)
- A Projection Model Designed to Assist with Estimating the Impact of the Baseline and Stressed Scenarios on Your Bank's Earnings and Capital

For more information on Mercer Capital's Stress Testing and Capital Planning Toolkit, contact Jay Wilson at wilsonj@mercercapital.com and 901.322.9725.

MERCER CAPITAL
BUSINESS VALUATION & FINANCIAL ADVISORY SERVICES

# Mercer Capital

## Stress Testing Services

Mercer Capital has the experience and expertise to understand your bank's unique strengths and weaknesses and help to solve your complex stress testing issues.

We acknowledge that community bank stress testing can be a complex exercise as it requires the bank to essentially perform the role of both doctor and patient. For example, the bank must administer the test, determine and analyze the outputs of its performance, and provide support for key assumptions/results. There are also a variety of potential stress testing methods and economic scenarios for the bank to consider when setting up their test. In addition, the qualitative, written support for the test and its results is often as important as the results themselves. For all of these reasons, it is important that banks begin building their stress testing expertise sooner rather than later.

In order to assist community bankers with this complex and often time-consuming exercise, we offer three potential solutions to make the process as efficient and valuable as possible.

### Services Provided

- **Stress Testing & Capital Planning Toolkit**
  You do it yourself using our model – with a twist
- **Custom Stress Testing & Capital Planning**
  Outsource the entire process to Mercer Capital
- **Model Confirmation & Validation Services**
  Our experts will review and validate your existing stress test model

Contact a Mercer Capital professional to discuss your needs in confidence.

To subscribe to our complimentary, monthly newsletter, *Bank Watch* visit **www.mercercapital.com**.

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